REPORT

Fall 2013 Semi-Annual Monitoring Report

Waste Management of Canada
Richmond Landfill
Town of Greater Napanee, Ontario

Submitted to:

WASTE MANAGEMENT OF CANADA
1271 Beechwood Road
Napanee, ON K7R 3L1

Submitted by:

WESA, a division of BluMetric Environmental Inc.
The Tower, The Woolen Mill
4 Cataraqui Street
Kingston, ON K7K 1Z7

January 2014
WESA Project No.: K-B11166-00-03

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1. INTRODUCTION

The purpose of this document is to present results and to provide an interpretation of the data that were collected during the fall 2013 semi-annual monitoring event at the Waste Management of Canada Corporation (WM) Richmond Landfill. This document also includes results of additional sampling activities conducted during summer and fall 2013 as per Further Interim Minutes of Settlement, arising from the Environmental Review Tribunal (ERT) proceedings associated with the closure of the WM Richmond Landfill.

The WM Richmond Landfill is approved as a 16.2 hectare waste disposal (landfilling) facility within a total site area of 138 hectares, located on parts of Lots 1, 2 and 3, Concession IV of the former Township of Richmond, now in the Town of Greater Napanee, Ontario.

2. MONITORING PROGRAM

2.1 PROGRAM METHODOLOGY

The fall 2013 semi-annual monitoring event was conducted in accordance with Environmental Compliance Approval (ECA) number A371203, issued by MOE January 9, 2012 and amended May 3, 2013. The site layout and monitoring locations are shown on Figure 1. The monitoring programs for groundwater, surface water, leachate, and landfill gas are summarized in Table 1. Leachate samples are collected once annually in the spring, so there are no leachate quality results reported in this semi-annual monitoring report. An estimation of leachate generation, based on the 2013 haulage records from the landfill, is provided in Section 4.

The fall monitoring event was conducted between October 16 and 24, 2013. The activities completed included:

- Water levels were recorded at groundwater monitoring wells on October 16, 2013, except from groundwater monitors M15, M18, M29 and M39 because they were dry, and groundwater monitors M19 and OW57 because they were damaged;
- Pond water levels were measured on October 16, 2013 at the three ponds on the south side of the landfill;
- Seven off-site domestic water supply wells were sampled on October 23, 2013. Water samples from private supply wells were analyzed for groundwater inorganic and general parameters, and VOCs;
- A total of 43 groundwater monitors were sampled between October 21 and 24, 2013. Four groundwater monitoring wells could not be sampled because they (a) had insufficient recovery for sampling after purging (M29, M39, and M53-4), or (b) were

damaged (the standpipe in M58-4 was broken below the ground surface and contained bentonite). Samples were analyzed for the suite of groundwater inorganic and general parameters;

- Surface water sampling was conducted on October 22, 2013 from locations S2, S3, S6 and S7; the samples were analyzed for surface water inorganic and general parameters. Sampling locations S4, S5 and S8R along Beechwood Ditch were all dry;
- Landfill gas monitoring was conducted on October 24, 2013. Field measurements were made with an Eagle II probe calibrated to methane gas response at seven gas monitors (GM1, GM2, GM3, GM4-1, GM4-2, GM5 and GM6); and,
- Additionally, five field duplicate samples were collected during the fall sampling event.

As per Further Interim Minutes of Settlement, arising from the Environmental Review Tribunal (ERT) proceedings associated with the closure of the WM Richmond Landfill, the following activities were also completed:

- Selected groundwater monitoring wells were also analyzed for 1,4-dioxane and tritium. This additional sampling took place between October 21 and 24, 2013;
- Groundwater and pond water levels were measured August 13, 2013;
- Liquid levels in the newly-installed leachate wells were measured September 5, 2013, along with selected groundwater monitoring wells south of the landfill;
- Surface water sampling was conducted on September 23, 2013 (following a rainfall event of 25 mm) from locations S2, S3, S5, S6, S7 and S8R (including one duplicate sample), sample location S4R was dry; the samples were analyzed for surface water inorganic and general parameters, and PAHs; and,
- Liquid levels were measured on October 16, 2013 in the two leachate wells installed in the landfill.

2.2 Water Sample Collection and Laboratory Analysis

Groundwater and surface water samples were collected in accordance with accepted industry protocols. Groundwater samples were collected using dedicated Waterra inertial lift pumps connected to dedicated polyethylene tubing. Three casing volumes of water were purged from each monitoring well prior to the collection of groundwater samples. During purging, readings for pH, conductivity and temperature were recorded on a regular basis. The stabilization of the parameters was used to assess when well purging was complete. Low producing wells were purged dry and allowed to recover prior to sampling. If the monitoring well had not recovered sufficiently for sampling within 24 hours, the monitor was considered dry and a sample was not collected.

Domestic supply wells were sampled at an access point before any treatment system. A typical sampling location was a tap or access located near the pressure tank or when access to the treatment system was not available, the sample was collected from the kitchen tap (with the aerator screen removed). Prior to collecting the water sample, the water was allowed to run for a minimum of five but more typically closer to 10 minutes to ensure the volume of the pressure tank and supply line was purged and that the sample would be representative of well water conditions.

Surface water samples were collected using a clean bottle where water depth was sufficient; at sampling locations where water depth was an issue, a 50 cc syringe was used to carefully collect the surface water as not to disturb the bottom sediments. Surface water sampling locations were sampled from downstream to upstream to prevent any re-suspension of sediment impacting the downstream sampling locations. The pH, temperature, and conductivity of the surface water were obtained in the field at all surface water sampling points while minimizing disturbance of the bottom sediment.

All water samples were placed in bottles supplied and prepared by the laboratory. The samples were packed in coolers with ice and shipped by courier to the laboratory. All samples were analysed by Maxxam Analytics Inc. of Mississauga, ON, which is accredited by the *Canadian Association for Laboratory Accreditation Inc. (CALA).* Table 2 presents a summary of groundwater, surface water and leachate analytical parameters.

2.3 GROUNDWATER ELEVATIONS

Water levels were recorded to the nearest 0.01 m using an electronic water level meter. Table 3 presents groundwater elevation monitoring locations.

3. MONITORING RESULTS AND DISCUSSION

Background information concerning the site geology and hydrogeology was described in detail in the Site Conceptual Model (SCM) report[1], and is summarized here. The SCM report describes the groundwater flow conditions at the Richmond Landfill. Based on the results from extensive studies conducted previously at the site, the basic hydrogeological framework for the facility has been defined as follows:

- the active groundwater flow zone at the site extends to a depth of approximately 30 metres below the top of bedrock;

[1] *Site Conceptual Model Report, WM Richmond Landfill*, prepared by Dr. B.H. Kueper and WESA Inc., October 2009

- the shallow groundwater flow zone is conceptualized as the overburden, the overburden-bedrock contact and the upper one to two metres of bedrock;
- the direction of groundwater flow in the shallow flow zone is strongly influenced by topography;
- the intermediate bedrock flow zone extends from one to two metres below top of bedrock to a depth of approximately 30 metres below top of bedrock;
- groundwater flows through a well-connected network of fractures in the upper 30 metres of bedrock;
- the dominant fracture orientation is horizontal to sub-horizontal; however, vertical to subvertical fractures are present providing hydraulic connection between horizontal fractures;
- hydraulic connection of fractures exists in the intermediate bedrock flow zone to the west, south and east of the site (horizontal and vertical connections);
- intermediate bedrock flownets show that groundwater generally flows to the west from the western edge of the landfill, to the south-southeast from the southern edge of the landfill, to the southwest from the southwest corner of the landfill and north to northwest from the northwest portion of the landfill;
- the hydraulic conductivity of the intermediate bedrock is lower to the north and east of the landfill compared to other areas of the site, implying that the rate of groundwater flow is lower than in areas south, southeast and west of the landfill; and,
- flow directions in the intermediate bedrock zone are variable with season.

3.1 LIQUID LEVELS IN LEACHATE WELLS

Liquid levels were measured in the two landfill leachate wells on September 5 and October 16, 2013:

- On September 5, the liquid level at LW-P1 was 149.57 metres above sea level (masl) and the liquid level at LW-P2 was 156.46 masl.
- On October 16, the liquid level at LW-P1 was 149.05 masl and the liquid level at LW-P2 was 151.68 masl.

3.2 GROUNDWATER RESULTS

3.2.1 Groundwater Elevations

Groundwater elevations from EMP program monitoring wells were measured on August 13 and October 16, 2013; groundwater elevations of a subset of wells south of the landfill were measured on September 5, 2013 at the same time as liquid levels were measured in the leachate wells. Going forward, water levels for EMP program monitoring wells will continue to be

measured during the spring and fall monitoring events and a subset of water levels for wells south of the landfill will be measured in the summer. Liquid levels in the leachate wells will be measured during all three events.

Groundwater elevation results are presented in Tables 4a (August), 4b (September) and 4c (October). An inventory of monitoring well locations is provided in Appendix A. Groundwater elevation contours within the shallow and intermediate bedrock groundwater flow zones are shown on Figures 2 and 3, respectively. Groundwater flow directions were inferred by interpolating the hydraulically responsive wells screened within the corresponding groundwater flow zone, and are consistent with historical results.

The August, September and October 2013 shallow groundwater contours (Figures 2a, 2b and 2c, respectively) are consistent with historical results and show that the Empey Hill drumlin southwest from the landfill creates a flow divide with shallow groundwater being directed both to the north and the south. The northerly flowing groundwater is oriented toward Marysville Creek, while shallow groundwater to the south flows towards Beechwood Ditch. Shallow groundwater south of Beechwood Road flows locally to the southwest (see Figures 2a and 2b). Shallow groundwater east of the landfill is influenced by a local zone of higher water levels in the vicinity of monitoring well M96. Shallow groundwater north of M96 flows to the north while groundwater south of M96 flows to the south-southeast.

The liquid levels measured in the newly-installed leachate wells (LW-P1 and LW-P2) in September and October were between 23 and 30 metres higher than the shallow groundwater levels adjacent to the landfill footprint. This indicates that the liquid levels in the leachate wells are not in direct hydraulic connection with the shallow groundwater zone, since such high gradients could not be sustained in an unconfined, permeable fractured bedrock environment.

The August, September and October 2013 intermediate bedrock zone contours are presented on Figures 3a, 3b and 3c, respectively. Water levels from intermediate bedrock monitors identified as non-responsive, including M49-2, M52-1, M70-1, OW1 and OW4, were not used to prepare the groundwater contours. The wells were excluded from the interpolation on the basis that water levels were not static, believed to be recovering from past sampling events or seasonal variations. Groundwater in the intermediate bedrock flow zone generally flows to the north, west, and south relative to the landfill. Overall, the directions of groundwater flow within the intermediate flow zone are consistent with the regional directions of groundwater flow, towards the south.

3.2.2 Groundwater Analytical Results

Results from the groundwater monitoring wells sampled in fall 2013 are presented in Table 5a. Groundwater quality data for the fall 2013 monitoring event are similar to historical results, and discussed in this section.

Slightly elevated concentrations of a number of water quality parameters (e.g., alkalinity, chloride, conductivity, DOC, iron, manganese, sodium and/or TDS) were observed in some shallow groundwater zone monitoring wells located in close proximity to the landfill footprint (M41 to the south; M101 and M103 to the northwest).

In other areas of the site, there is no evidence of groundwater impacts away from the landfill footprint in the shallow groundwater flow zone. Isolated occurrences of elevated concentrations of water quality parameters (i.e., one or two parameters per sample) are seen elsewhere on the Site. No indications of elevated concentrations related to impacts are identified at the property boundary in the shallow flow zone.

Analytical results from intermediate bedrock groundwater monitors sampled in fall 2013 are generally consistent with historical results. North of the landfill, elevated concentrations of water quality parameters are noted at M6-3 and OW4, which are in close proximity to the footprint. These results indicate the presence of leachate impacts at these locations. However, further north of the footprint and along Marysville Creek (e.g., at M5-3, M75, M82-1, M82-2 and OW1), as well as north of the creek at M59-2, M59-3 and M59-4, the concentrations are lower and impacts from the landfill are not evident.

South of the landfill, slightly elevated concentrations of alkalinity, DOC, chloride and TDS at M71, M10-1 and M105 indicate potential impacts from the landfill. Other locations south and southeast of the landfill with elevated concentrations (e.g., M49-1, M49-2 and M70-1) represent areas where the deeper saline groundwater is affecting the water quality. These pockets of more saline groundwater are isolated and do not reflect any widespread or significant upwelling of saline groundwater.

Elsewhere to the west (M58-3, M72, M74, M91-1 and M95-1), southwest (M56-2 and M80-1) and east (M52-1) of the landfill, the concentrations of water quality parameters are relatively low and continue to reflect background conditions.

Alkalinity and ammonia results for the EMP wells, as well as 1,4-dioxane and tritium results for EMP monitoring wells that were included in those agreed to be sampled as part of the ERT

mediation process, are shown for the shallow and intermediate bedrock flow zones on Figures 4 (shallow zone) and 5 (intermediate bedrock zone), respectively.

Monitoring wells M41, M54-4, M101, M102 and M103 in the shallow groundwater flow zone were analyzed for 1,4-dioxane and tritium. Detectable concentrations of 1,4-dioxane were reported for monitors M41, M101 and M103 (0.00161, 0.00537 and 0.03 mg/L, respectively). Tritium concentrations ranged from 10.9 Tritium Units (TU) at M102 to 30.4 TU at M103. The background concentration of tritium in the groundwater is approximately 25 TU.

Monitoring wells M6-3, M9-3, M10-1, M49-2, M52-1, M59-2, M71, M75, M105, M107, OW1 and OW4 in the intermediate groundwater flow zone were analyzed for 1,4-dioxane and tritium in accordance with the ERT Minutes of Settlement. Detectable concentrations of 1,4-dioxane were reported for monitors M10-1, M71, M105 and M107 south of the landfill (0.014 to 0.0326 mg/L), and M6-3 and OW4 north of the landfill (0.123 to 0.348 mg/L). Tritium concentrations were within the background concentration at monitors M49-2, M52-1, M75, OW1, M9-3 and M59-2. Tritium concentrations ranged from 26.8 to 40.1 TU at monitors M10-1, M105, M107 and M71. Concentrations of tritium were highest at monitors OW4 (186.7 TU) and M6-3 (625.6 TU) located north of the landfill.

3.2.3 Guideline B-7 Reasonable Use Limits (RULs)

Selected monitoring wells within the low-head areas (downgradient flow locations) of the WM Richmond Landfill in both the Shallow and Intermediate Bedrock Flow Zones are compared to the RULs derived from laboratory analytical results (Table 5b). Proposed RULs for leachate indicator parameters and trigger monitors were presented in the EMP dated June 29, 2010. These will be re-examined as part of ongoing investigations, but are used here on an interim basis.

Slightly elevated concentrations of a number of inorganic or general water quality parameters (e.g., alkalinity, chloride, chromium, DOC, iron, manganese, sodium and/or TDS) were observed in shallow groundwater zone monitoring wells (M41, M54-4, M66-2, M67-2, M68-4, M70-3, M80-2, M81, M87-2, M99-2, M101, M102, M103 and OW37-s). In the low head areas at the property boundary along Marysville Creek north of the landfill (M67-2 and OW37-s), the only exceedances of the RULs were for iron and manganese. In the low-head areas south of the landfill (M54-4, M80-2 and M81), the only RUL exceedances were for manganese and TDS. Based on these results, it is interpreted that there are no landfill-related impacts at the property boundaries in the shallow groundwater zone.

Slightly elevated concentrations of a number of water quality parameters (e.g alkalinity, boron, chloride, DOC, iron, manganese, sodium, TDS and/or benzene) were observed in some

intermediate groundwater zone monitoring wells (M5-3, M6-3, M10-1, M49-1, M49-2, M52-1, M56-2, M59-2, M59-3, M70-1, M71, M75, M80-1, M82-1, M82-2, M95-1, M105, M107, OW1 and OW4). Along the western boundary of the landfill property, RUL exceedances are noted for alkalinity, DOC, iron, manganese and TDS. However, in all samples collected to date from the intermediate bedrock zone along the western boundary of the site, 1,4 dioxane has not been detected and the tritium concentrations are within background levels (<25 TU). Therefore, it is concluded that there are no landfill impacts to groundwater at the western boundary of the landfill site.

Along the southern boundary of the landfill property (Beechwood Road), RUL exceedances are noted east of the landfill access road for alkalinity, DOC, iron, manganese, chloride and TDS. These exceedances have been reported in previous semi-annual monitoring reports. In these areas, 1,4 dioxane and tritium have also been detected historically at concentrations above background levels. Further investigation work is ongoing south of Beechwood Road to delineate the extent of groundwater impacts, and to establish the boundaries for a Contaminant Attenuation Zone (CAZ).

The Reasonable Use assessment demonstrates the limited value that Figures 4, 5 and 6 provide in terms of interpreting groundwater conditions at the site. These figures show the concentrations of alkalinity, ammonia, tritium and 1,4 dioxane, and are included in the semi-annual reports at the request of CCCTE as part of the ERT mediation process. At some monitoring locations in the shallow and intermediate bedrock zones, the alkalinity concentrations exceed the Reasonable Use Limit; however, there are no leachate impacts at these monitoring wells since there is no detectable 1,4 dioxane, and tritium is within background levels (e.g., M49-2, M59-2, M75, M102 and OW1). Similarly, there is no correlation between ammonia concentrations and whether leachate is present at the monitoring locations.

3.2.4 Status of Monitoring Wells and Compliance with Ontario Regulation 903

During the fall 2013 monitoring event, the conditions of monitoring wells were inspected. Any repairs, such as new locks, labels or well caps, etc. were made as necessary. Watertight casings and seals remain in place at all monitors to ensure that surface water or foreign materials do not infiltrate the wells. The monitoring wells comply with the applicable sections of Ontario Regulation 903 relevant to "test holes" as defined in the regulation, as well as the overall intent of the regulation to protect groundwater supplies. With the exception of monitors M19, M58-4 and OW57 (damaged), all of the monitoring wells included in the EMP are currently active. It is recommended that these wells are decommissioned as they cannot be repaired.

3.2.5 Off-Site Domestic Water Supply Well Results

Results from off-site private water supply wells sampled in fall 2013 are presented in Table 6. The results from the Spring 2013 sampling program conducted in accordance with Item 2(d) of the Further Interim Minutes of Settlement were provided to the Parties on June 27, 2013, and as required by Item 5(k)(ii) of the Further Interim Minutes of Settlement, are also included in this report in Appendix B.

Comparison with Ontario Drinking Water Quality Objectives and Guidelines (ODWSOG, 2006) revealed all parameters were below their respective maximum acceptable concentrations (MAC) or interim maximum acceptable concentrations (IMAC) as specified in Table 2 of the ODWSOG. Some inorganic parameters (alkalinity, chloride, DOC, hardness, iron, manganese, sodium and TDS) were measured at concentrations exceeding their respective aesthetic objective (AO) or operational guideline (OG) from Table 4 of the ODWSOG.

As was the case in previous sampling events, most volatile organic compounds (VOCs) in off-site supply wells were reported below the laboratory reporting limit (RL) at all locations, with the exception of some VOCs that were detected in measurable quantities above the RL at some locations. In all cases, VOC concentrations were below the MAC or AO. The following VOCs were detected at the domestic wells:

- 1,1,1-trichloroethane (1252 Beechwood Road)
- 1,1-dichloroethane (1206, 1250 and 1252 Beechwood Road)
- 1,1-dichloroethylene (1250, 1252 and 1264 Beechwood Road)
- 1,2-dichloropropane (1206 Beechwood Road)
- benzene (1144, 1181, 1206 and 1264 Beechwood Road)
- bromodichloromethane (1097 Beechwood Road)
- chloroethane (1206, 1250, 1252 and 1264 Beechwood Road)
- chloroform (1097 and 1144 Beechwood Road)
- cis-1,2-dichloroethylene (1206 Beechwood Road)
- dichloromethane (1206 Beechwood Road)
- tetrachloroethylene (1252 Beechwood Road)
- toluene (1144 and 1181 Beechwood Road)
- vinyl chloride (1206 Beechwood Road)

The detected concentrations of VOCs, as well as the general and inorganic parameters, indicate potential impacts from contaminant source(s) at the following locations: 1144, 1181, 1206, 1250, 1252 and 1264 Beechwood Road. The sources may include one or more of the following: the landfill, the former abattoir, surface water infiltration, sewage systems, livestock and agricultural activities and the deep saline groundwater.

3.2.6 Groundwater Chemistry Quality Assurance / Quality Control (QA/QC)

An evaluation of the QA/QC data (from duplicate samples) is included in Appendix C, where analytical results are compared between regular samples and their corresponding field duplicate samples, submitted to the laboratory without identifying the location they were collected from. A standard margin of error of 20% (relative percent difference (RPD) between regular sample and duplicate) was deemed acceptable for field duplicates. In general, the comparison between samples and duplicates shows very good correlation for the majority of analyzed constituents. All parameters for groundwater duplicate QA/QC sampling were well within the 20% margin of error with the exception of boron (which was measured at low concentrations (less than 5 times the RDL) and therefore within acceptable margin of error) and dissolved organic carbon.

3.3 SURFACE WATER RESULTS

3.3.1 Pond Elevations

Staff gauges were installed in the three ponds on the south side of the landfill labeled SG1, SG2 and SG3. Staff gauge locations and pond elevations measured on August 13, September 5 and October 16, 2013 are shown on Figures 2a, 2b and 2c, respectively.

3.3.2 Surface Water Monitoring Locations

The two water courses that may receive surface water/storm water runoff from the Richmond Landfill are Marysville Creek to the north of the waste mound and Beechwood Ditch to the south (Figure 1). The Beechwood Ditch is a man-made surface water course that flows from the east onto WM property. It then flows west across a portion of the site before again crossing Beechwood Road and travelling southwest to cross County Road 10, and joins Marysville Creek east of Highway 49 and north of Highway 401. Both the Beechwood Ditch and Marysville Creek flow intermittently in the vicinity of the landfill. Marysville Creek has some base flow locally, and flows on a continuous basis west of County Road 10 (Deseronto Road). Marysville Creek eventually discharges into the Bay of Quinte at Hungry Bay.

All surface water monitoring locations are shown on Figure 1.

3.3.3 Surface Water Flow Rates

Visual observations of surface water flow and general water characteristics for the storm sampling event and fall sampling program are summarized in Table 7. Samples could not be collected from sampling location S4S following the 25 mm precipitation event, or from sampling locations S4R,

S5 and S8R during the fall monitoring program because these locations were dry (or did not have enough water to sample). Surface water flow rates were generally low during both sampling events, often insuffient to register on the flow meter as indicated on Table 7.

3.3.4 Surface Water Analytical Results

The results from the surface water locations sampled in September and October 2013 are presented in Tables 8a and 8b, respectively, and are similar to historical results. Surface water quality was compared to the Provincial Water Quality Objectives (PWQO) (exceedances are indicated on Tables 8a and 8b).

Background surface water quality is monitored from upstream station S2 for Marysville Creek, while background surface water quality for Beechwood Ditch is monitored at station S5. Storm water runoff from the existing landfill area flows to one of three storm water sedimentation retention ponds, located to the northeast, northwest and south of the landfill footprint. The retention pond located south of the landfill was reconstructed in 2008 and now has an increased storage volume and, as a result, an increased retention time.

All constituents analysed in surface water samples were below their respective PWQO, with the following exceptions:

Marysville Creek:

(a) September
- copper was detected at a concentration equal to the PWQO of 0.005 mg/L at sampling location S6;
- iron was detected at concentrations exceeding the PWQO of 0.3 mg/L at all sampling locations S2, S3, S6 and S7, ranging from 0.47 to 1.6 mg/L;
- total phosphorus was detected at concentrations exceeding the PWQO of 0.03 mg/L at all sampling locations S2, S3, S6 and S7, ranging from 0.068 and 0.13 mg/L;

(b) October
- iron was detected at a concentration of 1.2 mg/L, exceeding the PWQO of 0.3 mg/L at sampling location S6;
- cobalt was detected at a concentration equal to the PWQO of 0.0009 mg/L at sampling location S6;
- phenols were detected at concentrations exceeding the PWQO of 0.001 mg/L in samples, ranging from 0.0014 to 0.0019 mg/L;
- total phosphorus was detected at concentrations exceeding the PWQO of 0.03 mg/L at all sampling locations S2, S3, S6 and S7, ranging from 0.037 and 0.14 mg/L.

Beechwood Ditch:

(a) September

- total phosphorus was detected at a concentration of 0.1 mg/L exceeding the PWQO of 0.03 mg/L at sampling location S5.

Results from September and October 2013 indicate that the landfill is not causing adverse impacts to surface water quality. In Marysville Creek, the water quality concentrations at the downstream location S3 are similar to, and often lower than, the concentrations at upstream location S2. At S6 and S7 (north of the landfill), they are also similar to upstream and downstream locations. Some parameter concentrations are slightly higher at S6 (e.g., iron, total phosphorus, copper, cobalt); however, these do not extend downstream to S7 or S3. No PAHs were detected in any surface water samples collected from Marysville Creek.

Significant differences in water quality were not seen between the fall sampling event (October) and the sampling event following a 25 mm rainfall in September.

In Beechwood Ditch, no exceedances of the PWQO were noted at the downstream location S8R. No PAHs were detected in the Beechwood Ditch samples.

3.3.5 Surface Water Quality Assurance / Quality Control (QA/QC)

An evaluation of the QA/QC data (from duplicate samples) is included in Appendix C, where analytical results are compared between regular samples and their corresponding field duplicate samples, submitted to the laboratory without identifying the location they were collected from. A standard margin of error of 20% was deemed acceptable for field duplicates. In general, the comparison between samples and duplicates shows very good correlation for the majority of analyzed constituents. All parameters for the surface water duplicate QA/QC sample (location S3) were well within the 20% margin of error, with the exception of copper and total suspended solids which were measured at low concentrations (less than 5 times the RDL) and are therefore within acceptable margin of error.

3.4 Subsurface Gas Sampling

On October 24, 2013, WESA inspected the subsurface gas monitoring probes and obtained measurements at all locations. Measurements were made using an Eagle II portable landfill gas monitor. The location and condition of the gas monitors and the measurement results are shown in Table 9. Readings at all monitors were reported as 0% of the lower explosive limit (LEL) for methane.

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The fall 2013 monitoring program included the collection of groundwater and surface water samples, as well as landfill gas monitoring, in accordance with the site groundwater monitoring requirements outlined in the revised EMP dated June 29, 2010, as specified in the Environmental Compliance Approval (ECA) issued on January 9, 2012 and amended May 3, 2013. In addition, several items are included in this semi-annual monitoring report as agreed to with the Parties to the ERT Appeal Process, such as the results of tritium and 1,4 dioxane sampling, summer water levels and surface water sampling, and liquid levels in the new leachate wells.

An annual summary of the activities conducted for the 2013 EMP at the Richmond Landfill is provided below.

The following were completed between April 19 and April 26, 2013:

- Water levels were measured from 69 groundwater monitoring wells: 39 in the shallow groundwater flow zone and 30 in the intermediate bedrock flow zone.
- Forty-four groundwater monitors (17 completed in the shallow zone and 27 in the intermediate bedrock) were sampled for analytical testing.
- Eight off-site domestic water supply wells located along Beechwood Road were sampled for analytical testing.
- Seven surface water locations were sampled for analytical testing.
- A total of nine Quality Assurance/Quality Control (QA/QC) samples were collected (six field duplicates, two field blanks and one trip blank).
- Subsurface gas concentrations were recorded from six on-site gas monitoring wells.

The following were completed between October 16 and October 24, 2013:

- Water levels were measured from 68 groundwater monitoring wells: 35 in the shallow groundwater flow zone and 33 in the intermediate bedrock flow zone.
- Forty-three groundwater monitors (16 completed in the shallow zone and 27 in the intermediate bedrock) were sampled for analytical testing.
- Seven off-site domestic water supply wells located along Beechwood Road were sampled for analytical testing.
- Six surface water locations were sampled for analytical testing.
- A total of six Quality Assurance/Quality Control (QA/QC) duplicate samples were collected.
- Subsurface gas concentrations were recorded from seven on-site gas monitoring wells.

4.1 GROUNDWATER

- Groundwater flow directions interpreted from monitors known to be hydraulically active were consistent with historical flownets:
  - Shallow groundwater flow is influenced by local topographic highs in the southwestern (Empey Hill Drumlin) and eastern (groundwater monitor M96 area) portions of the site, and is characterized by a flow divide with shallow groundwater being directed both to the north (toward Marysville Creek) and the south (toward Beechwood Ditch).
  - Groundwater in the intermediate bedrock flow zone generally flows to the north, west, and south relative to the landfill. Overall, the directions of groundwater flow within the intermediate flow zone are consistent with the regional directions of groundwater flow, towards the south.
- Groundwater quality data from 2013 are generally consistent with historical results.
- Slightly elevated concentrations of a number of water quality parameters are seen in the shallow groundwater zone northwest and north of the Phase 1 landfill footprint. In other areas of the site, there is no evidence of groundwater impact away from the landfill footprint in the shallow groundwater flow zone.
- The geochemical results for the intermediate bedrock groundwater flow zone indicate higher concentrations of water quality parameters north and south of the landfill relative to the concentrations east and west of the landfill. The higher concentrations are downgradient from the landfill footprint and occur in monitoring wells that are known to be hydraulically connected to each other. The impacts north of the landfill are contained to within approximately 40 metres of the landfill footprint, and do not affect water quality in Marysville Creek or beyond the WM property boundaries.
- Further investigation of the groundwater conditions south of the landfill and south of Beechwood Road is underway in order to better define and delineate impacts from the landfill and other contaminant sources. A CAZ is to be established south of Beechwood Road once the extent of groundwater impacts is delineated.
- Continued groundwater monitoring within the shallow and intermediate bedrock groundwater flow zones between the landfill footprint and the low-head areas is warranted in order to further examine groundwater quality and any trends over time.
- It is recommended that the following groundwater monitoring wells be replaced, upgraded or removed from the monitoring program for the reasons stated below, as these wells have become unreliable for water level and/or quality monitoring as a result of these issues:
  - M29 and M39: low recovery small diameter (2.54 cm) overburden monitors that are often dry and/or cannot be sampled after being purged dry; and
  - M19, M58-4 and OW57: damaged monitors.

Repair, upgrade or replacement of these wells will be subject to the outcome from the ongoing investigation, and will be reflected in the revised EMP (as per Condition 8.5(b) of the Amended ECA).

It is also recommended that upon approval of the revised EMP for the closed landfill, an application be made to amend the ECA to remove Condition 14.1.(a)(vi), which requires that the semi-annual reports include "maps or figures showing groundwater concentrations of alkalinity, tritium, 1,4 dioxane and ammonia in the shallow and intermediate aquifers".

4.2 SURFACE WATER

The concentrations observed are within the range of historical monitoring results. All constituents analysed in surface water samples were below their respective PWQO, with the following exceptions:

- Total phosphorus was detected at concentrations exceeding the PWQO of 0.03 mg/L at sampling locations S4R, S5 and S8R in April; and, sampling locations S2, S3, S5, S6 and S7 in September and October, ranging between 0.037 and 0.14 mg/L;
- Iron was detected at a concentration exceeding the PWQO of 0.3 mg/L at sampling location S5 in April, at sampling locations S2, S3, S6 and S7 in September and at sampling location S6 in October, ranging between 0.47 and 1.6 mg/L;
- Phenols were detected at concentrations exceeding the PWQO of 0.001 mg/L in samples collected in October, ranging from 0.0014 to 0.0019 mg/L;
- Copper was detected at a concentration equal to the PWQO of 0.005 mg/L at sampling location S6 in September;
- Cobalt was detected at a concentration equal to the PWQO of 0.0009 mg/L.

The results indicate that surface water runoff from the site or discharge of contaminated groundwater is not affecting Marysville Creek or Beechwood Ditch.

4.3 SUBSURFACE GAS

All measurements for methane gas in 2013 were below the LEL of 5% by volume in air, or 50,000 ppm.

4.4 LEACHATE GENERATION

An estimate of the amount of leachate generated at the site is provided by the site records of the volume of leachate hauled to the Napanee municipal sewer system and treated at the wastewater

treatment plant. For the 2013 calendar year, the site records show that 17,743 tonnes of leachate were generated and hauled for discharge to the municipal sewer system.

5. LIMITING CONDITIONS

The fall 2013 monitoring program involved the collection of groundwater (from on-site monitoring wells and off-site domestic supply wells) and surface water samples for analyses at the site monitoring locations. The data collected during this investigation represent the conditions at the sampled locations only.

The conclusions presented in this report represent our professional opinion and are based on the conditions observed on the dates set out in the report, the information available at the time this report was prepared, the scope of work, and any limiting conditions noted herein.

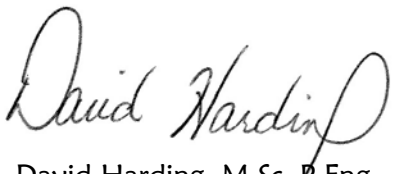
WESA provides no assurances regarding changes to conditions subsequent to the time of the assessment. WESA makes no warranty as to the accuracy or completeness of the information provided by others or of the conclusions and recommendations predicated on the accuracy of that information.

This report has been prepared for Waste Management of Canada. Any use a third party makes of this report, any reliance on the report, or decisions based upon the report, are the responsibility of those third parties unless authorization is received from WESA in writing. WESA accepts no responsibility for any loss or damages suffered by any unauthorized third party as a result of decisions made or actions taken based on this report.

Respectfully submitted,

Madeleine Corriveau, M.Sc., P.Geo.
Environmental Geochemist

François A. Richard, Ph.D, P.Geo.
Senior Hydrogeologist



David Harding, M.Sc. P.Eng.
Senior Consulting Engineer

TABLES

Table 1: Summary of Environmental Monitoring Program

Monitoring Locations		Parameter Suite	Monitoring Frequency
Shallow Groundwater Flow Zone Monitors			
M12, M14, M15, M16, M18, M19, M23, M27, M28, M29, M30, M31, M35, M38, M39, M41, M47-3, M53-4, M54-4, M58-4, M60-4, M66-2, M67-2, M68-4, M70-3, M77, M80-2, M81, M87-2, M88-2, M89-2, M96, M97, M98, M99-2, M100, M101, M102, M103, OW37-s, OW57		Groundwater Elevations	Semi-annual: Spring and Fall
M29, M39, M41, M53-4, M54-4, M58-4, M66-2, M67-2, M68-4, M70-3, M80-2, M81, M87-2, M96, M97, M99-2, M101, M102, M103, OW37-s		Groundwater Inorganic & General	Semi-annual: Spring and Fall
M41, M58-4, M96, M97, M53-4, M54-4, M66-2, M67-2, M70-3, M80-2, M87-2, M101, M102, M103, OW37-s		VOCs	Annual: Spring
Intermediate Bedrock Groundwater Flow Zone Monitors			
M3A-3, M9-3, M10-1, M49-1, M49-2, M50-3, M52-1, M56-2, M58-3, M59-2, M59-3, M59-4, M60-1, M63-2, M64-2, M70-1, M71, M72, M73, M74, M80-1, M82-1, M82-2, M91-1, M95-1, M105, M106, M107*, M108, OW1, OW4, OW54-i, OW54-d		Groundwater Elevations	Semi-annual: Spring and Fall
M5-3, M6-3, M9-3, M10-1, M49-1, M49-2, M52-1, M56-2, M58-3, M59-2, M59-3, M59-4, M70-1, M71, M72, M74, M75, M80-1, M82-1, M82-2, M91-1, M95-1, M105, M107*, OW1, OW4, OW54-d		Groundwater Inorganic & General	Semi-annual: Spring and Fall
M5-3, M6-3, M9-3, M10-1, M49-1, M49-2, M52-1, M56-2, M59-3, M70-1, M74, M75, M80-1, M82-1, M82-2, M91-1, M95-1, OW1, OW4		VOCs	Annual: Spring
Surface Water Sampling Locations			
Beechwood Ditch	S4R, S5 and S8R	Surface Water Inorganic and General	Spring, Summer and Fall
	S8R	PAHs	Spring and Summer
Marysville Creek	S2, S3, S6 and S7	Surface Water Inorganic and General	Spring, Summer and Fall
		PAHs	Spring and Summer
Leachate Monitoring Locations			
North Chamber and South Chamber		Groundwater Inorganic & General VOCs, PAHs	Annual: Spring
Landfill Gas Monitoring Wells			
GM1, GM2, GM3, GM4-1, GM4-2, GM5, GM6		% methane by volume	Semi-annual: Spring and Fall
Off-site Domestic Water Supply Wells			
1097 Beechwood Road 1121 Beechwood Road 1144 Beechwood Road 1181 Beechwood Road	1206 Beechwood Road 1250 Beechwood Road 1252 Beechwood Road 1264 Beechwood Road	Groundwater Inorganic & General, VOCs	Semi-annual: Spring and Fall

* M107: Originally labelled as M106 in EMP dated June 29, 2010

Table 2: Analytical Parameters for Groundwater and Surface Water

Groundwater Inorganic and General Parameters		
Alkalinity	Conductivity	Nitrite
Ammonia (total)	Copper	pH
Arsenic	Dissolved organic carbon	Phenols
Barium	Hardness	Phosphorus (total)
Biological oxygen demand	Iron	Potassium
Boron	Lead	Sodium
Cadmium	Magnesium	Sulphate
Calcium	Manganese	Total dissolved solids
Chemical oxygen demand	Mercury	Total Kjeldahl Nitrogen
Chloride	Naphthalene	Zinc
Chromium (total)	Nitrate	
Surface Water Inorganic and General Parameters		
Alkalinity	Cyanide (free)	Total dissolved solids
Ammonia (total, unionized)	Hardness	Total kjeldahl nitrogen
Arsenic	Iron	Total phosphorus
Barium	Lead	Total suspended solids
Biological oxygen demand	Magnesium	Zinc
Boron	Mercury	
Cadmium	Naphthalene	
Calcium	Nickel	*Field measured:*
Chemical oxygen demand	Nitrate	conductivity
Chloride	Nitrite	dissolved oxygen
Chromium (Cr-III, Cr-VI & total)	Phenols	estimated flow rate
Cobalt	Potassium	pH
Conductivity	Sodium	temperature
Copper	Sulphate	
Volatile Organic Compounds (VOCs)		
1,1,1,2-Tetrachloroethane	Benzene	Ethylbenzene
1,1,1-Trichloroethane	Bromodichloromethane	m&p-Xylene
1,1,2,2-Tetrachloroethane	Bromoform	o-Xylene
1,1,2-Trichloroethane	Bromomethane	Styrene
1,1-Dichloroethane	Carbon tetrachloride	Toluene
1,1-Dichloroethylene	Chlorobenzene	Trans-1,2-Dichloroethylene
1,2-Dibromoethane	Chloroethane	Trans-1,3-Dichloropropylene
1,2-Dichlorobenzene	Chloroform	Tetrachloroethylene
1,2-Dichloroethane	Chloromethane	Trichloroethylene
1,2-Dichloropropane	Cis-1,2-Dichloroethylene	Trichlorofluoromethane
1,3,5-Trimethylbenzene	Cis-1,3-Dichloropropylene	Vinyl chloride
1,3-Dichlorobenzene	Dibromochloromethane	
1,4-Dichlorobenzene	Dichloromethane (methylene chloride)	
Polycyclic Aromatic Hydrocarbons (PAHs)		
Biphenyl	Benzo(g,h,i)perylene	1-Methylnaphthalene
Acenaphthene	Benzo(k)fluoranthene	2-Methylnapthalene
Acenaphthylene	Chrysene	Naphthalene
Anthracene	Dibenz(a,h)anthracene	Phenanthrene
Benzo(a)anthracene	Fluoranthene	Pyrene
Benzo(a)pyrene	Fluorene	
Benzo(b/j)fluoranthene	Indeno(1,2,3-cd)pyrene	

Table 3: Groundwater Elevation Monitoring Locations

Location	Shallow Groundwater Flow Zone			Intermediate Groundwater Flow Zone		
West of landfill footprint	M27	M58-4	M98	M3A-3	M59-4	M82-1
	M28	M67-2	M99-2	M56-2	M72	M82-2
	M29	M87-2	M100	M58-3	M73	M91-1
	M30	M88-2	M101	M59-2	M74	M95-1
	M31	M89-2	M102	M59-3		
	M38	M97	OW37-s			
North of landfill footprint	M35	M66-2		M60-1		
	M39	M103		OW1		
	M60-4			OW4		
South of landfill footprint	M12	M18	M80-2	M9-3	M64-2	M105
	M14	M41	M81	M10-1	M71	M106
	M15	M53-4	OW57	M49-1	M80-1	M107*
	M16	M54-4		M49-2	OW54-i	M108
				M63-2	OW54-d	
East of landfill footprint	M19	M68-4	M96	M50-3		
	M23	M70-3		M52-1		
	M47-3	M77		M70-1		

* M107: Originally labelled as M106 in EMP dated June 29, 2010

Table 4a: Groundwater Elevations - August 13, 2013

Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)
Shallow Groundwater Flow Zone							
M12	125.02	M31	dry	M67-2	122.61	M98	129.42
M14	125.93	M35	124.26	M68-4	123.71	M99-2	129.50
M15	dry	M38	124.49	M70-3	126.38	M100	124.45
M16	124.27	M39	dry	M77	125.37	M101	123.48
M18	dry	M41	124.82	M80-2	123.34	M102	123.51
M19	damaged	M47-3	124.25	M81	124.32	M103	123.20
M23	126.27	M53-4	124.47	M87-2	123.54	OW37-s	121.90
M27	125.71	M54-4	124.11	M88-2	127.45	OW57	damaged
M28	125.67	M58-4	123.70	M89-2	128.69		
M29	dry	M60-4	124.05	M96	128.00		
M30	123.61	M66-2	122.81	M97	124.39		
Intermediate Bedrock Groundwater Flow Zone							
M3A-3	124.62	M58-3	122.80	M72	122.58	M105	120.62
M9-3	120.86	M59-2	122.80	M73	122.65	M106	122.73
M10-1	120.52	M59-3	122.77	M74	123.53	M107	120.60
M49-1	120.28	M59-4	122.78	M80-1	122.83	M108	120.24
M49-2	118.95	M60-1	122.65	M82-1	121.64	OW1	122.91
M50-3	124.43	M63-2	121.48	M82-2	122.52	OW4	123.29
M52-1	110.87	M64-2	118.85	M91-1	126.20	OW54-d	120.24
M56-2	122.78	M70-1	114.65	M95-1	122.66	OW54-i	120.25
		M71	120.58				

Table 4b: Groundwater Elevations - September 5, 2013

Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)
Shallow Groundwater Flow Zone							
M12	124.80	M19	damaged	M54-4	124.07	M88-2	127.10
M14	125.53	M23	damaged	M58-4	dry	M89-2	128.42
M15	dry	M27	125.95	M70-3	126.01	M97	124.06
M16	124.22	M28	125.29	M80-2	123.29	M98	129.28
M18	dry	M41	124.69	M81	124.28	M99-2	129.33
		M53-4	124.32	M87-2	123.30		
Intermediate Bedrock Groundwater Flow Zone							
M49-1	120.00	M63-2	121.21	M80-1	122.70	M106	122.60
M56-2	122.64	M64-2	118.64	M105	120.32	M107	120.31
		M71	120.28			M108	119.98

Table 4c: Groundwater Elevations - October 16, 2013

Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)	Monitoring Well	Water Level (masl)
Shallow Groundwater Flow Zone							
M12	124.70	M31	123.33	M67-2	122.23	M98	129.26
M14	125.31	M35	124.26	M68-4	124.06	M99-2	129.30
M15	dry	M38	124.30	M70-3	126.61	M100	124.27
M16	124.24	M39	dry	M77	124.21	M101	123.41
M18	dry	M41	124.70	M80-2	123.37	M102	123.60
M19	damaged	M47-3	124.30	M81	124.36	M103	123.04
M23	125.63	M53-4	124.33	M87-2	123.37	OW37-s	121.89
M27	126.09	M54-4	124.12	M88-2	127.01	OW57	damaged
M28	125.89	M58-4	123.46	M89-2	128.31		
M29	dry	M60-4	123.99	M96	127.47		
M30	123.43	M66-2	122.93	M97	123.88		
Intermediate Bedrock Groundwater Flow Zone							
M3A-3	124.64	M58-3	122.74	M72	122.52	M105	120.19
M9-3	120.47	M59-2	122.75	M73	122.59	M106	122.68
M10-1	120.13	M59-3	122.72	M74	124.33	M107	120.17
M49-1	119.97	M59-4	122.73	M80-1	122.78	M108	119.89
M49-2	119.84	M60-1	122.59	M82-1	122.20	OW1	122.98
M50-3	124.44	M63-2	121.13	M82-2	122.46	OW4	123.09
M52-1	111.86	M64-2	118.56	M91-1	122.75	OW54-d	119.86
M56-2	122.72	M70-1	116.67	M95-1	122.59	OW54-i	119.86
		M71	120.16				

Table 5a: Groundwater Quality Results - October 21 - 24, 2013

Name	Date	Alkalinity	Ammonia	Arsenic	Barium	Biochemical Oxygen Demand	Boron	Cadmium	Calcium	Chemical Oxygen Demand	Chloride	Chromium	Conductivity	Copper	Dissolved Organic Carbon	Hardness	Iron	Lead	Magnesium	Manganese	Mercury	Naphthalene	Nitrate	Nitrite	pH (Lab)	Phenols	Phosphorus (total)	Potassium	Sodium	Sulphate	Total Dissolved Solids	Total Kjeldahl Nitrogen	Zinc
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Shallow Groundwater Flow Zone[1]																																	
M41	10/24/2013	280	< 0.15	< 0.001	0.088	< 2	0.057	< 0.0001	160	< 4	190	< 0.005	1280	0.0011	2.9	740	0.17	< 0.0005	81	0.056	< 0.0002	< 0.0005	0.22	< 0.01	7.89	< 0.001	< 0.03	12	41	85	904	< 0.7	< 0.005
M54-4	10/21/2013	360	< 0.15	< 0.001	0.18	< 2	0.034	< 0.0001	140	< 4	72	0.0062	969	< 0.001	2.2	470	< 0.1	< 0.0005	27	0.031	< 0.0002	< 0.0005	< 0.1	< 0.01	7.78	< 0.001	0.61	1.6	43	49	590	0.9	< 0.005
M66-2	10/21/2013	340	0.18	0.0014	0.028	< 2	1	< 0.0001	120	15	140	0.025	1640	< 0.001	1.7	480	0.37	< 0.0005	44	0.016	< 0.0002	< 0.0005	< 0.1	< 0.01	7.94	< 0.001	< 0.15	7.4	170	310	1030	1	< 0.005
M67-2	10/22/2013	360	1.2	0.0012	0.22	< 2	0.76	< 0.0001	49	9.9	5	0.0071	723	< 0.001	1.8	240	0.45	< 0.0005	28	0.052	< 0.0002	< 0.0005	< 0.1	0.016	8.13	0.0011	0.15	8.6	58	24	402	6.2	< 0.005
M68-4	10/24/2013	250	< 0.15	< 0.001	0.14	< 2	< 0.01	< 0.0001	140	18	22	0.018	595	< 0.001	2.4	460	0.14	< 0.0005	24	0.096	< 0.0002	< 0.0005	< 0.1	< 0.01	7.78	< 0.001	0.9	0.41	25	35	508	< 2	< 0.005
M70-3	10/23/2013	380	< 0.15	< 0.001	0.035	< 2	0.017	< 0.0001	150	< 4	42	< 0.005	1100	< 0.001	2.8	600	0.13	< 0.0005	52	0.11	< 0.0002	< 0.0005	< 0.1	< 0.01	7.77	< 0.001	0.07	0.9	25	160	744	< 0.7	< 0.005
M80-2	10/23/2013	320	< 0.15	< 0.001	0.1	< 2	0.06	< 0.0001	93	< 4	63	< 0.005	839	< 0.001	1.5	440	< 0.1	< 0.0005	51	0.032	< 0.0002	< 0.0005	< 0.5	< 0.05	7.97	< 0.001	0.12	4.2	15	36	498	< 0.7	< 0.005
M81	10/21/2013	360	< 0.15	< 0.001	0.23	< 2	0.038	< 0.0001	110	< 4	62	< 0.005	924	< 0.001	1.5	500	< 0.1	< 0.0005	54	0.03	< 0.0002	< 0.0005	< 0.1	< 0.01	7.81	< 0.001	< 0.03	2.7	12	40	532	< 0.7	< 0.005
M87-2	10/24/2013	190	< 0.15	0.0011	0.059	< 2	0.035	< 0.0001	55	10	25	0.057	536	< 0.001	1.4	290	< 0.1	< 0.0005	38	0.0086	< 0.0002	< 0.0005	< 0.1	< 0.01	8.15	< 0.001	1.8	2.3	15	55	354	< 0.7	< 0.005
M96	10/23/2013	310	< 0.15	< 0.001	0.12	< 2	0.091	< 0.0001	70	< 4	5	< 0.005	642	< 0.001	2	330	< 0.1	< 0.0005	38	0.0047	< 0.0002	< 0.0005	1.8	0.014	8.04	< 0.001	0.19	4.7	14	38	352	< 0.7	< 0.005
M97	10/24/2013	220	< 0.15	0.0013	0.073	< 2	0.065	< 0.0001	33	6.7	6	0.011	513	< 0.001	1.1	220	< 0.1	< 0.0005	33	0.02	< 0.0002	< 0.0005	< 0.1	< 0.01	8.21	< 0.001	0.84	2	27	54	290	< 0.7	< 0.005
M99-2	10/23/2013	300	0.2	0.0018	0.043	< 2	0.075	< 0.0001	64	12	26	0.018	835	< 0.001	5	420	0.6	< 0.0005	64	0.017	< 0.0002	< 0.0005	< 0.5	< 0.05	8.06	< 0.001	3.2	2.5	19	130	486	1.1	< 0.005
M101	10/22/2013	430	0.17	< 0.001	0.18	< 2	0.063	< 0.0001	160	11	78	0.01	1160	< 0.001	6.2	600	< 0.1	< 0.0005	50	0.024	< 0.0002	< 0.0005	< 0.1	< 0.01	7.65	< 0.001	0.31	3.7	17	87	666	0.8	0.0051
M102	10/22/2013	430	< 0.15	< 0.001	0.13	< 2	0.055	< 0.0001	140	7	26	0.0082	953	< 0.001	2.5	480	0.61	< 0.0005	31	0.054	< 0.0002	< 0.0005	< 0.1	0.01	7.78	< 0.001	0.25	2.6	25	58	592	0.8	< 0.005
M103	10/22/2013	820	0.18	0.0016	0.21	< 2	0.31	< 0.0001	160	18	170	< 0.005	2030	< 0.001	5.7	830	0.15	< 0.0005	100	0.034	< 0.0002	< 0.0005	< 0.1	< 0.01	7.54	< 0.001	0.26	7.6	140	45	1100	1.2	< 0.005
OW37-s	10/24/2013	140	< 0.15	< 0.001	0.088	< 2	0.08	< 0.0001	28	< 4	46	< 0.005	448	0.0057	1.6	130	< 0.1	0.00078	15	0.13	< 0.0002	< 0.0005	< 0.1	< 0.01	8.19	< 0.001	< 0.03	8.3	36	2	230	< 0.7	< 0.005
Intermediate BedrockGroundwater Flow Zone																																	
M5-3	10/21/2013	450	1.4	< 0.001	0.19	4	1.2	< 0.0001	36	18	39	< 0.005	997	< 0.001	1.4	200	< 0.1	< 0.0005	28	0.0032	< 0.0002	< 0.0005	< 0.1	< 0.01	7.99	0.011	< 0.06	14	150	20	556	1.6	< 0.005
M6-3	10/21/2013	1000	4.08	< 0.002	1.8	< 2	0.17	< 0.0001	880	150	1300	0.021	8170	0.0043	48	2200	< 0.1	0.00083	0.098	< 0.002	< 0.0002	< 0.0013	< 0.1	0.28	12.1	0.019	< 0.6	61	560	59	3790	8	< 0.005
M9-3	10/22/2013	260	1.18	< 0.001	0.043	< 2	0.56	< 0.0001	43	4.5	72	< 0.005	747	0.0096	2.5	220	0.12	< 0.0005	27	0.018	< 0.0002	< 0.0005	< 0.1	< 0.01	8.08	< 0.001	< 0.03	15	65	11	396	1.7	< 0.005
M10-1	10/21/2013	560	0.74	0.0019	0.29	< 2	0.39	< 0.0001	170	28	170	< 0.005	1580	< 0.001	7.8	610	21	< 0.0005	44	0.88	< 0.0002	< 0.0005	< 0.1	< 0.01	7.44	< 0.001	< 0.06	6.8	94	11	874	1.5	< 0.005
M49-1	10/21/2013	400	0.94	< 0.001	0.04	2	0.94	< 0.0001	9	21	340	< 0.005	1920	< 0.001	3.1	38	< 0.1	< 0.0005	3.8	0.013	< 0.0002	< 0.0005	< 0.5	< 0.05	8.13	0.0082	0.15	7.3	400	31	1010	2.3	< 0.005
M49-2	10/21/2013	740	1.39	< 0.001	0.054	46	2.4	< 0.0001	13	69	280	< 0.005	2290	< 0.001	1.4	68	< 0.1	< 0.0005	8.6	< 0.002	< 0.0002	< 0.0005	< 0.1	< 0.01	8.63	0.073	< 0.06	12	500	61	1300	1.5	< 0.005
M52-1	10/23/2013	400	1.3	< 0.001	0.24	13	1.3	< 0.0001	24	15	200	< 0.005	1420	< 0.001	2.9	130	0.87	< 0.0005	17	0.011	< 0.0002	< 0.001	< 0.1	< 0.01	8.15	< 0.001	0.08	12	280	2	722	3	< 0.005
M56-2	10/24/2013	260	< 0.15	< 0.001	0.19	< 2	0.069	< 0.0001	77	< 4	20	< 0.005	705	< 0.001	1.6	390	< 0.1	< 0.0005	47	0.06	< 0.0002	< 0.0005	< 0.1	< 0.01	8.13	< 0.001	< 0.03	3.2	13	96	484	< 0.7	< 0.005
M58-3	10/23/2013	310	< 0.15	< 0.001	0.13	< 2	0.019	< 0.0001	90	< 4	4	< 0.005	641	< 0.001	1.1	350	< 0.1	< 0.0005	31	< 0.002	< 0.0002	< 0.0005	0.2	< 0.01	7.94	< 0.001	0.03	1.5	5.7	40	356	< 0.7	< 0.005
M59-2	10/22/2013	430	0.48	< 0.001	0.21	3	0.24	< 0.0001	130	21	59	< 0.005	1040	< 0.001	6.7	480	< 0.1	< 0.0005	37	0.015	< 0.0002	< 0.0005	< 0.1	< 0.01	7.66	0.0059	< 0.03	5.5	34	44	608	2.1	< 0.005
M59-3	10/22/2013	290	< 0.15	< 0.001	0.12	< 2	0.069	< 0.0001	130	5.3	29	< 0.005	776	< 0.001	3.1	380	0.49	< 0.0005	16	0.04	< 0.0002	< 0.0005	0.44	< 0.01	7.81	0.001	< 0.03	2.4	15	71	470	< 0.7	< 0.005
M59-4	10/22/2013	300	1.09	0.0051	0.11	< 2	0.43	< 0.0001	67	40	7	< 0.005	630	< 0.001	2.1	300	1.4	< 0.0005	33	0.019	< 0.0002	< 0.0005	< 0.1	0.022	7.95	0.0015	0.29	6.5	13	34	354	5.8	< 0.005
M70-1	10/23/2013	400	2.44	< 0.005	0.19	3	2.4	< 0.0005	200	40	2300	< 0.025	8770	< 0.005	3.5	1100	5	< 0.0025	140	0.13	< 0.0002	< 0.0005	< 0.1	< 0.01	7.73	0.0085	0.12	32	1600	760	5530	3	< 0.025
M71	10/22/2013	620	1.56	< 0.001	0.055	2	0.47	< 0.0001	170	30	180	< 0.005	1730	< 0.001	7.8	630	0.2	< 0.0005	50	0.02	< 0.0002	< 0.0005	< 0.1	< 0.01	7.56	0.0061	0.11	12	130	8	914	2.3	< 0.005
M72	10/23/2013	280	0.58	< 0.001	0.16	11	0.39	< 0.0001	57	15	29	0.0053	616	< 0.001	1.7	290	< 0.1	< 0.0005	35	0.0034	< 0.0002	< 0.0005	< 0.1	< 0.01	8.18	0.025	0.05	8.1	19	19	328	< 1	< 0.005
M74	10/23/2013	310	1.16	< 0.001	0.11	9	0.95	< 0.0001	35	25	13	< 0.005	652	< 0.001	1.3	180	< 0.1	< 0.0005	23	0.027	< 0.0002	< 0.0005	< 0.1	< 0.01	8.19	< 0.001	0.55	12	77	26	382	2	< 0.005
M75	10/21/2013	440	2.02	< 0.001	0.072	< 2	1.4	< 0.0001	32	63	80	< 0.005	1200	< 0.001	1.4	160	< 0.1	< 0.0005	21	0.019	< 0.0002	< 0.0005	< 0.1	0.01	8.13	< 0.001	1.1	17	190	83	698	16	< 0.005
M80-1	10/23/2013	140	0.4	< 0.001	0.039	22	0.36	< 0.0001	22	16	22	< 0.005	362	< 0.001	0.8	110	< 0.1	< 0.0005	13	0.0057	< 0.0002	< 0.005	< 0.1	< 0.01	7.94	0.016	< 0.03	4.6	34	1	186	2	< 0.005
M82-1	10/22/2013	330	0.81	< 0.001	0.17	2	0.98	< 0.0001	52	19	43	< 0.005	882	< 0.001	2.5	230	< 0.1	< 0.0005	25	0.0028	< 0.0002	< 0.0005	< 0.1	< 0.01	8.01	0.011	< 0.03	9.9	96	53	504	1	< 0.005
M82-2	10/22/2013	330	0.27	< 0.001	0.13	< 2	0.16	< 0.0001	110	9.1	21	< 0.005	809	< 0.001	2.3	400	< 0.1	< 0.0005	30	0.019	< 0.0002	< 0.0005	< 0.1	< 0.01	7.82	0.0025	< 0.03	4.1	18	69	482	< 0.7	< 0.005
M91-1	10/23/2013	300	0.72	< 0.001	0.088	9	0.78	< 0.0001	45	< 4	14	< 0.005	675	< 0.001	1.3	210	< 0.1	< 0.0005	24	0.0055	< 0.0002	< 0.0005	< 0.1	< 0.01	8.11	< 0.001	0.08	7.6	66	44	308	0.8	< 0.005
M95-1	10/24/2013	310	< 0.15	< 0.001	0.14	< 2	0.018	< 0.0001	110	< 4	8	< 0.005	556	< 0.001	5	380	< 0.1	< 0.0005	28	0.0025	< 0.0002	< 0.0005	0.11	< 0.01	7.97	< 0.001	< 0.03	2.2	6.8	57	462	< 0.7	< 0.005
M105	10/21/2013	550	0.8	< 0.001	0.23	3	0.38	< 0.0001	160	23	190	< 0.005	1630	< 0.001	6.6	660	< 0.1	< 0.0005	62	0.0094	< 0.0002	< 0.0005	< 0.1	< 0.01	7.69	0.0079	< 0.03	9.1	97	10	932	5.1	< 0.005
M107[2]	10/21/2013	540	0.2	< 0.001	0.14	< 2	0.18	< 0.0001	180	14	140	< 0.005	1460	< 0.001	6.5	630	7.3	< 0.0005	43	0.47	< 0.0002	< 0.0005	< 0.1	< 0.01	7.44	0.0015	< 0.03	4.2	78	13	794	< 0.7	< 0.005
OW1	10/23/2013	460	6.72	< 0.001	0.093	22	1.1	< 0.0001	46	39	45	< 0.005	1100	< 0.001	6.2	250	< 0.1	< 0.0005	32	0.03	< 0.0002	< 0.005	< 0.5	< 0.05	8	< 0.001	0.96	14	160	53	586	7.8	< 0.005
OW4	10/23/2013	1100	1.38	0.001	0.19	11	1.1	< 0.0001	180	160	540	< 0.005	3460	< 0.001	53	920	12	< 0.0005	120	0.22	< 0.0002	< 0.01	< 0.1	< 0.01	7.63	0.012	0.11	13	500	3	1880	5.1	< 0.005
OW54-d	10/22/2013	270	1.22	< 0.001	0.049	< 2	0.61	< 0.0001	43	< 4	78	< 0.005	796	< 0.001	1.2	220	< 0.1	< 0.0005	28	0.031	< 0.0002	< 0.0005	< 0.1	< 0.01	8.04	< 0.001	< 0.03	13	71	18	410	1.2	< 0.005

[1] Shallow groundwater monitoring wells not sampled: M29, M39, M53-4, M58-4 (see text for details)

[2] M107: Originally labelled as M106 in EMP dated June 29, 2010

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Table 5b: Groundwater Quality Results and Reasonable Use Limits

Name	Date	Alkalinity	Boron	Chloride	Chromium	Dissolved Organic Carbon	Iron	Manganese	Sodium	Total Dissolved Solids
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Shallow Groundwater Flow Zone[1]										
RUL		*386*	*1.27*	*128*	*0.014*	*3.1*	*0.18*	*0.028*	*104*	*415*
M41	10/24/2013	280	0.057	*190*	< 0.005	2.9	0.17	*0.056*	41	*904*
M54-4	10/21/2013	360	0.034	72	0.0062	2.2	< 0.1	*0.031*	43	*590*
M66-2	10/21/2013	340	1.00	*140*	*0.025*	1.7	*0.37*	0.016	*170*	*1030*
M67-2	10/22/2013	360	0.76	5	0.0071	1.8	*0.45*	*0.052*	58	402
M68-4	10/24/2013	250	< 0.01	22	*0.018*	2.4	0.14	*0.10*	25	*508*
M70-3	10/23/2013	380	0.017	42	< 0.005	2.8	0.13	*0.11*	25	*744*
M80-2	10/23/2013	320	0.06	63	< 0.005	1.5	< 0.1	*0.032*	15	*498*
M81	10/21/2013	360	0.038	62	< 0.005	1.5	< 0.1	*0.03*	12	*532*
M87-2	10/24/2013	190	0.035	25	*0.057*	1.4	< 0.1	0.0086	15	354
M96	10/23/2013	310	0.091	5	< 0.005	2	< 0.1	0.0047	14	352
M97	10/24/2013	220	0.065	6	0.011	1.1	< 0.1	0.02	27	290
M99-2	10/23/2013	300	0.075	26	*0.018*	5	*0.6*	0.017	19	*486*
M101	10/22/2013	*430*	0.063	78	0.01	*6.2*	< 0.1	0.024	17	*666*
M102	10/22/2013	*430*	0.055	26	0.0082	2.5	*0.61*	*0.054*	25	*592*
M103	10/22/2013	*820*	0.31	*170*	< 0.005	*5.7*	0.15	*0.034*	*140*	*1100*
OW37-s	10/24/2013	140	0.08	46	< 0.005	1.6	< 0.1	*0.13*	36	230
Intermediate BedrockGroundwater Flow Zone										
RUL		*403*	*1.3*	*130*	*0.014*	*3.4*	*0.18*	*0.037*	*106*	*478*
M5-3	10/21/2013	*450*	1.2	39	< 0.005	1.4	< 0.1	0.0032	*150*	*556*
M6-3	10/21/2013	*1000*	0.17	*1300*	*0.021*	*48*	< 0.1	< 0.002	*560*	*3790*
M9-3	10/22/2013	260	0.56	72	< 0.005	2.5	0.12	0.018	65	396
M10-1	10/21/2013	*560*	0.39	*170*	< 0.005	*7.8*	*21*	*0.88*	94	*874*
M49-1	10/21/2013	400	0.94	*340*	< 0.005	3.1	< 0.1	0.013	*400*	*1010*
M49-2	10/21/2013	*740*	*2.4*	*280*	< 0.005	1.4	< 0.1	< 0.002	*500*	*1300*
M52-1	10/23/2013	400	*1.3*	*200*	< 0.005	2.9	*0.87*	0.011	*280*	*722*
M56-2	10/24/2013	260	0.069	20	< 0.005	1.6	< 0.1	*0.06*	13	*484*
M58-3	10/23/2013	310	0.019	4	< 0.005	1.1	< 0.1	< 0.002	5.7	356
M59-2	10/22/2013	*430*	0.24	59	< 0.005	*6.7*	< 0.1	0.015	34	*608*
M59-3	10/22/2013	290	0.069	29	< 0.005	3.1	*0.49*	*0.04*	15	470
M59-4	10/22/2013	300	0.43	7	< 0.005	2.1	*1.4*	0.019	13	354
M70-1	10/23/2013	400	*2.4*	*2300*	< 0.025	*3.5*	*5.0*	*0.13*	*1600*	*5530*
M71	10/22/2013	*620*	0.47	*180*	< 0.005	*7.8*	*0.2*	0.02	*130*	*914*
M72	10/23/2013	280	0.39	29	0.0053	1.7	< 0.1	0.0034	19	328
M74	10/23/2013	310	0.95	13	< 0.005	1.3	< 0.1	0.027	77	382
M75	10/21/2013	*440*	*1.4*	80	< 0.005	1.4	< 0.1	0.019	*190*	*698*
M80-1	10/23/2013	140	0.36	22	< 0.005	0.8	< 0.1	0.0057	34	186
M82-1	10/22/2013	330	0.98	43	< 0.005	2.5	< 0.1	0.0028	96	*504*
M82-2	10/22/2013	330	0.16	21	< 0.005	2.3	< 0.1	0.019	18	*482*
M91-1	10/23/2013	300	0.78	14	< 0.005	1.3	< 0.1	0.0055	66	308
M95-1	10/24/2013	310	0.018	8	< 0.005	*5.0*	< 0.1	0.0025	6.8	462
M105	10/21/2013	*550*	0.38	*190*	< 0.005	*6.6*	< 0.1	0.0094	97	*932*
M107[2]	10/21/2013	*540*	0.18	*140*	< 0.005	*6.5*	*7.3*	*0.47*	78	*794*
OW1	10/23/2013	*460*	1.1	45	< 0.005	*6.2*	< 0.1	0.03	*160*	*586*
OW4	10/23/2013	*1100*	1.1	*540*	< 0.005	*53*	*12*	*0.22*	*500*	*1880*
OW54-d	10/22/2013	270	0.61	78	< 0.005	1.2	< 0.1	0.031	71	410

[1] Shallow groundwater monitoring wells not sampled: M29, M39, M53-4, M58-4 (see text for details)

[2] M107: Originally labelled as M106 in EMP dated June 29, 2010

Groundwater results exceed Reasonable Use Limits (RUL)

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Table 5c: 1,4-Dioxane and Tritium Groundwater Results for EMP Monitoring Wells - October 21 - 24, 2013

Name	Date	1,4 Dioxane	Tritium	
		mg/L	TU[1]	
Shallow Groundwater Flow Zone				
M41	10/24/2013	0.00161	11.9	0.9
M54-4	10/21/2013	< 0.001	11.6	0.9
M101	10/22/2013	0.00537	15.9	1.2
M102	10/22/2013	< 0.001	10.9	0.9
M103	10/22/2013	0.03	30.4	+/- 8
Intermediate BedrockGroundwater Flow Zone				
M6-3	10/21/2013	0.348	625.6	+/- 8
M9-3	10/22/2013	< 0.001	6.7	0.7
M10-1	10/21/2013	0.0219	33.7	2.4
M49-2	10/21/2013	< 0.001	3	0.6
M52-1	10/23/2013	< 0.001	1.6	0.4
M59-2	10/22/2013	< 0.001	9.7	0.8
M71	10/22/2013	0.0326	40.1	2.8
M75	10/21/2013	< 0.001	2.2	0.5
M105	10/21/2013	0.022	30.8	2.2
M107[2]	10/21/2013	0.014	26.8	1.9
OW1	10/23/2013	< 0.001	<0.8	0.3
OW4	10/23/2013	0.123	186.7	+/- 8

[1] TU = Tritium Unit: 1 TU = 3.221 Picocurries/L; 1 TU = 0.11919 Becquerels/L
Accuracy ranges (+/-) provided by University of Waterloo Environmental Isotope Laboratory

[2] Originally labelled as M106 in EMP dated June 29, 2010

Table 6: Water Quality Results from Off-Site Domestic Supply Wells - October 23, 2013

	Units	ODWSOG		1097 Beechwood Rd	1144 Beechwood Rd	1181 Beechwood Rd	1206 Beechwood Rd	1250 Beechwood Rd	1252 Beechwood Rd	1264 Beechwood Rd
Inorganic and General Parameters										
Alkalinity (as CaCO3)	mg/L	30-500	OG	240	360	300	***510***	490	310	440
Ammonia	mg/L			< 0.15	0.98	2.59	1.14	0.45	0.18	0.57
Arsenic	mg/L	0.025	IMAC	< 0.001	< 0.001	< 0.001	< 0.001	0.0015	< 0.001	< 0.001
Barium	mg/L	1	MAC	0.075	0.042	0.11	0.22	0.32	0.13	0.092
Biochemical Oxygen Demand	mg/L			< 2	2	21	< 2	< 2	< 2	6
Boron	mg/L	5	IMAC	0.052	0.67	0.94	0.11	0.14	0.086	0.39
Cadmium	mg/L	0.005	IMAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L			80	120	89	240	210	110	140
Chemical Oxygen Demand	mg/L			56	12	18	23	21	5	13
Chloride	mg/L	250	AO	5	***600***	***430***	170	180	33	200
Chromium	mg/L	0.05	MAC	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity	µS/cm			505	2610	2080	1510	1440	761	1470
Copper	mg/L	1	AO	0.022	0.0011	< 0.001	0.0046	< 0.001	< 0.001	0.0013
Dissolved Organic Carbon	mg/L	5	AO	4.1	4.4	2.6	***7.4***	***7.7***	2.2	6
Hardness (as CaCO3)	mg/L	80-100	OG	***250***	***560***	***450***	***780***	***700***	***410***	***520***
Iron	mg/L	0.3	AO	< 0.1	***2.3***	0.13	***35***	***26***	***2.9***	***8***
Lead	mg/L	0.01	MAC	0.00051	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Magnesium	mg/L			13	62	56	43	42	31	42
Manganese	mg/L	0.05	AO	0.0021	0.033	0.0086	***5.7***	***1.7***	***0.29***	***0.47***
Mercury	mg/L	0.001	MAC	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Naphthalene	mg/L	10	MAC	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.0005
Nitrate	mg/L	10	MAC	5.4	< 0.1	< 0.1	< 0.1	< 0.1	0.65	< 0.1
Nitrite	mg/L	1	MAC	< 0.01	0.022	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH (Lab)	unitless	6.5-8.5	OG	8.1	7.95	7.81	7.5	7.53	7.85	7.76
Phenols	mg/L			< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.014
Phosphorus (total)	mg/L			0.03	0.15	0.1	0.78	< 0.03	< 0.03	< 0.03
Potassium	mg/L			7.3	18	18	8.2	4.7	3.2	7.9
Sodium	mg/L	200 20	AO (see note)	8	***360***	***260***	**100**	**77**	**27**	**150**
Sulphate	mg/L	500	AO	18	11	10	24	15	54	5
Total Dissolved Solids	mg/L	500	AO	288	***1450***	***1090***	***982***	***890***	490	***836***
Total Kjeldahl Nitrogen	mg/L			< 0.7	1.4	4	2.5	1	< 0.7	1.1
Zinc	mg/L	5	AO	0.15	< 0.005	< 0.005	0.091	0.045	0.014	0.15

Exceeds ODWSOG

ODWSOG: Ontario Drinking Water Objective Standards and Guidelines
OG: Operational Guidelines
MAC: Maximum Acceptable Concentration
IMAC: Interim Maximum Acceptable Concentration
AO: Asthetic Objectives
Note: The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Table 6: Water Quality Results from Off-Site Domestic Supply Wells - October 23, 2013

	Units	ODWSOG		1097 Beechwood Rd	1144 Beechwood Rd	1181 Beechwood Rd	1206 Beechwood Rd	1250 Beechwood Rd	1252 Beechwood Rd	1264 Beechwood Rd
Volatile Organic Compounds (VOC)										
1,1,1,2-Tetrachloroethane	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,1,1-Trichloroethane	mg/L			< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.018	< 0.0001
1,1,2,2-Tetrachloroethane	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,1,2-Trichloroethane	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,1-Dichloroethane	mg/L			< 0.0001	< 0.0001	< 0.0001	0.0012	0.0029	0.026	< 0.0001
1,1-Dichloroethylene	mg/L	0.014	MAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00014	0.0031	0.0002
1,2-Dibromoethane	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,2-Dichlorobenzene (o)	mg/L	0.2 0.003	MAC AO	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,2-Dichloroethane	mg/L	0.005	IMAC	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,2-Dichloropropane	mg/L			< 0.0001	< 0.0001	< 0.0001	0.00011	< 0.0001	< 0.0002	< 0.0001
1,3,5-Trimethylbenzene	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,3-Dichlorobenzene (m)	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
1,4-Dichlorobenzene (p)	mg/L	0.005 0.001	MAC AO	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Benzene	mg/L	0.005	MAC	< 0.0001	0.0004	0.00021	0.00024	< 0.0001	< 0.0002	0.00064
Bromodichloromethane	mg/L			0.00015	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Bromoform	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Bromomethane	mg/L			< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.0005
Carbon Tetrachloride	mg/L	0.005	MAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Chlorobenzene	mg/L			< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Chloroethane	mg/L			< 0.0002	< 0.0002	< 0.0002	0.0018	0.0019	0.0057	0.01
Chloroform	mg/L			0.00065	0.00013	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Chloromethane	mg/L			< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.001	< 0.0005
Cis-1,2-Dichloroethylene	mg/L			< 0.0001	< 0.0001	< 0.0001	0.00015	< 0.0001	< 0.0002	< 0.0001
Cis-1,3-Dichloropropylene	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Dibromochloromethane				< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Dichloromethane	mg/L	0.05	MAC	< 0.0005	< 0.0005	< 0.0005	0.0011	< 0.0005	< 0.001	< 0.0005
Ethylbenzene	mg/L	0.0024	AO	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
m+p-Xylene	mg/L			< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
o-Xylene	mg/L			< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Styrene	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Tetrachloroethylene	mg/L	0.03	MAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00023	< 0.0001
Toluene	mg/L	0.024	AO	< 0.0002	0.00052	0.00027	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Total Xylenes	mg/L	0.3	AO	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Trans-1,2-dichloroethylene	mg/L			< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Trans-1,3-dichloropropene	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Trichloroethylene	mg/L	0.005	MAC	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0002	< 0.0001
Trichlorofluoromethane	mg/L			< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0004	< 0.0002
Vinyl Chloride	mg/L	0.002	MAC	< 0.0002	< 0.0002	< 0.0002	0.00064	< 0.0002	< 0.0004	< 0.0002

Exceeds ODWSOG

ODWSOG: Ontario Drinking Water Objective Standards and Guidelines
OG: Operational Guidelines
MAC: Maximum Acceptable Concentration
IMAC: Interim Maximum Acceptable Concentration
AO: Asthetic Objectives

Note: The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Table 7: Surface Water Characteristics - September 13 and October 22, 2013

Date	Parameter		Surface Water Station						
			S2	S3	S4R	S5	S6	S7	S8R
23-Sep-13	Velocity:	m/s	NM	0.05	-	NM	NM	0.30	NM
	Depth:	m	0.25	0.30	-	0.15	0.25	0.03	0.03
	Width:	m	2.50	0.80	-	0.55	3.50	2.80	0.6
	Estimated Flow Rate:	m^3/s	NM	0.01	-	NM	NM	0.02	NM
22-Oct-13	Velocity:	m/s	NM	NM	-	-	NM	NM	-
	Depth:	m	0.20	0.15	-	-	0.13	0.13	-
	Width:	m	1.70	0.70	-	-	1.50	3.00	-
	Estimated Flow Rate:	m^3/s	NM	NM	-	-	NM	NM	-

NM: Not Measured (flow was insufficient to register on the flow meter - very small flow observed)

Table 8a: Surface Water Quality Results - September 23, 2013

			Marysville Creek				Beechwood Ditch	
			S2	S3	S6	S7	S5	S8R
			(upstream)	(downstream)	(downstream)	(downstream)	(upstream)	(downstream)
		Date	9/23/2013	9/23/2013	9/23/2013	9/23/2013	9/23/2013	9/23/2013
Reading Name	Units	PWQO						
Inorganic and General Parameters								
Alkalinity	mg/L		230	160	160	150	130	260
Ammonia	mg/L		< 0.15	< 0.15	< 0.15	< 0.15	< 0.15	< 0.15
Ammonia (unionized)	mg/L	0.02	< 0.00045	< 0.0015	< 0.0006	< 0.001	< 0.001	< 0.003
Arsenic	mg/L	0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	mg/L		0.063	0.05	0.083	0.058	0.04	0.07
Biochemical Oxygen Demand	mg/L		< 2	< 2	< 2	< 2	< 2	< 2
Boron	mg/L	0.2	< 0.02	0.033	0.026	0.025	< 0.02	0.024
Cadmium	mg/L	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L		91	64	65	66	52	100
Chemical Oxygen Demand	mg/L		33	33	36	42	40	13
Chloride	mg/L		10	14	11	12	4	18
Chromium	mg/L		< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Cobalt	mg/L	0.0009	< 0.0005	< 0.0005	0.0005	< 0.0005	< 0.0005	< 0.0005
Conductivity	µS/cm		533	419	401	406	327	652
Copper	mg/L	0.005	0.003	0.004	***0.005***	0.004	0.003	< 0.002
Cyanide (free)	mg/L	0.005	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Hardness	mg/L		280	190	190	190	160	320
Iron	mg/L	0.3	***0.55***	***0.47***	***1.6***	***0.84***	0.21	0.12
Lead	mg/L	0.005	< 0.0005	< 0.0005	0.0007	< 0.0005	< 0.0005	< 0.0005
Magnesium	mg/L		14	10	11	11	9.6	20
Mercury	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel	mg/L	0.025	< 0.001	0.001	0.002	0.002	< 0.001	< 0.001
Nitrate	mg/L		< 0.1	< 0.1	0.14	0.11	< 0.1	< 0.1
Nitrite	mg/L		< 0.01	< 0.01	0.016	< 0.01	< 0.01	< 0.01
Phenols	mg/L	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Phosphorus (total)	mg/L	0.03	***0.068***	***0.11***	***0.11***	***0.13***	***0.1***	0.022
Potassium	mg/L		2.6	4.2	4.8	4.5	2.9	2.9
Sodium	mg/L		8.9	10	8.9	9.3	5.3	18
Sulphate	mg/L		36	37	35	36	36	53
Total Dissolved Solids	mg/L		322	276	280	272	234	378
Total Kjeldahl Nitrogen	mg/L		1.3	1.6	1.6	1.6	1.6	1.3
Total Suspended Solids	mg/L		5	5	10	7	4	8
Zinc	mg/L	0.02	< 0.01	< 0.01	< 0.01	0.012	< 0.01	< 0.01
PAHs								
1-Methylnaphthalene	mg/L	0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
2-Methylnaphthalene	mg/L	0.002	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Acenaphthene	mg/L		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Acenaphthylene	mg/L		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Anthracene	mg/L	0.0000008	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Benzo(a)anthracene	mg/L	0.0000004	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Benzo(a)pyrene	mg/L		< 0.00001	< 0.00001	< 0.00001	< 0.00001		< 0.00001
Benzo(b)fluoranthene	mg/L		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Benzo(g,h,i)perylene	mg/L	2E-08	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Benzo(k)fluoranthene	mg/L	0.0000002	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Biphenyl	mg/L	0.0002	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Chrysene	mg/L	0.0000001	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Dibenzo(a,h)anthracene	mg/L		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Fluoranthene	mg/L	0.0000008	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Fluorene	mg/L	0.0002	< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Indeno(1,2,3-cd)pyrene	mg/L		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Naphthalene	mg/L	0.007	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.0005	< 0.00005
Phenanthrene	mg/L	0.00003	< 0.00003	< 0.00003	< 0.00003	< 0.00003		< 0.00003
Pyrene	mg/L		< 0.00005	< 0.00005	< 0.00005	< 0.00005		< 0.00005
Field Measured								
Conductivity (Field)	µS/cm		695	418	399	398	328	641
Dissoved Oxygen (Field)	mg/L							
pH (Field)	unitless	6.5-8.5	7.06	7.65	7.25	7.32	7.39	7.92
Temperature (Field)	°C		14.60	12.10	12.90	12.50	12.30	15.00

Exceeds PWQO

WESA
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Table 8b: Surface Water Quality Results - October 22, 2013

			Marysville Creek			
			S2	S3	S6	S7
			(upstream)	(downstream)	(downstream)	(downstream)
		Date	10/22/2013	10/22/2013	10/22/2013	10/22/2013
Reading Name	Units	PWQO				
Inorganic and General Parameters						
Alkalinity	mg/L		280	270	280	270
Ammonia	mg/L		< 0.15	< 0.15	< 0.15	< 0.15
Ammonia (unionized)	mg/L	0.02	< 0.001	< 0.001	< 0.001	< 0.001
Arsenic	mg/L	0.1	< 0.001	< 0.001	< 0.001	< 0.001
Barium	mg/L		0.056	0.065	0.075	0.061
Biochemical Oxygen Demand	mg/L		< 2	< 2	< 2	< 2
Boron	mg/L	0.2	< 0.02	< 0.02	< 0.02	< 0.02
Cadmium	mg/L	0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Calcium	mg/L		99	95	99	96
Chemical Oxygen Demand	mg/L		21	20	29	24
Chloride	mg/L		9	24	20	20
Chromium (III)	mg/L	0.0089	< 0.005	< 0.005	< 0.005	< 0.005
Chromium (VI)	mg/L	0.001	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chromium (total)	mg/L		< 0.005	< 0.005	< 0.005	< 0.005
Cobalt	mg/L	0.0009	< 0.0005	< 0.0005	*0.0009*	< 0.0005
Conductivity	µS/cm		587	615	620	600
Copper	mg/L	0.005	< 0.002	< 0.002	< 0.002	< 0.002
Cyanide (free)	mg/L	0.005	< 0.002	< 0.002	< 0.002	< 0.002
Hardness	mg/L		270	260	270	260
Iron	mg/L	0.3	0.2	0.16	*1.2*	0.14
Lead	mg/L	0.005	< 0.0005	< 0.0005	0.0006	< 0.0005
Magnesium	mg/L		15	15	16	16
Mercury	mg/L	0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Nickel	mg/L	0.025	< 0.001	< 0.001	< 0.001	< 0.001
Nitrate	mg/L		< 0.1	< 0.1	< 0.1	< 0.1
Nitrite	mg/L		< 0.01	< 0.01	< 0.01	< 0.01
Phenols	mg/L	0.001	*0.0019*	*0.0017*	*0.0019*	*0.0014*
Phosphorus (total)	mg/L	0.03	*0.037*	*0.049*	*0.14*	*0.053*
Potassium	mg/L		2.4	4.6	4.1	4.4
Sodium	mg/L		8.7	16	14	13
Sulphate	mg/L		28	22	22	21
Total Dissolved Solids	mg/L		344	374	370	356
Total Kjeldahl Nitrogen	mg/L		< 0.7	< 0.7	1.3	0.8
Total Suspended Solids	mg/L		1	2	20	3
Zinc	mg/L	0.02	< 0.01	< 0.01	< 0.01	< 0.01
PAHs						
Naphthalene	mg/L	0.007	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Field Measured						
Conductivity (Field)	µS/cm		559	568	299	563
Dissoved Oxygen (Field)	mg/L		9.18	10.29	7.46	6.52
pH (Field)	unitless	6.5-8.5	7.43	7.61	7.45	7.57
Temperature (Field)	°C		10.27	9.30	9.49	9.88

Exceeds PWQO

WESA
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Table 9: Subsurface Gas Monitoring Results - October 24, 2013

Gas Monitor	Location	Reading (%LEL)
GM1*	North of garage area, south of waste mound	0
GM2	Southwest corner of waste mound	0
GM3	Northeast corner of waste mound	0
GM4-1	Southeast corner of waste mound	0
GM4-2		0
GM5	Northwest corner of waste mound	0
GM6	North of waste mound	0

* No cap on monitor

FIGURES

M60-1
M60-4
Former Lagoon (Empty)
M59-2
M59-3
M59-4
S2
Marysville Creek
M68-4
S3
S7
OW1
M82-1
M82-2
OW37-s
M67-2
S6
M66-2
M5-3
M75
GM6
M39
M35
M103
OW4
M6-3
M30
GM3
M50-3
M31
M101
GM5
M47-3
M95-1
M29
M77
M102
M74
M38
M100
M3A-3
M96
M73
M28
M27
M58-3
M58-4
M23
M72
M91-1
GM2
M89-2
M98
OW57
GM4
M19
M52-1
GM1
M41
M99-2
OW54-d
M9-3
M18
M71
OW54-i
S5
M105
M70-3
M70-1
M81
M16
M88-2
M56-2
M87-2
M49-1
M15
M97
M54-4
M108
M80-1
M49-2
M53-4
M107
1121 Beechwood Rd
M106
M80-2
S8R
S4R
M12
M14
M10-1
1097 Beechwood Rd
1181 Beechwood Rd
1144 Beechwood Rd
1264 Beechwood Rd
1252 Beechwood Rd
1250 Beechwood Rd
1206 Beechwood Rd
Beechwood Ditch
M63-2
M64-2

WASTE MANAGEMENT
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Figure 1:
Site Plan and EMP Monitoring Locations

M35 Monitoring Well Used to Measure Water Level (Not Sampled)
M53-4 Monitoring Well Used to Measure Water Level and Sampled for Chemistry
M5-3 Monitoring Well Sampled for Chemistry (Not used for Water Levels)
1097 Beechwood Domestic Water Supply Well Sampled for Chemistry
GM1 Gas Monitoring Well
S2 Surface Water Monitoring Location
Property Boundary

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009

0 12.5 25 50 75 100
Metres

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

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Figure 2a:
Shallow Groundwater Flow Zone Potentiometric Surface - August 13, 2013

M58-4 Shallow Groundwater Zone Elevation Monitor
Hydro Tower
Topographic Contour Lines
Staff Gauge Location
Surface Water
Potentiometric Surface (masl)
Property Boundary

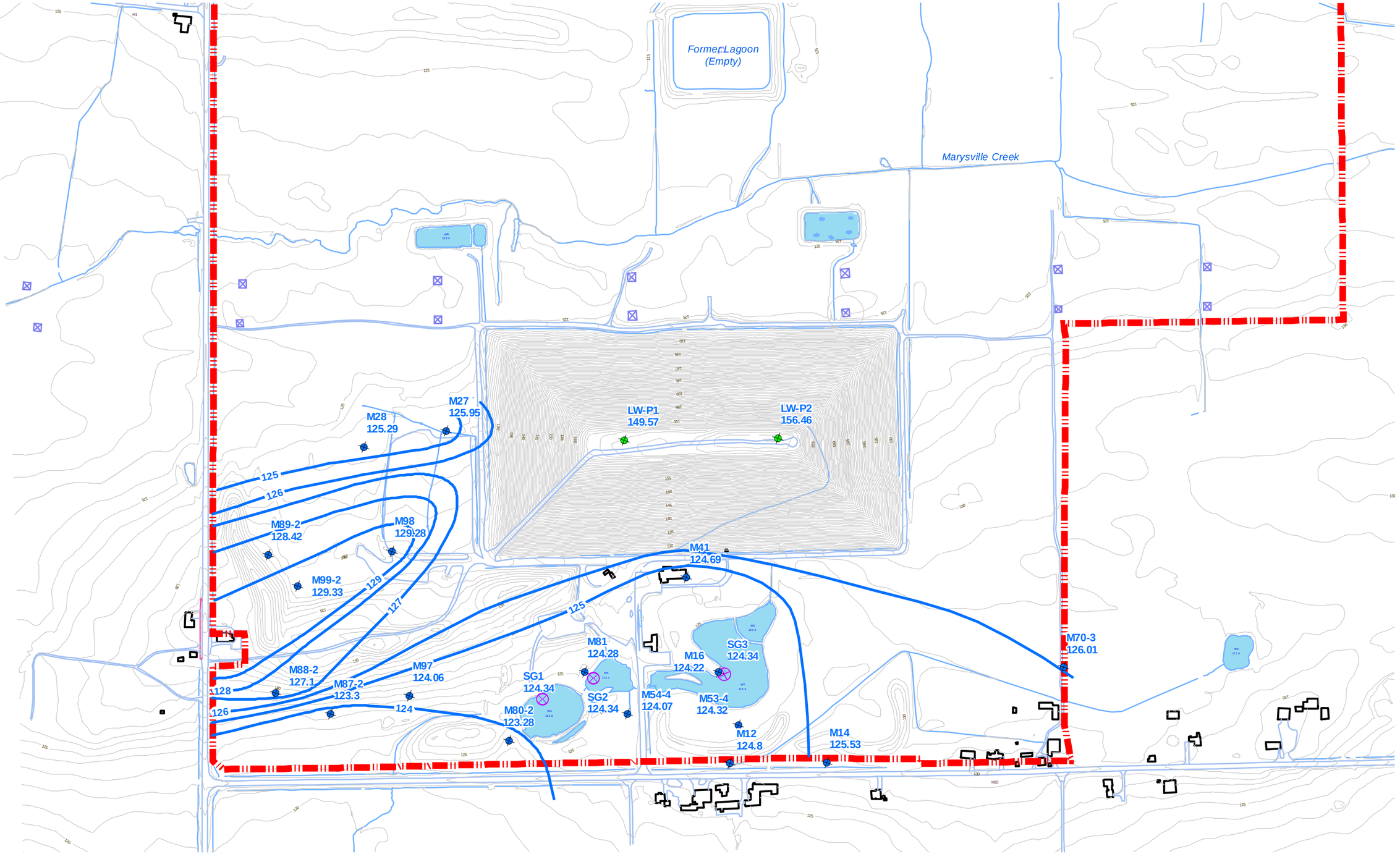
Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: September 2013

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:5000

0 12.5 25 50 75 100
Meters



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M58-4 Shallow Groundwater Zone Elevation Monitor
Staff Gauge Location
Leachate Monitoring Location

Surface Water
Potentiometric Surface (masl)
Property Boundary
Hydro Tower
Topographic Contour Lines

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: December 2013

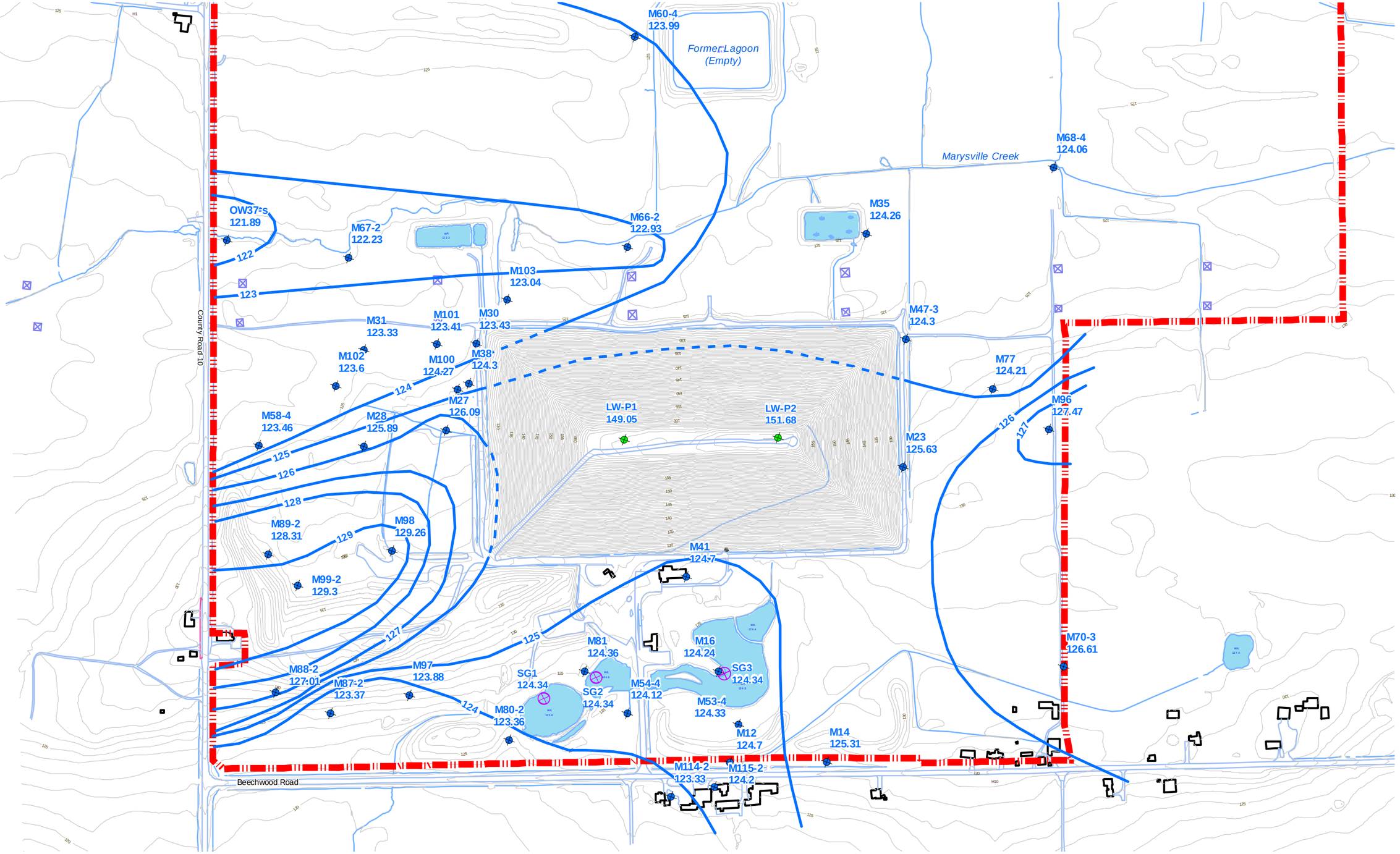
Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:5000

0 12.5 25 50 75 100
Meters

Figure 2b:
Shallow Groundwater Flow Zone Potentiometric Surface - September 5, 2013



WASTE MANAGEMENT
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Figure 2c:
Shallow Groundwater Flow Zone Potentiometric Surface - October 16, 2013

M58-4 Shallow Groundwater Zone Elevation Monitor
Staff Gauge Location
Leachate Monitoring Location

Surface Water
Potentiometric Surface (masl)
Property Boundary
Hydro Tower
Topographic Contour Lines

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: October 2013

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:5000

0 12.5 25 50 75 100
Meters

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M60-1
122.65

Former Lagoon
(empty)

M59-3
122.77

M59-2
122.8

M59-4
122.78

Marysville Creek

M82-1
121.64

M82-2
122.52

M50-3
124.43

M95-1
122.66

M74
123.53

M3A-3
124.62

M73
122.65

M58-3
122.8

M72
122.58

M91-1
121.62

123

124

122

121

OW54-d
119.86

OW54-i
119.86

M71
120.58

M9-3
120.86

M105
120.62

M56-2
122.78

M49-1
120.28

M108
120.24

M80-1
122.83

M106
122.73

M10-1
120.52

M107
120.6

M63-2
121.48

120

119

M64-2
118.85

WASTE MANAGEMENT
RICHMOND LANDFILL
FALL 2013 ANNUAL REPORT

M58-3 Intermediate Groundwater Zone Elevation Monitor
Topographic Contour Lines
Potentiometric Surface (masl)
Hydro Tower
Surface Water
Property Boundary

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: September 2013

50 25 0 50 100
Meters

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

WESA
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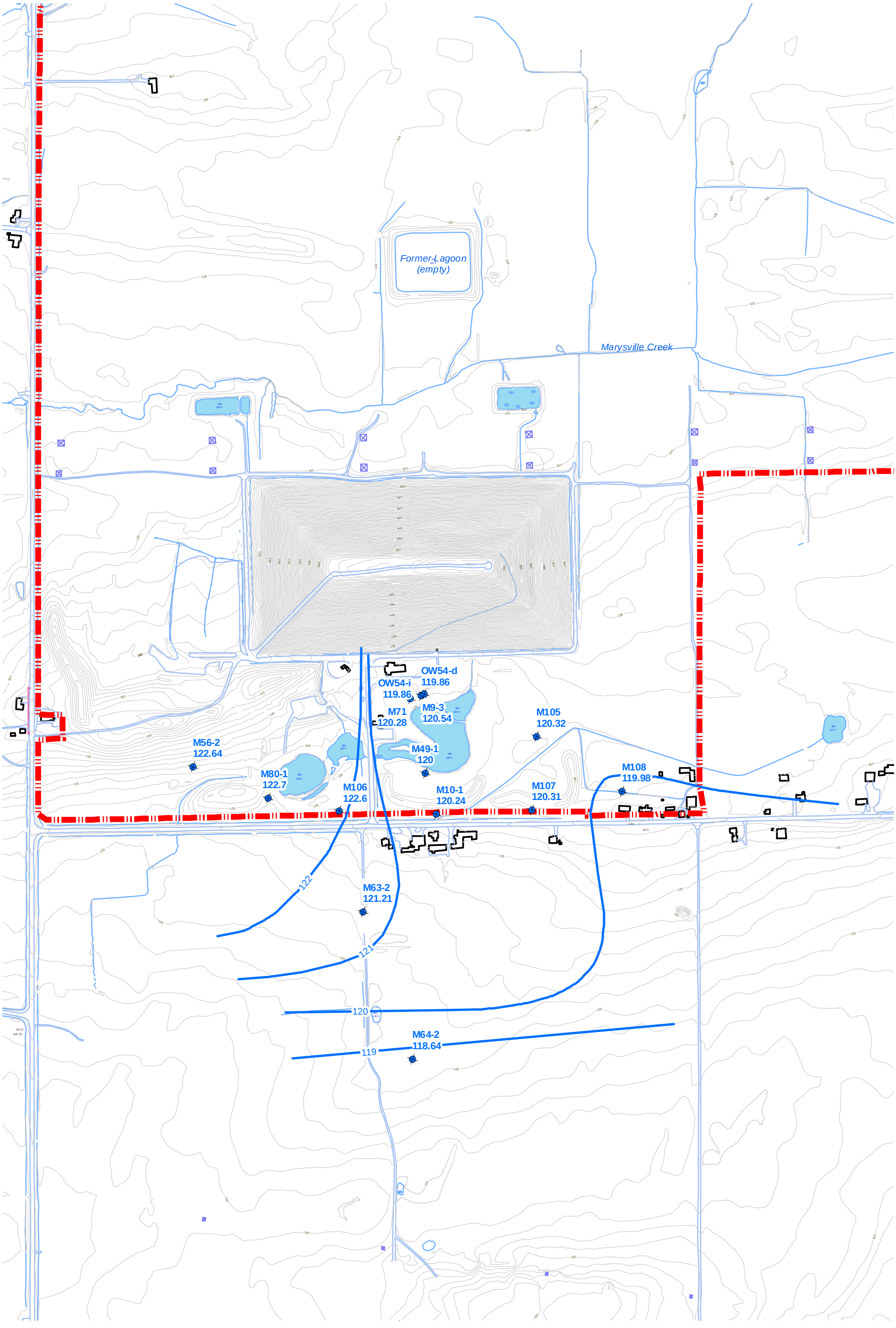
Figure 3a:
Intermediate Bedrock Groundwater Flow Zone Potentiometric Surface - August 13, 2013



WASTE MANAGEMENT
RICHMOND LANDFILL
FALL 2013 ANNUAL REPORT

M58-3 Intermediate Groundwater Zone Elevation Monitor
Topographic Contour Lines
Potentiometric Surface (masl)
Hydro Tower
Surface Water
Property Boundary

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: September 2013

50 25 0 50 100
Meters

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

Figure 3b:
Intermediate Bedrock Groundwater Flow Zone Potentiometric Surface - September 5, 2013

M60-1
122.58

Former Lagoon
(empty)

M59-3
122.72

M59-2
122.75

M59-4
122.73

Marysville Creek

M82-1
122.2

M82-2
122.46

M50-3
124.44

M95-1
122.59

M74
124.33

M3A-3
124.64

M73
122.59

M58-3
122.74

M72
122.52

M91-1
122.75

M71
120.16

M9-3
120.47

OW54-d
119.86

OW54-i
119.86

M105
120.19

M56-2
122.72

M49-1
119.97

M108
119.89

M80-1
122.78

M106
122.68

M10-1
120.13

M107
120.17

Beechwood Road

M63-2
121.13

County Road 10

M64-2
118.56

123
124
122
121
120
119

WASTE MANAGEMENT
RICHMOND LANDFILL
FALL 2013 SEMI-ANNUAL REPORT

M58-3 Intermediate Groundwater Zone Elevation Monitor
Topographic Contour Lines
Potentiometric Surface (masl)
Hydro Tower
Surface Water
Property Boundary

Project : K-B11166-00-03
Data Source: WM Canada, WESA,
HPA Ltd. Base Mapping 2009
Date: October 2013

50 25 0 50 100
Meters

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

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WASTE MANAGEMENT

Figure 3c:
Intermediate Bedrock Groundwater Flow Zone Potentiometric Surface - October 16, 2013

OW37-s	
Alkalinity	140
Ammonia	< 0.15

M67-2	
Alkalinity	360
Ammonia	1.2

M101	
Alkalinity	430
Ammonia	0.17
1,4-Dioxane	0.0054
Tritium	15.9

M103	
Alkalinity	820
Ammonia	0.18
1,4-Dioxane	0.03
Tritium	30.4

M66-2	
Alkalinity	340
Ammonia	0.18

M68-4	
Alkalinity	250
Ammonia	< 0.15

M102	
Alkalinity	430
Ammonia	< 0.15
1,4-Dioxane	< 0.001
Tritium	10.9

M96	
Alkalinity	310
Ammonia	< 0.15

M41	
Alkalinity	280
Ammonia	< 0.15
1,4-Dioxane	0.00161
Tritium	11.9

M99-2	
Alkalinity	300
Ammonia	0.2

M70-3	
Alkalinity	380
Ammonia	< 0.15

M87-2	
Alkalinity	190
Ammonia	< 0.15

M97	
Alkalinity	220
Ammonia	< 0.15

M80-2	
Alkalinity	320
Ammonia	< 0.15

M81	
Alkalinity	360
Ammonia	< 0.15

M54-4	
Alkalinity	360
Ammonia	< 0.15
1,4-Dioxane	< 0.001
Tritium	11.6

WASTE MANAGEMENT
RICHMOND LANDFILL
Figure 4:
Shallow Flow Zone Concentrations
Fall 2013 Semi-Annual Monitoring Report

Groundwater samples were collected as part of the
Fall 2013 monitoring event, during the period from October 21 - 29, 2013

Legend

M53-4 — Shallow Monitoring Well Sampled for Chemistry

Property Boundary

Parameter	Units
Alkalinity	mg/L CaCO3
Ammonia	mg/L
1,4-Dioxane	mg/L
Tritium	TU*

* Tritium is reported in Tritium Units.

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: December 2013

0 12.5 25 50 75 100
Metres

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

M59-2	
Alkalinity	430
Ammonia	0.48
1,4-Dioxane	< 0.001
Tritium	9.7

M59-3	
Alkalinity	290
Ammonia	< 0.15

M59-4	
Alkalinity	300
Ammonia	1.09

M82-1	
Alkalinity	330
Ammonia	0.81

M82-2	
Alkalinity	330
Ammonia	0.27

M95-1	
Alkalinity	310
Ammonia	< 0.15

OW1	
Alkalinity	460
Ammonia	6.72
1,4-Dioxane	< 0.001
Tritium	<0.8

M5-3	
Alkalinity	450
Ammonia	1.4

M75	
Alkalinity	440
Ammonia	2.02
1,4-Dioxane	< 0.001
Tritium	2.2

M6-3	
Alkalinity	1000
Ammonia	4.08
1,4-Dioxane	0.348
Tritium	625.6

M9-3	
Alkalinity	260
Ammonia	1.18
1,4-Dioxane	< 0.001
Tritium	6.7

M74	
Alkalinity	310
Ammonia	1.16

M58-3	
Alkalinity	310
Ammonia	< 0.15

M72	
Alkalinity	280
Ammonia	0.58

OW4	
Alkalinity	1100
Ammonia	1.38
1,4-Dioxane	0.123
Tritium	186.7

OW54-d	
Alkalinity	270
Ammonia	1.22

M52-1	
Alkalinity	400
Ammonia	1.3
1,4-Dioxane	< 0.001
Tritium	1.6

M105	
Alkalinity	550
Ammonia	0.8
1,4-Dioxane	0.022
Tritium	30.8

M91-1	
Alkalinity	300
Ammonia	0.72

M70-1	
Alkalinity	400
Ammonia	2.44

M56-2	
Alkalinity	260
Ammonia	< 0.15

M49-1	
Alkalinity	400
Ammonia	0.94

M80-1	
Alkalinity	140
Ammonia	0.4

M71	
Alkalinity	620
Ammonia	1.56
1,4-Dioxane	0.0326
Tritium	40.1

M10-1	
Alkalinity	560
Ammonia	0.74
1,4-Dioxane	0.0219
Tritium	33.7

M07	
Alkalinity	540
Ammonia	0.2
1,4-Dioxane	0.014
Tritium	26.8

M49-2	
Alkalinity	740
Ammonia	1.39
1,4-Dioxane	< 0.001
Tritium	3

Former Lagoon (Empty)

WASTE MANAGEMENT
RICHMOND LANDFILL

Figure 5:
Intermediate Flow Zone Concentrations
Fall 2013 Semi-Annual Monitoring Report

Groundwater samples were collected as part of the
Fall 2013 monitoring event, during the period from October 21 - 29, 2013

Legend

M53-4 — Intermediate Monitoring Well Sampled for Chemistry

Property Boundary

Parameter	Units
Alkalinity	mg/L CaCO3
Ammonia	mg/L
1,4-Dioxane	mg/L
Tritium	TU*

* Tritium is reported in Tritium Units.

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: December 2013

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

0 12.5 25 50 75 100
Metres

WESA a BluMetric company

WM WASTE MANAGEMENT

Former Lagoon (empty)

Marysville Creek

1264 Beechwood Rd	
Alkalinity	440
Ammonia	0.57

1206 Beechwood Rd	
Alkalinity	510
Ammonia	1.14

1181 Beechwood Rd	
Alkalinity	300
Ammonia	2.59

1097 Beechwood Rd	
Alkalinity	240
Ammonia	< 0.15

1252 Beechwood Rd

1250 Beechwood Rd

1264 Beechwood Rd

1206 Beechwood Rd

1181 Beechwood Rd

1144 Beechwood Rd

1097 Beechwood Rd

1252 Beechwood Rd	
Alkalinity	310
Ammonia	0.18

1250 Beechwood Rd	
Alkalinity	490
Ammonia	0.45

1144 Beechwood Rd	
Alkalinity	360
Ammonia	0.98

WASTE MANAGEMENT
RICHMOND LANDFILL
Figure 6:
Domestic Well Concentrations
Fall 2013 Semi-Annual Monitoring Report

Legend

Domestic Well Sampled for Chemistry

Property Boundary

Parameter	Units
Alkalinity	mg/L CaCO3
Ammonia	mg/L

Project : K-B11166-00-03
Data Source: WM Canada, WESA, HPA Ltd. Base Mapping 2009
Date: December 2013

Prepared by:
WESA Geomatics

Units:
UTM NAD 83 Zone 18

Scale: 1:6000

0 12.5 25 50 75 100
Metres

Groundwater samples were collected as part of the Fall 2013 monitoring event on October 23, 2013

APPENDIX A

Monitoring Well Inventory

Appendix A
Monitoring Well Inventory

Monitoring Well	Easting	Northing
2054	335293	4902797
2055	335402	4902782
M3A-1	334990	4902928
M3A-2	334990	4902930
M3A-3	334990	4902930
M4-1	335006	4903036
M4-2	335006	4903038
M4-3	335006	4903038
M5-1	335003	4903162
M5-2	335003	4903163
M5-3	335003	4903163
M6-1	335200	4903172
M6-2	335201	4903174
M6-3	335201	4903174
M9-1	335410	4902787
M9-2	335410	4902789
M9-3	335410	4902789
M9R-1	335400	4902787
M10-1	335494	4902596
M10-2	335494	4902596
M10-3	335494	4902594
M12	335500	4902596
M14	335625	4902637
M15	335528	4902695
M16	335447	4902710
M18	335648	4902866
M19	335632	4902944
M23	335602	4903049
M27	334997	4902908
M28	334897	4902853
M29	334924	4902983
M30	334999	4903033
M31	334857	4902977
M35	335458	4903336
M38	335006	4902978
M39	335299	4903310
M41	335368	4902818
M42-1	335006	4903006
M42-2	335007	4903008
M42-3	335007	4903008
M43-1	335475	4902588
M43-2	335476	4902590
M43-3	335476	4902590
M45-1	334790	4904582
M45-2	334790	4904582
M45-3	334790	4904582
M46-1	335185	4903230
M46-2	335185	4903232
M47-1	335552	4903214
M47-2	335552	4903215
M47-3	335552	4903215
M48-1	334838	4902564
M48-2	334839	4902565
M48-3	334839	4902565

Appendix A
Monitoring Well Inventory

Monitoring Well	Easting	Northing
M49-1	335454	4902658
M49-2	335455	4902660
M49-3	335455	4902660
M50-1	335660	4903247
M50-2	335660	4903248
M50-3	335660	4903248
M51-1	335714	4903073
M51-2	335714	4903075
M51-3	335714	4903075
M52-1	335748	4902939
M52-2	335748	4902940
M52-3	335748	4902940
M53-1	335501	4902651
M53-2	335499	4902650
M53-3	335498	4902650
M53-4	335496	4902649
M54-1	335346	4902623
M54-2	335347	4902622
M54-3	335347	4902620
M54-4	335348	4902618
M55-1	334961	4903151
M55-2	334962	4903149
M55-3	334962	4903148
M55-4	334963	4903146
M56-1	335066	4902508
M56-2	335065	4902545
M57	335418	4902623
M58-1	334760	4902816
M58-2	334760	4902814
M58-3	334761	4902812
M58-4	334761	4902811
M59-1	334609	4903287
M59-2	334607	4903287
M59-3	334606	4903287
M59-4	334604	4903287
M60-1	335044	4903538
M60-3	335079	4903494
M60-4	335077	4903494
M61-1	334457	4903750
M61-2	334456	4903749
M61-3	334455	4903748
M61-4	334454	4903747
M62-1	335166	4904438
M62-2	335168	4904441
M62-3	335166	4904441
M62-4	335165	4904440
M63-1	335424	4902393
M63-2	335425	4902394
M64-1	335585	4902174
M64-2	335585	4902176
M65-1	335297	4903314
M65-2	335298	4903316
M66-1	335154	4903218
M66-2	335155	4903219

Appendix A
Monitoring Well Inventory

Monitoring Well	Easting	Northing
M67-1	334799	4903089
M67-2	334799	4903090
M68-1	335670	4903504
M68-2	335671	4903502
M68-3	335671	4903500
M68-4	335672	4903499
M69-1	335062	4904299
M69-2	335063	4904298
M69-3	335063	4904296
M69-4	335064	4904295
M70-1	335890	4902862
M70-2	335891	4902860
M70-3	335891	4902858
M71	335390	4902773
M72	334981	4902831
M73	334931	4902891
M74	334950	4902962
M75	335151	4903215
M76	335675	4903217
M77	335685	4903188
M78	335391	4902776
M79	335673	4903215
M80-1	335207	4902532
M80-2	335206	4902534
M81	335275	4902654
M82-1	334640	4903060
M82-2	334641	4903058
M83	335169	4903156
M84	334702	4903072
M85	334999	4903208
M86	335077	4903195
M87-1	334959	4902493
M87-2	334965	4902495
M88-1	334883	4902497
M88-2	334885	4902499
M89-1	334815	4902673
M89-2	334818	4902674
M90-1	334520	4903845
M90-2	334522	4903843
M91-1	334798	4902729
M91-2	334792	4902734
M93	335006	4903908
M94-1	335497	4903519
M94-2	335486	4903526
M95-1	334743	4902908
M95-2	334740	4902917
M96	335774	4903158
M97	335059	4902551
M98	334976	4902730
M99-1	334869	4902646
M99-2	334869	4902646
M100	334994	4902965
M101	334949	4903015
M102	334836	4902919

Appendix A
Monitoring Well Inventory

Monitoring Well	Easting	Northing
M103	335021	4903101
M104	335150	4903152
M105	335620	4902778
M106	335331	4902549
M107	335650	4902654
M108	335791	4902733
M109-1	335405	4902844
M109-2	335407	4902840
M110-1	335543	4902883
M110-2	335546	4902884
M111-1	335250	4902774
M111-2	335254	4902774
M112-1	335274	4902692
M112-2	335277	4902693
M113-1	335123	4902751
M113-2	335119	4902750
M114-1	335437	4902530
M114-2	335439	4902528
M115-1	335489	4902561
M115-2	335490	4902558
M116	335480	4902494
M117	335586	4902525
M121	335529	4902337
M122	335742	4902433
M123	335905	4902479
M125	335561	4902368
M166	336069	4902589
M167	336266	4902624
M168	336063	4902714
M170	335889	4902865
M172	335490	4902593
OW1	334995	4903200
OW4	335108	4903128
OW5	335113	4903134
OW36	334799	4903100
OW37-d	334630	4903063
OW37-s	334634	4903062
OW54-d	335406	4902785
OW54-i	335406	4902785
OW54-s	335406	4902785
OW55-d	335376	4903186
OW55-i	335376	4903186
OW55-s	335376	4903184
OW56-d	335106	4903131
OW56-i	335106	4903131
OW56-s	335106	4903129
OW57	335117	4902762
PW1	335465	4902639
PW2	334988	4903095
PW3	335620	4902778
PW4	335626	4902775
PW5	335066	4902547

APPENDIX B

June 27, 2013 Memorandum – Domestic Well Results

MEMORANDUM

Date:	June 27, 2013
Project No.:	KB5691-00-06
To:	Chris Prucha, Waste Management (WM)
Cc:	Tim Murphy, Reid Cleland and William McDonough, WM Harry Dahme, Gowlings
From:	David Harding, WESA, a division of BluMetric Environmental Inc.
Re:	Groundwater Sampling Items to be reported by June 30, 2013 Further Interim Minutes of Settlement and ERT Order WM Richmond Landfill, Town of Greater Napanee, Ontario

The purpose of this memo is to provide the analytical chemistry results from the groundwater monitoring locations that are to be reported by June 30, 2013, in accordance with the Further Interim Minutes of Settlement and the ERT Order issued on April 26, 2013. The specific conditions and an overview of the attached results are provided below:

Settlement	ERT Order	Requirement
2g.	6G.	WMC shall resample wells M5-1, M5-2 and M46-1 and provide results to Parties by June 30, 2013.

Monitoring wells M5-1 and M5-2 were sampled on April 30, 2013. As with previous monitoring events (and as previously explained to CCCTE and MBQ), monitoring well M46-1 remains dry and could not be sampled for groundwater. The analytical chemistry results from M5-1 and M5-2 are found in the table attached to this memorandum.

The April 2013 results are consistent with previous results, and reflect the naturally poor water quality known to occur at M5-1 and M5-2. The monitoring wells are constructed in a low hydraulic conductivity environment, and are not responsive to pumping tests or seasonal water level variations. There are no indications of leachate impacts at these monitoring locations. In particular, the specific indicators requested by CCCTE and MBQ (tritium and 1,4 dioxane) were not detected at these wells. Therefore, there is no need to include these monitoring wells in a revised EMP, as requested by CCCTE.

Tel. 613-839-3053
Fax. 613-839-5376

WESA, a division of BluMetric Environmental Inc.
3108 Carp Road, PO Box 430, Ottawa, Ontario, Canada K0A 1L0

www.wesa.ca

Settlement	ERT Order	Requirement
2d.	6D.	By no later than May 31, 2013, and subject to receiving the consent of the applicable residents, WMC shall sample and test any domestic wells within a one kilometre radius of the perimeter of the landfill footprint that have not previously been tested for all parameters set out in the domestic well water quality monitoring program, 1,4 dioxane, tritium and VOCs and provide the results to the Parties by June 30, 2013.
Settlement	ERT Order	Requirement
2f.	6F.	By no later than May 31, 2013, WMC shall conduct a well survey within an area one kilometre to the east and west and two kilometres south of the landfill footprint boundary. Any wells within this area which are being pumped for more than just normal domestic use are to be sampled, with any such wells being tested for leachate indicator parameters including tritium and 1,4 dioxane, subject to receiving the consent of the owners of such wells. Where such wells are owned by WMC, consent shall not be withheld. Within 30 days of receiving the analytical results from the testing as described in this Paragraph, WMC shall provide the Parties with a report describing the results of the sampling. The need for an expanded area for such a survey and sampling (e.g. to 3.5 km south of the landfill) shall be reviewed by the Parties when WMC submits an application for a Contaminant Attenuation Zone (CAZ) pursuant to paragraph 2(l) of these Minutes.

Included in the tables attached to this memorandum are the results for the domestic wells within one kilometre of the landfill footprint (Settlement Item 2d and ERT Order Item 6D), as well as the results from the well at 1063 Deseronto Road, which is within 2 km south of the landfill and was included in the well survey (Settlement Item 2f and ERT Order Item 6F). The report of the well inspection survey for all domestic wells was previously provided to the parties (WESA/BluMetric memo dated May 30, 2013).

The water quality at 1063 Deseronto Road (which is a shallow dug well) has low concentrations of dissolved solids, no VOC detections including 1,4 dioxane, and tritium at background levels (<25 TU). There is no evidence of leachate impacts to the well. However, it is noted that this well exhibited the highest concentrations of nitrate, phosphorus and potassium (N-P-K) among the domestic wells sampled in Spring 2013. It appears that there may be fertilizer or agricultural impacts occurring at this well. In particular, the homeowner should be informed that the reported nitrate level (16 mg/L) exceeds the Ontario Drinking Water Standard (10 mg/L).

Three other wells are located within one kilometre of the landfill and are not included in the Environmental Monitoring Plan (1340 and 1517 Deseronto Rd, and 1464 Callaghan Rd). The first two of these are shallow dug wells, the third is a drilled well. These wells exhibit low concentrations of dissolved solids, no VOC detections including 1,4 dioxane, and tritium at

concentrations of dissolved solids, no VOC detections including 1,4 dioxane, and tritium at background levels. There is no evidence of leachate impacts to these wells. The sodium and chloride concentrations are elevated at 1517 Deseronto Rd, which is located at the intersection of Tucker Rd and Deseronto Rd. This is likely due to impacts from surface runoff of road salting and/or dust control along the roadways.

The remaining eight locations along Beechwood Rd are all included in the EMP domestic well sampling program. All of the residences are vacant, except 1121 and 1144 Beechwood Rd. The house at 1144 Beechwood is on a tank-based whole-house water supply, and no longer uses the well for domestic purposes (as of May 2013). The well at 1121 Beechwood is a shallow dug well and shows low concentrations of dissolved solids, with no evidence of impacts from leachate or other sources. Similarly, the well at 1097 Beechwood (also a shallow dug well) reflects natural water quality with no evidence of impacts.

The domestic well sampling results are consistent with previous monitoring events. Chlorinated aliphatic compounds were detected at 1144, 1206, 1250, 1252 and 1264 Beechwood Rd. Concentrations of 1,4 dioxane were detected at 1144, 1181, 1206, 1250, 1252 and 1264 Beechwood Rd. Tritium was detected above background levels at 1144, 1206, 1252 and 1264 Beechwood Rd. The detected concentrations of VOCs and tritium, as well as the general and inorganic parameters, indicate potential impacts from contaminant source(s) at the following locations: 1144, 1181, 1206, 1250, 1252 and 1264 Beechwood. The sources may include one or more of the following: the landfill, the former abattoir, surface water infiltration, sewage systems, livestock and agricultural activities and the deep saline groundwater. Further investigation is ongoing in the area to better define the various sources of impact south of the landfill.

We trust you will find the above summary report to be satisfactory. If you have any questions regarding the above information, please contact the undersigned anytime.

Respectfully submitted,

David Harding

David Harding, M.Sc. P.Eng.
Senior Consulting Engineer

Encl.
Ref: KB5691-00-06 Memo June27-2013.

TABLES

ERT Order 6G Results: M5-1, M5-2 (M46-1 remains dry)
ERT Orders 6D and 6F Results: Domestic Water Supply Wells

ERT Order 6G Results: M5-1, M5-2 (M46-1 remains dry)

Reading Name	Units	M5-1 2013-04-30	M5-2 2013-04-30
General and Inorganic Parameters			
Alkalinity	mg/L	420	480
Ammonia	mg/L	0.92	1.43
Arsenic	mg/L	< 0.001	< 0.001
Barium	mg/L	0.019	0.19
Biochemical Oxygen Demand	mg/L	< 2	63
Boron	mg/L	1.5	1.6
Cadmium	mg/L	< 0.0001	< 0.0001
Calcium	mg/L	14	21
Chemical Oxygen Demand	mg/L	29	120
Chloride	mg/L	140	330
Chromium	mg/L	< 0.005	< 0.005
Conductivity	µS/cm	1280	1730
Copper	mg/L	< 0.001	< 0.001
Dissolved Organic Carbon	mg/L	1.8	1.5
Hardness	mg/L	69	110
Iron	mg/L	< 0.1	< 0.1
Lead	mg/L	< 0.0005	< 0.0005
Magnesium	mg/L	8.3	14
Manganese	mg/L	< 0.002	< 0.002
Mercury	mg/L	< 0.0002	< 0.0002
Naphthalene	mg/L	< 0.0005	< 0.0005
Nitrate	mg/L	< 0.1	< 1
Nitrite	mg/L	< 0.01	< 0.1
pH (Lab)	unitless	8.3	8.64
Phenols	mg/L	0.0016	0.12
Phosphorus (total)	mg/L	0.18	0.15
Potassium	mg/L	8.3	11
Sodium	mg/L	270	350
Sulphate	mg/L	24	75
Total Dissolved Solids	mg/L	746	1030
Total Kjeldahl Nitrogen	mg/L	1	< 1
Zinc	mg/L	< 0.005	< 0.005

ERT Order 6G Results: M5-1, M5-2 (M46-1 remains dry)

Reading Name	Units	M5-1 2013-04-30	M5-2 2013-04-30
Volatile Organic Compounds (VOCs)			
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002
1,1-Dichloroethane	mg/L	< 0.0001	< 0.0001
1,1-Dichloroethylene	mg/L	< 0.0001	< 0.0001
1,2-Dibromoethane	mg/L	< 0.0002	< 0.0002
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002
1,2-Dichloropropane	mg/L	< 0.0001	< 0.0001
1,3,5-Trimethylbenzene	mg/L	< 0.0002	< 0.0002
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002
Benzene	mg/L	0.0051	0.012
Bromodichloromethane	mg/L	< 0.0001	< 0.0001
Bromoform	mg/L	< 0.0002	< 0.0002
Bromomethane	mg/L	< 0.0005	< 0.0005
Carbon Tetrachloride	mg/L	< 0.0001	< 0.0001
Chlorobenzene	mg/L	< 0.0001	< 0.0001
Chloroethane	mg/L	< 0.0002	< 0.0002
Chloroform	mg/L	< 0.0001	< 0.0001
Chloromethane	mg/L	0.0018	< 0.0005
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001
Cis-1,3-Dichloropropylene	mg/L	< 0.0002	< 0.0002
Dibromochloromethane	mg/L	< 0.0002	< 0.0002
Dichloromethane	mg/L	< 0.0005	< 0.0005
Ethylbenzene	mg/L	< 0.0001	< 0.0001
m+p-Xylene	mg/L	< 0.0001	< 0.0001
o-Xylene	mg/L	< 0.0001	< 0.0001
Styrene	mg/L	< 0.0002	< 0.0002
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001
Toluene	mg/L	< 0.0002	0.00024
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001
Trans-1,3-dichloropropylene	mg/L	< 0.0002	< 0.0002
Trichloroethylene	mg/L	< 0.0001	< 0.0001
Trichlorofluoromethane	mg/L	< 0.0002	< 0.0002
Vinyl Chloride	mg/L	< 0.0002	< 0.0002
Additional Parameters			
1,4-Dioxane	mg/L	< 0.001	< 0.001
Tritium (3H)	TU	< 0.8	< 0.8

ERT Orders 6D and 6F Results: Domestic Water Supply Wells

Reading Name	Units	1097 Beechwood Rd 2013-04-24	1121 Beechwood Rd 2013-04-24	1144 Beechwood Rd 2013-04-24	1181 Beechwood Rd 2013-04-24	1206 Beechwood Rd 2013-04-24	1250 Beechwood Rd 2013-04-24	1252 Beechwood Rd 2013-04-24	1264 Beechwood Rd 2013-04-24	1063 Deseronto Rd 2013-05-15	1340 Deseronto Rd 2013-04-24	1517 Deseronto Rd 2013-04-24	1464 Callaghan Rd 2013-04-24
General and Inorganic Parameters													
Alkalinity	mg/L	210	240	470	390	670	360	530	520	230	330	370	290
Ammonia	mg/L	< 0.15	< 0.15	1.03	2.28	0.28	0.41	0.64	0.51	< 0.15	< 0.15	< 0.15	< 0.15
Arsenic	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.0022	0.0016	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Barium	mg/L	0.063	0.062	0.024	0.11	0.14	0.15	0.26	0.092	0.047	0.093	0.097	0.036
Biochemical Oxygen Demand	mg/L	< 2	< 2	< 2	7	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Boron	mg/L	0.043	0.022	0.28	0.78	0.12	0.11	0.24	0.32	0.031	0.024	0.019	0.022
Cadmium	mg/L	< 0.0001	0.00012	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00025
Calcium	mg/L	83	83	130	110	260	120	170	160	110	130	200	110
Chemical Oxygen Demand	mg/L	5.3	4.2	15	22	7.4	13	31	25	11	< 4	< 4	6.3
Chloride	mg/L	5	8	110	360	180	59	140	200	10	11	360	4
Chromium	mg/L	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Conductivity	µS/cm	504	562	1260	2000	1820	883	1450	1640	610	756	2110	609
Copper	mg/L	0.007	0.0025	< 0.001	0.089	0.59	< 0.001	0.012	0.0023	0.0075	0.066	0.027	0.011
Dissolved Organic Carbon	mg/L	3	2	5	4.2	8.2	5.2	8.5	6.7	5.1	2	3.2	2.3
Hardness	mg/L	260	280	490	450	780	370	530	560	300	380	550	310
Iron	mg/L	0.12	< 0.1	< 0.1	1.3	2.8	15	23	11	< 0.1	0.53	0.2	2.2
Lead	mg/L	0.00066	< 0.0005	< 0.0005	0.01	0.034	< 0.0005	0.00059	< 0.0005	< 0.0005	0.0023	0.0012	0.0086
Magnesium	mg/L	12	21	41	52	44	23	38	44	9.8	26	32	15
Manganese	mg/L	< 0.002	0.011	0.0034	0.013	3.9	0.97	0.97	0.56	0.0071	0.0053	0.0036	0.053
Mercury	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Naphthalene	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0008	< 0.0005	< 0.0005	< 0.0005
Nitrate	mg/L	4.7	0.26	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	16	1.9	0.76	2.3
Nitrite	mg/L	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
pH (Lab)	unitless	8.22	8.11	7.89	7.99	7.67	7.78	7.76	7.74	7.98	8	8.01	8.1
Phenols	mg/L	< 0.001	< 0.001	0.0019	0.02	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Phosphorus (total)	mg/L	0.04	< 0.03	< 0.03	0.1	0.13	< 0.03	0.04	< 0.03	0.42	< 0.03	< 0.03	0.04
Potassium	mg/L	6.6	2.1	11	16	7	3.7	5.6	7.9	21	2.4	6.1	1.5
Sodium	mg/L	8	11	84	240	110	54	110	150	5	16	240	7.7
Sulphate	mg/L	20	38	29	15	35	16	11	13	18	55	110	25
Total Dissolved Solids	mg/L	300	322	686	1080	1080	492	820	876	408	446	1280	334
Total Kjeldahl Nitrogen	mg/L	< 0.7	< 0.7	1.5	2.4	0.8	1.1	1.2	1.1	< 0.7	< 0.7	< 0.7	< 0.7
Zinc	mg/L	0.076	0.042	< 0.005	0.017	0.19	0.016	0.097	0.04	0.016	0.14	0.059	0.5

ERT Orders 6D and 6F Results: Domestic Water Supply Wells

Reading Name	Units	1097 Beechwood Rd 2013-04-24	1121 Beechwood Rd 2013-04-24	1144 Beechwood Rd 2013-04-24	1181 Beechwood Rd 2013-04-24	1206 Beechwood Rd 2013-04-24	1250 Beechwood Rd 2013-04-24	1252 Beechwood Rd 2013-04-24	1264 Beechwood Rd 2013-04-24	1063 Deseronto Rd 2013-05-15	1340 Deseronto Rd 2013-04-24	1517 Deseronto Rd 2013-04-24	1464 Callaghan Rd 2013-04-24
Volatile Organic Compounds (VOCs)													
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0083	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,1-Dichloroethane	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00078	0.0035	0.012	0.00083	< 0.0001	< 0.0001	< 0.0001	< 0.0001
1,1-Dichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00014	0.0019	0.00032	< 0.0001	< 0.0001	< 0.0001	< 0.0001
1,2-Dibromoethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,2-Dichloropropane	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
1,3,5-Trimethylbenzene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Benzene	mg/L	< 0.0001	< 0.0001	< 0.0001	0.00014	< 0.0001	< 0.0001	< 0.0001	0.00013	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Bromodichloromethane	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Bromoform	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Bromomethane	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Carbon Tetrachloride	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chlorobenzene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chloroethane	mg/L	< 0.0002	< 0.0002	0.00048	< 0.0002	< 0.0002	0.0016	0.0063	0.014	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chloroform	mg/L	0.00042	0.00015	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0015	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Chloromethane	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Cis-1,3-Dichloropropylene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromochloromethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloromethane	mg/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Ethylbenzene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
m+p-Xylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
o-Xylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Styrene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00019	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Toluene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Trans-1,3-dichloropropylene	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Trichloroethylene	mg/L	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.00016	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Trichlorofluoromethane	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Vinyl Chloride	mg/L	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.00026	0.00029	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Additional Parameters													
1,4-Dioxane	mg/L	< 0.001	< 0.001	0.00907	0.00203	0.00456	0.00709	0.0178	0.0143	< 0.001	< 0.001	< 0.001	< 0.001
Tritium (3H)	TU	14.9	12.5	29.3	18.2	35.3	21.8	29.3	32.5	11.6	6.9	21.1	7.9

APPENDIX C

Results from Analytical Quality Assurance / Quality Control (QA/QC) Program

Appendix C
Results from Quality Assurance / Quality Control (QA/QC) Program

Summary of Results with Relative Percent Difference (RPD[1]) greater than 20%

Location	Parameter	Unit	Field Duplicate	Regular Sample	RPD (%)	MDL[2]	Comment
M58-3	Dissolved Organic Carbon	mg/L	1.4	1.1	24.00	0.2	
M58-3	Boron	mg/L	0.015	0.019	23.53	0.01	within 5x MDL
S5	Copper	mg/L	0.004	0.003	28.57	0.002	within 5x MDL
S5	Total Suspended Solids	mg/L	3	4	28.57	1	within 5x MDL

Note 1: RPD (%) = 100 * ABS (Regular Sample - Duplicate Sample) / ([Regular Sample + Duplicate Sample] / 2)
Note 2: MDL = Laboratory Method Detection Limit

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013

Parameter	Units	M107 Field Duplicate	M107 Regular Sample	RPD (%)
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1-Dichloroethane	mg/L	0.001	0.001	0.00
1,1-Dichloroethylene	mg/L	0.00018	0.00017	5.71
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloropropane	mg/L	< 0.0001	< 0.0001	0.00
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002	0.00
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002	0.00
1,4-Dioxane	mg/L	0.0124	0.014	12.12
Acetone	mg/L	< 0.01	< 0.01	0.00
Alkalinity	mg/L	540	540	0.00
Ammonia	mg/L	0.2	0.2	0.00
Arsenic	mg/L	< 0.001	< 0.001	0.00
Barium	mg/L	0.14	0.14	0.00
Benzene	mg/L	< 0.0001	< 0.0001	0.00
Biochemical Oxygen Demand	mg/L	< 2	< 2	0.00
Boron	mg/L	0.18	0.18	0.00
Bromodichloromethane	mg/L	< 0.0001	< 0.0001	0.00
Bromoform	mg/L	< 0.0002	< 0.0002	0.00
Bromomethane	mg/L	< 0.0005	< 0.0005	0.00
Cadmium	mg/L	< 0.0001	< 0.0001	0.00
Calcium	mg/L	180	180	0.00
Carbon Tetrachloride	mg/L	< 0.0001	< 0.0001	0.00
Chemical Oxygen Demand	mg/L	15	14	6.90
Chloride	mg/L	140	140	0.00
Chlorobenzene	mg/L	< 0.0001	< 0.0001	0.00
Chloroethane	mg/L	0.0082	0.0083	1.21
Chloroform	mg/L	< 0.0001	< 0.0001	0.00
Chloromethane	mg/L	< 0.0005	< 0.0005	0.00
Chromium (Total)	mg/L	< 0.005	< 0.005	0.00
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Cis-1,3-Dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Cobalt	mg/L	< 0.0005	< 0.0005	0.00
Conductivity	µS/cm	1460	1460	0.00

Note: Shaded value indicates RDP% higher than 20%

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013 (continued)

Parameter	Units	M107 Field Duplicate	M107 Regular Sample	RPD (%)
Copper	mg/L	< 0.001	< 0.001	0.00
Dibromochloromethane	mg/L	< 0.0002	< 0.0002	0.00
Dichloromethane	mg/L	< 0.0005	< 0.0005	0.00
Dissolved Organic Carbon	mg/L	6.4	6.5	1.55
Ethylbenzene	mg/L	< 0.0001	< 0.0001	0.00
Hardness	mg/L	630	630	0.00
Iron	mg/L	7.5	7.3	2.70
Lead	mg/L	< 0.0005	< 0.0005	0.00
m+p-Xylene	mg/L	< 0.0001	< 0.0001	0.00
Magnesium	mg/L	44	43	2.30
Manganese	mg/L	0.47	0.47	0.00
Mercury	mg/L	< 0.0002	< 0.0002	0.00
Methyl Ethyl Ketone	mg/L	< 0.005	< 0.005	0.00
Methyl Tert Butyl Ether	mg/L	< 0.0002	< 0.0002	0.00
Naphthalene	mg/L	< 0.0005	< 0.0005	0.00
Nickel	mg/L	0.0042	0.0044	4.65
Nitrate	mg/L	< 0.1	< 0.1	0.00
Nitrite	mg/L	< 0.01	< 0.01	0.00
Nitrite + Nitrate	mg/L	< 0.1	< 0.1	0.00
o-Xylene	mg/L	< 0.0001	< 0.0001	0.00
pH (Lab)	unitless	7.52	7.44	1.07
Phenols	mg/L	0.0017	0.0015	12.50
Phosphorus (total)	mg/L	< 0.03	< 0.03	0.00
Potassium	mg/L	4.2	4.2	0.00
Sodium	mg/L	78	78	0.00
Styrene	mg/L	< 0.0002	< 0.0002	0.00
Sulphate	mg/L	14	13	7.41
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Toluene	mg/L	< 0.0002	< 0.0002	0.00
Total Dissolved Solids	mg/L	808	794	1.75
Total Kjeldahl Nitrogen	mg/L	0.7	< 0.7	0.00
Total Xylenes	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,3-dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Trichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trichlorofluoromethane	mg/L	< 0.0002	< 0.0002	0.00
Vinyl Chloride	mg/L	0.00025	0.00025	0.00
Zinc	mg/L	< 0.005	< 0.005	0.00

Note: Shaded value indicates RDP% higher than 20%

Appendix C
Results from Quality Assurance / Quality Control (QA/QC) Program

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013

Parameter	Units	M58-3 Field Duplicate	M58-3 Regular Sample	RPD (%)
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1-Dichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloropropane	mg/L	< 0.0001	< 0.0001	0.00
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002	0.00
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002	0.00
Acetone	mg/L	< 0.01	< 0.01	0.00
Alkalinity	mg/L	310	310	0.00
Ammonia	mg/L	< 0.15	< 0.15	0.00
Arsenic	mg/L	< 0.001	< 0.001	0.00
Barium	mg/L	0.14	0.13	7.41
Benzene	mg/L	< 0.0001	< 0.0001	0.00
Biochemical Oxygen Demand	mg/L	< 2	< 2	0.00
Boron	mg/L	0.015	0.019	23.53
Bromodichloromethane	mg/L	< 0.0001	< 0.0001	0.00
Bromoform	mg/L	< 0.0002	< 0.0002	0.00
Bromomethane	mg/L	< 0.0005	< 0.0005	0.00
Cadmium	mg/L	< 0.0001	< 0.0001	0.00
Calcium	mg/L	94	90	4.35
Carbon Tetrachloride	mg/L	< 0.0001	< 0.0001	0.00
Chemical Oxygen Demand	mg/L	< 4	< 4	0.00
Chloride	mg/L	4	4	0.00
Chlorobenzene	mg/L	< 0.0001	< 0.0001	0.00
Chloroethane	mg/L	< 0.0002	< 0.0002	0.00
Chloroform	mg/L	< 0.0001	< 0.0001	0.00
Chloromethane	mg/L	< 0.0005	< 0.0005	0.00
Chromium (Total)	mg/L	< 0.005	< 0.005	0.00
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Cis-1,3-Dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Cobalt	mg/L	< 0.0005	< 0.0005	0.00
Conductivity	µS/cm	641	641	0.00
Copper	mg/L	< 0.001	< 0.001	0.00

Note: Shaded value indicates RDP% higher than 20%

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013 (continued)

Parameter	Units	M58-3 Field Duplicate	M58-3 Regular Sample	RPD (%)
Dibromochloromethane	mg/L	< 0.0002	< 0.0002	0.00
Dichloromethane	mg/L	< 0.0005	< 0.0005	0.00
Dissolved Organic Carbon	mg/L	1.4	1.1	24.00
Ethylbenzene	mg/L	< 0.0001	< 0.0001	0.00
Hardness	mg/L	370	350	5.56
Iron	mg/L	< 0.1	< 0.1	0.00
Lead	mg/L	< 0.0005	< 0.0005	0.00
m+p-Xylene	mg/L	< 0.0001	< 0.0001	0.00
Magnesium	mg/L	32	31	3.17
Manganese	mg/L	< 0.002	< 0.002	0.00
Mercury	mg/L	< 0.0002	< 0.0002	0.00
Methyl Ethyl Ketone	mg/L	< 0.005	< 0.005	0.00
Methyl Tert Butyl Ether	mg/L	< 0.0002	< 0.0002	0.00
Naphthalene	mg/L	< 0.0005	< 0.0005	0.00
Nickel	mg/L	< 0.001	< 0.001	0.00
Nitrate	mg/L	0.21	0.2	4.88
Nitrite	mg/L	< 0.01	< 0.01	0.00
Nitrite + Nitrate	mg/L	0.21	0.2	4.88
o-Xylene	mg/L	< 0.0001	< 0.0001	0.00
pH (Lab)	unitless	7.96	7.94	0.25
Phenols	mg/L	< 0.001	< 0.001	0.00
Phosphorus (total)	mg/L	< 0.03	0.03	0.00
Potassium	mg/L	1.5	1.5	0.00
Sodium	mg/L	5.7	5.7	0.00
Styrene	mg/L	< 0.0002	< 0.0002	0.00
Sulphate	mg/L	39	40	2.53
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Toluene	mg/L	< 0.0002	< 0.0002	0.00
Total Dissolved Solids	mg/L	344	356	3.43
Total Kjeldahl Nitrogen	mg/L	< 0.7	< 0.7	0.00
Total Xylenes	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,3-dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Trichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trichlorofluoromethane	mg/L	< 0.0002	< 0.0002	0.00
Vinyl Chloride	mg/L	< 0.0002	< 0.0002	0.00
Zinc	mg/L	< 0.005	< 0.005	0.00

Note: Shaded value indicates RDP% higher than 20%

Appendix C
Results from Quality Assurance / Quality Control (QA/QC) Program

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013

Parameter	Units	M82-2 Field Duplicate	M82-2 Regular Sample	RPD (%)
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1-Dichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloropropane	mg/L	< 0.0001	< 0.0001	0.00
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002	0.00
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002	0.00
Acetone	mg/L	< 0.01	< 0.01	0.00
Alkalinity	mg/L	330	330	0.00
Ammonia	mg/L	0.26	0.27	3.77
Arsenic	mg/L	< 0.001	< 0.001	0.00
Barium	mg/L	0.13	0.13	0.00
Benzene	mg/L	< 0.0001	< 0.0001	0.00
Biochemical Oxygen Demand	mg/L	< 2	< 2	0.00
Boron	mg/L	0.15	0.16	6.45
Bromodichloromethane	mg/L	< 0.0001	< 0.0001	0.00
Bromoform	mg/L	< 0.0002	< 0.0002	0.00
Bromomethane	mg/L	< 0.0005	< 0.0005	0.00
Cadmium	mg/L	< 0.0001	< 0.0001	0.00
Calcium	mg/L	110	110	0.00
Carbon Tetrachloride	mg/L	< 0.0001	< 0.0001	0.00
Chemical Oxygen Demand	mg/L	10	9.1	9.42
Chloride	mg/L	22	21	4.65
Chlorobenzene	mg/L	< 0.0001	< 0.0001	0.00
Chloroethane	mg/L	< 0.002	< 0.002	0.00
Chloroform	mg/L	< 0.0001	< 0.0001	0.00
Chloromethane	mg/L	< 0.0005	< 0.0005	0.00
Chromium (Total)	mg/L	< 0.005	< 0.005	0.00
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Cis-1,3-Dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Cobalt	mg/L	< 0.0005	< 0.0005	0.00
Conductivity	µS/cm	808	809	0.12
Copper	mg/L	< 0.001	< 0.001	0.00

Note: Shaded value indicates RDP% higher than 20%

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013 (continued)

Parameter	Units	M82-2 Field Duplicate	M82-2 Regular Sample	RPD (%)
Dibromochloromethane	mg/L	< 0.0002	< 0.0002	0.00
Dichloromethane	mg/L	< 0.0005	< 0.0005	0.00
Dissolved Organic Carbon	mg/L	2.3	2.3	0.00
Ethylbenzene	mg/L	< 0.0001	< 0.0001	0.00
Hardness	mg/L	400	400	0.00
Iron	mg/L	< 0.1	< 0.1	0.00
Lead	mg/L	< 0.0005	< 0.0005	0.00
m+p-Xylene	mg/L	< 0.0001	< 0.0001	0.00
Magnesium	mg/L	31	30	3.28
Manganese	mg/L	0.02	0.019	5.13
Mercury	mg/L	< 0.0002	< 0.0002	0.00
Methyl Ethyl Ketone	mg/L	< 0.005	< 0.005	0.00
Methyl Tert Butyl Ether	mg/L	< 0.0002	< 0.0002	0.00
Naphthalene	mg/L	< 0.0005	< 0.0005	0.00
Nickel	mg/L	< 0.001	< 0.001	0.00
Nitrate	mg/L	< 0.1	< 0.1	0.00
Nitrite	mg/L	< 0.01	< 0.01	0.00
Nitrite + Nitrate	mg/L	< 0.1	< 0.1	0.00
o-Xylene	mg/L	< 0.0001	< 0.0001	0.00
pH (Lab)	unitless	7.81	7.82	0.13
Phenols	mg/L	0.0023	0.0025	8.33
Phosphorus (total)	mg/L	< 0.03	< 0.03	0.00
Potassium	mg/L	4.1	4.1	0.00
Sodium	mg/L	18	18	0.00
Styrene	mg/L	< 0.0002	< 0.0002	0.00
Sulphate	mg/L	69	69	0.00
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Toluene	mg/L	< 0.0002	< 0.0002	0.00
Total Dissolved Solids	mg/L	484	482	0.41
Total Kjeldahl Nitrogen	mg/L	1.7	< 0.7	0.00
Total Xylenes	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,3-dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Trichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trichlorofluoromethane	mg/L	< 0.0002	< 0.0002	0.00
Vinyl Chloride	mg/L	< 0.0002	< 0.0002	0.00
Zinc	mg/L	< 0.005	< 0.005	0.00

Note: Shaded value indicates RDP% higher than 20%

Appendix C
Results from Quality Assurance / Quality Control (QA/QC) Program

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013

Parameter	Units	M56-2 Field Duplicate	M56-2 Regular Sample	RPD (%)
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1-Dichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloropropane	mg/L	< 0.0001	< 0.0001	0.00
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002	0.00
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002	0.00
Acetone	mg/L	< 0.01	< 0.01	0.00
Alkalinity	mg/L	260	260	0.00
Ammonia	mg/L	< 0.15	< 0.15	0.00
Arsenic	mg/L	< 0.001	< 0.001	0.00
Barium	mg/L	0.19	0.19	0.00
Benzene	mg/L	< 0.0001	< 0.0001	0.00
Biochemical Oxygen Demand	mg/L	< 2	< 2	0.00
Boron	mg/L	0.069	0.069	0.00
Bromodichloromethane	mg/L	< 0.0001	< 0.0001	0.00
Bromoform	mg/L	< 0.0002	< 0.0002	0.00
Bromomethane	mg/L	< 0.0005	< 0.0005	0.00
Cadmium	mg/L	< 0.0001	< 0.0001	0.00
Calcium	mg/L	78	77	1.29
Carbon Tetrachloride	mg/L	< 0.0001	< 0.0001	0.00
Chemical Oxygen Demand	mg/L	< 4	< 4	0.00
Chloride	mg/L	20	20	0.00
Chlorobenzene	mg/L	< 0.0001	< 0.0001	0.00
Chloroethane	mg/L	< 0.0002	< 0.0002	0.00
Chloroform	mg/L	< 0.0001	< 0.0001	0.00
Chloromethane	mg/L	< 0.0005	< 0.0005	0.00
Chromium (Total)	mg/L	< 0.005	< 0.005	0.00
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Cis-1,3-Dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Cobalt	mg/L	< 0.0005	< 0.0005	0.00
Conductivity	µS/cm	696	705	1.28
Copper	mg/L	< 0.001	< 0.001	0.00

Note: Shaded value indicates RDP% higher than 20%

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013 (continued)

Parameter	Units	M56-2 Field Duplicate	M56-2 Regular Sample	RPD (%)
Dibromochloromethane	mg/L	< 0.0002	< 0.0002	0.00
Dichloromethane	mg/L	< 0.0005	< 0.0005	0.00
Dissolved Organic Carbon	mg/L	1.6	1.6	0.00
Ethylbenzene	mg/L	< 0.0001	< 0.0001	0.00
Hardness	mg/L	390	390	0.00
Iron	mg/L	< 0.1	< 0.1	0.00
Lead	mg/L	< 0.0005	< 0.0005	0.00
m+p-Xylene	mg/L	< 0.0001	< 0.0001	0.00
Magnesium	mg/L	47	47	0.00
Manganese	mg/L	0.06	0.06	0.00
Mercury	mg/L	< 0.0002	< 0.0002	0.00
Methyl Ethyl Ketone	mg/L	< 0.005	< 0.005	0.00
Methyl Tert Butyl Ether	mg/L	< 0.0002	< 0.0002	0.00
Naphthalene	mg/L	< 0.0005	< 0.0005	0.00
Nickel	mg/L	< 0.001	< 0.001	0.00
Nitrate	mg/L	< 0.1	< 0.1	0.00
Nitrite	mg/L	< 0.01	< 0.01	0.00
Nitrite + Nitrate	mg/L	< 0.1	< 0.1	0.00
o-Xylene	mg/L	< 0.0001	< 0.0001	0.00
pH (Lab)	unitless	8.11	8.13	0.25
Phenols	mg/L	< 0.001	< 0.001	0.00
Phosphorus (total)	mg/L	< 0.03	< 0.03	0.00
Potassium	mg/L	3.2	3.2	0.00
Sodium	mg/L	13	13	0.00
Styrene	mg/L	< 0.0002	< 0.0002	0.00
Sulphate	mg/L	94	96	2.11
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Toluene	mg/L	< 0.0002	< 0.0002	0.00
Total Dissolved Solids	mg/L	436	484	10.43
Total Kjeldahl Nitrogen	mg/L	< 0.7	< 0.7	0.00
Total Xylenes	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,3-dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Trichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trichlorofluoromethane	mg/L	< 0.0002	< 0.0002	0.00
Vinyl Chloride	mg/L	< 0.0002	< 0.0002	0.00
Zinc	mg/L	< 0.005	< 0.005	0.00

Note: Shaded value indicates RDP% higher than 20%

Appendix C
Results from Quality Assurance / Quality Control (QA/QC) Program

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013

Parameter	Units	S2 Field Duplicate	S2 Regular Sample	RPD (%)
1,1,1,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,1-Trichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1,2,2-Tetrachloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1,2-Trichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,1-Dichloroethane	mg/L	< 0.0001	< 0.0001	0.00
1,1-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
1,2-Dichlorobenzene (o)	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloroethane	mg/L	< 0.0002	< 0.0002	0.00
1,2-Dichloropropane	mg/L	< 0.0001	< 0.0001	0.00
1,3-Dichlorobenzene (m)	mg/L	< 0.0002	< 0.0002	0.00
1,4-Dichlorobenzene (p)	mg/L	< 0.0002	< 0.0002	0.00
Acetone	mg/L	< 0.01	< 0.01	0.00
Alkalinity	mg/L	280	280	0.00
Aluminum	mg/L	0.072	0.078	8.00
Ammonia	mg/L	< 0.15	< 0.15	0.00
Antimony	mg/L	< 0.001	< 0.001	0.00
Arsenic	mg/L	< 0.001	< 0.001	0.00
Barium	mg/L	0.056	0.056	0.00
Benzene	mg/L	< 0.0001	< 0.0001	0.00
Beryllium	mg/L	< 0.0006	< 0.0006	0.00
Biochemical Oxygen Demand	mg/L	< 2	< 2	0.00
Boron	mg/L	< 0.02	< 0.02	0.00
Bromodichloromethane	mg/L	< 0.0001	< 0.0001	0.00
Bromoform	mg/L	< 0.0002	< 0.0002	0.00
Bromomethane	mg/L	< 0.0005	< 0.0005	0.00
Cadmium	mg/L	< 0.0001	< 0.0001	0.00
Calcium	mg/L	100	99	1.01
Carbon Tetrachloride	mg/L	< 0.0001	< 0.0001	0.00
Chemical Oxygen Demand	mg/L	20	21	4.88
Chloride	mg/L	9	9	0.00
Chlorobenzene	mg/L	< 0.0001	< 0.0001	0.00
Chloroethane	mg/L	< 0.0002	< 0.0002	0.00
Chloroform	mg/L	< 0.0001	< 0.0001	0.00
Chloromethane	mg/L	< 0.0005	< 0.0005	0.00
Chromium	mg/L	< 0.005	< 0.005	0.00
Chromium (III)	mg/L	< 0.005	< 0.005	0.00
Chromium (Total)	mg/L	< 0.005	< 0.005	0.00
Chromium (VI)	mg/L	< 0.0005	< 0.0005	0.00
Cis-1,2-Dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Cis-1,3-Dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Cobalt	mg/L	< 0.0005	< 0.0005	0.00
Conductivity	µS/cm	590	587	0.51
Copper	mg/L	< 0.002	< 0.002	0.00
Cyanide (free)	mg/L	< 0.002	< 0.002	0.00
Dibromochloromethane	mg/L	< 0.0002	< 0.0002	0.00

Note: Shaded value indicates RDP% higher than 20%

Appendix C
Results from Quality Assurance / Quality Control (QA/QC) Program

Detailed Results from Field Duplicate vs. Regular Samples - Fall 2013

Parameter	Units	S2 Field Duplicate	S2 Regular Sample	RPD (%)
Dichloromethane	mg/L	< 0.0005	< 0.0005	0.00
Ethylbenzene	mg/L	< 0.0001	< 0.0001	0.00
Hardness	mg/L	270	270	0.00
Iron	mg/L	0.19	0.2	5.13
Lead	mg/L	< 0.0005	< 0.0005	0.00
m+p-Xylene	mg/L	< 0.0001	< 0.0001	0.00
Magnesium	mg/L	16	15	6.45
Manganese	mg/L	0.044	0.039	12.05
Mercury	mg/L	< 0.0002	< 0.0002	0.00
Methyl Ethyl Ketone	mg/L	< 0.005	< 0.005	0.00
Methyl Tert Butyl Ether	mg/L	< 0.0002	< 0.0002	0.00
Molybdenum	mg/L	< 0.002	< 0.002	0.00
Naphthalene	mg/L	< 0.0005	< 0.0005	0.00
Nickel	mg/L	< 0.001	< 0.001	0.00
Nitrate	mg/L	< 0.1	< 0.1	0.00
Nitrite	mg/L	< 0.01	< 0.01	0.00
Nitrite + Nitrate	mg/L	< 0.1	< 0.1	0.00
o-Xylene	mg/L	< 0.0001	< 0.0001	0.00
Phenols	mg/L	0.002	0.0019	5.13
Phosphorus (total)	mg/L	0.031	0.037	17.65
Potassium	mg/L	2.6	2.4	8.00
Selenium	mg/L	< 0.005	< 0.005	0.00
Silver	mg/L	< 0.0004	< 0.0004	0.00
Sodium	mg/L	9	8.7	3.39
Strontium	mg/L	0.25	0.27	7.69
Styrene	mg/L	< 0.0002	< 0.0002	0.00
Sulphate	mg/L	28	28	0.00
Tetrachloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Thallium	mg/L	< 0.0002	< 0.0002	0.00
Tin	mg/L	< 0.002	< 0.002	0.00
Titanium	mg/L	< 0.005	0.007	0.00
Toluene	mg/L	< 0.0002	< 0.0002	0.00
Total Dissolved Solids	mg/L	350	344	1.73
Total Kjeldahl Nitrogen	mg/L	0.8	< 0.7	0.00
Total Suspended Solids	mg/L	1	1	0.00
Total Xylenes	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,2-dichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trans-1,3-dichloropropylene	mg/L	< 0.0002	< 0.0002	0.00
Trichloroethylene	mg/L	< 0.0001	< 0.0001	0.00
Trichlorofluoromethane	mg/L	< 0.0002	< 0.0002	0.00
Uranium	mg/L	0.0019	0.0019	0.00
Vanadium	mg/L	< 0.001	< 0.001	0.00
Vinyl Chloride	mg/L	< 0.0002	< 0.0002	0.00
Zinc	mg/L	< 0.01	< 0.01	0.00

Note: Shaded value indicates RDP% higher than 20%

Appendix C
Results from Quality Assurance / Quality Control (QA/QC) Program

Detailed Results from Field Duplicate vs. Regular Samples - Storm Sampling Event - Sept 2013

Parameter	Units	S5 Field Duplicate	S5 Regular Sample	RPD (%)
Alkalinity	mg/L	130	130	0.00
Aluminum	mg/L	0.23	0.25	8.33
Ammonia	mg/L	<0.15	<0.15	0.00
Antimony	mg/L	<0.001	<0.001	0.00
Arsenic	mg/L	<0.001	<0.001	0.00
Barium	mg/L	0.04	0.04	0.00
Beryllium	mg/L	<0.0006	<0.0006	0.00
Biochemical Oxygen Demand	mg/L	<2	<2	0.00
Boron	mg/L	<0.02	<0.02	0.00
Cadmium	mg/L	<0.0001	<0.0001	0.00
Calcium	mg/L	53	52	1.90
Chemical Oxygen Demand	mg/L	38	40	5.13
Chloride	mg/L	4	4	0.00
Chromium	mg/L	<0.005	<0.005	0.00
Cobalt	mg/L	<0.0005	<0.0005	0.00
Conductivity	µS/cm	327	327	0.00
Copper	mg/L	0.004	0.003	28.57
Cyanide (free)	mg/L	<0.002	<0.002	0.00
Hardness	mg/L	160	160	0.00
Iron	mg/L	0.19	0.21	10.00
Lead	mg/L	<0.0005	<0.0005	0.00
Magnesium	mg/L	9.8	9.6	2.06
Mercury	mg/L	<0.0002	<0.0002	0.00
Molybdenum	mg/L	<0.002	<0.002	0.00
Naphthalene	mg/L	<0.0005	<0.0005	0.00
Nickel	mg/L	<0.001	<0.001	0.00
Nitrate	mg/L	<0.1	<0.1	0.00
Nitrite	mg/L	<0.01	<0.01	0.00
Nitrite + Nitrate	mg/L	<0.1	<0.1	0.00
Phenols	mg/L	<0.001	<0.001	0.00
Phosphorus (total)	mg/L	0.099	0.1	1.01
Potassium	mg/L	2.9	2.9	0.00
Selenium	mg/L	<0.005	<0.005	0.00
Silver	mg/L	<0.0004	<0.0004	0.00
Sodium	mg/L	5.4	5.3	1.87
Strontium	mg/L	0.14	0.14	0.00
Sulphate	mg/L	36	36	0.00
Thallium	mg/L	<0.0002	<0.0002	0.00
Tin	mg/L	<0.002	<0.002	0.00
Titanium	mg/L	0.01	0.012	18.18
Total Dissolved Solids	mg/L	224	234	4.37
Total Kjeldahl Nitrogen	mg/L	1.6	1.6	0.00
Total Suspended Solids	mg/L	3	4	28.57
Uranium	mg/L	0.0005	0.0005	0.00
Vanadium	mg/L	0.001	0.001	0.00
Zinc	mg/L	<0.01	<0.01	0.00

Note: Shaded value indicates RDP% higher than 20%

Division of BluMetric Environmental Inc.

Envir-Eau

440, Blvd Rene-Levesque Ouest
Bureau 350
Montréal, Québec
Canada H2Z 1V7
Téléphone: 514 844.7199
Télécopieur: 514 841.9111
montreal@envireau.ca

160, boul. de l'Hôpital, #204
Gatineau, Québec
Canada J8T 8J1
Téléphone: 819 243.7555
Télécopieur: 819 243.0167
envireau@envireau.ca

WESAtech

4 Cataraqui Street
The Tower, The Woolen Mill
Kingston, Ontario
Canada K7K 1Z7
Tel: (613) 531-2725
Fax: (613) 531-1852
wesaking@wesa.ca

Seprotech

2378 Holly Lane
Ottawa, Ontario
Canada K1V 7P1
Tel: (613) 523-1641
Fax: (613) 731-0851
contact@seprotech.com

WESA Tecnologias S.A. de C.V.

Calle La Mascota, Pasaje # 4,
Casa # 3, Colonia La Mascota,
San Salvador, El Salvador
Teléfono: 011-503-2513-1335
Fax: 613-839-5376
wesasansal@wesa.ca

WESA

3108 Carp Road
PO Box 430
Ottawa, Ontario
Canada K0A 1L0
Tel: (613) 839-3053
Fax: (613) 839-5376
wesacarp@wesa.ca

4 Cataraqui Street
The Tower, The Woolen Mill
Kingston, Ontario
Canada K7K 1Z7
Tel: (613) 531-2725
Fax: (613) 531-1852
wesaking@wesa.ca

171 Victoria Street
North
Kitchener, Ontario
Canada N2H 5C5
Tel: (519) 742-6685
Fax: (519) 742-9810
wesakw@wesa.ca

273 Elm Street
Sudbury, Ontario
Canada P3C 1V5
Tel: (705) 525-6075
Fax: (705) 525-6077
wesasud@wesa.ca

4 Kern Road, Suite 1,
Toronto, Ontario,
Canada M3B 1T1
Tel: (416) 383-0957
Fax: (416) 383-0956
wesatoronto@wesa.ca

4901 – 48 Street
Ground Floor
Yellowknife, NT
Canada X1A 2P9
Tel: (867) 873-3500
Fax: (867) 873-3499
yellowknife@wesa.ca

www.blumetric.ca