Minutes

June 07, 2023

Project name	Brooks Road Landfill	**From**	Katrina McCullough
Subject	2023 Brooks Road PLC #2	**Tel**	+1 416-866-2365
Date/Time	June 7, 2023/ 7:00pm-8:00pm	**Project no.**	018235
Attendees	Katrina McCullough (KM) – GHD Ryan Loveday (RL) – GHD Tim Danyliw (TD) – BRE Michael Durst (MD) – MECP Hamilton District Charlene Anderson (CA) – MECP Hamilton District Dave Bruce (DB) - PLC Member, Chair Dave Glenney (DG) – PLC Member Diane Manto (DM) – Public Kim Seabon (KS) – PLC Member Rod Leclair (RL) – OPP Liaison	**Copy to:**	All Attendees

Summary of Action Items and Commitments
– TD to check if its possible for DB to visit the site – Increase the size of the font on future meeting minutes

Minutes	Action
Objectives and Introductions	– KM provided an overview of the meeting agenda. – KM reviewed the ground rules as well as the purpose and objectives of the meeting.
Review of Previous Minutes	– No comments on the minutes
Previous Commitments **Data logger**	– RL reviewed the procedure to download the leachate level from the cell. DM inquired to the size of the pipe, RL noted the figure indicated 450 mm or 18-inch diameter. TD outlined

Minutes	Action
Groundwater quality data **Food Bank donations** **Financial Assurance**	the operation of the Leachate Treatment System (LTS) and leachate removal in the cell. KS inquired how leachate collection system generally works across the Site, DB outlined the general basis for leachate collection. DB asked if leachate is being collected constantly and if it runs during the night. TD responded that it is running constantly and overnight, however, how much leachate is collected may fluctuate as needed. DB asked if MECP checks the data. CA responded that they do. – KM outlined the information provided to the PLC with respect to groundwater and that the OWDS is utilized for general reference only. Ryan reviewed the south Site property boundary compliance tables, and discussed each item not meeting the Reasonable Use Criteria (RUC). – KM noted soil is delivered from construction sites within the GTA and from local businesses in Hamilton and Niagara. – The BRE Website was updated to reflect regular donations to the Food Bank. DM inquired how much is donated to the Food Bank, TD noted he is unaware. – MD confirmed BRE has provided the appropriate Financial Assurance (FA). MD provided additional background on requirements for the FA. FA is a bond or cash held by the MECP so they could take over the landfill if BRE were to walk away from the site. Currently the FA is approximately $11.5 Million.
Site Updates	– TD provided the Site Update. – TD noted that raw leachate is hauled to Beamsville WWTP, and treated effluent is hauled to Dunnville WWTP. – TD noted a large clean of the membranes was completed along with the aeration tank and Dissolved Air Flotation (DAF) tank. A lot of flushing and cleaning was completed in warmer weather. – TD noted that discussions have started with the MECP for including the DAF as part of the ECA and LTS. The sand filtration will not be pursued. – TD outlined the summary of complaints (no complaints in March, April and May 2023). Tim noted contact information is included on the slides to lodge a complaint. – TD outlined volumes of leachate removed from the Site and corresponding leachate levels. The increase in leachate level in April 2023 was attributed to the cleaning and flushing of the MBR, DAF and aeration tank. TD reviewed the overall considerations for leachate generation and removal, waste compaction and application of cover soil.

Minutes	Action
	– DB asked if there is less leachate generated because there is less exposed waste. TD confirmed that was correct.
Landfill Life Expectancy	– RL reviewed the landfill life expectancy based on survey (December 2022), and projected tonnage and waste characteristics (type, compaction, density, consolidation). As of the previous PLC, the lifespan was approximately 1 year, so closure would be projected to be end of 2023 or into Q1 2024 (depending on waste type, compaction, etc.). – DG asked to confirm that most of the waste received is contaminated soil. TD confirmed that it was.
MECP Update	– CA introduced herself as the new Environmental Officer, recently took over Haldimand County. CA completed a Site inspection on May 23, 2023, no concerns at this time. – No complaints received by MECP at this time.
Approvals	– KM reviewed site approvals. Noted that we are currently looking at Summer 2023 for Open House 2 and the PLC will be updated once a date is set. No date is currently set.
Next Meeting and Other Business	– Next meeting is scheduled for November 1, 2023 – as part of that meeting, there will be meetings set for 2024. – DB noted it is currently dry weather, but it was very wet in March and April and inquired how rainwater is captured in the capped area. TD responded that runoff from the capped area is directed to the perimeter ditch and treated as surface water and runoff from the uncapped or active area or tip face (contact water) is treated as leachate. – DB inquired if he can tour the site. TD noted he would check if that's possible. – DM inquired if funds go to the community (for example the City of Toronto provides $4/tonne to the community where their landfill is located). TD responded that an agreement like that is not in place. MD noted that the Councillor may be best suited to respond. KM noted it would be a discussion between the municipality and BRE. – DG inquired about a completion or approval date for the expansion. KM noted that the completion date is to be determined and the schedule will be updated during Open House #2. – Following the meeting DM requested that the font size for the meeting minutes be increased.

5.4 Groundwater Quality

The groundwater quality monitoring program for the current monitoring period was performed by GHD. A sample key for the groundwater samples collected and analyzed during the current monitoring period is presented in Table 5.2 and the groundwater quality results for the reporting period are provided in Tables 5.4, 5.5 and 5.6 for the shallow overburden, basal overburden/shallow bedrock, and bedrock wells respectively.

Although not a requirement for Site compliance, the discussion of water quality includes an evaluation of analytical results against the criteria listed in the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines, published by the MECP in June 2003, and revised in June 2006 (ODWS). The ODWS includes operational guidelines (OG), aesthetic objectives (AO), maximum acceptable concentrations (MAC), and interim maximum acceptable concentrations (IMAC) are used. Where an ODWS criterion was not available, criteria have been used from Table 2 of the *Soil, Ground Water and Sediment Standards for Use Under part XV.1 of the Environmental Protection Act*, dated April 15, 2011. This evaluation is provided for information and comparative purposes only.

Groundwater quality at the Site is assessed in terms of the presence and magnitude of potential effects from landfilling on groundwater quality primarily through examining the spatial and temporal patterns in leachate indicator parameter concentrations. For the purposes of the Site groundwater, alkalinity, boron, chloride, DOC, hardness, sodium, and TDS have been selected as appropriate leachate indicator parameters (identified in Section 5.2.2.). To aid in the assessment, concentration versus time plots of these parameters for each groundwater monitoring well are provided in Appendix G-2.

An assessment of the groundwater quality relative to the Reasonable Use Criteria (RUC) at boundary monitoring wells is discussed in Section 6.1 and presented in Tables 6.1 to 6.4.

5.4.1 Shallow Overburden Unit

The shallow overburden unit is assessed using groundwater quality data collected from ten on-Site (MW1B-13, MW2B-07, OW1B-06, OW3B-13, OW5B-06, OW8B-06, OW9B-06, MW10B-18, MW11B-19, MW12B-19) and two off-Site (MW5B-09, MW6B-07) shallow overburden wells. As previously indicated monitoring wells MW2B-07, MW5B-07, and MW12B-19 were noted as dry or insufficient volume to sample during the November monitoring event.

Monitoring wells MW1B-13, OW3B-13 and OW9B-06 are located upgradient relative to the landfill. Accordingly, water quality from these locations is interpreted to represent water quality flowing on-Site from upgradient. As OW3B-13 is located further from the landfill footprint than OW9B-06 and further from Brooks Road than MW1B-13, OW3B-13 represents the most conservative upgradient location. As such, the water quality data from this well has been included on the concentration versus time plots in Appendix G-2.A so that comparison of water quality at each location to OW3B-13 can be made.

General Chemistry and Metals analytical results are summarized in Table 5.4A. Organics (VOCs and PAHs) results are summarized in Table 5.4B. Historical data is provided in Appendix G-1.

The following paragraphs describe the observations of shallow overburden water quality during the current monitoring period.

North Side of Landfill (Upgradient)

Water quality at MW1B-13 is generally similar to that observed at OW3B-13, however concentrations of chloride, sodium and TDS continue to be higher at this location. The proximity of this well to Brooks Road is interpreted to be the reason for these elevated parameters as road salt application on Brooks Road is a source of these parameters, particularly in shallow groundwater. Hardness is also elevated at MW1B-13 but with low concentrations of alkalinity, boron, and DOC, this is not interpreted to be related to the landfill.

Water quality at OW9B-06 is generally similar to that at OW3B-13, although concentrations of sodium and chloride are slightly elevated. Concentrations of sodium and chloride have been slowly increasing at this location since 2010 but have been generally stable or decreasing since 2019. The well is located in close proximity to the landfill; however, the water quality results do not suggest significant impairment of shallow groundwater at this location as the remainder of indicator parameters are at or not significantly elevated over background levels. Concentrations of alkalinity are slightly elevated over levels reported at OW3B-13 however alkalinity levels have remained relatively stable suggesting that the landfill is not the source of the slightly elevated alkalinity or increasing chloride observed. In addition, alkalinity concentrations are similar to those reported at historical background monitoring well OW1B-07.

Sulphate concentrations at MW1B-13 are elevated. Historically, sulphate has been frequently reported in samples from this well at concentrations greater than 1,000 mg/L. Similar sulphate levels have also been reported at OW9B-06. The absence of other leachate indicator parameters suggest that these levels are naturally occurring. Elevated sulphate levels are also observed within shallow overburden groundwater elsewhere on the Site. The source of the sulphate concentrations is suspected to be the influence of basal overburden/shallow bedrock flow zone water quality, as this flow zone frequently exhibits sulphate concentrations greater than 4,000 mg/L at the nested basal overburden/shallow bedrock monitoring well MW1A-13. Sulphate concentrations in the basal overburden/shallow bedrock unit are greater than 2,000 mg/L at most monitoring locations.

East Side of Landfill

MW2B-07 is a shallow overburden groundwater monitoring well located along the east side of the landfill. MW2B-07 had insufficient groundwater volume to sample in November 2022.

Water quality at MW2B-07 shows evidence of influence from landfilling with slightly elevated concentrations of chloride, sodium, hardness and TDS. There is some evidence of a trend of increases in these parameter concentrations during recent monitoring events. Continued monitoring will provide additional insight into this potential trend.

Elevated naturally occurring concentrations of sulphate at this location represents substantial proportions of the elevated TDS reported.

West Side of Landfill

Monitoring wells MW1-03, MW2-03, MW3-03 and MW10B-18 are shallow overburden groundwater monitoring wells located to the west of the landfill. These monitoring wells are located in close proximity to Brooks Road. Since the beginning of 2019, MW1-03, MW2-03, and MW3-03 have been included in the monitoring program for hydraulic monitoring purposes only.

As illustrated on the concentration versus time plots included in Appendix G-2.A, water quality at MW1-03, MW2-03 and MW3-03 has not been assessed since fall 2018. Groundwater quality at these wells is similar to background water quality other than trends of increasing sodium, chloride and TDS. The source of these increases is interpreted to be road salt application along Brooks Road. This is consistent with previous interpretations.

Water quality at MW10B-18 is also essentially at background levels, except for chloride concentrations. In the absence of other indicators of landfill-related impacts, the mildly elevated chloride concentrations are not interpreted to be landfill-related.

South Side of Landfill

Monitoring well OW5B-06 is located to the south of the landfill approximately 80 m from the landfill footprint and 50 m upgradient of the south Site boundary. Water quality at OW5B-06 was historically consistent with background water quality, however trends of increases in chloride, sodium, hardness, TDS and to a lesser extent boron, were observed between 2013 and 2016. Since 2016 water quality has demonstrated decreasing trends in these parameters with the exception of elevated chloride in November 2022. In the absence of other indicators of landfill-related impacts, the mildly elevated chloride concentrations are not interpreted to be landfill-related. The source of these trends in water quality is not known at this time. It should be noted that elevated concentrations of sulphate at this location represent a substantial proportion of the TDS concentrations reported.

Considering the improvements in water quality at this location during recent monitoring years, it is recommended that monitoring continue, and future reports consider the historical context of trends in water quality at this location. A discussion of the geochemical characteristics of water quality at select monitoring wells is provided under *Geochemical Fingerprint – Piper Diagram*, below.

Water quality at OW1B-06 is similar to background levels, however, increases in chloride concentrations have been observed between 2014 and 2016. Elevated chloride concentrations were identified in November 2022 at OW1B-06. In the absence of other indicators of landfill-related impacts, the elevated chloride concentration is not interpreted to be landfill-related. Continued monitoring will provide additional insight into this potential trend. Hardness, sodium and to a lesser extent TDS, are slightly elevated above background levels. Elevated sulphate concentrations contribute to the elevated TDS concentrations reported.

Water quality at OW8B-06 is similar to background water quality, with slightly elevated chloride, sodium and TDS. This monitoring well is located in close proximity to Brooks Road and road salt is likely a source of these parameters at this monitoring well. Boron concentrations are slightly elevated over background levels. Other leachate indicator parameters are at or near background levels. In May 2020, chloride, sodium, and TDS increased sharply (particularly chloride). The concentrations of these parameters have decreased since May 2021 but remain elevated above historical concentrations. The sudden increase may indicate well integrity issues. In May 2022, Aardvark Drilling Inc (Aardvark) and GHD inspected the monitoring well and no visual deficiencies were identified.

Monitoring wells MW11B-19 and MW12B-19 were installed in proximity to the south Site boundary in 2019 and therefore have limited groundwater results. Water quality at MW11B-19 shows evidence of influence from landfilling with slightly elevated but stable concentrations of alkalinity, boron, hardness, and TDS. Sodium concentrations are elevated above OW3B-13 background concentrations but remain stable.

Water quality at MW12B-19 shows evidence of influence from landfilling with slightly elevated but stable concentration of alkalinity, boron, hardness, sodium and TDS.

Sulphate concentrations are elevated at both monitoring wells MW11B-19 and MW12B-19, suggesting that water quality at these locations is naturally poor, contributing to the elevated TDS concentrations reported.

Organics

In May 2022, PAH detections were identified from samples collected from shallow monitoring wells MW2B-07, OW8B-06 for parameters including: Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene/Benzo(j)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, Chrysene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene. Benzo(a)pyrene concentrations at MW2B-07 (0.0282 µg/L) and OW8B-06 (<0.0208 µg/L), located to the east and south of the landfill, respectively, were identified above the ODWS of 0.01 µg/L for the May 2022 samples. Benzo(a)pyrene has historically been detected above the ODWS at these locations. No other exceedances of PAHs were identified.

In May 2020, chloroform was detected at MW11B-19 (2.7 µg/L) above the ODWS of 2.4 µg/L. Concentrations in June 2021 and May 2022 decreased and were detected at 1.4 and 0.86 µg/L, respectively. There were no other detections of VOCs reported in any samples from 2022. PAH and VOC parameter concentrations at shallow overburden unit monitoring wells are presented in Table 5.4B.

Geochemical Fingerprint – Piper Diagram

In order to supplement the evaluation of potential landfill-related impacts to shallow overburden groundwater quality, an analysis of the geochemical “fingerprints” of shallow groundwater quality and leachate was undertaken. This analysis was accomplished through plotting major anion and cation on a Piper diagram for the May 2022 shallow overburden unit groundwater chemistry (Figure 5.9). A Piper diagram presents the major ions as percentages and is used to determine patterns in the geochemical character of water samples. Cations (positive ions) and anions (negative ions) are potted in two triangles at the base of the diagram. The compositions from the base triangles are then projected up to the central diamond. This central diamond therefore presents the data from all of the major ions on a single plot. On a Piper diagram, samples with similar geochemical character will plot relatively close to one another. Because the major ions are used, a Piper diagram is useful for detecting large differences in the geochemical characteristics between water samples. Data on the central diamond presents a line of evidence that assists in interpreting the likelihood of a monitoring location being affected by landfill-derived impacts. The likelihood of impacts can be gauged by the monitoring well's proximity to leachate and other locations showing definite leachate-derived impacts. The following shallow overburden monitoring wells are used to plot the Piper diagram: MW1B-13, OW3B-13, OW9B-06, MW2B-07, MW10B-18, OW8B-06, OW1B-06, OW5B-06, MW11B-19, MW12B-19, and MW6B-07.

The Piper diagram demonstrates that the pattern of major ions associated with the leachate chemistry is different from the pattern of major ions observed in shallow overburden monitoring wells. It is important to note that OW5B-06 (located immediately downgradient of the landfill footprint) plots far away from the leachate source. This pattern indicates that the elevated concentrations of analytes within groundwater, including OW5B-06, are not likely attributable to leachate migration beyond the landfill footprint. Relative to observations made in June 2021, the pattern of major ions observed in May 2022 is largely unchanged. This finding is further substantiated with the apparent immobility of groundwater chemistry in the shallow overburden groundwater, as historically observed around the decommissioned OLA.

5.4.2 Basal Overburden/Shallow Bedrock Unit

The basal overburden/shallow bedrock unit was assessed in 2022 based on groundwater monitoring data collected from ten basal overburden/shallow bedrock monitoring wells, as listed in Table 5.2. Of these monitoring wells, ten are located throughout the Site (MW1A-13, MW2A-01, OW1A-06, OW3A-13, OW5A-06, OW8A-06, OW9A-06, MW10A-18, MW11A-19, MW12A-19), and of the three off-Site basal overburden/shallow bedrock monitoring wells, two (MW5A-09, MW6A-07) are located approximately 150 m south of the Site, and one (MW4A-09) is located to the west of, and in close proximity to the OLA. . As previously indicated monitoring well MW2A-01, OW5A-06, and OW8A-06 were noted as dry or insufficient volume to sample during the May monitoring event. Since the beginning of 2019, MW4A-09 has been included in the monitoring program for hydraulic monitoring purposes only. Off-Site groundwater monitoring of the basal overburden/shallow bedrock unit downgradient of the Site is currently monitored at MW5A-09 and MW6A-07.

General Chemistry and Metals analytical results are summarized in Table 5.5A. Organics (VOCs and PAHs) results are summarized in Table 5.5B. Historical data, including concentration versus time plots of landfill indicator parameters are provided in Appendix G.

5.4.2.1 On-Site Basal Overburden/Shallow Bedrock Monitoring

Monitoring wells MW1A-13, OW3A-13 and OW9A-06 are located upgradient relative to the landfill. Accordingly, water quality from these locations is interpreted to represent water quality flowing on-Site from upgradient. Water quality data from OW3A-13 has been included on the concentration versus time plots in Appendix G-2 so that comparison of water quality at each location to OW3A-13 can be made.

It is noted that water quality within the basal overburden/shallow bedrock flow zone is generally poor, including at upgradient monitoring locations. Concentrations of alkalinity, sulphate, hardness and TDS are all naturally elevated, often well above their respective ODWS.

The following paragraphs describe the observations of basal overburden/shallow bedrock groundwater quality during the current monitoring period.

North Side of Landfill (Upgradient)

Water quality at upgradient monitoring wells MW1A-13, OW3A-13 and OW9A-06 is generally poor with elevated concentrations of alkalinity, sulphate, hardness and TDS. Water quality, though variable, is generally stable over time. Concentrations of chloride and sodium decreased significantly between 2013 and 2016 at MW1A-13.

East Side of Landfill

MW2A-01 is completed within the basal overburden/shallow bedrock flow zone along the east side of the landfill. Water quality at this location is similar to that observed upgradient of the landfill. There is no indication of landfill-related water quality alterations at this location.

West Side of Landfill

MW4A-09 and MW10A-18 are completed within the basal overburden/shallow bedrock flow zone along the west side of the landfill. Water quality at this MW4A-09, prior to 2019, is similar to that observed upgradient of the landfill. There is no indication of landfill-related water quality alterations at this location. This location is currently used for hydraulic monitoring purposes only.

Water quality at this MW10A-18 is similar to that observed upgradient of the landfill. There is no indication of landfill-related water quality alterations at MW10A-18.

South Side of Landfill

Monitoring wells OW1A-06, OW5A-06, OW8A-06, MW11A-19 and MW12A-19 are completed within the basal overburden/shallow bedrock flow zone to the south of the landfill. Water quality at OW1A-06, OW5A-06 and OW8A-06 continues to be similar to upgradient and demonstrates no evidence of impact from the landfill. DOC concentrations at OW5A-06A were identified slightly elevated above background in November 2022. In the absence of other indicators of landfill-related impacts, the elevated DOC concentration is not interpreted to be landfill-related. Continued monitoring will provide additional insight into this potential trend.

Monitoring wells MW11A-19 and MW12A-19 were installed in mid-2019 have been sampled seven and six times, respectively. Sample results suggest water quality is similar to upgradient locations and unaffected by the landfill. The November 2020 results from MW11A-19 show elevated concentrations of alkalinity and DOC. In 2021 and 2022, alkalinity and DOC were similar to background water quality indicating that the fall 2020 results are not consistent with the previous two samples and following four sampling events.

Organics

During the current monitoring period, for comparison and informational purposes, all VOC and PAH parameter concentrations at basal overburden/shallow bedrock monitoring locations were below their respective ODWS and Table 2 criteria as shown in Table 5.5B. In light of the general absence of evidence of landfill-related water quality impacts in this flow zone, the occasional low-level detections of VOCs or PAHs reported in these monitoring wells are not considered to be landfill-related.

5.4.2.2 Off-Site Basal Overburden/Shallow Bedrock Aquifer Monitoring

Basal overburden/shallow bedrock aquifer monitoring wells MW6A-07 and MW5A-09 were installed to monitor water quality downgradient of the Site. The 2022 monitoring results for general chemistry and metals are provided in Table 5.5A. During the current monitoring period, for comparison and informational purposes, all VOC and PAH parameter concentrations at off-Site basal overburden/shallow bedrock monitoring locations were below their respective laboratory detection limits as shown in Table 5.5B. Phenanthrene was detected in the groundwater at monitoring well MW5A-09 in May 2020 and June 2021. In light of the general absence of evidence of landfill-related water quality impacts in this flow zone, the occasional low-level detections of VOCs or PAHs reported in these monitoring wells are not interpreted to be landfill-related. Historical data, including concentration versus time plots for leachate indicator parameters, are provided in Appendix G-2.B.

In general, the results from these monitoring wells are consistent with current and historical observations obtained from on-Site basal overburden/shallow bedrock monitoring locations. The concentration versus time plots provided in Appendix G-2.B illustrate that water quality at these monitoring locations is very similar to that observed upgradient of the landfill.

On the basis of the pattern in water quality observed at MW6A-07 and MW5A-09, there is no evidence of landfill-related water quality impacts in the basal overburden/shallow bedrock water quality off-Site.

5.4.3 Bedrock Unit Monitoring

The bedrock unit is monitored through groundwater monitoring data collected from six on-Site bedrock monitoring wells (MW1S-07, MW1D-07, MW2S-07, MW2D-07, OW8S-07, OW8D-07). The bedrock unit is divided into two hydraulic units (intermediate bedrock and deep bedrock). In general, the water quality in the bedrock units is poor and comparable to the basal overburden/shallow bedrock aquifer unit.

General Chemistry and Metals analytical results are summarized in Table 5.6A. Organics (VOCs and PAHs) results are summarized in Table 5.6B. Historical data, including concentration versus time plots of landfill indicator parameters are provided in Appendix G-2.C.

It should be noted that MW1S-07 was not sampled following the 2017 monitoring events due to excessive sediment infilling within the monitoring well. The source of the infilling is suspected to be re-grading undertaken around the well during 2018. Water quality results following the monitoring well repair in August 2019 are comparable with historic ranges.

Water quality in the bedrock unit is poor and is characterized by elevated concentrations of hardness, sulphate, TDS, boron, iron, and manganese. These parameters generally exceed their respective ODWS. Water quality is generally stable at each monitoring well, with the exception of some variability noted at monitoring well MW1D-07.

A comparison of nested wells illustrates that water quality in the deep and shallow well nests for are generally similar in quality for leachate indicator parameters for MW1D/S-07 and MW2D/S-07 well nests. Water quality from the deep bedrock location OW8D-07 is characterized by lower alkalinity and sodium, and higher boron and chloride compared to the other five bedrock monitoring wells locations.

Based on the pattern of leachate indicator parameter concentrations in the bedrock unit monitoring wells, there is no evidence of landfill-related water quality impacts in the bedrock unit.

Sample results from bedrock unit monitoring wells, in particular monitoring well MW1D-07 and MW1S-07, have historically reported low-level detections above the ODWS of various PAH parameters. In light of the absence of landfill-related impacts, and the multiple flow zones between this monitoring well and the landfill, the PAH detections are considered unrelated to the landfill.

5.5 Surface Water Quality

The 2022 surface water quality monitoring program was performed by GHD. A sample key of the surface water samples collected and analyzed is presented in Table 5.7 and a summary of the surface water quality results for the 2017 through 2022 monitoring periods is provided in Tables 5.8A and 5.8B. Assessment of the potential influence of leachate impacts on surface water quality is undertaken primarily through comparing the pattern of leachate indicator parameter concentrations at each monitoring station against the criteria listed in the Water Management Policies, Guidelines, Provincial Water Quality Objectives (PWQO), published by the MECP in July 1994, and reprinted February 1999 is also presented in this Section.

Historical surface water quality results are provided in Appendix G-1. Concentration versus time plots of leachate indicator parameters at each surface water monitoring station are included in Appendix G-2.D.

The surface water monitoring locations include three off-site background locations: SW1, SW8, and SW9. All three have been established to document the background water quality in the local ditches and ponds. The on-Site surface water monitoring locations include one pond (SW5) located in the southern portion of the Site and one on-Site surface water ditch (SW2) located at the discharge from the Site SWMS. Off-Site surface water monitoring locations include two ponds (SW6 and SW7) located to the south of the Site, one drainage ditch located immediately downstream of the Site discharge point (SW3), and one drainage ditch (SW4) situated approximately 1 kilometre (km) south and downstream of the Site. SW9 is located immediately north of the Site, north of OW3A/B-13.

Table 5.4A

Summary of Groundwater Analytical Results - Shallow Overburden
2022 Operations and Monitoring Report
Brooks Road Landfill Site
Haldimand County, Ontario

Sample Location:			MW1B-13	MW1B-13	MW2B-07	MW5B-09	MW6B-07	MW6B-07	MW10A-18	MW10A-18	MW10B-18	MW10B-18
Sample ID:			GW-MW1B	GW-18235-1122-BK-MW1B	GW-MW2B	GW-MW5B	GW-MW6B	GW-18235-1122-BK-MW6B	GW-MW10A	GW-18235-1122-PW-MW10A	GW-MW10B	GW-18235-1122-PW-MW10B
Sample Date:			5/10/2022	11/7/2022	5/11/2022	5/12/2022	5/11/2022	11/7/2022	5/10/2022	11/3/2022	5/10/2022	11/3/2022
Parameters	Units	ODWS[1] a										
Field Parameters												
Conductivity, field	mS/cm	-	2.82	2.84	-	0.575	-	2.73	3.91	4.04	1.34	-
Dissolved oxygen (DO), field	mg/L	-	0.00	1.41	-	7.65	-	1.50	0.0	-	9.47	-
Not sampled	none	-	-	-	-	-	-	-	-	-	-	-
Oxidation reduction potential (ORP), field	millivolts	-	225	109	-	86	-	82	56	-	126	-
pH, field	s.u.	6.5-8.5 (OG)	7.29	6.79	NM	7.97	NM	6.88	7.43	7.34	7.70	NM
Temperature, field	Deg C	15 (AO)	12.81	12.63	-	11.85	-	12.58	13.44	11.43	14.89	-
Turbidity, field	NTU	5.0/5.0 (MAC/AO)	1000[a]	307[a]	-	1000[a]	-	46.2[a]	1000[a]	1000[a]	763[a]	-
General Chemistry												
Alkalinity, total (as CaCO3)	mg/L	30-500 (OG)	523	598	600	250	444	460	462	415 J	443	382 J
Ammonia-N	mg/L	-	< 0.0293	4.16	0.0552 J+	< 0.0055	< 0.0050	< 0.0050	0.0579 J+	0.102 J	0.0546 J+	0.0815 J
Biochemical oxygen demand (BOD)	mg/L	-	< 3.0 J	-	5.1 J	< 3.0	< 3.0 J	-	< 3.0 J	-	< 3.0 J	-
Chemical oxygen demand (COD)	mg/L	-	53	110	112	33	16	< 10	46	48 J	39	35 J
Chloride	mg/L	250 (AO)	61.2 *	67.1 *	25.4 *	2.69 *	157 *	159 *	10.8 *	11.4 J *	48.7 *	46.0 J *
Conductivity	mS/cm	-	2.98	3.03	2.5	0.648	2.63	2.81	4.16	3.99 J	1.37	1.24 J
Dissolved organic carbon (DOC)	mg/L	-	4.78	15.4	6.38	5.86	3.49	4.10	1.89	3.79 J	6.94	9.07 J
Hardness	mg/L	80-100 (OG)	1600	-	1480	194	1670	-	2810	-	682	-
Nitrate (as N)	mg/L	10.0 (MAC)	< 0.100	< 0.100	< 0.100 J	0.045	< 0.100 J	< 0.100	< 0.100	< 0.100 J	0.104	< 0.100 J
Nitrite (as N)	mg/L	1.0 (MAC)	< 0.050	-	< 0.050 J	< 0.010	< 0.050 J	-	< 0.050	-	< 0.050	-
pH, lab	s.u.	6.5-8.5 (OG)	7.67	7.48	8.04	7.98	7.96	7.55	7.29	7.80 J	7.36	7.63 J
Phenolics (total)	mg/L	-	< 0.0010	-	< 0.0010	< 0.0010	< 0.0011	-	< 0.0010	-	< 0.0010	-
Phosphorus	mg/L	-	0.170	-	3.18	0.161	0.0110	-	0.522	-	0.122	-
Sulfate	mg/L	500 (AO)	1370 *[a]	1440 *[a]	1120 *[a]	100 *	1080 *[a]	1230 *[a]	2510 *[a]	2550 J *[a]	324 *	304 J *
Total dissolved solids (TDS)	mg/L	500 (AO)	2490[a]	2030[a]	1660[a]	404	2100[a]	2270[a]	3980[a]	3920 J[a]	980[a]	969 J[a]
Total kjeldahl nitrogen (TKN)	mg/L	-	0.547	-	< 5.00	0.588	0.193	-	< 0.500	-	< 0.500	-
Total suspended solids (TSS)	mg/L	-	330	-	7560	762	11.9	-	1190	-	119	-
Turbidity	NTU	5.0/5.0 (MAC/AO)	-	-	-	-	-	-	-	-	-	-
Dissolved Metals												
Aluminum	mg/L	0.10 (OG)	< 0.0118	-	< 0.0333	< 0.0259	< 0.0119	-	< 0.0292	-	< 0.0043	-
Arsenic	mg/L	0.010 (IMAC) (a)	0.00103	-	< 0.00100	0.00102	< 0.00100	-	< 0.00100	-	0.00064	-
Barium	mg/L	1.0 (MAC)	0.0435	0.0570	0.0388	0.0251	0.0141	0.0168	0.00591	0.0145 J	0.0605	0.0344 J
Beryllium	mg/L	-	< 0.000200	-	< 0.000200	< 0.000020	< 0.000200	-	< 0.000200	-	< 0.000020	-
Boron	mg/L	5.0 (IMAC)	< 0.100	< 0.100	< 0.100	0.012	< 0.100	< 0.100	0.526	0.493 J	0.044	0.039 J
Cadmium	mg/L	0.005 (MAC)	0.0000952	-	< 0.0000500	0.0000061	< 0.0000500	-	< 0.0000500	-	0.0000092	-
Calcium	mg/L	-	184	254	106	22.1	194	231	517	502 J	218	234 J
Chromium	mg/L	0.05 (MAC)	< 0.00500	-	< 0.00500	< 0.00050	< 0.00500	-	< 0.00500	-	< 0.00050	-
Cobalt	mg/L	-	0.00398	-	0.00128	< 0.00010	< 0.00100	-	0.00125	-	0.00030	-
Copper	mg/L	1.0 (AO)	0.00247	-	< 0.00200	0.00129	< 0.00200	-	< 0.00200	-	0.00295	-
Iron	mg/L	0.30 (AO)	< 0.100	0.262	0.218	0.014	< 0.100	< 0.100	0.158	0.543 J[a]	< 0.010	< 0.010 J
Lead	mg/L	0.01 (MAC)	< 0.000500	-	< 0.000500	0.000051	< 0.000500	-	< 0.000500	-	< 0.000050	-
Magnesium	mg/L	-	276	280	294	33.7	287	297	368	351 J	33.4	32.8 J
Manganese	mg/L	0.05 (AO)	0.256[a]	-	0.182[a]	0.00027	< 0.00100	-	0.342[a]	-	0.182[a]	-
Mercury	mg/L	0.001 (MAC)	< 0.0000050	-	< 0.0000050	< 0.0000050	< 0.0000050	-	< 0.0000050	-	< 0.0000050	-
Molybdenum	mg/L	-	0.00498	-	0.00231	0.00416	0.000815	-	0.00710	-	0.000840	-
Nickel	mg/L	-	0.00817	-	< 0.00500	< 0.00050	< 0.00500	-	0.00953	-	0.00231	-
Potassium	mg/L	-	2.65	-	4.52	1.35	2.31	-	6.28	-	3.03	-
Silver	mg/L	-	< 0.000100	-	< 0.000100	< 0.000010	< 0.000100	-	< 0.000100	-	< 0.000010	-
Sodium	mg/L	200 (AO)	132	160	156	54.3	88.1	92.2	116	112 J	17.9	18.5 J
Thallium	mg/L	-	< 0.000100	-	< 0.000100	< 0.000010	< 0.000100	-	< 0.000100	-	0.000015	-
Vanadium	mg/L	-	< 0.00500	-	< 0.00500	< 0.00050	< 0.00500	-	< 0.00500	-	0.00135	-
Zinc	mg/L	5.0 (AO)	< 0.0100	-	< 0.0100	0.0011	< 0.0100	-	0.0150	-	0.0022	-

Sample Location:			MW11B-19	MW11B-19	MW12B-19	OW1B-06	OW1B-06	OW3B-13	OW3B-13	OW5B-06	OW5B-06	OW8B-06	OW8B-06	OW9B-06	OW9B-06
Sample ID:			GW-MW11B	GW-18235-1122-PW-MW11B	GW-MW12B	GW-OW1B	GW-18235-1122-PW-OW1B	GW-OW3B	GW-18235-1122-PW-OW3B	GW-OW5B	GW-18235-1122-PW-OW5B	GW-OW8B	GW-18235-1122-PW-OW8B	GW-OW9B	GW-18235-1122-BK-OW9B
Sample Date:			5/9/2022	11/3/2022	5/10/2022	5/10/2022	11/3/2022	5/12/2022	11/3/2022	5/10/2022	11/3/2022	5/9/2022	11/3/2022	5/10/2022	11/7/2022
Parameters	Units	ODWS[1] a													
Field Parameters															
Conductivity, field	mS/cm	-	8.23	8.43	2.55	1.75	2.23	0.884	0.919	2.49	3.02	1.80	1.92	2.15	2.06
Dissolved oxygen (DO), field	mg/L	-	8.01	-	3.96	1.78	-	0.0	0.51	0.54	-	2.38	-	0.0	4.92
Not sampled	none	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation reduction potential (ORP), field	millivolts	-	146	-	158	143	-	-26	74	133	-	80	-	232	146
pH, field	s.u.	6.5-8.5 (OG)	7.92	7.32	8.48	8.01	7.69	7.19	7.10	7.94	7.56	8.25	7.55	7.33	7.09
Temperature, field	Deg C	15 (AO)	13.88	11.11	18.49[a]	12.64	12.50	13.94	14.14	12.75	12.29	17.50[a]	13.41	17.69[a]	11.85
Turbidity, field	NTU	5.0/5.0 (MAC/AO)	787[a]	140[a]	58.9[a]	347[a]	48.7[a]	263[a]	179[a]	155[a]	27.4[a]	113[a]	8.1[a]	477[a]	429[a]
General Chemistry															
Alkalinity, total (as CaCO3)	mg/L	30-500 (OG)	348	728 J	1010	677	659 J	376	296	652	604 J	567	608 J	719	731
Ammonia-N	mg/L	-	< 0.0275	0.0121 J	< 0.0050	< 0.0050	< 0.0050 J	0.0713 J+	0.0275	< 0.0050	0.0078 J	< 0.0127	0.0059 J	< 0.0050	< 0.0050
Biochemical oxygen demand (BOD)	mg/L	-	< 3.0 J	-	< 3.0 J	< 3.0 J	-	< 3.0	-	< 3.0 J	-	< 3.0 J	-	< 3.0 J	-
Chemical oxygen demand (COD)	mg/L	-	43	30 J	17	21	< 10 J	14	12	16	14 J	< 10	18 J	21	10
Chloride	mg/L	250 (AO)	10.0 *	22.7 J *	31.2 *	35.2 *	358 J *[a]	1.06 *	1.34 *	197 *	376 J *[a]	178 *	144 J *	42.6 *	44.1 *
Conductivity	mS/cm	-	4.39	8.56 J	2.99	2.23	2.14 J	0.838	0.903	2.5	2.95 J	1.96	1.82 J	2.3	2.12
Dissolved organic carbon (DOC)	mg/L	-	8.00	12.3 J	6.34	4.81	5.04 J	4.75	1.91	4.92	6.51 J	2.54	6.94 J	9.72	10.2
Hardness	mg/L	80-100 (OG)	7380	-	1800	1160	-	462	-	1440	-	930	-	1100	-
Nitrate (as N)	mg/L	10.0 (MAC)	< 0.100 J	< 0.200 J	0.231 J	< 0.100	< 0.100 J	< 0.020	0.035	< 0.100 J	< 0.100 J	< 0.100 J	< 0.100 J	< 0.100	< 0.100
Nitrite (as N)	mg/L	1.0 (MAC)	< 0.050 J	-	< 0.050 J	< 0.050	-	< 0.010	-	< 0.050 J	-	< 0.050 J	-	< 0.050	-
pH, lab	s.u.	6.5-8.5 (OG)	7.68	8.00 J	7.97	7.86	8.20 J	7.63	8.04	7.77	7.89 J	7.81	8.19 J	7.80	7.69
Phenolics (total)	mg/L	-	< 0.0010	-	< 0.0010	< 0.0010	-	< 0.0011	-	< 0.0010	-	< 0.0010	-	< 0.0010	-
Phosphorus	mg/L	-	0.185	-	0.0179	0.0517	-	0.0340	-	0.0402	-	< 0.0020	-	0.0669	-
Sulfate	mg/L	500 (AO)	2870 *[a]	6810 J *[a]	1110 *[a]	748 *[a]	617 J *[a]	114 *	210 *	711 *[a]	652 J *[a]	293 *	286 J *	730 *[a]	611 *[a]
Total dissolved solids (TDS)	mg/L	500 (AO)	4160[a]	10300 J[a]	2160[a]	1530[a]	1480 J[a]	526[a]	625[a]	1770[a]	2160 J[a]	1150[a]	1200 J[a]	1590[a]	1390[a]
Total kjeldahl nitrogen (TKN)	mg/L	-	< 0.500	-	0.243	< 0.500	-	< 0.500	-	0.258	-	0.109	-	< 0.500	-
Total suspended solids (TSS)	mg/L	-	240	-	11.6	153	-	54.5	-	21.8	-	57.2	-	136	-
Turbidity	NTU	5.0/5.0 (MAC/AO)	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals															
Aluminum	mg/L	0.10 (OG)	0.251	-	< 0.0100	< 0.0195	-	< 0.0596	-	< 0.0104	-	< 0.0100	-	0.157 J+	-
Arsenic	mg/L	0.010 (IMAC) (a)	< 0.00100	-	< 0.00100	< 0.00100	-	0.00159	-	< 0.00100	-	< 0.00100	-	< 0.00100	-
Barium	mg/L	1.0 (MAC)	0.0146	0.0141 J	0.0383	0.0237	0.0239 J	0.0737	0.0699	0.0238	0.0298 J	0.0313	0.0352 J	0.0299	0.0300
Beryllium	mg/L	-	< 0.000200	-	< 0.000200	< 0.000200	-	< 0.000020	-	< 0.000200	-	< 0.000200	-	< 0.000200	-
Boron	mg/L	5.0 (IMAC)	0.479	0.418 J	< 0.100	< 0.100	0.114 J	0.036	< 0.100	< 0.100	0.148 J	0.935	0.814 J	0.123	0.127
Cadmium	mg/L	0.005 (MAC)	< 0.0000500	-	< 0.0000500	< 0.0000500	-	0.0000353	-	< 0.0000500	-	< 0.0000500	-	< 0.0000500	-
Calcium	mg/L	-	416	454 J	73.8	151	143 J	122	126	156	187 J	122	93.5 J	89.6	103
Chromium	mg/L	0.05 (MAC)	< 0.00500	-	< 0.00500	< 0.00500	-	< 0.00050	-	< 0.00500	-	< 0.00500	-	< 0.00500	-
Cobalt	mg/L	-	0.00701	-	< 0.00100	< 0.00100	-	0.00266	-	< 0.00100	-	< 0.00100	-	< 0.00100	-
Copper	mg/L	1.0 (AO)	< 0.00200	-	< 0.00200	< 0.00200	-	0.00297	-	< 0.00200	-	< 0.00200	-	< 0.00200	-
Iron	mg/L	0.30 (AO)	0.269	< 0.100 J	< 0.100	< 0.100	< 0.100 J	0.944[a]	< 0.100	< 0.100	< 0.100 J	< 0.100	< 0.100 J	0.156	< 0.100
Lead	mg/L	0.01 (MAC)	< 0.000500	-	< 0.000500	< 0.000500	-	0.000128	-	< 0.000500	-	< 0.000500	-	< 0.000500	-
Magnesium	mg/L	-	1540	1370 J	392	190	191 J	38.2	42.7	254	257 J	152	151 J	214	225
Manganese	mg/L	0.05 (AO)	0.104[a]	-	0.00577	0.00139	-	0.412[a]	-	0.00106	-	< 0.00100	-	0.00473	-
Mercury	mg/L	0.001 (MAC)	< 0.0000050	-	< 0.0000050	< 0.0000050	-	< 0.0000050	-	< 0.0000050	-	< 0.0000050	-	< 0.0000050	-
Molybdenum	mg/L	-	0.00304	-	0.00265	0.00158	-	0.00256	-	0.00280	-	0.00274	-	0.00195	-
Nickel	mg/L	-	< 0.00500	-	< 0.00500	< 0.00500	-	0.00318	-	< 0.00500	-	< 0.00500	-	< 0.00500	-
Potassium	mg/L	-	17.0	-	7.48	2.38	-	1.71	-	2.86	-	2.68	-	4.61	-
Silver	mg/L	-	< 0.000100	-	< 0.000100	< 0.000100	-	< 0.000017	-	< 0.000100	-	< 0.000100	-	< 0.000100	-
Sodium	mg/L	200 (AO)	413[a]	409 J[a]	172	71.1	71.4 J	16.5	10.5	103	104 J	105	93.6 J	117	118
Thallium	mg/L	-	< 0.000100	-	< 0.000100	< 0.000100	-	0.000026	-	< 0.000100	-	< 0.000100	-	< 0.000100	-
Vanadium	mg/L	-	< 0.00500	-	< 0.00500	< 0.00500	-	< 0.00050	-	< 0.00500	-	< 0.00500	-	< 0.00500	-
Zinc	mg/L	5.0 (AO)	< 0.0100	-	< 0.0100	< 0.0100	-	0.0021	-	< 0.0100	-	< 0.0100	-	< 0.0100	-

Notes:

(1)	Ontario Drinking Water Standards (ODWS), June 2003; revised June 2006, prepared by the MOECC.
-	No Value/Not Analyzed.
J	The result is an estimated value.
R	Rejected.
0.054[a]	Does not meet the applicable ODWS/O. Reg 153/04 criteria.
< 0.10	Method detection limit does not meet ODWS/O. Reg 153/04 criteria.
< 0.20	Result below method detection limit.
(a)	Current criteria for arsenic is provided wich came into affect 2018. Previous data is subjected to a limit of 0.025 mg/L.

Table 5.4B

Summary of Groundwater Analytical Results - Shallow Overburden
2022 Operations and Monitoring Report
Brooks Road Landfill Site
Haldimand County, Ontario

Sample Location:				**MW1B-13**	**MW2B-07**	**MW5B-09**	**MW6B-07**	**MW10B-18**	**MW11B-19**	**MW12B-19**	**OW1B-06**	**OW3B-13**	**OW5B-06**	**OW8B-06**	**OW9B-06**
Sample ID:				**GW-MW1B**	**GW-MW2B**	**GW-MW5B**	**GW-MW6B**	**GW-MW10B**	**GW-MW11B**	**GW-MW12B**	**GW-OW1B**	**GW-OW3B**	**GW-OW5B**	**GW-OW8B**	**GW-OW9B**
Sample Date:				**5/10/2022**	**5/11/2022**	**5/12/2022**	**5/11/2022**	**5/10/2022**	**5/9/2022**	**5/10/2022**	**5/10/2022**	**5/12/2022**	**5/10/2022**	**5/9/2022**	**5/10/2022**
Parameters	**Units**	**ODWS[(1)] a**	**Table 2[(2)] b**												
Semi-volatile Organic Compounds															
1-Methylnaphthalene	µg/L	-	-	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
1-Methylnaphthalene/2-Methylnaphthalene	µg/L	-	3.2	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015	< 0.015
2-Methylnaphthalene	µg/L	-	-	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	µg/L	-	4.1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	µg/L	-	1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	µg/L	-	2.4	< 0.010	0.015	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)anthracene	µg/L	-	1	< 0.010	0.042	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.015	< 0.010
Benzo(a)pyrene	µg/L	0.01 (MAC)	0.01	< 0.0050	**0.0282[ab]**	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	**< 0.0208[ab]**	< 0.0050
Benzo(b)fluoranthene	µg/L	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene/Benzo(j)fluoranthene	µg/L	-	0.1	< 0.010	0.041	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.031	< 0.010
Benzo(g,h,i)perylene	µg/L	-	0.2	< 0.010	0.017	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.015	< 0.010
Benzo(k)fluoranthene	µg/L	-	0.1	< 0.010	0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.012	< 0.010
Chrysene	µg/L	-	0.1	< 0.010	0.063	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.017	< 0.010
Dibenz(a,h)anthracene	µg/L	-	0.2	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	µg/L	-	0.41	0.013	0.125	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.033	< 0.010
Fluorene	µg/L	-	120	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-cd)pyrene	µg/L	-	0.2	< 0.010	0.020	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.020	< 0.010
Naphthalene	µg/L	-	11	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	µg/L	-	1	< 0.020	0.055	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Pyrene	µg/L	-	4.1	0.015	0.103	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.029	< 0.010
Volatile Organic Compounds															
1,1,1,2-Tetrachloroethane	µg/L	-	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,1-Trichloroethane	µg/L	-	200	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	µg/L	-	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	µg/L	-	4.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	µg/L	-	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50 J	< 0.50
1,1-Dichloroethene	µg/L	14 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dibromoethane (Ethylene dibromide)	µg/L	-	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	µg/L	200 (MAC)	3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	µg/L	5 (IMAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	µg/L	-	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	µg/L	-	59	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	µg/L	5 (MAC)	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	1800	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
2-Hexanone	µg/L	-	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	640	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	-	2700	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Benzene	µg/L	1 (MAC)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	µg/L	-	16	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	µg/L	-	25	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane (Methyl bromide)	µg/L	-	0.89	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	2 (MAC)	0.79	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chlorobenzene	µg/L	80 (MAC)	30	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	µg/L	-	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform (Trichloromethane)	µg/L	-	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.86	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane (Methyl chloride)	µg/L	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
cis-1,2-Dichloroethene	µg/L	-	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
cis-1,3-Dichloropropene/trans-1,3-Dichloropropene	µg/L	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	µg/L	-	25	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dichlorodifluoromethane (CFC-12)	µg/L	-	590	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	140 (MAC)	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexane	µg/L	-	51	-	-	-	-	-	-	-	-	-	-	-	-
m&p-Xylenes	µg/L	-	-	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Methyl tert butyl ether (MTBE)	µg/L	15 (AO)	15	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene chloride	µg/L	50 (MAC)	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Styrene	µg/L	-	5.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	µg/L	10 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	µg/L	60 (MAC)	24	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	µg/L	-	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Trichloroethene	µg/L	5 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorofluoromethane (CFC-11)	µg/L	-	150	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trihalomethanes	µg/L	100 (MAC)	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl chloride	µg/L	1 (MAC)	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenes (total)	µg/L	90 (MAC)	300	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Table 5.5A

Summary of Groundwater Analytical Results - Basal Overburden/Shallow Bedrock
2022 Operations and Monitoring Report
Brooks Road Landfill Site
Haldimand County, Ontario

Sample Location:			MW1A-13	MW1A-13	MW2A-01	MW5A-09	MW5A-09	MW6A-07	MW6A-07	MW11A-19	MW11A-19	MW12A-19	MW12A-19	MW12A-19	OW1A-06	OW1A-06	OW1A-06	OW3A-13	OW3A-13	OW5A-06	OW8A-06	OW9A-06	OW9A-06
Sample ID:			GW-MW1A	GW-18235-1122-PW-MW1A	GW-18235-1122-BK-MW2A	GW-MW5A	GW-18235-1122-BK-MW5A	GW-MW6A	GW-18235-1122-BK-MW6A	GW-MW11A	GW-18235-1122-PW-MW11A	GW-MW12A	GW-18235-1122-PW-MW12A	GW-18235-1122-PW-MW12X	GW-OW1A	GW-DUP1	GW-18235-1122-PW-OW1A	GW-OW3A	GW-18235-1122-PW-OW3A	GW-18235-1122-PW-OW5A	GW-18235-1122-PW-OW8A	GW-OW9A	GW-18235-1122-BK-OW9A
Sample Date:			5/10/2022	11/3/2022	11/7/2022	5/12/2022	11/7/2022	5/11/2022	11/7/2022	5/9/2022	11/3/2022	5/10/2022	11/3/2022	11/3/2022 Duplicate	5/10/2022	5/10/2022 Duplicate	11/3/2022	5/12/2022	11/3/2022	11/3/2022	11/3/2022	5/10/2022	11/7/2022
Parameters	**Units**	**ODWS[(1)] a**																					
Field Parameters																							
Conductivity, field	mS/cm	-	4.84	4.82	3.87	4.35	3.85	-	3.65	3.89	4.22	3.27	3.52	3.52	3.91	3.91	4.11	3.74	3.47	3.37	3.84	3.79	3.74
Dissolved oxygen (DO), field	mg/L	-	0.00	0.00	7.21	0.0	0.00	-	2.04	0.54	-	0.0	0.00	0.00	0.0	0.0	-	0.14	0.90	-	-	4.89	8.68
Not sampled	none	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation reduction potential (ORP), field	millivolts	-	122	49	53	-38	-27	-	-37	-17	-	17	21	21	-41	-41	-	40	99	-	-	184	44
pH, field	s.u.	6.5-8.5 (OG)	6.85	6.82	6.52	6.82	6.44[a]	NM	6.54	7.51	7.36	7.61	6.79	6.79	7.71	7.71	7.37	7.91	6.87	7.40	7.00	6.87	6.23[a]
Temperature, field	Deg C	15 (AO)	14.16	12.62	11.29	13.37	10.74	-	10.91	17.01[a]	10.59	12.40	12.91	12.91	14.48	14.48	10.87	12.66	13.57	10.97	11.97	16.92[a]	11.00
Turbidity, field	NTU	5.0/5.0 (MAC/AO)	1000[a]	1000[a]	14.9[a]	381[a]	1000[a]	-	990[a]	205[a]	48.6[a]	966[a]	1000[a]	1000[a]	445[a]	445[a]	52.0[a]	361[a]	165[a]	97.3[a]	124[a]	655[a]	28.3[a]
General Chemistry																							
Alkalinity, total (as CaCO3)	mg/L	30-500 (OG)	509	483	343	387	381	440	438	402	391 J	500	480	471	472	460	472 J	410	407	396 J	431 J	475	446
Ammonia-N	mg/L	-	0.482	0.417	0.0711 J+	0.650	0.720	0.426	0.408	0.384	0.413 J	0.139	0.232	0.229	0.647	0.617	0.498 J	< 0.0366	0.0665	0.494 J	0.438 J	0.250	0.236
Biochemical oxygen demand (BOD)	mg/L	-	< 3.0 J	-	-	< 3.0	-	< 3.0 J	-	< 3.0 J	-	< 3.0 J	-	-	< 3.0 J	< 3.0 J	-	< 3.0	-	-	-	< 3.0 J	-
Chemical oxygen demand (COD)	mg/L	-	32	63	< 10	15	34	44	19	11	< 10 J	41	41	44	17	19	58 J	14	< 10	11 J	12 J	23	< 10
Chloride	mg/L	250 (AO)	21.6 *	22.7 *	15.8 *	13.5 *	14.8 *	10.2 *	10.9 *	13.0 *	12.5 J *	14.2 *	13.6 *	13.7 *	12.1 *	12.2 *	12.4 J *	8.67 *	9.66 *	7.07 J *	12.0 J *	12.1 *	12.0 *
Conductivity	mS/cm	-	5.14	5.18	4.16	4.05	4.06	3.7	3.78	4.27	4.09 J	3.55	3.84	3.75	4.12	4.14	3.87 J	3.45	3.67	3.33 J	3.82 J	3.98	3.97
Dissolved organic carbon (DOC)	mg/L	-	3.10	2.35	2.49	2.49	3.10	2.54	2.65	1.92	2.50 J	3.07	2.69	2.51	2.23	1.79	2.36 J	2.31	1.73	11.0 J	2.57 J	1.50	2.33
Hardness	mg/L	80-100 (OG)	3370	-	-	2780	-	2640	-	2950	-	2220	-	-	2830	2820	-	2390	-	-	-	2380	-
Nitrate (as N)	mg/L	10.0 (MAC)	< 0.100	< 0.200	< 0.100	< 0.100	< 0.100	< 0.100 J	< 0.100	< 0.100 J	< 0.200 J	< 0.100 J	< 0.100	< 0.100	< 0.100	< 0.100	< 0.100 J	< 0.100	< 0.100	< 0.100 J	< 0.100 J	< 0.100	< 0.100
Nitrite (as N)	mg/L	1.0 (MAC)	< 0.050	-	-	< 0.050	-	< 0.050 J	-	< 0.050 J	-	< 0.050 J	-	-	< 0.050	< 0.050	-	< 0.050	-	-	-	< 0.050	-
pH, lab	s.u.	6.5-8.5 (OG)	7.42	7.91	7.58	7.34	7.47	7.55	7.46	7.40	8.00 J	7.71	7.84	7.80	7.52	7.52	8.03 J	7.34	7.83	7.87 J	7.88 J	7.42	7.26
Phenolics (total)	mg/L	-	< 0.0010	-	-	< 0.0011	-	< 0.0018	-	< 0.0010	-	< 0.0010	-	-	< 0.0010	< 0.0010	-	< 0.0016	-	-	-	< 0.0010	-
Phosphorus	mg/L	-	0.696	-	-	0.135	-	0.0572	-	0.0826	-	0.777	-	-	0.131	0.129	-	0.0574	-	-	-	0.134	-
Sulfate	mg/L	500 (AO)	3650 *[a]	3700 *[a]	2750 *[a]	2690 *[a]	2910 *[a]	2400 *[a]	2460 *[a]	2700 *[a]	2530 J *[a]	2190 *[a]	2250 *[a]	2250 *[a]	2580 *[a]	2630 *[a]	2300 J *[a]	2230 *[a]	2240 *[a]	2020 J *[a]	2420 J *[a]	2660 *[a]	2560 *[a]
Total dissolved solids (TDS)	mg/L	500 (AO)	5360[a]	5330[a]	3860[a]	2650[a]	3920[a]	3560[a]	3610[a]	4080[a]	4340 J[a]	3490[a]	3720[a]	3570[a]	3870[a]	3830[a]	3470 J[a]	3310[a]	3660[a]	3050 J[a]	3840 J[a]	3990[a]	3660[a]
Total kjeldahl nitrogen (TKN)	mg/L	-	0.782	-	-	0.673	-	0.802	-	0.497	-	0.523	-	-	0.668	0.937	-	0.137	-	-	-	0.535	-
Total suspended solids (TSS)	mg/L	-	1780	-	-	391	-	846	-	161	-	945	-	-	162	114	-	98.5	-	-	-	645	-
Turbidity	NTU	5.0/5.0 (MAC/AO)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Metals																							
Aluminum	mg/L	0.10 (OG)	< 0.0100	-	-	< 0.0100	-	< 0.0146	-	< 0.0100	-	< 0.0100	-	-	< 0.0100	< 0.0100	-	< 0.0100	-	-	-	4.94	-
Arsenic	mg/L	0.010 (IMAC) (a)	0.00346	-	-	0.0131[a]	-	0.00170	-	0.00622	-	0.00401	-	-	0.00735	0.00674	-	< 0.00100	-	-	-	0.00226	-
Barium	mg/L	1.0 (MAC)	0.00747	0.00541	0.00391	0.00492	0.00784	0.00634	0.00651	0.00707	0.00774 J	0.0309	0.0146	0.0139	0.00594	0.00573	0.00483 J	0.0257	0.0125	0.00649 J	0.00522 J	0.0536	0.0117
Beryllium	mg/L	-	< 0.000200	-	-	< 0.000200	-	< 0.000200	-	< 0.000200	-	< 0.000200	-	-	< 0.000200	< 0.000200	-	< 0.000200	-	-	-	0.000222	-
Boron	mg/L	5.0 (IMAC)	0.625	0.617	0.470	0.712	0.624	0.494	0.490	0.676	0.534 J	0.186	0.293	0.280	0.597	0.573	0.504 J	0.455	0.516	0.475 J	0.538 J	0.420	0.510
Cadmium	mg/L	0.005 (MAC)	< 0.0000500	-	-	< 0.0000500	-	< 0.0000500	-	< 0.0000500	-	< 0.0000500	-	-	< 0.0000500	< 0.0000500	-	0.0000581	-	-	-	0.0000541	-
Calcium	mg/L	-	448	439	529	482	481	490	508	482	465 J	494	510	498	422	425	457 J	505	502	494 J	463 J	451	538
Chromium	mg/L	0.05 (MAC)	< 0.00500	-	-	< 0.00500	-	< 0.00500	-	< 0.00500	-	< 0.00500	-	-	< 0.00500	< 0.00500	-	< 0.00500	-	-	-	0.00766	-
Cobalt	mg/L	-	0.00309	-	-	< 0.00100	-	< 0.00100	-	< 0.00100	-	0.00135	-	-	< 0.00100	< 0.00100	-	0.00136	-	-	-	0.00494	-
Copper	mg/L	1.0 (AO)	< 0.00200	-	-	< 0.00200	-	< 0.00200	-	< 0.00200	-	< 0.00200	-	-	< 0.00200	< 0.00200	-	< 0.00200	-	-	-	0.00729	-
Iron	mg/L	0.30 (AO)	0.388[a]	0.353[a]	< 0.100	3.20[a]	2.78[a]	3.38[a]	2.92[a]	2.94[a]	2.89 J[a]	0.897[a]	1.43[a]	1.41[a]	2.69[a]	2.36[a]	2.55 J[a]	< 0.100	< 0.100	4.26 J[a]	3.20 J[a]	7.70[a]	1.48[a]
Lead	mg/L	0.01 (MAC)	< 0.000500	-	-	< 0.000500	-	< 0.000500	-	< 0.000500	-	< 0.000500	-	-	< 0.000500	< 0.000500	-	< 0.000500	-	-	-	0.00527	-
Magnesium	mg/L	-	546	642	421	382	396	343	357	424	398 J	241	308	305	432	426	388 J	275	304	223 J	350 J	305	373
Manganese	mg/L	0.05 (AO)	0.216[a]	-	-	0.0336	-	0.119[a]	-	0.191[a]	-	0.0983[a]	-	-	0.109[a]	0.112[a]	-	0.279[a]	-	-	-	0.261[a]	-
Mercury	mg/L	0.001 (MAC)	< 0.0000050	-	-	< 0.0000050	-	< 0.0000050	-	< 0.0000050	-	< 0.0000050	-	-	< 0.0000050	< 0.0000050	-	< 0.0000050	-	-	-	0.0000090	-
Molybdenum	mg/L	-	0.00667	-	-	0.00406	-	0.00456	-	0.00537	-	0.00368	-	-	0.00385	0.00376	-	0.00567	-	-	-	0.00516	-
Nickel	mg/L	-	0.00535	-	-	< 0.00500	-	< 0.00500	-	< 0.00500	-	< 0.00500	-	-	< 0.00500	< 0.00500	-	0.00677	-	-	-	0.0119	-
Potassium	mg/L	-	4.88	-	-	4.98	-	4.71	-	5.89	-	3.70	-	-	4.78	4.85	-	4.86	-	-	-	6.63	-
Silver	mg/L	-	< 0.000100	-	-	< 0.000100	-	< 0.000100	-	< 0.000100	-	< 0.000100	-	-	< 0.000100	< 0.000100	-	< 0.000100	-	-	-	< 0.000100	-
Sodium	mg/L	200 (AO)	155	185	128	125	140	112	116	134	129 J	83.1	103	102	147	143	133 J	103	122	87.3 J	118 J	88.9	110
Thallium	mg/L	-	< 0.000100	-	-	< 0.000100	-	< 0.000100	-	< 0.000100	-	< 0.000100	-	-	< 0.000100	< 0.000100	-	< 0.000100	-	-	-	0.000195	-
Vanadium	mg/L	-	< 0.00500	-	-	< 0.00500	-	< 0.00500	-	< 0.00500	-	< 0.00500	-	-	< 0.00500	< 0.00500	-	< 0.00500	-	-	-	0.00998	-
Zinc	mg/L	5.0 (AO)	< 0.0100	-	-	< 0.0100	-	< 0.0100	-	< 0.0100	-	< 0.0100	-	-	< 0.0100	< 0.0100	-	< 0.0100	-	-	-	< 0.0300	-

Ontario Drinking Water Standards (ODWS), June 2003; revised June 2006, prepared by the MOECC.
No Value/Not Analyzed.
The result is an estimated value.
Rejected.
Does not meet the applicable ODWS/O. Reg 153/04 criteria.
Method detection limit does not meet ODWS/O. Reg 153/04 criteria.
Result below method detection limit.
Current criteria for arsenic is provided wich came into affect 2018. Previous data is subjected to a limit of 0.025 mg/L.

Notes:

(1)	Ontario Drinking Water Standards (ODWS), June 2003; revised June 2006, prepared by the MOECC.
-	No Value/Not Analyzed.
J	The result is an estimated value.
R	Rejected.
0.054[a]	Does not meet the applicable ODWS/O. Reg 153/04 criteria.
< 0.10	Method detection limit does not meet ODWS/O. Reg 153/04 criteria.
< 0.20	Result below method detection limit.
(a)	Current criteria for arsenic is provided wich came into affect 2018. Previous data is subjected to a limit of 0.025 mg/L.

Table 5.5B

Summary of Groundwater Analytical Results - Basal Overburden/Shallow Bedrock
2022 Operations and Monitoring Report
Brooks Road Landfill Site
Haldimand County, Ontario

Sample Location:				**MW1A-13**	**MW5A-09**	**MW6A-07**	**MW10A-18**	**MW11A-19**	**MW13A-22**	**MW14A-22**	**OW1A-06**	**OW1A-06**	**OW3A-13**	**OW9A-06**
Sample ID:				**GW-MW1A**	**GW-MW5A**	**GW-MW6A**	**GW-MW10A**	**GW-MW11A**	**GW-MW13A**	**GW-MW14A**	**GW-OW1A**	**GW-DUP1**	**GW-OW3A**	**GW-OW9A**
Sample Date:				**5/10/2022**	**5/12/2022**	**5/11/2022**	**5/10/2022**	**5/9/2022**	**5/10/2022**	**5/10/2022**	**5/10/2022**	**5/10/2022**	**5/12/2022**	**5/10/2022**
		ODWS[(1)]	**Table 2[(2)]**									**Duplicate**		
Parameters	**Units**	**a**	**b**											
Semi-volatile Organic Compounds														
1-Methylnaphthalene	µg/L	-	-	0.034	< 0.010	0.010	0.042	< 0.010	0.047	0.681	< 0.010	< 0.010	< 0.010	< 0.010
1-Methylnaphthalene/2-Methylnaphthalene	µg/L	-	3.2	0.071	< 0.015	0.023	0.080	< 0.015	0.098	1.42	< 0.015	< 0.015	< 0.015	< 0.015
2-Methylnaphthalene	µg/L	-	-	0.037	< 0.010	0.013	0.038	< 0.010	0.051	0.734	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthene	µg/L	-	4.1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.020	< 0.078	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	µg/L	-	1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.027	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	µg/L	-	2.4	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.122	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)anthracene	µg/L	-	1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.014	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	µg/L	0.01 (MAC)	0.01	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0085	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Benzo(b)fluoranthene	µg/L	-	0.1	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene/Benzo(j)fluoranthene	µg/L	-	0.1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.024	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(g,h,i)perylene	µg/L	-	0.2	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.011	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	µg/L	-	0.1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	µg/L	-	0.1	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.012	< 0.050	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	µg/L	-	0.2	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	µg/L	-	0.41	0.011	< 0.010	< 0.010	< 0.010	< 0.010	0.049	0.131	< 0.010	< 0.010	< 0.010	0.011
Fluorene	µg/L	-	120	0.014	< 0.010	< 0.010	0.015	< 0.010	0.019	0.319	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-cd)pyrene	µg/L	-	0.2	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	µg/L	-	11	< 0.050	< 0.050	< 0.050	0.375	< 0.050	< 0.050	< 0.269	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	µg/L	-	1	< 0.020	< 0.020	0.035	< 0.020	< 0.020	0.047	0.460	< 0.020	< 0.020	< 0.020	< 0.020
Pyrene	µg/L	-	4.1	0.027	< 0.010	0.013	0.010	< 0.010	0.058	0.129	< 0.010	< 0.010	< 0.010	0.010
Volatile Organic Compounds														
1,1,1,2-Tetrachloroethane	µg/L	-	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,1-Trichloroethane	µg/L	-	200	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	µg/L	-	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	µg/L	-	4.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	µg/L	-	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	µg/L	14 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dibromoethane (Ethylene dibromide)	µg/L	-	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	µg/L	200 (MAC)	3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	µg/L	5 (IMAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	µg/L	-	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	µg/L	-	59	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	µg/L	5 (MAC)	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	1800	< 20	< 20	< 20	< 20	< 20	< 20	76	< 20	< 20	< 20	< 20
2-Hexanone	µg/L	-	-	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	640	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	-	2700	< 20	< 20	< 20	< 20	< 20	< 20	70	< 20	< 20	< 20	< 20
Benzene	µg/L	1 (MAC)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	µg/L	-	16	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	µg/L	-	25	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane (Methyl bromide)	µg/L	-	0.89	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	2 (MAC)	0.79	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chlorobenzene	µg/L	80 (MAC)	30	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	µg/L	-	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform (Trichloromethane)	µg/L	-	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane (Methyl chloride)	µg/L	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
cis-1,2-Dichloroethene	µg/L	-	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
cis-1,3-Dichloropropene/trans-1,3-Dichloropropene	µg/L	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	µg/L	-	25	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dichlorodifluoromethane (CFC-12)	µg/L	-	590	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	µg/L	140 (MAC)	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexane	µg/L	-	51	-	-	-	-	-	-	-	-	-	-	-
m&p-Xylenes	µg/L	-	-	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Methyl tert butyl ether (MTBE)	µg/L	15 (AO)	15	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene chloride	µg/L	50 (MAC)	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Styrene	µg/L	-	5.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	µg/L	10 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	µg/L	60 (MAC)	24	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.67	0.56	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	µg/L	-	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Trichloroethene	µg/L	5 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorofluoromethane (CFC-11)	µg/L	-	150	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trihalomethanes	µg/L	100 (MAC)	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl chloride	µg/L	1 (MAC)	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenes (total)	µg/L	90 (MAC)	300	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Table 5.6A

Summary of Groundwater Analytical Results - Bedrock
2022 Operations and Monitoring Report
Brooks Road Landfill Site
Haldimand County, Ontario

Sample Location:			**MW1D-07**	**MW1S-07**	**MW2D-07**	**MW2S-07**	**OW8D-07**	**OW8S-07**
Sample ID:			**GW-MW1D**	**GW-MW1S**	**GW-MW2D**	**GW-MW2S**	**GW-OW8D**	**GW-OW8S**
Sample Date:			**5/11/2022**	**5/11/2022**	**5/11/2022**	**5/11/2022**	**5/9/2022**	**5/9/2022**
Parameters	**Units**	**ODWS[(1)] a**						
Field Parameters								
Conductivity, field	mS/cm	-	3.62	3.80	4.00	4.05	2.96	-
Dissolved oxygen (DO), field	mg/L	-	0.0	3.58	0.0	0.0	1.01	-
Oxidation reduction potential (ORP), field	millivolts	-	-44	-3	63	44	-296	-
pH, field	s.u.	6.5-8.5 (OG)	7.64	7.76	7.46	7.56	8.27	NM
Temperature, field	Deg C	15 (AO)	13.53	**20.94[a]**	12.78	11.63	14.78	-
Turbidity, field	NTU	5.0/5.0 (MAC/AO)	**1000[a]**	**445[a]**	**116[a]**	0.4	**118[a]**	-
General Chemistry								
Alkalinity, total (as CaCO3)	mg/L	30-500 (OG)	577	357	408	413	204	406
Ammonia-N	mg/L	-	0.993	0.386	0.166	0.197	3.52	0.306
Biochemical oxygen demand (BOD)	mg/L	-	6.6 J	6.1 J	< 3.0 J	< 3.0 J	70.0 J	< 3.0 J
Chemical oxygen demand (COD)	mg/L	-	1220	693	< 10	< 10	148	11
Chloride	mg/L	250 (AO)	13.0 *	12.7 *	12.9 *	12.6 *	23.9 *	13.6 *
Conductivity	mS/cm	-	3.66	2.92	3.95	3.93	3.33	4.17
Dissolved organic carbon (DOC)	mg/L	-	3.41	2.58	2.58	1.70	3.47	2.36
Hardness	mg/L	80-100 (OG)	3630	2660	2900	2860	2260	2830
Nitrate (as N)	mg/L	10.0 (MAC)	< 0.100 J	0.115 J	< 0.100 J	< 0.100 J	< 0.100 J	< 0.100 J
Nitrite (as N)	mg/L	1.0 (MAC)	< 0.050 J	< 0.050 J	< 0.050 J	< 0.050 J	< 0.050 J	< 0.050 J
pH, lab	s.u.	6.5-8.5 (OG)	7.51	7.70	7.52	7.52	8.17	7.44
Phenolics (total)	mg/L	-	< 0.0100	< 0.0100	< 0.0010	< 0.0010	< 0.0100	< 0.0026
Phosphorus	mg/L	-	13.2	10.8	0.0329	0.0024	0.103	0.0218
Sulfate	mg/L	500 (AO)	**2280 *[a]**	**1850 *[a]**	**2610 *[a]**	**2600 *[a]**	**2060 *[a]**	**2690 *[a]**
Total dissolved solids (TDS)	mg/L	500 (AO)	**3450[a]**	**2690[a]**	**4020[a]**	**3970[a]**	**3310[a]**	**3860[a]**
Total kjeldahl nitrogen (TKN)	mg/L	-	22.3	< 5.00	0.236	0.264	< 5.00	0.428
Total suspended solids (TSS)	mg/L	-	64700	12400	103	4.5	400	26.0
Turbidity	NTU	5.0/5.0 (MAC/AO)	-	-	-	-	-	-
Dissolved Metals								
Aluminum	mg/L	0.10 (OG)	84.8	0.418	< 0.0758	< 0.0100	0.680	< 0.0100
Arsenic	mg/L	0.010 (IMAC) (a)	**0.0272[a]**	0.00619	< 0.00100	0.00123	0.00244	0.00391
Barium	mg/L	1.0 (MAC)	0.583	0.0267	0.00713	0.00324	0.00931	0.00436
Beryllium	mg/L	-	0.00412	< 0.000200	< 0.000200	< 0.000200	< 0.000200	< 0.000200
Boron	mg/L	5.0 (IMAC)	0.766	0.514	0.526	0.509	**10.6[a]**	0.579
Cadmium	mg/L	0.005 (MAC)	0.000750	< 0.0000500	< 0.0000500	< 0.0000500	< 0.0000500	< 0.0000500
Calcium	mg/L	-	908	489	491	478	526	475
Chromium	mg/L	0.05 (MAC)	**0.137[a]**	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Cobalt	mg/L	-	0.0695	0.00139	0.00235	0.00157	< 0.00100	0.00225
Copper	mg/L	1.0 (AO)	0.139	< 0.00200	< 0.00200	< 0.00200	< 0.00200	< 0.00200
Iron	mg/L	0.30 (AO)	**158[a]**	**2.43[a]**	**0.311[a]**	**0.479[a]**	0.236	**1.85[a]**
Lead	mg/L	0.01 (MAC)	**0.0839[a]**	< 0.000500	< 0.000500	< 0.000500	< 0.000500	< 0.000500
Magnesium	mg/L	-	330	350	407	405	231	400
Manganese	mg/L	0.05 (AO)	**3.06[a]**	**0.0911[a]**	**0.162[a]**	**0.158[a]**	0.0182	**0.215[a]**
Mercury	mg/L	0.001 (MAC)	0.0000337	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000500	< 0.0000050
Molybdenum	mg/L	-	0.00234	0.00383	0.00514	0.00498	< 0.000500	0.00492
Nickel	mg/L	-	0.164	< 0.00500	0.00500	< 0.00500	< 0.00500	< 0.00500
Potassium	mg/L	-	18.9	5.36	6.46	6.07	27.8	5.80
Silver	mg/L	-	0.000262	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100
Sodium	mg/L	200 (AO)	90.6	108	124	121	31.7	123
Thallium	mg/L	-	0.000847	< 0.000100	< 0.000100	< 0.000100	< 0.000100	< 0.000100
Vanadium	mg/L	-	0.161	< 0.00500	< 0.00500	< 0.00500	< 0.00500	< 0.00500
Zinc	mg/L	5.0 (AO)	0.478	< 0.0100	< 0.0100	< 0.0100	< 0.0100	< 0.0100

Table 5.6B

Summary of Groundwater Analytical Results - Bedrock
2022 Operations and Monitoring Report
Brooks Road Landfill Site
Haldimand County, Ontario

Sample Location:				**MW1D-07**	**MW1S-07**	**MW2D-07**	**MW2S-07**	**OW8D-07**	**OW8S-07**
Sample ID:				**GW-MW1D**	**GW-MW1S**	**GW-MW2D**	**GW-MW2S**	**GW-OW8D**	**GW-OW8S**
Sample Date:				**5/11/2022**	**5/11/2022**	**5/11/2022**	**5/11/2022**	**5/9/2022**	**5/9/2022**
Parameters	**Units**	**ODWS[(1)] a**	**Table 2[(2)] b**						
Semi-volatile Organic Compounds									
1-Methylnaphthalene	µg/L	-	-	0.093	0.031	< 0.010	< 0.010	0.014	< 0.010
1-Methylnaphthalene/2-Methylnaphthalene	µg/L	-	3.2	0.191	0.071	< 0.015	< 0.015	0.033	< 0.015
2-Methylnaphthalene	µg/L	-	-	0.098	0.040	< 0.010	< 0.010	0.019	< 0.010
Acenaphthene	µg/L	-	4.1	0.054	0.022	< 0.010	< 0.010	< 0.010	< 0.010
Acenaphthylene	µg/L	-	1	0.051	0.012	< 0.010	< 0.010	< 0.010	< 0.010
Anthracene	µg/L	-	2.4	0.246	0.078	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)anthracene	µg/L	-	1	0.604	0.195	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(a)pyrene	µg/L	0.01 (MAC)	0.01	**0.426[ab]**	**0.168[ab]**	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Benzo(b)fluoranthene	µg/L	-	0.1	-	-	-	-	-	-
Benzo(b)fluoranthene/Benzo(j)fluoranthene	µg/L	-	0.1	**0.657[b]**	**0.225[b]**	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(g,h,i)perylene	µg/L	-	0.2	**0.278[b]**	0.100	< 0.010	< 0.010	< 0.010	< 0.010
Benzo(k)fluoranthene	µg/L	-	0.1	**0.243[b]**	0.094	< 0.010	< 0.010	< 0.010	< 0.010
Chrysene	µg/L	-	0.1	**0.722[b]**	**0.220[b]**	< 0.010	< 0.010	< 0.010	< 0.010
Dibenz(a,h)anthracene	µg/L	-	0.2	0.0658	0.0241	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Fluoranthene	µg/L	-	0.41	**2.23[b]**	**0.650[b]**	< 0.010	< 0.010	< 0.010	< 0.010
Fluorene	µg/L	-	120	0.165	0.043	< 0.010	< 0.010	< 0.010	< 0.010
Indeno(1,2,3-cd)pyrene	µg/L	-	0.2	**0.385[b]**	0.140	< 0.010	< 0.010	< 0.010	< 0.010
Naphthalene	µg/L	-	11	0.225	0.122	< 0.050	< 0.050	< 0.050	< 0.050
Phenanthrene	µg/L	-	1	**1.18[b]**	0.384	< 0.020	< 0.020	< 0.020	< 0.020
Pyrene	µg/L	-	4.1	1.78	0.522	< 0.010	< 0.010	< 0.010	< 0.010
Volatile Organic Compounds									
1,1,1,2-Tetrachloroethane	µg/L	-	1.1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,1-Trichloroethane	µg/L	-	200	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2,2-Tetrachloroethane	µg/L	-	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1,2-Trichloroethane	µg/L	-	4.7	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethane	µg/L	-	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,1-Dichloroethene	µg/L	14 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dibromoethane (Ethylene dibromide)	µg/L	-	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
1,2-Dichlorobenzene	µg/L	200 (MAC)	3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloroethane	µg/L	5 (IMAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,2-Dichloropropane	µg/L	-	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	µg/L	-	59	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	µg/L	5 (MAC)	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
2-Butanone (Methyl ethyl ketone) (MEK)	µg/L	-	1800	< 20	< 20	< 20	< 20	< 20	< 20
2-Hexanone	µg/L	-	-	< 20	< 20	< 20	< 20	< 20	< 20
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	-	640	< 20	< 20	< 20	< 20	< 20	< 20
Acetone	µg/L	-	2700	< 20	< 20	< 20	< 20	< 20	< 20
Benzene	µg/L	1 (MAC)	5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromodichloromethane	µg/L	-	16	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromoform	µg/L	-	25	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Bromomethane (Methyl bromide)	µg/L	-	0.89	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Carbon disulfide	µg/L	-	-	-	-	-	-	-	-
Carbon tetrachloride	µg/L	2 (MAC)	0.79	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Chlorobenzene	µg/L	80 (MAC)	30	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroethane	µg/L	-	-	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloroform (Trichloromethane)	µg/L	-	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Chloromethane (Methyl chloride)	µg/L	-	-	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
cis-1,2-Dichloroethene	µg/L	-	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
cis-1,3-Dichloropropene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
cis-1,3-Dichloropropene/trans-1,3-Dichloropropene	µg/L	-	-	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Dibromochloromethane	µg/L	-	25	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dichlorodifluoromethane (CFC-12)	µg/L	-	590	-	-	-	-	-	-
Ethylbenzene	µg/L	140 (MAC)	2.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Hexane	µg/L	-	51	-	-	-	-	-	-
m&p-Xylenes	µg/L	-	-	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Methyl tert butyl ether (MTBE)	µg/L	15 (AO)	15	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Methylene chloride	µg/L	50 (MAC)	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Styrene	µg/L	-	5.4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Tetrachloroethene	µg/L	10 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	µg/L	60 (MAC)	24	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,2-Dichloroethene	µg/L	-	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
trans-1,3-Dichloropropene	µg/L	-	-	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Trichloroethene	µg/L	5 (MAC)	1.6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trichlorofluoromethane (CFC-11)	µg/L	-	150	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Trihalomethanes	µg/L	100 (MAC)	-	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl chloride	µg/L	1 (MAC)	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Xylenes (total)	µg/L	90 (MAC)	300	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Notes: