



## **2021 Annual Report**

# **Norway Lake Waste Disposal Site (A411702)**

**Township of Greater Madawaska  
County of Renfrew, Ontario**

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## Executive Summary

This report has been prepared to document the results of the 2021 environmental monitoring program for the Township of Greater Madawaska's Norway Lake Waste Disposal Site, located on part of Lot 20, Concession 7 within the geographic Township of Bagot, in the Township of Greater Madawaska. The site is located approximately five (5) kilometres east of the Village of Calabogie, on Norway Lake Road.

The Norway Lake Waste Disposal Site operates in accordance with Environmental Compliance Approval A411702, for the transfer of municipal solid waste and Blue Box recycling from the Norway Lake site to GFL Environmental Inc. in Moose Creek, Ontario for disposal and processing. The site consists of an approved waste disposal area of 1.37 hectares within a total site area of 18.47 hectares. The Norway Lake site was closed to landfilling operations in 2002, and final closure of the waste mound at the Norway Lake site was completed in 2007. Since 2002, the Norway Lake site has operated as a municipal solid waste and recycling transfer station only.

The interpreted groundwater configuration at the site in 2021 was relatively consistent with historical interpretations in the overburden and bedrock aquifers. The predominant groundwater flow directions in the overburden and bedrock aquifers were interpreted to be to the northeast.

Groundwater quality northeast, east, and immediately downgradient of the site was interpreted to be impacted from the Norway Lake Waste Disposal Site in both the overburden and bedrock aquifers. Based on the results of the 2021 Reasonable Use Concept criteria assessment at the site, the Norway Lake Waste Disposal Site was interpreted to meet the intent of Ontario Ministry of the Environment, Conservation, and Parks' Guideline B-7 at all downgradient property boundaries for a closed landfill.

Surface water quality in the vicinity of the site was assessed at the seasonally inundated creek/low-lying depressional area located to the north and east of the closed waste mound. The downstream sampling location SW-1 in spring 2021 was not interpreted to be significantly impacted by landfill-related factors and surface water quality was interpreted to meet Provincial Water Quality Objectives. Surface water sampling locations SW-1 and background location SW-4 were not sampled in fall 2021 as both locations were observed to be dry, while SW-4 was also not sampled in spring 2021 due to dry conditions.

Based on Township Greater Madawaska records, approximately 15,430 vehicles visited the Norway Lake site in 2021, and accepted approximately 24,852 bags of waste. Based on information supplied by the Township of Greater Madawaska, 415 tonnes of municipal waste were collected at the Norway Lake site in 2021 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally, approximately 780 cubic metres of leaf and yard waste and 3,800 cubic metres of construction, demolition, and bulky waste were accepted at the Norway Lake site in 2021.

Recycling tonnage records provided by the Township of Greater Madawaska indicated that 97 tonnes of Blue Box recyclables were collected from the Norway Lake Waste Disposal Site in 2021. Blue Box recyclable quantities contributing to this total included 45 tonnes of commingled containers, 35 tonnes of mixed fibres, and 17 tonnes of old corrugated cardboard. Approximately 3 tonnes of household organics were diverted at the Norway Lake site in 2021.

According to Township of Greater Madawaska records, 129 tonnes of scrap metal, 63 refrigerant units, 3,078 tires, and 20 tonnes of waste electronic and electrical equipment were diverted from the depots at the Norway Lake Waste Disposal Site, Mount St. Patrick Waste Disposal Site, and Griffith Waste Disposal Site.

Based on the results of the 2021 environmental monitoring program, and in accordance with Condition 7.2 (b) (iii) of the Amended Environmental Compliance Approval (A411702), the Norway Lake Waste Disposal Site was interpreted to be in compliance with all conditions of the Environmental Certificate of Approval, and with the inspection and reporting requirements therein.

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## 1.0 Introduction

### 1.1 Site Information

The Norway Lake Waste Disposal Site is located on part of Lot 20, Concession 7 within the geographic Township of Bagot, in the amalgamated Township of Greater Madawaska (Township). The site is located approximately five (5) kilometres (km) east of the Village of Calabogie, on Norway Lake Road (Figures 1 and 2). The Universal Transverse Mercator (UTM) coordinates at the site entrance gate relative to the North American Datum (NAD83) are 367326.0 metres (m) East, 5021906.0 m North, in Zone 18T (Google Earth, 2013). The site operates in accordance with the Amended Environmental Compliance Approval (ECA) A411702 issued on April 9, 2013, including the most recent amendment on September 26, 2013 (Appendix A). The site consists of an approved waste disposal area (AWDA) of 1.37 hectares (ha) within a total site area of approximately 18.47 ha (Appendix A; Figures 2 and 3).

The Norway Lake site was closed to landfilling operations in 2002, and final closure of the waste mound at the Norway Lake site was completed in 2007. Since 2002, the Norway Lake site has operated as a municipal solid waste and recycling transfer station only. Currently, received residential and Industrial, Commercial, and Institutional (IC&I) waste and Blue Box recyclables are transported off-site for disposal at GFL Environmental, Inc. (GFL) in Moose Creek, Ontario for disposal and processing. As part of the Township's long-term waste management plan, the Norway Lake site was identified for an upgrade to the site's existing municipal solid waste and recycling transfer station, similar to the waste and recycling transfer stations at the Township's Griffith and Mount St. Patrick sites. Construction of the upgraded municipal solid waste and recycling transfer station was initiated in fall 2008. The upgraded transfer station was opened to the public on November 21, 2009. Construction and demolition (C&D) and bulky wastes are collected at the Norway Lake site and transferred to the Township's Black Donald and Mount St. Patrick Waste Disposal Sites for processing and disposal.

### 1.2 Background

In accordance with Condition 24 of the ECA (December 24, 2003, Appendix A), the Township identified the Norway Lake site for final closure. Final closure of the waste mound at the Norway Lake site was completed in 2007, in accordance with Condition 24 of the ECA (Appendix A) and correspondence to the Ontario Ministry of the Environment, Conservation, and Parks (MECP) dated September 28, 2006 and October 27, 2006, as detailed in the 2007 Annual Report (Greenview Environmental Management Limited [Greenview], 2008).

Based on the formal closure of the landfill area of the site, and given the direction of long-term waste management planning in the Township which included a waste and recycling transfer station at the Norway Lake site, an application to amend the ECA dated June 8, 2007 was submitted to the MECP, with supporting technical documentation entitled, *Design and Operations Plan, Municipal Solid Waste Transfer Station, Norway Lake Waste Disposal Site* (DOP; Greenview, 2007). The intent of the 2007 application was to recognize proposed future site operations in the form of the upgraded solid waste and recycling transfer station operations to maintain service to residents and IC&I generators of the entire Township. On September 25, 2007, the ECA (A411702) for the Norway Lake site was amended to approve the proposed future site operations as presented in the DOP (Greenview, 2007).

On August 28, 2008, the MECP issued an additional Amendment to the ECA for the Norway Lake site, defining changes in types and volumes of acceptable waste and recyclables allowed on-site, and procedures for the storage and transfer of source separated organic waste (Appendix A).

Upgrades to the transfer station at the Norway Lake site were initiated by the Township in 2008, and were completed in 2009 with operations commencing on November 21, 2009. Funding for the upgrades at the site was made possible with assistance from the Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF).

The Township received MECP Technical Support Section (TSS) surface water review comments, dated March 5, 2012, for the 2010 Annual Report (Greenview, 2011). The MECP TSS agreed to the discontinuation of

surface water sample collection at surface water sampling locations SW2 and SW3, as the locations were historically observed to be shallow, stagnant pools of water with no flow or limited flow conditions.

The Township also received MECP TSS groundwater review comments, dated October 4, 2012 related to the 2011 Annual Report (Greenview, 2012), and further to the subsequent site meeting involving Township representatives, MECP personnel, and Greenview personnel, on December 3, 2012, the MECP TSS provided an Addendum to the October 4, 2012 review comments (Greenview, 2013). The MECP TSS agreed that groundwater quality at monitoring well OB-11 was impacted by road salt utilized by the Township for winter road maintenance and amended the interpretation of non-compliance of the site with MECP Guideline B-7 (MECP, 1994a). The MECP TSS agreed that historical overburden groundwater quality prior to fall 2009 from monitoring well OB-12 could be used for assessing compliance with the Reasonable Use Concept (RUC) and conformance with MECP Guideline B-7 (MECP, 1994a). A consistent calculation for background bedrock groundwater quality was also initiated at that time, using groundwater quality results from prior to fall 2009 from background bedrock well BR-2 to calculate median background groundwater quality for the site. These practices have been continued for this 2021 Annual Report.

The Township provided response comments to the MECP for both the draft Amended ECA (February 28, 2012), and the surface water review comments (March 5, 2012) in correspondence, dated October 31, 2012. Following the submission, the MECP issued an Amended ECA on April 9, 2013.

Condition 5.1 of the Amended ECA (April 9, 2013; Appendix A) required the Township to submit a Contingency Plan by June 3, 2013. The Contingency Plan was submitted to the MECP Environmental Approvals Branch (EAB) by Greenview on behalf of the Township on May 31, 2013 (Greenview, 2014). Subsequent to the submission of the Contingency Plan, an Amendment to the ECA was issued by the MECP on September 26, 2013 (Appendix A).

In 2013, the Township passed a new waste management by-law (By-law No. 09 – 2013) to maintain and regulate a system for the disposal of municipal waste, recyclables and other refuse (Greenview, 2014).

On September 29, 2014, the Township received MECP TSS groundwater review comments for the 2012 Annual Report (Greenview, 2013) for the Norway Lake site, dated February 5, 2014 (Greenview, 2015). The review comments noted that the Norway Lake site was interpreted to be in conformance with MECP Guideline B-7 and the monitoring schedule and analytical program were deemed to be satisfactory. On January 20, 2015, the Township received MECP TSS surface water review comments for the 2013 Annual Report (Greenview, 2014) for the Norway Lake site dated January 14, 2015 (Greenview, 2015). The MECP TSS surface water review noted that the surface water system in the vicinity of the Norway Lake site was not adversely impacted from former and current site operations, and that the current surface water monitoring program and schedule at the site was sufficient.

On March 16, 2016, the Township requested approval from the MECP Ottawa District Office to amend the operating hours for the transfer station at the Norway Lake Waste Disposal Site (Greenview, 2017). In electronic communication dated March 21, 2016, the MECP Ottawa District Office requested that the Township provide documentation regarding public notification of the Township's intent to modify the transfer station's operational hours prior to MECP approval, in accordance with Condition 9.7 (b) and (c) of the site's ECA. On May 10, 2016, the Township provided the MECP Ottawa District Office with electronic documentation related to public notification efforts in advance of amendment to the transfer stations hours (Greenview, 2017) and confirmed that no public/ratepayer comments were received as part of the process (Greenview, 2017). On May 12, 2016, the MECP Ottawa District Office provided the Township with an electronic letter confirming the MECP's approval to amend the hours of operation of the transfer station effective May 21, 2016 (Greenview, 2017).

On October 29, 2018, monitoring well OB-11 was decommissioned and replaced with a new overburden monitoring well adjacent to the former location of OB-11 (Figure 4). OB-11 had been previously observed to be damaged, likely due to an impact from an all-terrain vehicle. It was interpreted that the PVC well pipe of OB-11 had been broken below grade, which was confirmed during decommissioning operations. The replacement well

was designated as OB-11R, and was advanced through sand and gravel overburden and terminated at the interpreted interface with bedrock, at approximately 4.22 m below ground surface (bgs). A borehole log for the replacement monitoring well OB-11R is included in Appendix C of this report. Decommissioning and well installation operations were conducted by licenced drillers in accordance with Ontario Regulation (O.Reg.) 903 (Wells), as amended.

On June 14, 2019, the Township received MECP TSS surface water review comments related to the 2017 Annual Report, dated June 12, 2019 (Greenview, 2020). The MECP TSS reviewer noted that the seasonal creek at the site was not being impacted by landfill-related factors. Additionally, the reviewer noted that it was premature to cease the surface water monitoring program at the site; however, they noted that they would be agreeable to reducing the frequency of the surface water monitoring program. Subsequent communications between Greenview and the MECP clarified the intended wording of the MECP review, and reducing the frequency of the surface water monitoring program to a biennial program (once every two [2] years, in spring and fall) was confirmed (Greenview, 2020). Based on MECP TSS approval, the next surface water monitoring event at the Norway Lake Waste Disposal Site is scheduled for spring and fall 2021.

Throughout 2021, the Township and Greenview worked together on a Revised Design and Operations Plan (DOP) for the Norway Lake Waste Disposal Site, in an effort to modify transfer station operations and general layout of the site. On January 04, 2022, a copy of the Revised DOP was provided to the MECP Ottawa District Office for preliminary review and as part of the Township's obligation to initiate a Pre-Submission Meeting with the MECP relative to the Revised DOP and planned ECA Application for 2022 (Appendix B). The Pre-Submission Meeting was held between representatives of the MECP, Greenview, and the Township on January 20, 2022 (Appendix B). Formal submission of the ECA Application package, including the Revised DOP, is planned for submission to the MECP in 2022.

Greenview was retained by the Township to complete the 2021 environmental monitoring and reporting program at the Norway Lake site.

### **1.3 Purpose and Scope**

The purpose of this report is to provide an overview of the annual monitoring, environmental compliance, and operations at the Norway Lake site, in accordance with Condition 7.0 of the Amended ECA (A411702), including the following:

- Groundwater quality assessment and Reasonable Use Concept (RUC, MECP Guideline B-7) compliance (Section 4.1).
- Surface water quality assessment (Section 4.2).
- Site operational overview (Section 0).
- Conclusions and recommendations (Section 5.0).

## 2.0 Site Description

The following sections present a summary of the physical characteristics for the Norway Lake site. Locations of features described in this report are referenced to grid north.

### 2.1 Topography and Drainage

Local topography in the vicinity of the Norway Lake site is characterized by granite and gneissic marble bedrock outcrops, while the topography of the actual site area is of relatively flat to hummocky terrain (Golder Associates Ltd. [Golder], 2007). The AWDA at the site is relatively flat; however, the adjacent ground surface topography slopes towards low-lying areas located to the southeast, east, and northeast of the waste mound.

A topographic depression exists in the northern corner of the contaminant attenuation zone (CAZ), in which a seasonally inundated creek is located, and which is sampled by the two (2) existing surface water sampling locations at the site, SW-1 and SW-4 (Figures 2, 3, 4, 5, and 6). The seasonally inundated creek was historically interpreted to be a localized zone of potential groundwater discharge present during periods when the shallow groundwater table is elevated, primarily in the spring and fall.

A dormant aggregate resource area, locally identified as Burke's Pit, is located to the southwest of the site in the vicinity of monitoring wells OB-11R and OB-12, and adjacent to Norway Lake Road (Figure 3).

### 2.2 Hydrogeological and Geological Conditions

In the southern and western portions of the site, overburden geology is characterized by a thin layer of fine sand to silty sand, ranging from 0.3 metres (m) to 4.2 m, overlying fractured granite and gneissic marble. A layer of peat was determined to be present over the sandy overburden layer in the vicinity of monitoring well OB-2 (Golder, 2007).

To the north of the site, in the vicinity of the seasonally inundated creek, overburden geology is characterized by silty to coarse sand from surface to a depth of 3.7 m, underlain by a bedrock unit characterized by gneiss, marble, and fractured granite (Golder, 2007).

On the southwest side of Norway Lake Road in Burke's Pit (Figure 3), overburden geology is characterized by fine to coarse sand with trace gravel and/or cobbles, with auger refusal encountered at depths of 2.15 m to 3.65 m bgs (Golder, 2007). Based on observations during the installation of replacement monitoring well OB-11R in October 2018 (Figure 4), bedrock was interpreted at a depth of 4.22 m bgs, and overburden was observed to be generally fine to coarse-grained sand with gravel (Appendix C).

Historically, overburden and bedrock groundwater was interpreted to flow predominantly towards the east, with a localized component of radial flow away from the waste mound. Prior to the 2007 groundwater monitoring program, groundwater in the overburden aquifer in the vicinity of Burke's Pit (southwest of the waste mound) was reported to flow to the east and west (Golder, 2007). For further discussion on current groundwater flow directions, see Section 4.1.1 of this report.

Further to the MECP TSS groundwater review comments dated October 4, 2007 (Greenview, 2008), all available borehole logs for monitoring wells at the Norway Lake site are included in Appendix C. The available borehole logs include details regarding well construction for the corresponding monitoring wells.

In accordance with the MECP TSS Addendum (Greenview, 2012), hydraulic conductivity in the overburden was estimated in 2012 in the range of 0.050 to 0.086 cm/second, which is noted to be within the typical hydraulic conductivity range for well sorted sands and glacial outwash (0.1 to 0.001 cm/second, Fetter, 2001).

### 2.3 Land Use and Zoning

The zoning designation for the Norway Lake site is "DM", Disposal Industrial, and "DM-E1" Disposal Industrial



Exception 1, for the land area east of the waste mound used for CAZ purposes. Adjacent land use is designated "RU" Rural around the licensed site area, including a dormant mineral aggregate resource area (Burke's Pit) directly southwest of the landfill on the southwest side of Norway Lake Road (Figure 3).

## 2.4 Operational Setting

The Norway Lake site currently consists of an AWDA and transfer station of 1.37 ha within a total licensed site area of approximately 18.47 ha (Figures 2 and 3), as registered on the ECA (Appendix A).

The site currently operates as a municipal waste and recycling transfer station, and has been closed to landfilling operations since 2002. As part of waste transfer operations at the site, the Township maintains a waste and recycling depot (Figure 3). Municipal waste and Blue Box recycling received at the site is transferred to GFL in Moose Creek, Ontario for disposal, processing and market.

In accordance with amendments to the site's ECA (Appendix A), the Norway Lake transfer station was upgraded as part of the Township's long-term waste management plan. The upgraded transfer station was opened to the public on November 21, 2009.

The Norway Lake site is currently approved in accordance with Amended ECA A411702 (Appendix A) to accept up to 200 cubic metres (m<sup>3</sup>) of solid non-hazardous waste and recyclables per day, and the maximum amount of non-hazardous solid waste and recyclable materials to be stored or be present at the site at any given time cannot exceed 910 m<sup>3</sup>.

### 3.0 2021 Environmental Monitoring Program

The following sections present a methodology of the environmental monitoring program conducted at the Norway Lake site in 2021.

#### 3.1 Groundwater Monitoring

Groundwater monitoring and sampling activities were conducted by Greenview on May 17, 2021 and August 19, 2021 from the network of groundwater monitoring wells as part of the 2021 environmental monitoring program at the site (Table 1). The UTM coordinates of the groundwater monitoring wells were confirmed or measured by Greenview personnel during site visits in 2021 using a handheld geographic positioning system (GPS) instrument with an anticipated accuracy of within +/- 5 m (Table 2). During the 2021 spring and summer sampling events, groundwater elevations were measured at each monitoring well using an electronic water level tape prior to sampling. Based on the groundwater elevation a well purge volume equivalent to approximately three (3) borehole volumes was calculated in-situ using a standard conversion factor relevant to the respective well diameter.

Groundwater samples were collected from each monitoring well using dedicated polyethylene tubing and inertial lift foot-valves. Samples were collected into appropriate sample bottles as provided by an accredited laboratory and the designated sample for metal parameters was field-filtered using a dedicated high capacity 45-micron filter to reduce the potential for turbidity induced bias in the analytical results for the metal parameters.

As part of the 2021 monitoring program, a sample for the analysis of volatile organic compounds (VOCs) was collected from monitoring well BR-1 during the summer sampling event.

During the spring 2021 sampling event, monitoring well OB-5 was observed to be dry and no groundwater elevation measurements were collected. Monitoring well BR-8 was observed to pump dry and a full purge volume was not obtained (Appendix D).

During the summer 2021 sampling event, monitoring wells OB-5 and BR-5 were observed to be dry and no groundwater elevation measurements were collected (Appendix D).

Piezometers G-1 and G-5 were observed to be damaged during the spring and summer 2021 sampling events and groundwater elevations were not obtained. During the summer 2021 sampling event, piezometer G-3 was observed to be dry (Appendix D).

Duplicate groundwater samples were collected for Quality Assurance and Quality Control (QA/QC) purposes from the routine and surveillance parameter suites (Table 1) as part of the 2021 environmental monitoring program. During the spring and summer sampling events, QA/QC samples were collected from monitoring well OB-3 for the routine parameter suite and OB-12 for the surveillance parameter suite (Appendix D).

All samples were submitted to an accredited analytical laboratory to be analyzed for the parameter suites listed in Table 1.

Field measurements of pH, conductivity, temperature and dissolved oxygen (DO) were recorded at each respective groundwater well immediately following the collection of the groundwater samples. Field sampling records completed during the 2021 monitoring program are included in Appendix D. The groundwater samples were recorded on a laboratory Chain of Custody Form, and placed in coolers packed with contained ice for preservation during transport to the analytical laboratory.

The results of the 2021 groundwater monitoring program are presented in Section 4.1 of this report.

#### 3.2 Surface Water Monitoring

Surface water monitoring at the Norway Lake Waste Disposal Site have a biennial frequency, with the modified frequency starting in 2019.

Surface water monitoring and sampling activities in 2021 were conducted by Greenview on May 17, 2021 and November 16, 2021 from the established surface water monitoring locations at the site (Table 1). The UTM coordinates of the surface water monitoring locations were confirmed or measured by Greenview personnel during site visits in 2021 using a handheld GPS instrument with an anticipated accuracy of +/- 5 m (Table 2). In 2012, the environmental monitoring program was amended in response to MECP TSS surface water review comments dated March 5, 2012 (Greenview, 2013) to remove surface water monitoring locations SW-2 and SW-3 as they had historically been observed to be shallow, stagnant pools of water that did not exist on a defined surface water channel and were difficult to sample due to low water conditions. The changes made to the environmental monitoring program were applied as of the 2013 environmental monitoring program at the Norway Lake site (Greenview, 2014).

During the spring sampling event on May 17, 2021, sampling location SW-4 was observed to be dry and no sample was obtained. During the fall sampling event on November 16, 2021, surface water sampling locations SW-1 and SW-4 were both documented to be dry and no samples were obtained (Appendix D).

The surface water samples were collected by submerging a dedicated, non-preserved, sample container into the water body and decanting into preserved sample bottles so as not to displace preservative chemicals.

A duplicate surface water sample was collected for QA/QC purposes from surface water sampling location SW-1 for the spring 2021 sampling event (Appendix D).

All samples were submitted to an accredited analytical laboratory to be analyzed for the parameter suite listed in Table 1.

Field measurements of pH, conductivity, DO, and temperature were recorded at each surface water sampling location immediately following the collection of the surface water samples. Physical characteristics including depth, width, and flow velocity of each surface water location were recorded at the time of sampling. Field sampling records completed during the 2021 monitoring program are included in Appendix D. The surface water samples were recorded on a laboratory Chain of Custody Form, and placed in coolers packed with contained ice for preservation during transport to the analytical laboratory.

The results of the 2021 surface water monitoring program are presented in Section 4.2 of this report.

The next sampling event for surface water monitoring (spring and fall) is scheduled for 2023. Details on the surface water monitoring program are included on Table 1 and historical results are included in Table 7.

### **3.3 Analytical Laboratory Accreditation**

Collected groundwater and surface water samples were submitted for analysis to the Caduceon Environmental Laboratories (Caduceon), located in Kingston, Ontario. Caduceon is accredited by the Canadian Association for Laboratory Accreditation (CALA), for specific environmental testing procedures listed in the scope of accreditation and is assessed biannually by CALA to the ISO/IEC 17025 standard. ISO/IEC 17025 is an international standard for both quality management and technical aspects of operating a testing laboratory. Caduceon is licensed by the MECP to perform analysis on drinking water in Ontario in accordance with the Safe Drinking Water Act.

### **3.4 Landfill Gas Monitoring**

Landfill gas monitoring is not part of the current environmental monitoring program for the Norway Lake site. The waste mound at the Norway Lake site is covered with porous soil materials, allowing natural gas flux to the atmosphere. Overburden geology at and adjacent to the site is characterized by shallow, sandy materials, overlying a dense bedrock unit. These overburden and bedrock characteristics, coupled with the extended distance to the nearest residence, provide a minimal risk of landfill gases impinging off-site receivers.

### **3.5 Operational Monitoring**

Operational monitoring at the Norway Lake site is minimal since the site operates as a municipal solid waste and recycling transfer station only, with received municipal waste and Blue Box recycling transported off-site to GFL in Moose Creek, Ontario for disposal and processing. A topographic survey of the waste mound and transfer station at the Norway Lake site was conducted on August 12, 2021, as part of the work required for the Revised DOP (Greenview, 2022a). Topographic surfaces for the site have been updated on all figures related to this 2021 Annual Report, accordingly.

Daily waste records at the Norway Lake site are completed as part of regular operations at the site to monitor transfer station operations and vehicular traffic. The Township submits annual reports in accordance with the Municipal Datacall, inclusive of the Norway Lake site, to the Resource Productivity and Recovery Authority (RPRA). The results of the operational monitoring are presented in Section 4.3 of this report.

## 4.0 Environmental Monitoring Results

The following sections present a summary of the environmental monitoring results obtained during the Norway Lake site 2021 environmental monitoring program.

### 4.1 Groundwater Quality Assessment

The results of the 2021 groundwater monitoring program conducted at the site are presented as follows.

#### 4.1.1 Groundwater Configuration

The interpreted groundwater configuration at the site in 2021 was relatively consistent with historical interpretations in the overburden and bedrock aquifers (Greenview, 2021). Groundwater elevation data obtained during the 2021 groundwater monitoring program at the site are provided in Table 3. Environmental monitoring location plans for the overburden and bedrock aquifers at the Norway Lake site are included in Figures 3, 4, 5, and 6 of this report.

Average horizontal gradients and the associated predominant directions of groundwater flow in the overburden aquifer at the Norway Lake site in spring and summer 2021 were interpreted as follows:

Aquifer	Sampling Event	Location	Horizontal Gradient	Predominant Direction
Overburden	Spring 2021	Southwest of Waste Mound	0.012	South
		Northeast of Waste Mound	0.045	Northeast
		Southeast of Waste Mound	0.009	East
	Summer 2021	Southwest of Waste Mound	0.007	South
		Northeast of Waste Mound	0.059	Northeast
		Southeast of Waste Mound	0.007	East

Average horizontal gradients and the associated predominant directions of groundwater flow in the bedrock aquifer at the Norway Lake site in spring and summer 2021 were interpreted as follows:

Aquifer	Sampling Event	Location	Horizontal Gradient	Predominant Direction
Bedrock	Spring 2021	Vicinity of Waste Mound	0.016	East
		East of Waste Mound	0.082	Northeast
	Summer 2021	Vicinity of Waste Mound	0.013	East
		East of Waste Mound	0.108	Northeast

Using groundwater elevations measured in 2021 (Table 3), vertical hydraulic gradients were calculated at the following pair of shallow and deep monitoring wells for the spring and summer groundwater elevation monitoring events. The vertical gradients calculated in 2021 were as follows:

Monitoring Wells	Vertical Gradient (Spring 2021)	Vertical Gradient (Summer 2021)
BR-1 and OB-3	0.208	0.244

Monitoring well OB-7 was observed to be significantly damaged during the spring 2015 sampling event, due to an impact from a fallen tree. Since the well could not be accessed via equipment, OB-7 was removed by hand. OB-7 was not historically sampled as part of the groundwater monitoring events at the Norway Lake site

(Greenview, 2016).

Further to the MECP TSS hydrogeological review comments, dated October 4, 2012 (Greenview, 2013), a December 3, 2012 site meeting was arranged which included Township representatives, MECP personnel, and Greenview personnel. The MECP TSS issued an Addendum, dated December 11, 2012, in which the MECP TSS agreed that groundwater quality at monitoring well OB-11 was impacted by road salt utilized by the Township for winter road maintenance, and retracted the statement regarding non-compliance of the site with MECP Guideline B-7 (MECP, 1994a). The MECP TSS agreed that historical overburden groundwater quality from monitoring well OB-12 (prior to August 2009) could be used for assessing compliance with the RUC and conformance with MECP Guideline B-7 (MECP, 1994a). In addition, the MECP reviewer was willing to consider utilization of scientifically defensible methods to determine hydraulic conductivity at the site, rather than requiring the completion of slug tests, as initially directed in the October 4, 2012 review comments (Greenview 2013).

As noted previously in this report, monitoring well OB-11 was decommissioned and replaced with OB-11R on October 29, 2018 (Appendix C).

Per the MECP TSS Addendum (Greenview, 2013), a discussion on hydraulic conductivity within the overburden at the site is included in Section 2.2 of this Report.

#### 4.1.2 Groundwater Quality

The results of the 2021 groundwater monitoring program are presented in Tables 4, 5, 6, and 7 of this report and the accredited laboratory Certificates of Analysis are attached in Appendix E. Analytical data obtained from respective groundwater wells were compared to the Ontario Drinking Water Standards (ODWS; MECP, 2006), median background water quality at the site, and MECP Guideline B-7 (MECP, 1994b) and the RUC (MECP, 1994a). Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

The blind duplicate samples collected for routine monitoring at monitoring well OB-3 during the spring and summer 2021 sampling events were similar to the identified samples, indicating that the results of the 2021 routine groundwater monitoring program can be interpreted with confidence. Similarly, the blind duplicate samples collected for surveillance monitoring at monitoring well OB-12 during the spring and summer 2021 sampling events were similar to the identified samples, indicating that the results of the 2021 surveillance groundwater monitoring program can be interpreted with confidence.

Prior to August 2009, background groundwater quality in the overburden aquifer was assessed at monitoring well OB-12, which is located in Burke's Pit, approximately 80 m upgradient and west of the entrance gate to the Norway Lake site (Figures 3 and 5). Due to impacts related to road salt, the MECP TSS agreed that historical overburden groundwater quality prior to fall 2009 from OB-12 could be used for assessing compliance with the Reasonable Use Concept (RUC) and conformance with MECP Guideline B-7 (Greenview, 2013). In 2021, many parameter concentrations in the samples collected from background overburden well OB-12 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background overburden monitoring location OB-12 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Summer 2021	Increasing	Decreasing
OB-12 (background)	<ul style="list-style-type: none"> <li>Hardness</li> </ul>	<ul style="list-style-type: none"> <li>Hardness</li> <li>Manganese</li> </ul>	<ul style="list-style-type: none"> <li>Chloride</li> <li>Sodium</li> <li>Total Dissolved Solids (TDS)</li> </ul>	<ul style="list-style-type: none"> <li>Chemical Oxygen Demand (COD)</li> <li>Phosphorus</li> <li>Total Kjeldahl Nitrogen (TKN)</li> </ul>

Groundwater quality at OB-12 in 2021 was interpreted to be impacted by road salt from winter road maintenance activities at the nearby Norway Lake Road and the transfer station of the Norway Lake site (Table 4). Further to



MECP TSS groundwater review comments, dated December 11, 2012, for the 2011 Annual Report (Greenview, 2012), the MECP confirmed that OB-12 was being impacted by road salt and with the absence of any suitable locations for a replacement background well, the MECP TSS agreed that historical (stable; pre-fall 2009) groundwater quality data from OB-12 should be used for the purpose of establishing median background groundwater quality and the RUC.

Monitoring well OB-3 is installed in the overburden unit at the Norway Lake site, and is located approximately 80 m downgradient and south of the southeastern corner of the former disposal area (Figures 3 and 5). Groundwater at OB-3 is considered most representative of leachate quality in the overburden unit, given the proximity of the well to the existing limit of waste and the interpreted groundwater flow direction. In 2021, most parameter concentrations in samples collected from overburden leachate well OB-3 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at overburden leachate groundwater monitoring location OB-3 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Summer 2021	Increasing	Decreasing
OB-3	<ul style="list-style-type: none"> <li>Alkalinity</li> <li>Hardness</li> <li>Manganese</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>Alkalinity</li> <li>Chloride</li> <li>Hardness</li> <li>Manganese</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>Chloride</li> </ul>	<ul style="list-style-type: none"> <li>Alkalinity</li> <li>Boron</li> <li>Dissolved Organic Carbon (DOC)</li> </ul>

Overburden groundwater at OB-3 was interpreted to be impacted by landfill-related factors and winter road maintenance operations at the transfer station of the Norway Lake site, which was expected given its proximity to the current existing limit of waste at the site and the interpreted groundwater flow direction (Figures 3 and 5).

Overburden monitoring well OB-11R is located on the southwest side of the Norway Lake Road in Burke's Pit (Figure 3). Generally consistent with historical reports (Greenview, 2021), in spring and summer 2021 OB-11R was interpreted to be downgradient and/or cross-gradient of background monitor OB-12 (Figures 3 and 5). During the spring 2021 sampling event, the area in the vicinity of OB-11R was observed to be significantly flooded. The source of the standing water was interpreted to be related to snowmelt from the vicinity of Norway Lake Road flowing towards the topographic low area around OB-11R. The following photographs are indicative of the location of monitoring well OB-11R and the annual spring flooding adjacent to the monitoring well:

**Photograph 1: Typical Annual Spring Flooding Adjacent to OB-11R (Spring 2021)**



In 2021, most parameter concentrations in samples collected from OB-11R in spring and summer were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at overburden groundwater monitoring location OB-11R were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Summer 2021	Increasing	Decreasing
OB-11R	<ul style="list-style-type: none"> <li>Aluminum</li> <li>Chloride</li> <li>Hardness</li> <li>Sodium</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>Aluminum</li> <li>Chloride</li> <li>Hardness</li> <li>Sodium</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>Chloride</li> <li>Conductivity</li> <li>Nitrate</li> <li>Sodium</li> <li>Sulphate</li> </ul>	<ul style="list-style-type: none"> <li>DOC</li> <li>Iron</li> <li>Manganese</li> <li>Total Kjeldahl Nitrogen (TKN)</li> </ul>

Based on the directions of groundwater flow in the vicinity of overburden monitoring well OB-11R (Figures 3 and 5), it is unlikely that groundwater was impacted from landfill-related factors of the Norway Lake site. However, results in 2021 suggest continued impacts related to winter road maintenance activities of Norway Lake Road and the transfer station (Table 4, Figures 3 and 5), as supported by the flooding adjacent to OB-11R in the spring.

Overburden groundwater quality northeast of the site is assessed at monitoring well OB-8, located approximately 220 m northeast of the eastern corner of the former disposal area (Figures 3 and 5). In 2021, many parameter concentrations in samples collected from OB-8 were above the median background concentrations during the spring and fall sampling events (Table 4, Appendix D). Non-conformances of ODWS and significant groundwater trends at overburden groundwater monitoring location OB-8 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Summer 2021	Increasing	Decreasing
OB-8	<ul style="list-style-type: none"> <li>Hardness</li> </ul>	<ul style="list-style-type: none"> <li>Hardness</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>Chloride</li> </ul>	<ul style="list-style-type: none"> <li>DOC</li> </ul>

Impacts resultant of both naturally-occurring conditions and landfill-related factors at OB-8 were interpreted to be occurring downgradient of the site in 2021. OB-8 has historically been observed to be slow to recharge during well purging activities, related to low groundwater conditions, which may be impacting groundwater quality results at the sampling location. The noted concentrations in groundwater results from OB-8 were not interpreted to represent significant landfill-related impacts.

Background groundwater quality in the bedrock aquifer at the Norway Lake site has historically been assessed at bedrock monitoring well BR-2, located approximately 175 m southeast of the AWDA (Figures 4 and 6). In 2021, many parameter concentrations in samples collected from background bedrock well BR-2 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background bedrock groundwater monitoring location BR-2 were as follows (Table 5):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Summer 2021	Increasing	Decreasing
BR-2 (background)	<ul style="list-style-type: none"> <li>Hardness</li> <li>Iron</li> </ul>	<ul style="list-style-type: none"> <li>Hardness</li> <li>Iron</li> </ul>	<ul style="list-style-type: none"> <li>Alkalinity</li> <li>DOC</li> <li>Phosphorus</li> <li>Sulphate</li> </ul>	<ul style="list-style-type: none"> <li>No significant trends</li> </ul>

In 2021, groundwater quality at BR-2 was interpreted to continue to be impacted by winter road maintenance activities along Norway Lake Road (Table 5; Figures 4 and 6). Further to MECP TSS review comments of the 2011 Annual Report (Greenview, 2012), dated December 11, 2012, the MECP confirmed that BR-2 was being impacted by road salt and with the absence of any suitable locations for a replacement background well, the MECP TSS agreed that historical groundwater quality data from prior to fall 2009 at background bedrock well BR-2 should be used for the purpose of calculating median background groundwater quality and the RUC (Greenview 2013).



Bedrock monitoring well BR-10 is located on the southern boundary of the existing limit of waste at the site (Figures 4 and 6), and is installed in an area of refuse as shown on the borehole log in Appendix C (SGS, 2005). Similarly, bedrock monitoring well BR-1 is located approximately 100 m southeast of the former disposal area at the site (Figures 4 and 6). Based on the proximity of these wells to the waste mound, and the documented historical groundwater quality at these locations, these wells are considered to be most representative of leachate characterization in the bedrock aquifer at the site (Table 5). However, further to MECP TSS review comments dated December 11, 2012, BR-10 was noted to be particularly susceptible to road salt impacts from nearby Norway Lake Road and the transfer station, and as such, was not representative of source leachate impacts to the bedrock aquifer at the site. It was the recommendation of the MECP TSS that BR-1 be used in future monitoring programs as most representative of leachate quality at the Norway Lake site (Greenview, 2013). In 2021, most parameter concentrations in samples collected from bedrock wells BR-10 and BR-1 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at bedrock groundwater monitoring locations BR-10 and BR-1 were as follows (Table 5):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Summer 2021	Increasing	Decreasing
BR-10	<ul style="list-style-type: none"> <li>• Alkalinity</li> <li>• Aluminum</li> <li>• Chloride</li> <li>• DOC</li> <li>• Hardness</li> <li>• Iron</li> <li>• Manganese</li> <li>• Sodium</li> <li>• TDS</li> </ul>	<ul style="list-style-type: none"> <li>• Alkalinity</li> <li>• Aluminum</li> <li>• Barium</li> <li>• Chloride</li> <li>• Hardness</li> <li>• Iron</li> <li>• Manganese</li> <li>• Sodium</li> <li>• TDS</li> </ul>	<ul style="list-style-type: none"> <li>• Barium</li> <li>• Calcium</li> <li>• Chloride</li> <li>• Conductivity</li> <li>• Hardness</li> <li>• Iron</li> <li>• Sodium</li> <li>• TDS</li> </ul>	<ul style="list-style-type: none"> <li>• DOC</li> </ul>
BR-1	<ul style="list-style-type: none"> <li>• Alkalinity</li> <li>• Aluminum</li> <li>• DOC</li> <li>• Hardness</li> <li>• Iron</li> <li>• Manganese</li> <li>• TDS</li> </ul>	<ul style="list-style-type: none"> <li>• Alkalinity</li> <li>• Aluminum</li> <li>• DOC</li> <li>• Hardness</li> <li>• Iron</li> <li>• Manganese</li> <li>• TDS</li> </ul>	<ul style="list-style-type: none"> <li>• Ammonia (total)</li> <li>• Chloride</li> </ul>	<ul style="list-style-type: none"> <li>• Alkalinity</li> <li>• Boron</li> <li>• Calcium</li> <li>• COD</li> <li>• DOC</li> <li>• Hardness</li> <li>• Magnesium</li> </ul>

Groundwater quality results at BR-10 and BR-1 were interpreted to continue to be representative of leachate characterization at the site; however, BR-10 was interpreted to be significantly more impacted by road salt from winter road maintenance of the nearby Norway Lake Road and the waste transfer station at the Norway Lake site than leachate well BR-1. Therefore, BR-1 was considered most representative of leachate characterization at the site. BR-1 was also interpreted to be partially impacted by winter road maintenance, though to a lesser extent than BR-10. BR-1 and BR-10 were interpreted to exhibit impacts resultant of landfill-related factors in 2021.

As part of the summer 2021 sampling event, samples collected at bedrock monitoring well BR-1 were analyzed for VOCs, and no non-conformances of ODWS were noted in results (Table 7).

Bedrock monitoring wells BR-8 and BR-9 are located approximately 300 m and 400 m downgradient of the site, respectively. BR-8 and BR-9 are located upgradient of the low-lying area east of the Norway Lake waste mound and were interpreted to reflect groundwater quality in the northeastern most extent of the CAZ (Figures 4 and 6). BR-9 is located immediately adjacent to a low-lying, depressional area, and therefore groundwater results were compared to both the ODWS and PWQO (Tables 5 and 6). In 2021, some parameter concentrations in samples collected from BR-8 and BR-9 were above the median background concentrations (Table 5). Non-conformances of ODWS and significant groundwater trends at monitoring locations BR-8 and BR-9 were as follows (Table 5):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Summer 2021	Increasing	Decreasing
BR-8	<ul style="list-style-type: none"> <li>• Hardness</li> <li>• Manganese</li> </ul>	<ul style="list-style-type: none"> <li>• Hardness</li> <li>• Manganese</li> </ul>	<ul style="list-style-type: none"> <li>• Chloride</li> </ul>	<ul style="list-style-type: none"> <li>• No significant trends</li> </ul>
BR-9	<ul style="list-style-type: none"> <li>• Hardness</li> </ul>	<ul style="list-style-type: none"> <li>• Hardness</li> </ul>	<ul style="list-style-type: none"> <li>• No significant trends</li> </ul>	<ul style="list-style-type: none"> <li>• Phosphorus</li> </ul>

Minor non-conformances of the ODWS limits for manganese concentrations at the Norway Lake Waste Disposal Site were not interpreted to represent significant landfill-related impacts, as similar high concentrations of manganese (and iron) have been historically documented in background groundwater at the site (Table 5). Similarly, the ODWS non-conformances of hardness in spring and summer 2021 at BR-8 and BR-9 were generally consistent with historical concentrations at background monitor BR-2 and were interpreted to be resultant of local bedrock geology (Table 5). High concentrations of DOC have also historically been documented in the background at the site, and are interpreted generally to natural conditions in the low-lying areas in the vicinity of the Norway Lake site (Table 6; Figures 4 and 6). The high concentration of aluminum at monitoring well BR-9 in summer 2021 was interpreted to be related to naturally-occurring conditions in the vicinity of the site, and not to landfill-related factors. Monitoring wells BR-8 and BR-9 were not interpreted to be significantly impacted from landfill-related factors in 2021.

Given the close proximity of BR-9 to the low-lying depressional area northeast of the site, groundwater results from BR-9 were also compared with PWQO (MECP, 1994b) and Table B of the TGD (MECP, 2010). Non-conformances of PWQO and Table B of the TGD for monitoring well BR-9 were as follows, and non-conformances documented in background bedrock monitoring well BR-2 in 2021 were included for comparison purposes (Table 6):

Monitoring Well	PWQO Non-Conformance		Table B of TGD Non-Conformance	
	Spring 2021	Summer 2021	Spring 2021	Summer 2021
BR-2 (background)	<ul style="list-style-type: none"> <li>• Iron</li> <li>• Phosphorus</li> </ul>	<ul style="list-style-type: none"> <li>• Aluminum</li> <li>• Iron</li> <li>• Phosphorus</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>
BR-9	<ul style="list-style-type: none"> <li>• Phosphorus</li> </ul>	<ul style="list-style-type: none"> <li>• Phosphorus</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>	<ul style="list-style-type: none"> <li>• None</li> </ul>

Phosphorus concentrations at BR-9 in 2021 were interpreted to be generally consistent with historical concentrations at background monitor BR-2 and were not interpreted to represent significant landfill-related impacts at the Norway Lake Waste Disposal Site (Table 6). No non-conformances of the limits of Table B of the TGD were documented in results from either of background location BR-2 and downgradient bedrock monitoring well BR-9 following including of 2021 results (Table 6).

#### 4.1.3 Reasonable Use Concept Assessment

In an effort to assess potential landfill-related impacts migrating beyond the site boundary, the RUC was used as an assessment tool to monitor downgradient impacts from the site. Downgradient impacts are typically assessed using the MECP RUC at monitoring wells located at, or in close proximity to, the downgradient property boundary. The downgradient monitoring wells, located near the property boundary, were compared to trigger concentrations for specific parameters as determined by groundwater quality at the site using the RUC for groundwater (MECP Procedure B-7-1, 1994a).

The MECP Procedure B-7-1: Determination of Contaminant Limits and Attenuation Zones iterates that in accordance with the appropriate criteria for particular uses, a change in groundwater quality on an adjacent property as a result of landfilling activities will only be accepted by the MECP as follows:

*The quality cannot be degraded by an amount in excess of 50% of the difference between background and the Ontario Drinking Water Standards for non-health related parameters and in excess of 25% of the difference between background and the Ontario Drinking Water Standards for health-related parameters. Background is considered to be the quality of the groundwater prior to any man-made contamination.*

**MECP Procedure B-7-1**

The RUC assessment was conducted using the concepts and procedures outlined in MECP Procedure B-7-1 (MECP, 1994a), specifically using the median value of individual background parameter concentrations from monitoring wells BR-2 (bedrock aquifer) and OB-12 (overburden aquifer) to characterize natural groundwater quality at the site. Further to MECP TSS Addendum, dated December 11, 2012, the MECP TSS confirmed that monitoring wells BR-2 and OB-12 were being impacted by road salt and with the absence of any suitable locations for replacement background wells, the MECP TSS agreed that historical groundwater quality data prior to fall 2009 from background wells BR-2 and OB-12 should be used for the purpose of calculating median background concentrations and the RUC.

For assessing site compliance with the RUC and MECP Guideline B-7, groundwater monitoring wells OB-8, BR-8 and BR-9 were used for monitoring downgradient impacts at the property boundary northeast of the waste mound. OB-11R, located in the vicinity of Burke's Pit and southwest of the site, was used for monitoring potential downgradient impacts near the property boundary southwest of the waste mound along Norway Lake Road. BR-2 was used to assess potential impacts at the southeast property boundary. OB-12 and BR-10 were not interpreted to be downgradient of the Norway Lake site in 2021, based on the interpreted ground water flow directions in 2021 (Figures 3, 4, 5, and 6).

All parameters tested as part of the established annual monitoring program were used as groundwater triggers, and a respective RUC criteria value was calculated for each parameter at the Norway Lake site. The trigger concentrations used to assess RUC compliance for the groundwater regime at the site were based on the MECP RUC for each of the respective parameters.

RUC values for overburden and bedrock aquifers were generated based on historical background data for individual parameters at the Norway Lake site up to and including August 2009. If RUC non-conformances are noted, then action will be undertaken as appropriate and necessary in accordance with a defined groundwater contingency plan for the site. In cases where a groundwater contingency plan is not defined, a meeting with representatives of the local MECP District office should be held to develop an appropriate contingency plan, as necessary and appropriate for the particular site.

Bedrock monitoring wells BR-8 and BR-9 are located approximately 300 m and 400 m downgradient of the site, respectively, and were used to assess compliance with the RUC near the northeastern property boundary in 2021 (Figures 4 and 6). Monitoring well OB-8 is located approximately 220 m northeast of the limit of waste, and was also used to assess compliance with the RUC near the northeastern property boundary (Figures 3 and 5). Non-conformances of RUC in spring and summer 2021 from groundwater results at downgradient wells BR-8, BR-9, and OB-8 are included in the table below (Table 5):

Monitoring Well	RUC Non-Conformance	
	Spring 2021	Summer 2021
BR-8	<ul style="list-style-type: none"> <li>• DOC</li> <li>• Hardness</li> </ul>	<ul style="list-style-type: none"> <li>• DOC</li> <li>• Hardness</li> </ul>
BR-9	<ul style="list-style-type: none"> <li>• Hardness</li> </ul>	<ul style="list-style-type: none"> <li>• Aluminum</li> <li>• Hardness</li> </ul>
OB-8	<ul style="list-style-type: none"> <li>• DOC</li> <li>• Hardness</li> <li>• TDS</li> </ul>	<ul style="list-style-type: none"> <li>• Chloride</li> <li>• DOC</li> <li>• Hardness</li> <li>• TDS</li> </ul>

Given that OB-8, BR-8, and BR-9 are approximately 245 m, 190 m, and 10 m upgradient from the downgradient CAZ boundary, respectively (Figures 3, 4, 5, and 6), BR-9 was interpreted to be the most representative of downgradient groundwater quality near the northeastern CAZ boundary. The significant distances from monitoring wells OB-8 and BR-8 to the downgradient northeastern CAZ boundary were interpreted to be sufficient for the attenuation of any landfill-related factors in groundwater. DOC, hardness, and TDS concentrations have consistently been noted to be high in background groundwater monitoring locations (BR-2 and OB-12) prior to 2009, and were generally attributed to naturally-occurring conditions in the vicinity of the site and in the low-lying depressional area northeast of the AWDA (Tables 4 and 5). Typically low groundwater conditions (at OB-8) and general difficulty in obtaining a full purge of groundwater (at BR-8) have historically been documented for summer sampling events for both wells, and the identified RUC non-conformances were interpreted to be related to these generally dry, summer conditions. Ultimately, high DOC concentrations in the vicinity of the downgradient northeastern property boundary (OB-8 and BR-8) and periodically at BR-9 were interpreted to the low-lying conditions near the well. High hardness concentrations in results at BR-9 in 2021 were interpreted to bedrock geology at the site (marble). The high concentration of aluminum in summer 2021 at BR-9 (Table 5) was interpreted to naturally-occurring conditions and not to landfill-related factors, and is mostly likely related to low groundwater conditions. Based on the above, the Norway Lake site was interpreted to meet the intent of the RUC and conformance with Guideline B-7 in 2021 at the northeastern CAZ/property boundary.

Background monitoring well BR-2 is located southeast and generally upgradient and/or cross-gradient of the waste mound and was used to assess compliance with the RUC at the southeastern property boundary in 2021 (Figures 4 and 6). Non-conformances of RUC in spring and summer 2021 from groundwater results at background monitoring well BR-2 are included in the table below (Table 5):

Monitoring Well	RUC Non-Conformance	
	Spring 2021	Summer 2021
BR-2 (background)	<ul style="list-style-type: none"> <li>• Aluminum</li> <li>• DOC</li> <li>• Hardness</li> </ul>	<ul style="list-style-type: none"> <li>• Aluminum</li> <li>• Hardness</li> <li>• TDS</li> </ul>

As was noted in MECP TSS hydrogeological review comments, dated December 11, 2012 (Greenview, 2013), BR-2 was interpreted to be impacted by road salt from winter maintenance activities on the adjacent Norway Lake Road and from the transfer station at the Norway Lake site (Figures 4 and 6). Furthermore, naturally-occurring conditions in the vicinity of BR-2 (i.e. local geology, low-lying area characteristics, etc.) and road salt impacting the solubility of other constituents, were interpreted to be influencing groundwater quality results at BR-2 (Table 5). High concentrations of aluminum, DOC, hardness, iron, manganese, and TDS have historically been documented at BR-2 in results prior to 2009 (Greenview, 2014). Based on the interpreted impacts from road salt in the vicinity of BR-2, naturally-occurring conditions (Table 5), and documented low groundwater conditions in summer (Appendix D), background monitoring well BR-2 is not interpreted to be significantly impacted by landfill-related factors and groundwater at the southern property boundary is interpreted to be in compliance with RUC and conformance with MECP Guideline B-7 in 2021. Additionally, based on interpreted groundwater flow directions in 2021, monitoring well BR-2 was not interpreted to be located downgradient of the former disposal area of the Norway Lake site in 2021 (Figures 4 and 6).

Monitoring wells OB-11R and OB-12 are located in the vicinity of Burke's Pit, southwest of the waste mound and were used to assess compliance with the RUC adjacent to the southwestern property boundary along Norway Lake Road (Figures 3 and 5). OB-12 is located adjacent to the southwestern property boundary, and was historically used to determine background overburden water quality at the site. Non-conformances of RUC in spring and summer 2021 from groundwater results at OB-12 and OB-11R are included in the table below (Table 4):

Monitoring Well	RUC Non-Conformance	
	Spring 2021	Summer 2021
OB-12 (background)	<ul style="list-style-type: none"> <li>Aluminum</li> <li>Chloride</li> <li>Hardness</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>Aluminum</li> <li>Hardness</li> <li>Manganese</li> <li>TDS</li> </ul>
OB-11R	<ul style="list-style-type: none"> <li>Alkalinity</li> <li>Aluminum</li> <li>Barium</li> <li>Chloride</li> <li>Hardness</li> <li>Sodium</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>Alkalinity</li> <li>Aluminum</li> <li>Barium</li> <li>Chloride</li> <li>Hardness</li> <li>Sodium</li> <li>TDS</li> </ul>

As OB-11R and OB-12 have historically been interpreted to be located upgradient and/or cross-gradient of the waste mound (Figures 3 and 5), the noted RUC non-conformances were not interpreted to be resultant of landfill-related factors; however, as noted in MECP TSS hydrogeological review comments, dated December 11, 2012 (Greenview, 2013), it was interpreted that OB-11R and OB-12 were impacted by road salt from winter maintenance activities on the adjacent Norway Lake Road and the transfer station at the Norway Lake site. RUC non-conformances for alkalinity, aluminum, barium, chloride, hardness, manganese, sodium, and TDS were interpreted to be directly attributable to winter road maintenance activities and the resultant solubility of related parameters. Concentrations of iron, hardness and manganese were historically elevated in groundwater quality at background wells BR-2 and OB-12 (Greenview, 2013) and are likely partially resultant of naturally-occurring conditions at the site (Tables 4 and 5). The flooding/standing water observed in spring 2021 in the vicinity of OB-11R (as shown in Section 4.1.2) was interpreted to be a significant factor in documented groundwater quality at OB-11R in 2021 (Table 4). Based on the above, the Norway Lake site was interpreted to meet the intent of the RUC and conformance with Guideline B-7 in 2021 in the vicinity of the southwestern CAZ/property boundary.

In 2021, monitoring well BR-10 was interpreted to be located upgradient of the direction of bedrock groundwater flow at the Norway Lake site (Figures 4 and 6), and therefore was not used to assess the site compliance with the RUC and MECP Guideline B-7. The location of BR-10 relative to the direction of bedrock groundwater flow should be re-assessed for each future Annual Report to determine its applicability related to the RUC and Guideline B-7.

In summary, the Norway Lake site was interpreted to meet the intent of the RUC and conformance with MECP Guideline B-7 in 2021 for a closed landfill at the downgradient property boundaries.

#### 4.2 Surface Water Quality Assessment

As part of the spring and fall 2021 surface water sampling events, physical characteristics of sampling locations SW-1 and SW-4 (background) were recorded.

For the spring 2021 sampling event, depth (m), width (m), velocity (metres per second, m/s), and discharge (cubic metres per second, m<sup>3</sup>/s) were measured and calculated with results as follows:

Spring 2021				
Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m <sup>3</sup> /s)
SW-1	0.10	0.25	0.15	0.003
SW-4 (background)	No sample - Dry			



For the fall 2021 sampling event, depth (m), width (m), velocity (m/s), and discharge (m<sup>3</sup>/s) were measured and calculated with results as follows:

Fall 2021				
Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m <sup>3</sup> /s)
SW-1	No sample - Dry			
SW-4 (background)	No sample - Dry			

Further to MECP TSS surface water review comments (March 5, 2012), surface water sampling was discontinued at locations SW-2 and SW-3 in 2012 (Greenview, 2013).

Surface water quality results for the Norway Lake site were compared to PWQO (MECP, 1994b) and the results of the 2021 surface water monitoring program are presented in Table 8. Surface water quality results were also compared with the Canadian Water Quality Guidelines (CWQG) for select parameters, in accordance with Table B of the MECP Technical Guidance Document (TGD; MECP, 2010). Accredited laboratory Certificates of Analysis for the surface water quality results are provided in Appendix E. Background surface water quality was determined using the 75<sup>th</sup> percentile of a minimum of the previous ten (10) sampling event results from background surface water monitoring location SW-4. Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in this report.

The blind duplicate samples collected at surface water location SW-1 during the spring 2021 sampling event were similar to the identified samples, indicating that the results of the 2021 surface water monitoring program can be interpreted with confidence.

Historically, background surface water quality at the Norway Lake site was assessed using surface water location SW-4, which is located approximately 420 m northeast of the former disposal area on a seasonally-inundated creek flowing in a southeastern direction (Figure 3). The following photographs are representative of background sampling location SW-4.

**Photograph 2: Surface Water Location SW-4 (Spring 2021 [left] and Fall 2021 [right])**



In 2021, background location SW-4 was observed to be dry and no samples were obtained for analysis for both the spring and fall 2021 sampling events (Appendix D). Non-conformances of PWQO, and significant trends, at background surface water sampling location SW-4 were as follows (Table 8):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Fall 2021	Increasing	Decreasing
SW-4 (background)	<ul style="list-style-type: none"> <li>No sample (Dry)</li> </ul>	<ul style="list-style-type: none"> <li>No sample (Dry)</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient recent data for trend analysis</li> </ul>	<ul style="list-style-type: none"> <li>Insufficient recent data for trend analysis</li> </ul>

In 2021, as no samples were obtained in spring or fall, no non-conformances of the parameter concentration limits per Table B of the TGD were documented for background location SW-4.

Surface water location SW-1 was added to the surface water monitoring program in 2008 in order to better characterize surface water quality downstream of background location SW-4. SW-1 is located approximately 80 m downstream of surface water location SW-4 (Figure 4), and has consistently been observed to be dry for all fall sampling events since 2008 (Appendix D; Table 8). The following photographs are representative of downstream sampling location SW-1.

**Photograph 3: Surface Water Location SW-1 (Spring 2021 [left] and Fall 2021 [right])**



SW-1 was observed to have low-flow conditions during the spring 2021 sampling event. In fall 2021, SW-1 was observed to be dry and no samples were obtained for analysis (Appendix D). In 2021, few parameter concentrations at SW-1 were above the 75<sup>th</sup> percentile background surface water quality at the site (Table 8). Non-conformances of PWQO, and significant trends, at surface water sampling location SW-1 were as follows (Table 8):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2021	Fall 2021	Increasing	Decreasing
SW-1	<ul style="list-style-type: none"> <li>Aluminum</li> </ul>	<ul style="list-style-type: none"> <li>No sample (Dry)</li> </ul>	<ul style="list-style-type: none"> <li>Alkalinity</li> <li>Conductivity</li> <li>Hardness</li> <li>TDS</li> </ul>	<ul style="list-style-type: none"> <li>No significant trends</li> </ul>

In spring 2021, the concentration of nitrite was documented to be in non-conformances with the concentration limits per Table B of the TGD at downstream location SW-1. The PWQO non-conformance for the concentration of aluminum was not interpreted to be indicative of significant landfill-related impacts at the Norway Lake site and was attributed to naturally-occurring conditions in the vicinity of the site (Table 8).

Based on the review of surface water quality at the Norway Lake site in 2021, the Norway Lake site was not interpreted to be impacting surface water to the north and northeast of the former landfill.

### 4.3 Operations Summary

A summary of 2021 waste management operations at the Norway Lake site is presented below.

#### 4.3.1 Site Operations

The site operates as a municipal solid waste and recycling transfer station, servicing residents and IC&I generators of the Township of Greater Madawaska. The site has been closed to landfilling operations since 2002. Final closure construction activities were completed for the waste mound area in 2007.

In accordance with Condition 25 of the ECA, a sign is posted at the entrance to the site providing the ECA number (A411702, Appendix A), Township information, transfer station hours of operation, accepted waste types, emergency contact information, and a sign warning against dumping outside the site.

The hours of operation for the Norway Lake site effective May 21, 2016 were as follows:

Day of the Week	Hours of Operation
Wednesday	8:00 a.m. – 4:00 p.m.
Saturday	8:00 a.m. – 6:00 p.m.
Sunday (Thanksgiving to Victoria Day)	10:00 a.m. – 5:00 p.m.
Sunday (Victoria Day to Thanksgiving)	10:00 a.m. – 6:00 p.m.
Holiday Mondays (Victoria Day to Thanksgiving)	12:00 p.m. – 6:00 p.m.

As per the Amended ECA dated April 9, 2013 (Appendix A), the Norway Lake site is approved for the acceptance and diversion of the following waste and recyclable materials:

Waste / Recyclable Material	Quantity (units)
Regular Municipal Waste (Residential & IC&I)	120 m <sup>3</sup>
Organic Waste	20 m <sup>3</sup>
Waste Electronic and Electrical Equipment (WEEE)	40 m <sup>3</sup>
Blue Box Recyclables (mixed fibres / commingled containers / old corrugated cardboard)	240 m <sup>3</sup>
Tires	100 m <sup>3</sup>
Leaf and Yard Waste	200 m <sup>3</sup>
C&D and Bulky Waste	105 m <sup>3</sup>
Scrap Metal and White Goods	60 m <sup>3</sup>
Refrigerants	25 m <sup>3</sup>

The Norway Lake site is well screened with surrounding trees and thick vegetation, and a screening berm and fence exist between the site and the Norway Lake Road. Lockable gates control access to the site (Figure 3).

The access roads at the site entrance and within the Norway Lake site have sufficient width to allow for unimpeded winter travel and access for emergency and snow removal equipment. The site access road was observed to be in serviceable condition during the routine site inspections conducted by Greenview during various site visits in 2021.

The Norway Lake site was closed to landfilling operations in 2002, and final closure of the waste mound at the Norway Lake site was completed in 2007. Since 2002, the Norway Lake site has operated as a municipal solid waste and recycling transfer station only. Construction began in late 2008 on the upgrades to the waste and recycling transfer station at the Norway Lake site, and the upgraded transfer station was opened to the public on November 21, 2009.

Throughout 2021, the Township and Greenview worked together on a Revised DOP for the Norway Lake Waste Disposal Site, in an effort to modify transfer station operations and general layout of the site. On



January 04, 2022, a copy of the Revised DOP was provided to the MECP Ottawa District Office for preliminary review and as part of the Township's obligation to initiate a Pre-Submission Meeting with the MECP relative to the Revised DOP and planned ECA Application for 2022 (Appendix B). The Pre-Submission Meeting was held between representatives of the MECP, Greenview, and the Township on January 20, 2022 (Appendix B). Formal submission of the ECA Application package, including the Revised DOP, is planned for submission to the MECP in 2022.

#### 4.3.2 Waste Disposal / Transfer Summary

The Norway Lake site is currently closed to all landfilling operations; however, the site is presently operating as a municipal solid waste and recycling transfer station, with all residential and IC&I waste, and Blue Box recycling, transferred to GFL for disposal and processing.

Based on Township records, approximately 15,430 vehicles visited the Norway Lake site in 2021, and accepted approximately 24,852 bags of waste. Based on information supplied by the Township, 415 tonnes of municipal waste were collected at the Norway Lake site in 2021 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally, approximately 780 m<sup>3</sup> of leaf and yard waste and 3,800 m<sup>3</sup> of C&D and bulky waste were accepted at the Norway Lake site in 2021.

Recycling tonnage records provided by the Township indicated that 97 tonnes of Blue Box recyclables were collected from the Norway Lake Waste Disposal Site in 2021. Blue Box recyclable quantities contributing to this total included 45 tonnes of commingled containers, 35 tonnes of mixed fibres, and 17 tonnes of old corrugated cardboard (OCC). Approximately 3 tonnes of household organics were diverted at the Norway Lake site in 2021.

According to Township records, 129 tonnes of scrap metal, 63 refrigerant units, 3,078 tires, and 20 tonnes of WEEE were diverted from the depots at the Norway Lake Waste Disposal Site, Mount St. Patrick Waste Disposal Site, and Griffith Waste Disposal Site in 2021.

Waste operations training for Township waste operation staff was conducted by Greenview on June 12, 2017. In 2013, the Township passed a new waste management by-law (By-law No. 09 – 2013), to establish, maintain and regulate a system for the disposal of municipal waste, recyclables and other refuse (Greenview, 2014).

#### 4.3.3 Site Inspections and Maintenance

Site inspections of the transfer station area, waste disposal area, and property at the Norway Lake site were conducted by Greenview on May 17, 2021, August 19, 2021, and November 16, 2021 during the spring, summer, and fall sampling events. An additional site inspection was conducted by Greenview on August 12, 2021 during topographic surveying operations related to the preparation of the Revised DOP for the Norway Lake Waste Disposal Site. The Township also conducted periodic investigations to verify the compliance status of the site.

The site inspections included a cursory investigation of housekeeping and litter control aspects, monitoring well maintenance requirements in accordance with Ontario Regulation 903 (Wells), and a general site overview for MECP regulatory compliance issues.

#### 4.3.4 Complaints

There were no complaints received by the Township with respect to the waste management operations at the Norway Lake site in 2021.

#### 4.3.5 Monitoring and Screening Checklist

In accordance with the MECP TGD (MECP, 2010), the Monitoring and Screening Checklist for the Norway Lake site is included as Appendix F of this report.

## 5.0 Conclusions and Recommendations

Based on the results of the 2021 environmental monitoring program completed for the Norway Lake Waste Disposal Site, the following conclusions are provided:

- Following the conclusion of the 2021 environmental monitoring program, and in accordance with Condition 7.2 (b) (iii) of the Amended ECA (A411702), the Norway Lake Waste Disposal Site is interpreted to be in compliance with all conditions of the ECA, and with the inspection and reporting requirements of the conditions therein.
- The interpreted groundwater configuration at the site in 2021 was relatively consistent with historical interpretations in the overburden and bedrock aquifers. The predominant groundwater flow directions in the overburden and bedrock aquifers were interpreted to be to the northeast.
- Average horizontal gradients in the overburden aquifer at the Norway Lake site were calculated for both the spring and summer sampling events. In spring 2021, average horizontal gradients northeast of the waste mound, southeast of the waste mound, and southwest of the waste mound were calculated to be 0.050 to the northeast, 0.017 to the east, and 0.050 to the south, respectively. In summer 2021, average horizontal gradients northeast of the waste mound, southeast of the waste mound, and southwest of the waste mound were calculated to be 0.055 to the northeast, 0.009 to the east, and 0.019 to the south, respectively.
- Average horizontal gradients in the bedrock aquifer at the Norway Lake site were calculated for both the spring and summer sampling events. In spring 2021, average horizontal gradients in the vicinity of the waste mound and east of the waste mound were calculated to be 0.016 to the east and 0.082 to the northeast, respectively. In summer 2021, average horizontal gradients in the vicinity of the waste mound and east of the waste mound were calculated to be 0.013 to the east and 0.108 to the northeast, respectively.
- Groundwater quality northeast, east, and immediately downgradient of the site was interpreted to be impacted from the Norway Lake Waste Disposal Site in both the overburden and bedrock aquifers.
- Based on the results of the 2021 RUC assessment at the site, the Norway Lake Waste Disposal Site was interpreted to meet the intent of MECP Guideline B-7 at the downgradient property boundaries to the north, northeast, south, southeast, and southwest of the site. Further sampling in future environmental monitoring programs is required in order to confirm continued site conformance with Guideline B-7.
- Groundwater in the overburden aquifer southwest of the site was interpreted to be impacted by road salt from winter road maintenance activities at the transfer station of the Norway Lake site and along Norway Lake Road.
- Surface water quality in the vicinity of the site was assessed at the seasonally inundated creek/low-lying depressional area located to the north and east of the closed waste mound, at surface water locations SW-1 and background surface water location SW-4. The downstream sampling location SW-1 in spring 2021 was not interpreted to be significantly impacted by landfill-related factors and surface water quality was interpreted to meet PWQO. Surface water sampling locations SW-1 and SW-4 were not sampled in fall 2021 as both locations were observed to be dry, while SW-4 was also not sampled in spring 2021 due to dry conditions.
- Based on Township records, approximately 15,430 vehicles visited the Norway Lake site in 2021, and accepted approximately 24,852 bags of waste. Based on information supplied by the Township, 415 tonnes of municipal waste were collected at the Norway Lake site in 2021 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario. Additionally,

approximately 780 m<sup>3</sup> of leaf and yard waste and 3,800 m<sup>3</sup> of C&D and bulky waste were accepted at the Norway Lake site in 2021.

- Recycling tonnage records provided by the Township indicated that 97 tonnes of Blue Box recyclables were collected from the Norway Lake Waste Disposal Site in 2021. Blue Box recyclable quantities contributing to this total included 45 tonnes of commingled containers, 35 tonnes of mixed fibres, and 17 tonnes of old corrugated cardboard. Approximately 3 tonnes of household organics were diverted at the Norway Lake site in 2021.
- According to Township records, 129 tonnes of scrap metal, 63 refrigerant units, 3,078 tires, and 20 tonnes of WEEE were diverted from the depots at the Norway Lake Waste Disposal Site, Mount St. Patrick Waste Disposal Site, and Griffith Waste Disposal Site in 2021.

The following recommendations are provided to the Township for consideration as part of the 2022 environmental work program for the Norway Lake Waste Disposal Site:

- The 2022 groundwater monitoring program for the site should continue to include sampling events in the spring and summer, for the parameter suite shown in Table 1, for the groundwater regime at the site.
- It is requested that consideration should be undertaken by the MECP to amend the schedule for groundwater sampling from spring and summer to spring and fall, consistent with the surface water monitoring program, in order to avoid low groundwater conditions in summer months.
- Consistent with the approval from the MECP TSS in 2019, the surface water monitoring program has been modified to a biennial frequency, with samples to be collected in spring and fall at monitors SW-1 and SW-4 (background). The next surface water sampling events are to be conducted in spring and fall 2023, with subsequent monitoring programs over the next ten (10) year period to be conducted in 2025, 2027, 2029, and 2031 (unless approval to cease the surface water monitoring program is received from the MECP). Collection of surface water samples during scheduled sample events should only be conducted if sufficient quantities of water are available at the sampling location to avoid potentially biased results.

## 6.0 Closing

Greenview has prepared the 2021 Annual Report in accordance with MECP guidelines and Condition 21 of the ECA (A411702) to document the results of the 2021 environmental monitoring program and to provide waste information for the Norway Lake Waste Disposal Site.

This report is governed by the attached statement of service conditions and limitations (Appendix G).

All respectfully submitted by,

**Greenview Environmental Management Limited**



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Dan Hagan, P.Geo.  
Senior Project Manager / Geologist



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Tyler H. Peters, P.Eng.  
Project Director

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## Tables



**Table 1**  
**2021 Groundwater and Surface Water Monitoring Program**  
**Norway Lake Waste Disposal Site**

Location		Frequency	Parameters		
<b>Groundwater (Routine Monitors)</b>					
OB-3	OB-8	Twice (2x)	Alkalinity	Boron	Chloride
BR-8			DOC	Hardness	Iron
			Manganese	Sodium	TDS
1x QA/QC		(Spring & Late Summer)	<b>Field Measurements</b>		
			Conductivity	Dissolved Oxygen	pH
<b>COUNT =</b>	<b>4</b>		Temperature		
<b>Groundwater (Surveillance Monitors)</b>					
BR-1	BR-2	Twice (2x)	Alkalinity	Aluminum	Ammonia (total)
BR-9	BR-10		Barium	Boron	Calcium
OB-11R	OB-12		Chloride	Chromium	Cobalt
			COD	Copper	DOC
			Hardness	Iron	Magnesium
1x QA/QC			Manganese	Nitrate	Phosphorus (total)
			Potassium	Silicon	Sodium
			Strontium	Sulphate	TDS
			TKN	Zinc	
			(Spring & Late Summer)	<b>Field Measurements</b>	
			Conductivity	Dissolved Oxygen	pH
<b>COUNT =</b>	<b>7</b>		Temperature		
<b>Groundwater (Volatile Organic Compounds)</b>					
BR-1		Once (1x)	EPA 624 Volatile Organic Compounds		
<b>COUNT =</b>	<b>1</b>	(Late Summer)			
<b>Surface Water</b>					
SW-1	SW-4	Twice (2x)  Every Two (2) Years  Next in 2021  (Spring & Late Fall)	Alkalinity	Aluminum	Ammonia (total)
			Barium	Boron	BOD
			Calcium	Chloride	Chromium
1x QA/QC			Cobalt	COD	Conductivity
			Copper	DOC	Hardness
			Iron	Magnesium	Manganese
			Nitrate	Nitrite	pH
			Phenols	Phosphorus (total)	Potassium
			Silicon	Sodium	Strontium
			TDS	TKN	TSS
		Zinc			
			<b>Field Measurements</b>		
			Conductivity	Dissolved Oxygen	pH
<b>COUNT =</b>	<b>3</b>		Temperature	Un-ionized Ammonia (calculation)	



**Table 2**  
**Groundwater Monitoring Well and Surface Water Sampling Locations**  
**Norway Lake Waste Disposal Site**

Groundwater			
Monitor	Zone	Northing	Easting
BR-1	18T	5021910	367520
BR-2	18T	5021811	367580
BR-8	18T	5022137	367795
BR-9	18T	5022200	367859
BR-10	18T	5021888	367372
OB-3	18T	5021906	367525
OB-8	18T	5022091	367711
OB-11R	18T	5021820	367360
OB-12	18T	5021900	367222

Surface Water			
Monitor	Zone	Northing	Easting
SW-1	18T	5022187	367743
SW-2	18T	5022232	367884
SW-3	18T	5022213	367919
SW-4	18T	5022244	367687

Notes:

Global Positioning System (GPS) point locations acquired by Greenview using a Garmin eTrex Venture HC.

**Table 3**  
**Groundwater Elevations**  
**Norway Lake Waste Disposal Site**

Monitor	Ground Elevation (m) <sup>1</sup>	Top of Pipe Elevation (m) <sup>1</sup>	Original Stick-up (m)	Measured Stick-Up (m) <sup>2</sup>	Depth of Well (m)	Well Diameter (mm)	Groundwater Elevation (m)														
							26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	29-Oct-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21
OB-1	171.63	172.39	0.76	0.65	1.55	38.1	171.34	171.24	171.31	171.04	171.44	171.23	171.42	171.09	-	171.40	170.79	171.38	171.21	171.31	171.09
OB-2	171.21	171.96	0.75	0.81	0.45	38.1	171.00	170.97	170.96	170.77	171.01	170.94	171.01	170.79	-	170.97	170.45	170.97	170.90	170.91	170.75
OB-3	171.20	172.01	0.81	0.80	4.35	38.1	170.98	170.93	170.98	170.73	171.05	170.93	171.06	170.75	-	171.03	170.42	171.02	170.92	170.99	170.68
OB-4	171.74	172.75	1.01	0.94	1.29	38.1	171.15	170.89	171.09	170.72	171.56	170.94	171.41	170.78	-	171.32	-	171.25	170.86	171.05	170.72
OB-5	174.48	174.88	0.40	0.39	3.03	38.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OB-7	170.29	171.29	1.00	1.00	2.37	38.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OB-8	166.76	167.51	0.75	0.72	4.23	38.1	164.34	162.89	164.00	162.69	166.45	163.34	166.38	163.00	-	166.25	162.68	165.60	162.55	164.36	162.99
OB-11 <sup>4</sup>	171.87	172.78	0.91	0.85	3.58	50.8	171.55	171.43	171.50	-	172.04	-	171.86	171.28	-	-	-	-	-	-	-
OB-11R <sup>4</sup>	171.04	172.08	1.04	1.04	4.22	50.8	-	-	-	-	-	-	-	-	171.24	171.71	170.97	171.63	171.32	170.72	170.48
OB-12	172.66	173.67	1.01	1.01	2.07	50.8	172.08	171.92	171.94	171.71	172.55	171.82	172.39	171.74	-	172.33	171.47	172.27	171.90	172.89	171.55
BR-1	171.18	171.91	0.73	0.64	5.39	101.6	171.34	171.28	171.31	171.04	171.41	171.04	171.43	171.07	-	171.39	170.75	171.38	171.26	171.34	171.09
BR-2	172.09	172.64	0.55	0.55	3.00	101.6	171.17	171.03	171.09	170.82	171.31	170.82	171.25	170.97	-	171.21	170.82	171.15	171.10	171.13	170.93
BR-3	176.25	176.69	0.44	0.37	4.70	101.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BR-4 <sup>3</sup>	179.06	179.86	0.80	0.46	7.89	101.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BR-5	175.60	176.14	0.54	0.56	4.56	101.6	171.55	-	171.62	-	169.16	-	173.00	170.97	-	172.60	-	172.47	-	171.85	-
BR-7	170.29	171.29	1.00	0.90	5.60	38.1	169.28	168.42	169.09	168.48	169.55	168.48	169.48	168.58	-	-	-	169.32	168.33	169.28	168.59
BR-8	162.09	162.69	0.60	0.54	5.44	38.1	161.28	160.52	161.09	160.07	161.75	160.07	161.46	160.44	-	161.52	160.18	161.41	160.41	161.20	160.39
BR-9	160.86	161.30	0.44	0.41	5.14	38.1	159.62	159.47	159.58	159.15	159.74	159.15	159.70	159.34	-	159.65	159.09	159.64	159.43	160.60	160.34
BR-10 <sup>3</sup>	176.09	177.20	1.11	1.10	7.79	31.8	172.13	171.73	171.39	171.82	173.41	171.82	172.86	171.83	-	172.91	171.54	172.72	171.98	172.23	171.76
G-1	173.73	174.18	0.45	0.36	2.04	25.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
G-2	171.21	171.73	0.52	0.44	2.01	25.0	171.29	170.85	171.18	170.97	171.38	168.97	171.11	170.92	-	171.12	170.56	171.03	170.74	171.03	170.82
G-3	171.66	172.18	0.52	0.38	2.08	25.0	-	-	-	-	-	171.44	171.90	171.32	-	171.88	171.11	171.78	171.43	171.65	-
G-4	171.69	172.08	0.39	0.35	2.06	25.0	171.81	171.37	171.27	171.10	171.54	169.10	171.57	171.27	-	171.47	170.87	171.35	171.11	171.23	171.04
G-5	171.60	172.08	0.48	0.39	2.01	25.0	171.53	171.24	171.53	-	-	-	-	-	-	171.90	-	171.79	-	-	-
G-6	171.80	172.74	0.94	0.49	1.59	25.0	172.14	172.26	172.07	171.73	172.52	171.73	172.44	171.76	-	172.38	171.56	172.37	171.79	172.13	171.74
G-7	171.99	173.51	1.52	1.40	1.07	25.0	172.99	172.92	171.93	171.79	172.16	171.79	172.18	171.87	-	172.09	171.44	172.10	171.88	171.94	171.71
G-8	171.85	172.81	0.96	0.85	1.34	25.0	-	-	-	-	172.82	172.70	172.24	171.92	-	171.94	171.72	172.15	171.81	172.14	171.92
G-9	171.89	172.84	0.95	0.85	1.42	25.0	172.51	-	-	-	-	-	172.16	171.89	-	172.08	171.66	172.08	171.92	172.01	171.82

Notes:  
1. Elevations surveyed by SGS Lakefield Research on October 7, 2003 and October 5, 2004  
2. Stick-Up measured by Greenview April 25, 2007.  
3. BR-4 was decommissioned and BR-10 repaired by Greenview July 29, 2013.  
4. OB-11 was decommissioned and OB-11R was installed on October 29, 2018.  
All elevations are relative to a site specific benchmark (BM# 1) elevation of 176.93 m.  
\*- indicates water level is not available.

**Table 4  
Groundwater Quality - Overburden  
Norway Lake Waste Disposal Site**

Parameter	Background Overburden (median)	Overburden RUC <sup>1</sup>	ODWS <sup>2</sup>	OB-3														5-year Trends	
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	(sparkline)	
Alkalinity (as CaCO <sub>3</sub> )	246	373	30 - 500	558	645	962	752	782	1160	754	765	602	779	570	674	651	646		
Aluminum	0.01	0.06	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ammonia, Total (as N)	0.1	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium	0.09	0.32	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	0.02	1.26	5	0.614	0.548	0.566	0.719	0.663	1.610	0.943	1.020	0.637	0.885	0.632	0.671	0.573	0.621	0.621	
Calcium	74	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chloride	33	142	250	130	160	91.2	197	124	69.1	82.7	117	187	127	251	252	201	338	338	
Chromium	0.0014	0.014	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt	0.0005	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	8	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Conductivity (µS/cm) <sup>4</sup>	430	N/L	N/L	297	975	1308	1860	1164	1564	1060	1239	948	1147	987	1204	1181	1280	1280	
Copper	0.002	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Organic Carbon	1.3	3.15	5	7.9	21.1	8.7	3.9	6.8	20.2	9.9	8.3	8.2	10.1	4.0	5.9	4.1	2.9	2.9	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	681	704	852	943	923	1350	820	874	758	995	871	961	817	956	956	
Iron	0.05	0.18	0.3	0.007	0.206	< 0.005	0.019	0.236	0.104	0.078	0.150	0.044	0.091	0.260	0.227	0.088	0.215	0.215	
Magnesium	17	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese	0.12	0.12	0.05	0.283	0.304	0.334	0.391	0.384	0.663	0.387	0.445	0.348	0.492	0.449	0.468	0.394	0.461	0.461	
Nitrate (as N)	0.1	2.58	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH (units) <sup>4</sup>	7.50	8.00	6.5 - 8.5	6.92	6.92	7.24	6.86	7.77	5.69	6.90	6.88	7.39	6.99	7.06	7.23	6.99	8.00	8.00	
Phosphorus, Total	0.02	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Potassium	3	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon	4	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sodium	12	106	200	69.1	69.0	77.0	89.4	89.7	114	84.8	88.3	73.8	86.3	81.6	79.7	76.8	87.6	87.6	
Strontium	0.18	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	8	254	500	-	-	94	-	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	318	409	500	860	1090	1130	1100	1020	1280	909	1000	886	1940	1002	1102	999	1091	1091	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	0.006	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Note:

1. Reasonable Use Concept (RUC) criteria.
  2. Ontario Drinking Water Standards (ODWS).
  3. Results obtained from laboratory analysis.
  4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.  
 Bold and shaded values exceed the ODWS.  
 Bold and Italic values exceed RUC limits.  
 Bedrock RUC is compared to background monitoring well BR-2.  
 Overburden RUC is compared to background monitoring well OB-12.  
 N/L indicates No Limit.  
 "-" indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality - Overburden**  
**Norway Lake Waste Disposal Site**

Parameter	Background Overburden (median)	Overburden RUC <sup>1</sup>	ODWS <sup>2</sup>	OB-8											5-year Trends (sparkline)	
				26-May-15	11-Aug-15	25-May-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	27-Apr-20	17-May-21	19-Aug-21		
Alkalinity (as CaCO <sub>3</sub> )	246	373	30 - 500	275	309	272	233	<b>394</b>	261	338	229	223	257	351		
Aluminum	0.01	0.06	0.1	-	-	-	-	-	-	-	-	-	-	-		
Ammonia, Total (as N)	0.1	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Barium	0.09	0.32	1	-	-	-	-	-	-	-	-	-	-	-		
Boron	0.02	1.26	5	0.107	0.0996	0.054	0.062	<b>1.620</b>	0.052	0.085	0.070	0.078	0.079	0.107		
Calcium	74	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Chloride	33	142	250	56	71	71.6	66.0	69.0	55.1	89.6	86.7	92.8	95.0	<b>162</b>		
Chromium	0.0014	0.014	0.05	-	-	-	-	-	-	-	-	-	-	-		
Cobalt	0.0005	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Chemical Oxygen Demand	8	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Conductivity (µS/cm) <sup>4</sup>	430	N/L	N/L	424	329	497	436	792	387	672	433	423	525	737		
Copper	0.002	0.5	1	-	-	-	-	-	-	-	-	-	-	-		
Dissolved Organic Carbon	1.3	3.15	5	<b>7.5</b>	<b>5.7</b>	<b>4.3</b>	<b>6.8</b>	<b>20.8</b>	<b>4.4</b>	<b>6.1</b>	<b>7.1</b>	<b>5.5</b>	<b>4.9</b>	<b>4.3</b>		
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	<b>316</b>	<b>358</b>	<b>303</b>	<b>342</b>	<b>1350</b>	<b>315</b>	<b>439</b>	<b>341</b>	<b>367</b>	<b>347</b>	<b>548</b>		
Iron	0.05	0.18	0.3	< 0.007	0.008	0.009	0.011	0.105	0.009	< 0.005	0.027	0.011	0.063	0.154		
Magnesium	17	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Manganese	0.12	0.12	0.05	0.00009	0.0131	0.001	< 0.001	<b>0.663</b>	< 0.001	0.001	0.001	0.001	0.001	0.002	0.006	
Nitrate (as N)	0.1	2.58	10	-	-	-	-	-	-	-	-	-	-	-		
pH (units) <sup>4</sup>	7.50	8.00	6.5 - 8.5	7.14	6.57	7.78	7.89	8.16	7.87	7.09	7.45	7.45	7.91	8.14		
Phosphorus, Total	0.02	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Potassium	3	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Silicon	4	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Sodium	12	106	200	20.0	20.7	21.2	25.0	<b>115</b>	18.8	32.3	23.9	27.5	27.8	38.2		
Strontium	0.18	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Sulphate	8	254	500	-	-	19	-	-	-	-	-	-	-	-		
Total Dissolved Solids	318	409	500	386	<b>497</b>	382	397	<b>577</b>	334	<b>509</b>	391	406	<b>419</b>	<b>607</b>		
Total Kjeldahl Nitrogen	0.5	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-		
Zinc	0.006	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-		

Note:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the ODWS.

Bold and Italic values exceed RUC limits.

















Bedrock RUC is compared to background monitoring well BR-2.

Overburden RUC is compared to background monitoring well OB-12.

N/L indicates No Limit.

\*\* indicates the parameter was not analyzed.

**Table 4**  
**Groundwater Quality - Overburden**  
**Norway Lake Waste Disposal Site**

Parameter	Background Overburden (median)	Overburden RUC <sup>1</sup>	ODWS <sup>2</sup>	OB-11								OB-11R				5-year Trends (sparkline)	
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21		19-Aug-21
Alkalinity (as CaCO <sub>3</sub> )	246	373	30 - 500	315	345	324	338	254	<b>421</b>	<b>381</b>	182	345	249	342	<b>403</b>	<b>409</b>	
Aluminum	0.01	0.06	0.1	0.009	0.013	0.05	<b>0.06</b>	<b>0.06</b>	<b>0.14</b>	<b>0.08</b>	<b>0.71</b>	<b>0.09</b>	<b>0.07</b>	<b>0.10</b>	<b>0.10</b>	<b>0.10</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	< 0.1	0.02	0.08	0.01	0.03	0.02	0.16	0.08	0.03	0.03	0.05	0.04	
Barium	0.09	0.32	1	<b>0.374</b>	0.284	<b>0.356</b>	<b>0.594</b>	0.112	<b>0.742</b>	<b>0.402</b>	0.084	<b>0.360</b>	0.231	<b>0.531</b>	<b>0.462</b>	<b>0.489</b>	
Boron	0.02	1.26	5	0.0655	0.0492	0.016	0.030	< 0.005	0.041	0.041	0.020	0.033	0.027	0.038	0.040	0.044	
Calcium	74	N/L	N/L	214	167	160	271	101	298	167	72.8	194	129	242	210	206	
Chloride	33	142	250	<b>480</b>	<b>350</b>	<b>623</b>	<b>898</b>	97.0	75.9	<b>572</b>	121	<b>646</b>	<b>405</b>	<b>881</b>	<b>865</b>	<b>912</b>	
Chromium	0.0014	0.014	0.05	< 0.00003	0.00003	< 0.002	< 0.002	< 0.001	0.002	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	
Cobalt	0.0005	N/L	N/L	0.000925	0.00146	0.0003	0.0003	0.0014	0.0017	0.0008	0.0017	0.0001	0.0003	< 0.0005	< 0.001	< 0.001	
Chemical Oxygen Demand	8	N/L	N/L	< 8	8	101	6	25	10	36	20	30	12	8	19	11	
Conductivity (µS/cm) <sup>4</sup>	430	N/L	N/L	1088	1228	1683	3251	569	2508	1862	461	1863	995	2335	2354	3150	
Copper	0.002	0.5	1	0.00064	0.00075	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.003	< 0.002	< 0.002	0.0018	0.0021	< 0.002	
Dissolved Organic Carbon	1.3	3.15	5	2.8	< 1	0.4	0.6	<b>4.1</b>	2.3	1.2	<b>3.7</b>	2.1	1.5	2.3	2.1	1.8	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	<b>714</b>	<b>539</b>	<b>571</b>	<b>934</b>	<b>324</b>	<b>1030</b>	<b>577</b>	<b>253</b>	<b>637</b>	<b>436</b>	<b>784</b>	<b>703</b>	<b>678</b>	
Iron	0.05	0.18	0.3	<b>0.879</b>	0.125	0.062	0.022	<b>1.10</b>	<b>0.609</b>	0.163	<b>1.34</b>	0.035	0.016	0.015	0.011	0.021	
Magnesium	17	N/L	N/L	43.4	29.7	41.3	62.3	17.5	68.8	38.8	17.2	36.9	27.6	43.6	43.2	39.6	
Manganese	0.12	0.12	0.05	<b>0.0991</b>	<b>0.0774</b>	0.022	0.016	<b>0.991</b>	<b>0.284</b>	<b>0.051</b>	<b>0.112</b>	0.003	0.001	0.002	0.002	0.003	
Nitrate (as N)	0.1	2.58	10	1.17	0.33	0.7	2.3	< 0.05	0.15	< 0.5	< 0.05	1.22	0.42	2.31	2.18	2.07	
pH (units) <sup>4</sup>	7.50	8.00	6.5 - 8.5	7.12	7.18	7.32	7.27	7.82	<b>8.67</b>	7.09	7.82	7.20	7.19	<b>6.40</b>	7.28	7.74	
Phosphorus, Total	0.02	N/L	N/L	0.07	0.15	1.67	0.53	0.29	0.22	0.55	0.37	0.39	0.39	0.14	0.45	0.04	
Potassium	3	N/L	N/L	3.59	3.50	3.2	4.8	2.2	5.7	4.5	2.1	4.8	2.8	5.4	4.7	5.3	
Silicon	4	N/L	N/L	4.95	6.14	4.12	5.51	5.98	6.82	5.04	4.17	4.73	3.80	5.30	4.59	5.64	
Sodium	12	106	200	<b>137</b>	<b>138</b>	<b>216</b>	<b>322</b>	<b>75.3</b>	<b>397</b>	<b>322</b>	65.1	<b>373</b>	<b>232</b>	<b>437</b>	<b>469</b>	<b>499</b>	
Strontium	0.18	N/L	N/L	0.455	0.353	0.383	0.693	0.158	0.714	0.430	0.161	0.435	0.303	0.527	0.522	0.504	
Sulphate	8	254	500	50	37	45	80	9	8	68	8	53	37	78	64	74	
Total Dissolved Solids	318	409	500	<b>1314</b>	<b>1230</b>	<b>1290</b>	<b>1840</b>	<b>470</b>	<b>1950</b>	<b>1451</b>	380	<b>1583</b>	<b>941</b>	<b>1944</b>	<b>2042</b>	<b>2036</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	1.1	1.1	0.5	0.3	0.4	0.1	0.3	0.3	0.3	0.3	0.2	
Zinc	0.006	2.5	5.0	0.004	< 0.002	0.007	0.005	< 0.005	< 0.005	< 0.005	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:

1. Reasonable Use Concept (RUC) criteria.
2. Ontario Drinking Water Standards (ODWS).
3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the ODWS.

Bold and italic values exceed RUC limits.

Bedrock RUC is compared to background monitoring well BR-2.

Overburden RUC is compared to background monitoring well OB-12.

N/L indicates No Limit.

\*\* indicates the parameter was not analyzed.























**Table 4  
Groundwater Quality - Overburden  
Norway Lake Waste Disposal Site**

Parameter	Background Overburden (median)	Overburden RUC <sup>1</sup>	ODWS <sup>2</sup>	OB-12 (Background)														5-year Trends (sparkline)
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	246	373	30 - 500	245	255	247	246	211	284	220	243	203	232	207	254	243	253	
Aluminum	0.01	0.06	0.1	0.0113	0.02	0.02	0.03	<b>0.06</b>	<b>0.06</b>	0.05	<b>0.07</b>	0.05	0.05	0.05	<b>0.15</b>	<b>0.06</b>	<b>0.06</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	< 0.1	0.02	0.08	0.03	0.03	0.06	0.03	0.13	0.14	0.02	0.02	0.02	0.05	
Barium	0.09	0.32	1	0.188	0.150	0.102	0.158	0.100	0.130	0.101	0.174	0.120	0.143	0.124	0.164	0.126	0.145	
Boron	0.02	1.26	5	0.0262	0.0216	0.007	0.016	< 0.005	0.009	0.006	0.013	0.007	0.015	0.008	0.013	0.009	0.013	
Calcium	74	N/L	N/L	140	105	71.8	97.1	80.5	78.5	82.5	105	93.4	98.0	97.8	98.1	92.0	89.4	
Chloride	33	142	250	<b>210</b>	130	138	128	39.5	39.6	123	<b>194</b>	<b>158</b>	140	<b>204</b>	<b>160</b>	<b>147</b>	132	
Chromium	0.0014	0.014	0.05	< 0.00003	0.00006	< 0.002	< 0.002	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	< 0.001	
Cobalt	0.0005	N/L	N/L	0.000064	0.00135	< 0.0001	0.0002	< 0.0001	0.0003	< 0.0001	0.0003	0.0002	< 0.0001	< 0.0002	0.0005	< 0.0001	0.0002	
Chemical Oxygen Demand	8	N/L	N/L	< 8	< 8	37	46	34	17	12	39	23	43	9	7	10	< 5	
Conductivity (µS/cm) <sup>4</sup>	430	N/L	N/L	750	785	642	866	385	540	477	881	531	643	578	713	635	570	
Copper	0.002	0.5	1	0.00106	0.00151	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	0.0033	0.0013	< 0.002	
Dissolved Organic Carbon	1.3	3.15	5	1.2	1.7	0.9	1.2	1.9	3.1	1.4	1.3	2.8	2.8	1.4	2.0	1.5	1.7	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	<b>462</b>	<b>342</b>	<b>253</b>	<b>330</b>	<b>271</b>	<b>271</b>	<b>291</b>	<b>364</b>	<b>321</b>	<b>338</b>	<b>339</b>	<b>326</b>	<b>319</b>	<b>305</b>	
Iron	0.05	0.18	0.3	< 0.007	0.026	< 0.005	0.013	0.006	0.007	0.029	< 0.005	0.009	0.005	0.006	<b>0.315</b>	0.005	0.009	
Magnesium	17	N/L	N/L	27.4	19.5	17.8	21.2	16.9	18.3	20.5	24.7	21.3	22.7	22.9	19.7	21.6	19.9	
Manganese	0.12	0.12	0.05	<b>0.0775</b>	<b>0.245</b>	0.008	<b>0.251</b>	0.047	<b>0.752</b>	0.033	<b>0.290</b>	0.027	<b>0.363</b>	0.012	<b>0.200</b>	0.020	<b>0.421</b>	
Nitrate (as N)	0.1	2.58	10	< 0.06	< 0.06	0.2	0.2	< 0.05	< 0.05	< 0.05	< 0.05	0.07	0.08	0.07	< 0.05	0.10	< 0.05	
pH (units) <sup>4</sup>	7.50	8.00	6.5 - 8.5	7.33	7.59	7.71	7.71	7.98	<b>8.75</b>	7.51	7.27	7.30	7.09	7.19	<b>6.20</b>	7.50	7.93	
Phosphorus, Total	0.02	N/L	N/L	0.17	0.16	0.70	0.37	4.48	0.48	0.25	1.21	0.42	0.31	0.16	0.11	0.07	0.10	
Potassium	3	N/L	N/L	3.63	3.3	2.3	3.4	2.5	3.0	2.3	3.8	2.9	3.6	2.5	3.2	2.8	3.4	
Silicon	4	N/L	N/L	4.59	5.04	3.38	4.71	3.32	5.16	3.05	4.48	3.21	4.35	3.19	4.43	3.33	4.59	
Sodium	12	106	200	42.0	45.2	58.9	54.8	26.4	59.5	35.2	79.5	50.2	67.7	74.4	93.9	61.2	70.0	
Strontium	0.18	N/L	N/L	0.303	0.262	0.170	0.262	0.166	0.197	0.185	0.287	0.210	0.258	0.220	0.218	0.212	0.224	
Sulphate	8	254	500	9	11	16	15	6	12	6	13	15	15	9	13	10	12	
Total Dissolved Solids	318	409	500	<b>780</b>	<b>534</b>	<b>455</b>	<b>481</b>	301	382	392	<b>590</b>	<b>467</b>	<b>494</b>	<b>556</b>	<b>551</b>	<b>497</b>	<b>449</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	0.7	0.4	1.7	0.4	0.3	0.6	0.2	0.4	0.2	0.2	0.2	0.2	
Zinc	0.006	2.5	5.0	0.003	0.002	0.008	0.006	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:

1. Reasonable Use Concept (RUC) criteria.
  2. Ontario Drinking Water Standards (ODWS).
  3. Results obtained from laboratory analysis.
  4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.  
 Bold and shaded values exceed the ODWS.  
 Bold and italic values exceed RUC limits.  
 Bedrock RUC is compared to background monitoring well BR-2.  
 Overburden RUC is compared to background monitoring well OB-12.  
 N/L indicates No Limit.  
 "-" indicates the parameter was not analyzed.

**Table 5  
Groundwater Quality - Bedrock  
Norway Lake Waste Disposal Site**

Parameter	Background Bedrock (median)	Bedrock RUC <sup>1</sup>	ODWS <sup>2</sup>	BR-1														5-year Trends (sparkline)
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	199	350	30 - 500	742	732	1020	825	962	1090	864	880	684	820	651	743	788	705	
Aluminum	0.0045	0.052	0.1	0.0094	0.007	0.05	0.06	0.11	0.11	0.09	0.10	0.09	0.10	0.09	0.09	0.10	0.10	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	< 0.1	0.04	0.09	0.09	0.14	0.22	0.16	0.21	0.25	0.27	0.21	0.28	0.22	
Barium	0.081	0.31	1	0.113	0.118	0.130	0.153	0.175	0.219	0.172	0.160	0.136	0.175	0.161	0.184	0.154	0.172	
Boron	0.018	1.26	5	0.906	0.713	0.757	0.830	1.02	1.38	1.20	1.15	0.949	1.01	0.939	0.822	0.823	0.752	
Calcium	73	N/L	N/L	180	176	183	208	233	264	221	199	177	231	204	227	189	208	
Chloride	39	144	250	100	120	63.0	154	53.0	59.2	80.3	79.3	106	96.7	156	164	11.8	241	
Chromium	0.002	0.014	0.05	0.00033	0.00035	< 0.002	< 0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0005	N/L	N/L	0.00903	0.00699	0.0104	0.0079	0.0094	0.0106	0.0122	0.0097	0.0085	0.0104	0.0100	0.0101	0.0096	0.0084	
Chemical Oxygen Demand	8	N/L	N/L	30	25	67	23	42	58	56	42	48	43	55	34	37	28	
Conductivity (µS/cm) <sup>4</sup>	424	N/L	N/L	1003	1125	1351	1253	1191	1468	1222	1274	950	1100	990	1147	1137	1630	
Copper	0.0039	0.5	1	0.00621	0.00348	0.006	0.005	< 0.002	0.002	0.004	< 0.002	0.003	< 0.002	0.004	0.0043	0.0051	0.002	
Dissolved Organic Carbon	1.5	3.3	5	14.3	7.2	13.5	5.8	13.9	20.8	15.6	11.9	13.4	13.9	9.1	8.8	10.0	5.9	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	789	750	871	961	1080	1220	1030	945	838	1050	942	987	875	943	
Iron	2.18	2.18	0.3	0.985	1.39	0.967	0.877	1.69	1.05	0.820	0.995	1.57	0.993	3.74	3.99	1.01	1.77	
Magnesium	17	N/L	N/L	82.3	75.5	101	107	122	136	115	109	96.3	116	105	102	98.0	103	
Manganese	0.11	0.11	0.05	0.445	0.388	0.510	0.488	0.585	0.773	0.661	0.572	0.496	0.693	0.651	0.645	0.610	0.564	
Nitrate (as N)	0.05	2.54	10	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	0.06	< 0.05	< 0.05	< 0.05	0.06	< 0.05	0.08	< 0.05	
pH (units) <sup>4</sup>	7.53	8.02	6.5 - 8.5	6.97	7.07	7.10	6.85	7.17	6.52	6.65	6.78	7.24	7.08	6.97	7.09	6.94	7.91	
Phosphorus, Total	0.025	N/L	N/L	< 0.03	< 0.03	0.03	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.10	0.03	0.02	0.01	
Potassium	6	N/L	N/L	11.3	10.5	11.9	13.0	16.7	19.1	17.2	16.8	15.7	18.2	18.0	17.4	17.4	17.3	
Silicon	4	N/L	N/L	7.05	7.98	5.84	6.76	7.43	8.21	6.75	6.93	6.25	6.81	6.56	6.63	6.13	6.82	
Sodium	3	101	200	71.0	66.2	73.2	88.6	86.2	99.4	78.3	85.4	65.9	80.3	72.6	76.0	67.7	81.1	
Strontium	0.13	N/L	N/L	0.670	0.852	0.661	0.865	0.903	1.01	0.880	0.916	0.844	0.927	0.898	0.847	0.808	0.885	
Sulphate	11	255	500	76	64	82	92	55	92	104	91	61	110	75	13	7	80	
Total Dissolved Solids	332	416	500	1017	1090	1130	1080	1040	1190	994	1034	897	1034	960	1051	975	1045	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	0.7	0.5	0.7	0.9	0.8	0.8	0.6	0.8	0.8	0.7	0.8	0.6	
Zinc	0.01	2.5	5.0	0.005	0.009	0.008	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:

1. Reasonable Use Concept (RUC) criteria.
  2. Ontario Drinking Water Standards (ODWS).
  3. Results obtained from laboratory analysis.
  4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.  
 Bold and shaded values exceed the ODWS.  
 Bold and Italic values exceed RUC limits.  
 Bedrock RUC is compared to background monitoring well BR-2.  
 Overburden RUC is compared to background monitoring well OB-12.  
 N/L indicates No Limit.  
 "-" indicates the parameter was not analyzed.

**Table 5  
Groundwater Quality - Bedrock  
Norway Lake Waste Disposal Site**






Parameter	Background Bedrock (median)	Bedrock RUC <sup>1</sup>	ODWS <sup>2</sup>	BR-2 (Background)														5-year Trends (sparkline)
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	199	350	30 - 500	311	340	322	327	250	296	290	320	258	268	267	292	328	338	
Aluminum	0.0045	0.052	0.1	0.0085	0.004	0.03	0.04	<b>0.06</b>	<b>0.08</b>	0.05	<b>0.08</b>	0.05	0.05	<b>0.06</b>	<b>0.06</b>	<b>0.07</b>	<b>0.08</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	< 0.1	< 0.01	0.05	< 0.01	0.03	0.03	0.01	0.04	0.28	0.02	0.02	0.02	0.03	
Barium	0.081	0.31	1	0.154	0.184	0.132	0.163	0.147	0.188	0.136	0.166	0.129	0.125	0.141	0.164	0.156	0.197	
Boron	0.018	1.26	5	0.0972	0.0558	0.007	0.020	< 0.005	0.014	0.011	0.013	0.011	0.017	0.010	0.015	0.012	0.016	
Calcium	73	N/L	N/L	115	159	98.7	115	107	128	96.9	112	91.0	92.4	101	111	110	132	
Chloride	39	144	250	55	78	51.0	80.1	42.9	65.4	44.6	71.8	31.4	49.5	32.7	51.0	56.4	91.7	
Chromium	0.002	0.014	0.05	< 0.00003	< 0.00003	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0005	N/L	N/L	0.000079	0.000126	0.0002	0.0002	< 0.0001	0.0003	< 0.0001	0.0004	0.0004	< 0.0001	0.0003	0.0003	0.0003	0.0003	
Chemical Oxygen Demand	8	N/L	N/L	9	11	14	7	8	6	14	13	19	16	7	5	15	19	
Conductivity (µS/cm) <sup>4</sup>	424	N/L	N/L	495	583	438	731	406	593	441	553	361	399	342	468	526	565	
Copper	0.0039	0.5	1	0.00066	0.00069	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0014	0.0011	< 0.002	
Dissolved Organic Carbon	1.5	3.3	5	<b>4.5</b>	1.5	2.3	2.2	2.2	<b>3.3</b>	2.5	3.0	3.1	<b>4.0</b>	<b>3.6</b>	<b>4.1</b>	<b>3.9</b>	3.0	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	<b>376</b>	<b>483</b>	<b>330</b>	<b>387</b>	<b>352</b>	<b>416</b>	<b>319</b>	<b>369</b>	<b>301</b>	<b>309</b>	<b>331</b>	<b>358</b>	<b>363</b>	<b>428</b>	
Iron	2.18	2.18	0.3	<b>1.74</b>	<b>0.464</b>	<b>1.06</b>	<b>4.89</b>	<b>1.27</b>	<b>0.794</b>	<b>0.311</b>	<b>1.55</b>	<b>0.788</b>	<b>5.93</b>	<b>0.923</b>	<b>2.98</b>	<b>0.643</b>	<b>0.604</b>	
Magnesium	17	N/L	N/L	21.7	20.9	20.1	24.2	20.5	23.3	18.7	21.6	18.0	18.9	19.2	19.6	21.5	23.9	
Manganese	0.11	0.11	0.05	<b>0.0545</b>	0.0291	0.032	<b>0.118</b>	<b>0.058</b>	0.025	0.019	0.037	0.023	<b>0.117</b>	0.027	<b>0.082</b>	0.034	0.049	
Nitrate (as N)	0.05	2.54	10	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	< 0.05	0.38	< 0.05	< 0.05	0.08	< 0.05	0.15	< 0.05	
pH (units) <sup>4</sup>	7.53	8.02	6.5 - 8.5	7.74	7.22	<b>6.06</b>	7.53	7.93	<b>8.80</b>	7.90	7.63	7.57	7.42	7.33	6.95	7.79	8.37	
Phosphorus, Total	0.025	N/L	N/L	0.03	< 0.03	0.01	0.12	0.04	0.02	0.05	0.08	0.07	0.13	0.10	0.13	0.10	0.22	
Potassium	6	N/L	N/L	6.49	6.65	5.4	7.3	6.6	8.1	5.9	7.4	5.6	6.6	6.0	7.1	6.5	7.8	
Silicon	4	N/L	N/L	5.43	8.12	4.63	5.24	5.19	7.04	5.04	5.72	4.94	4.66	5.23	5.19	5.13	6.39	
Sodium	3	101	200	17.0	17.4	17.4	22.3	18.7	25.2	19.9	26.0	19.7	22.3	20.6	21.7	21.5	26.4	
Strontium	0.13	N/L	N/L	0.192	0.241	0.172	0.218	0.174	0.218	0.172	0.209	0.163	0.154	0.172	0.181	0.200	0.229	
Sulphate	11	255	500	25	26	24	24	15	16	19	19	19	16	22	20	20	25	
Total Dissolved Solids	332	416	500	<b>451</b>	<b>571</b>	411	<b>493</b>	366	<b>451</b>	348	<b>433</b>	328	368	347	394	413	<b>469</b>	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	0.1	0.2	0.2	0.1	0.1	0.2	< 0.1	0.2	0.1	0.2	0.2	0.3	
Zinc	0.01	2.5	5.0	0.003	0.007	< 0.005	0.007	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:

1. Reasonable Use Concept (RUC) criteria.
  2. Ontario Drinking Water Standards (ODWS).
  3. Results obtained from laboratory analysis.
  4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.  
 Bold and shaded values exceed the ODWS.  
 Bold and Italic values exceed RUC limits.  
 Bedrock RUC is compared to background monitoring well BR-2.  
 Overburden RUC is compared to background monitoring well OB-12.  
 N/L indicates No Limit.  
 "-" indicates the parameter was not analyzed.



**Table 5**  
**Groundwater Quality - Bedrock**  
**Norway Lake Waste Disposal Site**

Parameter	Background Bedrock (median)	Bedrock RUC <sup>1</sup>	ODWS <sup>2</sup>	BR-8														5-year Trends (sparkline)
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	199	350	30 - 500	262	278	259	258	230	264	255	265	226	239	218	247	250	260	
Aluminum	0.0045	0.052	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Ammonia, Total (as N)	0.1	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium	0.081	0.31	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	0.018	1.26	5	0.147	0.139	0.104	0.275	0.102	0.261	0.121	0.194	0.144	0.152	0.100	0.208	0.191	0.259	
Calcium	73	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chloride	39	144	250	42	47	32.5	43.1	47.8	38.7	50.4	42.5	45.3	41.0	56.5	56.6	55.1	61.1	
Chromium	0.002	0.014	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt	0.0005	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chemical Oxygen Demand	8	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Conductivity (µS/cm) <sup>4</sup>	424	N/L	N/L	360	448	425	408	398	448	384	462	337	376	345	405	402	408	
Copper	0.0039	0.5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Dissolved Organic Carbon	1.5	3.3	5	<b>3.5</b>	<b>4.7</b>	<b>3.3</b>	3.2	<b>3.9</b>	<b>5.4</b>	<b>3.9</b>	<b>3.7</b>	<b>5.1</b>	<b>4.8</b>	<b>4.2</b>	<b>4.6</b>	<b>4.1</b>	<b>3.6</b>	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	<b>307</b>	<b>308</b>	<b>277</b>	<b>293</b>	<b>326</b>	<b>344</b>	<b>298</b>	<b>312</b>	<b>294</b>	<b>324</b>	<b>330</b>	<b>344</b>	<b>307</b>	<b>327</b>	
Iron	2.18	2.18	0.3	0.220	0.219	0.083	0.294	0.052	<b>0.354</b>	0.040	0.111	0.074	0.155	0.044	<b>0.658</b>	0.161	0.232	
Magnesium	17	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese	0.11	0.11	0.05	<b>0.0551</b>	<b>0.0735</b>	0.013	<b>0.074</b>	0.016	<b>0.091</b>	<b>0.173</b>	0.041	0.016	<b>0.058</b>	0.012	<b>0.090</b>	<b>0.054</b>	<b>0.064</b>	
Nitrate (as N)	0.05	2.54	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
pH (units) <sup>4</sup>	7.53	8.02	6.5 - 8.5	6.64	7.15	7.02	7.95	8.06	<b>8.78</b>	7.89	7.33	7.23	7.82	7.48	6.89	8.15	8.19	
Phosphorus, Total	0.025	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Potassium	6	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon	4	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sodium	3	101	200	13.4	18.3	16.4	16.9	19.0	21.5	21.0	23.2	16.9	19.7	20.8	18.6	17.4	18.7	
Strontium	0.13	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulphate	11	255	500	-	-	23	-	-	-	-	-	-	-	-	-	-	-	
Total Dissolved Solids	332	416	500	354	<b>471</b>	326	364	358	372	325	343	320	328	340	367	347	361	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	0.01	2.5	5.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Note:

1. Reasonable Use Concept (RUC) criteria.
  2. Ontario Drinking Water Standards (ODWS).
  3. Results obtained from laboratory analysis.
  4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.  
 Bold and shaded values exceed the ODWS.  
 Bold and Italic values exceed RUC limits.  
 Bedrock RUC is compared to background monitoring well BR-2.  
 Overburden RUC is compared to background monitoring well OB-12.  
 N/L indicates No Limit.  
 "-" indicates the parameter was not analyzed.

**Table 5  
Groundwater Quality - Bedrock  
Norway Lake Waste Disposal Site**

Parameter	Background Bedrock (median)	Bedrock RUC <sup>1</sup>	ODWS <sup>2</sup>	BR-9														5-year Trends (sparkline)
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	199	350	30 - 500	261	257	254	249	209	246	251	260	217	228	234	260	253	256	
Aluminum	0.0045	0.052	0.1	0.0074	0.008	0.02	0.03	0.04	<b>0.06</b>	0.04	0.05	0.05	0.05	0.05	<b>0.15</b>	0.05	<b>0.06</b>	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	0.1	< 0.01	0.04	< 0.01	< 0.01	0.05	< 0.01	0.04	0.05	0.03	< 0.01	< 0.01	0.01	
Barium	0.081	0.31	1	0.0717	0.07996	0.059	0.083	0.066	0.094	0.067	0.078	0.063	0.074	0.075	0.095	0.068	0.086	
Boron	0.018	1.26	5	0.0392	0.0410	0.009	0.026	< 0.005	0.028	0.007	0.026	0.008	0.023	0.008	0.024	0.013	0.026	
Calcium	73	N/L	N/L	76.6	81.9	61.2	79.3	71.1	81.0	71.0	75.5	68.5	77.5	79.1	86.8	70.9	83.2	
Chloride	39	144	250	9.0	17.0	5.5	13.1	1.3	10.6	1.5	15.1	3.6	16.4	4.6	17.6	6.0	21.8	
Chromium	0.002	0.014	0.05	0.00045	0.00037	< 0.002	< 0.002	0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	0.002	< 0.001	< 0.001	
Cobalt	0.0005	N/L	N/L	0.000034	0.00121	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0002	< 0.0001	0.0002	0.0024	0.0001	0.0001	
Chemical Oxygen Demand	8	N/L	N/L	< 8	< 8	5	< 5	18	6	6	5	11	5	< 5	< 5	8	9	
Conductivity (µS/cm) <sup>4</sup>	424	N/L	N/L	310	384	346	500	251	334	303	355	263	298	265	316	325	349	
Copper	0.0039	0.5	1	0.00104	0.00098	< 0.002	0.002	0.005	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	0.0031	0.0014	< 0.002	
Dissolved Organic Carbon	1.5	3.3	5	2.9	2.8	1.5	2.0	2.1	<b>3.4</b>	1.7	2.3	<b>3.3</b>	3.1	2.8	<b>3.6</b>	2.8	3.0	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	<b>272</b>	<b>283</b>	<b>228</b>	<b>285</b>	<b>253</b>	<b>295</b>	<b>261</b>	<b>281</b>	<b>253</b>	<b>278</b>	<b>288</b>	<b>304</b>	<b>259</b>	<b>300</b>	
Iron	2.18	2.18	0.3	< 0.007	0.010	< 0.005	0.009	< 0.005	0.005	0.010	< 0.005	0.008	< 0.005	0.006	0.232	0.006	0.011	
Magnesium	17	N/L	N/L	19.7	19.1	18.2	21.2	18.4	22.5	20.3	22.5	20.0	20.4	21.9	21.2	20.0	22.4	
Manganese	0.11	0.11	0.05	0.00004	0.00360	< 0.001	< 0.001	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	<b>0.062</b>	0.001	0.002	
Nitrate (as N)	0.05	2.54	10	< 0.06	0.07	0.1	0.2	< 0.05	< 0.05	0.06	< 0.05	0.07	0.11	0.10	0.05	0.17	0.06	
pH (units) <sup>4</sup>	7.53	8.02	6.5 - 8.5	6.87	<b>6.42</b>	7.55	7.95	8.33	<b>8.89</b>	7.69	7.53	7.72	7.48	7.25	7.14	7.68	8.38	
Phosphorus, Total	0.025	N/L	N/L	0.03	0.06	0.05	0.14	0.17	0.04	0.11	0.03	0.09	0.08	0.10	0.08	0.03	0.04	
Potassium	6	N/L	N/L	2.86	3.07	2.3	3.2	2.5	3.5	2.6	3.6	2.5	3.0	2.8	3.3	2.8	3.4	
Silicon	4	N/L	N/L	4.30	4.73	3.47	4.34	4.37	4.95	4.01	4.07	3.78	4.00	4.12	4.19	3.67	4.35	
Sodium	3	101	200	3.11	4.74	3.6	6.0	2.4	5.9	2.8	6.9	2.9	5.4	3.4	6.1	3.7	6.5	
Strontium	0.13	N/L	N/L	0.130	0.187	0.114	0.183	0.101	0.188	0.117	0.203	0.114	0.163	0.121	0.170	0.136	0.184	
Sulphate	11	255	500	10	11	11	14	8	9	8	10	9	11	10	14	11	18	
Total Dissolved Solids	332	416	500	291	343	255	293	224	285	240	281	239	266	254	277	254	287	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	< 0.5	< 0.5	0.2	0.2	0.7	0.1	0.1	0.1	< 0.1	0.2	0.1	0.1	0.1	0.1	
Zinc	0.01	2.5	5.0	0.004	0.003	0.011	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:

1. Reasonable Use Concept (RUC) criteria.
  2. Ontario Drinking Water Standards (ODWS).
  3. Results obtained from laboratory analysis.
  4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.  
 Bold and shaded values exceed the ODWS.  
 Bold and Italic values exceed RUC limits.  
 Bedrock RUC is compared to background monitoring well BR-2.  
 Overburden RUC is compared to background monitoring well OB-12.  
 N/L indicates No Limit.  
 "-" indicates the parameter was not analyzed.

**Table 5  
Groundwater Quality - Bedrock  
Norway Lake Waste Disposal Site**

Parameter	Background Bedrock (median)	Bedrock RUC <sup>1</sup>	ODWS <sup>2</sup>	BR-10														5-year Trends (sparkline)
				26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	199	350	30 - 500	570	627	556	613	480	708	482	585	516	626	490	589	512	571	
Aluminum	0.0045	0.052	0.1	0.0144	0.011	0.04	0.08	0.09	0.12	0.07	0.10	0.09	0.12	0.08	0.11	0.10	0.13	
Ammonia, Total (as N)	0.1	N/L	N/L	9.6	11.8	12.4	11.7	6.38	16.5	8.60	18.3	12.5	20.2	13.4	19.8	12.6	12.8	
Barium	0.081	0.31	1	0.826	1.12	0.500	1.19	0.640	0.878	0.626	1.16	0.617	1.17	0.612	1.14	0.762	1.40	
Boron	0.018	1.26	5	0.506	0.446	0.362	0.483	0.398	0.704	0.349	0.650	0.550	0.713	0.482	0.613	0.415	0.476	
Calcium	73	N/L	N/L	185	282	131	302	167	201	157	270	159	291	149	277	193	374	
Chloride	39	144	250	310	550	211	752	186	176	289	519	271	571	229	657	469	987	
Chromium	0.002	0.014	0.05	0.00177	0.00165	< 0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	< 0.002	
Cobalt	0.0005	N/L	N/L	0.0148	0.0167	0.0087	0.0183	0.0121	0.0115	0.0115	0.0177	0.0127	0.0131	0.0103	0.0136	0.0116	0.0174	
Chemical Oxygen Demand	8	N/L	N/L	24	42	51	59	67	87	150	116	82	72	74	92	44	60	
Conductivity (µS/cm) <sup>4</sup>	424	N/L	N/L	1333	1795	1864	2168	1109	1441	1239	2195	1102	1825	1040	1902	1909	3800	
Copper	0.0039	0.5	1	0.00049	0.00102	0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0013	0.0020	< 0.002	
Dissolved Organic Carbon	1.5	3.3	5	13.3	27.5	6.3	2.8	9.0	9.0	6.2	5.3	14.4	8.0	8.1	6.6	5.2	4.8	
Hardness (as CaCO <sub>3</sub> )	254	254	80 - 100	653	958	463	1080	579	725	550	963	559	1010	519	925	664	1260	
Iron	2.18	2.18	0.3	21.6	22.5	12.1	26.2	19.0	25.9	17.9	28.9	20.3	29.7	19.7	20.7	21.2	30.3	
Magnesium	17	N/L	N/L	46.5	61.7	32.6	77.9	39.2	54.2	38.4	70.0	39.4	69.4	35.7	56.6	44.2	79.9	
Manganese	0.11	0.11	0.05	6.29	7.64	4.09	9.07	7.81	7.27	5.95	7.33	6.65	7.18	5.45	6.02	5.26	8.03	
Nitrate (as N)	0.05	2.54	10	< 0.06	< 0.06	0.6	0.6	0.23	< 0.05	< 0.05	< 0.5	0.22	< 0.05	0.08	0.28	0.66	< 0.5	
pH (units) <sup>4</sup>	7.53	8.02	6.5 - 8.5	6.83	7.02	6.02	6.92	7.11	8.95	7.04	6.78	6.95	6.81	6.82	6.88	6.97	7.70	
Phosphorus, Total	0.025	N/L	N/L	0.05	0.09	0.11	0.31	0.23	0.49	0.41	0.80	0.48	0.23	0.69	0.52	0.20	0.13	
Potassium	6	N/L	N/L	17.4	18.2	15.2	21.6	18.3	29.0	17.8	32.1	24.1	34.4	23.9	35.7	25.2	33.6	
Silicon	4	N/L	N/L	11.5	12.5	7.81	11.1	11.2	12.6	10.2	10.6	10.5	10.7	11.1	9.99	9.72	10.7	
Sodium	3	101	200	129	162	112	252	138	149	150	244	134	246	141	264	212	444	
Strontium	0.13	N/L	N/L	0.546	0.758	0.394	0.870	0.466	0.600	0.472	0.847	0.523	0.840	0.482	0.767	0.603	1.09	
Sulphate	11	255	500	32	47	26	69	36	31	33	42	34	43	24	47	33	64	
Total Dissolved Solids	332	416	500	1163	2030	896	1830	915	1080	960	1520	977	1669	893	1686	1336	2266	
Total Kjeldahl Nitrogen	0.5	N/L	N/L	10.1	12.4	14.8	14.7	13.6	20.6	10.1	21.9	15.4	23.5	15.5	23.3	13.4	13.6	
Zinc	0.01	2.5	5.0	0.004	0.003	0.010	0.009	< 0.005	0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	

Note:

1. Reasonable Use Concept (RUC) criteria.
  2. Ontario Drinking Water Standards (ODWS).
  3. Results obtained from laboratory analysis.
  4. Results obtained from field analysis.
- All results are expressed in mg/L unless otherwise stated.  
 Bold and shaded values exceed the ODWS.  
 Bold and Italic values exceed RUC limits.  
 Bedrock RUC is compared to background monitoring well BR-2.  
 Overburden RUC is compared to background monitoring well OB-12.  
 N/L indicates No Limit.  
 "-" indicates the parameter was not analyzed.

**Table 6**  
**Groundwater Quality Compared to PWQO**  
**Norway Lake Waste Disposal Site**

Parameter	PWQO <sup>1</sup>	BR-9														5-year Trends (sparkline)
		26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	< 25% decrease	261	257	254	249	209	246	251	260	217	228	234	260	253	256	
Aluminum	0.075	0.0074	0.0080	0.02	0.03	0.04	0.06	0.04	0.05	0.05	0.05	0.05	<b>0.15</b>	0.05	0.06	
Ammonia, Total (as N)	N/L	< 0.1	0.1	< 0.01	0.04	< 0.01	< 0.01	0.05	< 0.01	0.04	0.05	0.03	< 0.01	< 0.01	0.01	
Barium	N/L	0.0717	0.0800	0.059	0.083	0.066	0.094	0.067	0.078	0.063	0.074	0.075	0.095	0.068	0.086	
Boron	0.2	0.0392	0.0410	0.009	0.026	< 0.005	0.028	0.007	0.026	0.008	0.023	0.008	0.024	0.013	0.026	
Calcium	N/L	76.6	81.9	61.2	79.3	71.1	81.0	71.0	75.5	68.5	77.5	79.1	86.8	70.9	83.2	
Chloride	N/L	9	17	5.5	13.1	1.3	10.6	1.5	15.1	3.6	16.4	4.6	17.6	6.0	21.8	
Chromium	0.001	0.00045	0.00037	< 0.002	< 0.002	<b>0.002</b>	< 0.001	< 0.001	< 0.001	<b>0.001</b>	< 0.001	<b>0.001</b>	<b>0.002</b>	< 0.001	< 0.001	
Cobalt	0.0009	0.000034	<b>0.00121</b>	0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	0.0002	< 0.0001	0.0002	<b>0.0024</b>	0.0001	0.0001	
Chemical Oxygen Demand	N/L	< 8	< 8	5	< 5	18	6	6	5	11	5	< 5	< 5	8	9	
Conductivity (µS/cm) <sup>3</sup>	N/L	310	384	346	500	251	334	303	355	263	298	265	316	325	349	
Copper	0.005	0.00104	0.00098	< 0.002	0.002	<b>0.005</b>	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	0.0031	0.0014	< 0.002	
Dissolved Organic Carbon	N/L	2.9	2.8	1.5	2.0	2.1	3.4	1.7	2.3	3.3	3.1	2.8	3.6	2.8	3.0	
Hardness (as CaCO <sub>3</sub> )	N/L	272	283	228	285	253	295	261	281	253	278	288	304	259	300	
Iron	0.3	< 0.007	0.01	< 0.005	0.009	< 0.005	0.005	0.01	< 0.005	0.008	< 0.005	0.006	0.232	0.006	0.011	
Magnesium	N/L	19.7	19.1	18.2	21.2	18.4	22.5	20.3	22.5	20.0	20.4	21.9	21.2	20.0	22.4	
Manganese	N/L	0.00004	0.00360	< 0.001	< 0.001	0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.062	0.001	0.002	
Nitrate (as N)	N/L	< 0.06	0.07	0.1	0.2	< 0.05	< 0.05	0.06	< 0.05	0.07	0.11	0.10	0.05	0.17	0.06	
pH (units) <sup>3</sup>	6.5 - 8.5	6.87	<b>6.42</b>	7.55	7.95	8.33	<b>8.89</b>	7.69	7.53	7.72	7.48	7.25	7.14	7.68	8.38	
Phosphorus, Total	0.03	<b>0.03</b>	<b>0.06</b>	<b>0.05</b>	<b>0.14</b>	<b>0.17</b>	<b>0.04</b>	<b>0.11</b>	<b>0.03</b>	<b>0.09</b>	<b>0.08</b>	<b>0.10</b>	<b>0.08</b>	<b>0.03</b>	<b>0.04</b>	
Potassium	N/L	2.86	3.07	2.3	3.2	2.5	3.5	2.6	3.6	2.5	3.0	2.8	3.3	2.8	3.4	
Silicon	N/L	4.30	4.73	3.47	4.34	4.37	4.95	4.01	4.07	3.78	4.00	4.12	4.19	3.67	4.35	
Sodium	N/L	3.11	4.74	3.6	6.0	2.4	5.9	2.8	6.9	2.9	5.4	3.4	6.1	3.7	6.5	
Strontium	N/L	0.130	0.187	0.114	0.183	0.101	0.188	0.117	0.203	0.114	0.163	0.121	0.170	0.136	0.184	
Sulphate	N/L	10	11	11	14	8	9	8	10	9	11	10	14	11	18	
Total Dissolved Solids	N/L	291	343	255	293	224	285	240	281	239	266	254	277	254	287	
Total Kjeldahl Nitrogen	N/L	< 0.5	< 0.5	0.2	0.2	0.7	0.1	0.1	0.1	< 0.1	0.2	0.1	0.1	0.1	0.1	
Zinc	0.02	0.004	0.003	0.011	0.007	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:  
1. Provincial Water Quality Objectives (PWQO).  
2. Results obtained from laboratory analysis.  
3. Results obtained from field analysis.  
All results are expressed in mg/L unless otherwise stated.  
Bold and shaded values exceed the PWQO.  
N/L indicates No Limit.  
\*\* indicates the parameter was not analyzed.

**Table 6**  
**Groundwater Quality Compared to PWQO**  
**Norway Lake Waste Disposal Site**

Parameter	PWQO <sup>1</sup>	BR-2 (Background)														5-year Trends (sparkline)
		26-May-15	11-Aug-15	25-May-16	01-Sep-16	08-May-17	18-Sep-17	02-May-18	13-Aug-18	15-May-19	21-Aug-19	27-Apr-20	18-Aug-20	17-May-21	19-Aug-21	
Alkalinity (as CaCO <sub>3</sub> )	< 25% decrease	311	340	322	327	250	296	290	320	258	268	267	292	328	338	
Aluminum	0.075	0.0085	0.0040	0.03	0.04	0.06	<b>0.08</b>	0.05	<b>0.08</b>	0.05	0.05	0.06	0.06	0.07	<b>0.08</b>	
Ammonia, Total (as N)	N/L	< 0.1	< 0.1	< 0.01	0.05	< 0.01	0.03	0.03	0.01	0.04	0.28	0.02	0.02	0.02	0.03	
Barium	N/L	0.154	0.184	0.132	0.163	0.147	0.188	0.136	0.166	0.129	0.125	0.141	0.164	0.156	0.197	
Boron	0.2	0.0972	0.0558	0.007	0.020	< 0.005	0.014	0.011	0.013	0.011	0.017	0.010	0.015	0.012	0.016	
Calcium	N/L	115	159	98.7	115	107	128	96.9	112	91.0	92.4	101	111	110	132	
Chloride	N/L	55	78	51.0	80.1	42.9	65.4	44.6	71.8	31.4	49.5	32.7	51.0	56.4	91.7	
Chromium	0.001	< 0.00003	< 0.00003	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Cobalt	0.0009	0.000079	0.000126	0.0002	0.0002	< 0.0001	0.0003	< 0.0001	0.0004	0.0004	< 0.0001	0.0003	0.0003	0.0003	0.0003	
Chemical Oxygen Demand	N/L	9	11	14	7	8	6	14	13	19	16	7	5	15	19	
Conductivity (µS/cm) <sup>3</sup>	N/L	495	583	438	731	406	593	441	553	361	399	342	468	526	565	
Copper	0.005	0.00066	0.00069	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0014	0.0011	< 0.002	
Dissolved Organic Carbon	N/L	4.5	1.5	2.3	2.2	2.2	3.3	2.5	3.0	3.1	4.0	3.6	4.1	3.9	3.0	
Hardness (as CaCO <sub>3</sub> )	N/L	376	483	330	387	352	416	319	369	301	309	331	358	363	428	
Iron	0.3	<b>1.74</b>	<b>0.464</b>	<b>1.06</b>	<b>4.89</b>	<b>1.27</b>	<b>0.794</b>	<b>0.311</b>	<b>1.55</b>	<b>0.788</b>	<b>5.93</b>	<b>0.923</b>	<b>2.98</b>	<b>0.643</b>	<b>0.604</b>	
Magnesium	N/L	21.7	20.9	20.1	24.2	20.5	23.3	18.7	21.6	18.0	18.9	19.2	19.6	21.5	23.9	
Manganese	N/L	0.0545	0.0291	0.032	0.118	0.058	0.025	0.019	0.037	0.023	0.117	0.027	0.082	0.034	0.049	
Nitrate (as N)	N/L	< 0.06	< 0.06	< 0.1	0.1	< 0.05	< 0.05	< 0.05	0.38	< 0.05	< 0.05	0.08	< 0.05	0.15	< 0.05	
pH (units) <sup>3</sup>	6.5 - 8.5	7.74	7.22	<b>6.06</b>	7.53	7.93	<b>8.80</b>	7.90	7.63	7.57	7.42	7.33	6.95	7.79	8.37	
Phosphorus, Total	0.03	<b>0.03</b>	< 0.03	0.01	<b>0.12</b>	<b>0.04</b>	0.02	<b>0.05</b>	<b>0.08</b>	<b>0.07</b>	<b>0.13</b>	<b>0.10</b>	<b>0.13</b>	<b>0.10</b>	<b>0.22</b>	
Potassium	N/L	6.49	6.65	5.4	7.3	6.6	8.1	5.9	7.4	5.6	6.6	6.0	7.1	6.5	7.8	
Silicon	N/L	5.43	8.12	4.63	5.24	5.19	7.04	5.04	5.72	4.94	4.66	5.23	5.19	5.13	6.39	
Sodium	N/L	17.0	17.4	17.4	22.3	18.7	25.2	19.9	26.0	19.7	22.3	20.6	21.7	21.5	26.4	
Strontium	N/L	0.192	0.241	0.172	0.218	0.174	0.218	0.172	0.209	0.163	0.154	0.172	0.181	0.200	0.229	
Sulphate	N/L	25	26	24	24	15	16	19	19	19	16	22	20	20	25	
Total Dissolved Solids	N/L	451	571	411	493	366	451	348	433	328	368	347	394	413	469	
Total Kjeldahl Nitrogen	N/L	< 0.5	< 0.5	0.1	0.2	0.2	0.1	0.1	0.2	< 0.1	0.2	0.1	0.2	0.2	0.3	
Zinc	0.02	0.003	0.007	< 0.005	0.007	< 0.005	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Note:  
1. Provincial Water Quality Objectives (PWQO).  
2. Results obtained from laboratory analysis.  
3. Results obtained from field analysis.  
All results are expressed in mg/L unless otherwise stated.  
Bold and shaded values exceed the PWQO.  
N/L indicates No Limit.  
\*\* indicates the parameter was not analyzed.

**Table 7**  
**Groundwater Quality - Volatile Organic Compounds**  
**Norway Lake Waste Disposal Site**

Parameter	ODWS <sup>1</sup>	BR-1						
		11-Aug-15	01-Sep-16	18-Sep-17	13-Aug-18	21-Aug-19	18-Aug-20	19-Aug-21
Acetone	N/L	-	< 0.002	< 0.002	< 0.002	< 0.03	< 0.03	< 0.03
Benzene	0.001	< 0.0005	< 0.0005	0.0009	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Bromobenzene	N/L	-	< 0.0001	< 0.0001	< 0.0001	< 0.0004	< 0.0004	< 0.0004
Bromodichloromethane	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.002	< 0.002
Bromoform	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.005
Bromomethane	N/L	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.0005	< 0.0005	< 0.0005
Carbon Tetrachloride	0.002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorobenzene	0.08	0.0008	0.0007	0.0033	0.0014	< 0.0005	< 0.0005	< 0.0005
Chloroethane	N/L	< 0.005	< 0.0001	< 0.0001	0.0016	< 0.003	< 0.003	< 0.003
Chloroform	N/L	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.001	< 0.001	< 0.001
Chloromethane	N/L	< 0.005	< 0.0003	0.0025	0.0003	< 0.002	< 0.002	< 0.002
Chlorotoluene, 2-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Chlorotoluene, 4-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dibromo-3-Chloropropane, 1,2-	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0006	< 0.0006	< 0.0006
Dibromochloromethane	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.002	< 0.002	< 0.002
Dibromoethane, 1,2- (Ethylene Dibromide)	N/L	< 0.0002	< 0.001	< 0.0001	< 0.0001	< 0.0002	< 0.0002	< 0.0002
Dibromomethane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0001	< 0.0001	< 0.0001
Dichlorobenzene, 1,2-	0.2	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichlorobenzene, 1,3-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichlorobenzene, 1,4-	0.005	0.0007	0.0007	0.0012	0.001	< 0.0005	< 0.0005	0.0011
Dichlorodifluoromethane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002
Dichloroethane, 1,1-	N/L	< 0.0005	0.0002	0.0002	0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloroethane, 1,2-	0.005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloroethylene (vinylidene chloride), 1,1-	0.014	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloroethylene, cis-1,2-	N/L	< 0.0005	0.0001	0.0001	0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloroethylene, trans-1,2-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloromethane (Methylene Chloride)	0.05	< 0.0005	< 0.0003	< 0.0003	< 0.0003	< 0.005	< 0.005	< 0.005
Dichloropropane, 1,2-	0.7	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloropropane, 1,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Dichloropropane, 2,2-	N/L	-	< 0.0002	< 0.0002	< 0.0002	-	-	-
Dichloropropylene, cis-1,3-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloropropylene, trans-1,3-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Dichloropropene, 1,1-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Ethylbenzene	0.14	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Hexachlorobutadiene	N/L	-	< 0.001	< 0.001	< 0.001	< 0.0006	< 0.0006	< 0.0006
Hexane	N/L	-	< 0.001	< 0.001	< 0.001	< 0.005	< 0.005	< 0.005
Isopropylbenzene	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Isopropyltoluene, 4-	N/L	-	< 0.0004	< 0.0004	< 0.0004	< 0.0002	< 0.0002	< 0.0002
Methyl Butyl Ketone	N/L	-	< 0.010	< 0.010	< 0.01	< 0.005	< 0.005	< 0.005
Methyl Ethyl Ketone	N/L	-	< 0.001	< 0.001	< 0.001	< 0.02	< 0.02	< 0.02
Methyl Isobutyl Ketone	N/L	-	< 0.001	< 0.001	< 0.001	< 0.02	< 0.02	< 0.02
Methyl-t-Butyl Ether	N/L	-	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002
Naphthalene	N/L	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004	< 0.0004	< 0.0004
n-Butylbenzene	N/L	-	< 0.0007	< 0.0007	< 0.0007	< 0.0004	< 0.0004	< 0.0004
n-Propylbenzene	N/L	-	< 0.0004	< 0.0004	< 0.0004	< 0.0001	< 0.0001	< 0.0001
sec-Butylbenzene	N/L	-	< 0.0005	< 0.0005	< 0.0005	< 0.0001	< 0.0001	< 0.0001
Styrene	N/L	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
tert-Butylbenzene	N/L	-	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Tetrachloroethane, 1,1,1,2-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Tetrachloroethane, 1,1,2,2-	N/L	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.0005	< 0.0005	< 0.0005
Tetrachloroethylene (Perchloroethylene)	0.03	< 0.0005	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005
Toluene	0.06	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.0006	< 0.0005	< 0.0005
Trichlorobenzene, 1,2,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005
Trichlorobenzene, 1,2,4-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005
Trichloroethane, 1,1,1-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Trichloroethane, 1,1,2-	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Trichloroethene (Trichloroethylene)	0.005	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005
Trichlorofluoromethane	N/L	< 0.005	< 0.0001	< 0.0001	< 0.0001	< 0.005	< 0.005	< 0.005
Trichloropropane, 1,2,3-	N/L	-	< 0.0002	< 0.0002	< 0.0002	< 0.0005	< 0.0005	< 0.0005
Trimethylbenzene, 1,2,4-	N/L	-	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001
Trimethylbenzene, 1,3,5-	N/L	-	< 0.0006	< 0.0006	< 0.0006	< 0.0001	< 0.0001	< 0.0001
Vinyl Chloride	0.001	< 0.0002	< 0.0002	0.0003	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Xylene	0.09	< 0.0005	< 0.0005	< 0.0005	< 0.0004	< 0.0015	< 0.0015	< 0.0015
m-Xylene & p-Xylene	N/L	< 0.0005	< 0.0004	< 0.0004	< 0.0004	< 0.001	< 0.001	< 0.001
o-Xylene	N/L	< 0.0005	< 0.0001	< 0.0001	< 0.0001	< 0.0005	< 0.0005	< 0.0005

1. Ontario Drinking Water Standards (ODWS).  
2. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.

Bold and shaded values exceed the ODWS.

NL indicates No Limit.

\*\* indicates the parameter was not analyzed.

**Table 8**  
**Surface Water Quality**  
**Norway Lake Waste Disposal Site**

Parameter	Background (75th Percentile)	PWQO <sup>1</sup>	SW-1						5-year Trends	SW-4 (Background)			5-year Trends
			26-May-15	25-May-16	08-May-17	02-May-18	15-May-19	17-May-21	(sparkline)	25-May-16	08-May-17	02-May-18	(sparkline)
Alkalinity (as CaCO <sub>3</sub> )	125	25 % Decrease	143	138	84	85	96	128		174	88	60	
Aluminum	0.039	0.075	<b>0.0790</b>	<b>0.22</b>	0.06	0.02	0.03	<b>0.17</b>		0.02	0.04	0.04	
Ammonia, Total (as N)	0.1	N/L	< 0.1	0.01	< 0.01	0.01	0.03	0.01		< 0.01	< 0.01	0.04	
Ammonia, Un-ionized (as N) <sup>2</sup>	0.001	0.02	0.00068	0.000004	0.000265	0.000003	0.000253	0.000154		0.00009	0.00024	0.00001	
Barium	0.12	N/L	0.0700	0.075	0.059	0.046	0.060	0.064		0.127	0.063	0.048	
Biological Oxygen Demand	3	N/L	< 4	< 3	< 2	< 2	< 3	< 3		< 3	< 2	< 2	
Boron	0.03	0.2	0.0245	0.020	0.010	0.016	0.019	0.026		0.031	0.014	0.013	
Calcium	45	N/L	42.8	38.7	29.4	23.7	32.4	38.7		48.6	30.0	21.5	
Chemical Oxygen Demand	49	N/L	31	32	30	23	34	23		31	30	35	
Chloride	2	N/L	1	0.7	0.9	< 0.5	0.7	1.0		0.9	0.7	< 0.5	
Chromium	0.001	0.001	0.00020	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001		< 0.002	< 0.001	< 0.001	
Conductivity (µS/cm) <sup>3</sup>	193	N/L	119	223	109	101	123	260		262	103	109	
Cobalt	0.00034	0.0009	0.000099	0.0003	< 0.0001	< 0.0001	0.0001	0.0002		0.0001	< 0.0001	0.0001	
Copper	0.001	0.005	0.00127	0.0012	0.0007	0.0005	0.0008	0.0015		0.0009	0.0008	0.0006	
Dissolved Organic Carbon	18.7	N/L	12.1	7.2	11.2	7.6	11.4	9.5		13.0	11.0	9.5	
Dissolved Oxygen	7.22	5	10.12	14.38	12.78	11.10	10.61	8.72		9.87	11.02	6.24	
Hardness	148	N/L	151	138	102	84	113	139		172	106	72	
Iron	0.23	0.3	0.107	<b>0.748</b>	0.051	0.024	0.033	0.268		0.096	0.016	0.121	
Magnesium	10	N/L	10.7	10.1	6.82	5.91	7.75	10.2		12.4	7.57	4.36	
Manganese	0.163	N/L	0.00781	0.051	0.004	0.001	0.002	0.025		0.150	0.003	0.033	
pH (units) <sup>3</sup>	7.54	6.5 - 8.5	7.59	<b>6.18</b>	8.33	<b>6.40</b>	7.80	7.95		7.48	8.29	<b>6.45</b>	
Nitrate (as N)	0.15	N/L	< 0.06	0.1	0.07	< 0.05	< 0.05	0.13		0.2	0.19	< 0.05	
Nitrite (as N)	0.06	N/L	< 0.03	< 0.1	< 0.05	< 0.05	< 0.05	0.07		< 0.1	< 0.05	< 0.05	
Phenols	0.001	0.001	< 0.001	< 0.001	<b>0.005</b>	< 0.001	< 0.002	< 0.001		< 0.001	<b>0.004</b>	< 0.001	
Phosphorus, Total	0.043	0.03	0.012	<b>0.08</b>	0.02	0.02	<b>0.03</b>	0.02		0.02	0.01	<b>0.10</b>	
Potassium	1.4	N/L	1.43	1.0	1.2	1.0	1.0	1.0		1.3	1.3	1.3	
Silicon	5	N/L	4.40	3.96	3.51	2.72	3.17	3.71		3.63	3.62	2.80	
Sodium	2	N/L	1.84	1.7	1.4	1.1	1.4	1.9		2.5	1.6	2.2	
Strontium	0.14	N/L	0.124	0.114	0.081	0.072	0.090	0.112		0.117	0.066	0.089	
Total Dissolved Solids	208	N/L	137	141	98	87	106	133		176	103	60	
Total Kjeldahl Nitrogen	0.7	N/L	< 0.5	0.65	1.8	0.3	0.3	0.4		0.42	0.4	0.7	
Total Suspended Solids	11	N/L	3	22	< 3	< 3	< 3	< 3		< 3	3	8	
Zinc	0.0065	0.02	0.003	< 0.005	< 0.005	< 0.005	0.010	0.013		< 0.005	< 0.005	<b>0.025</b>	

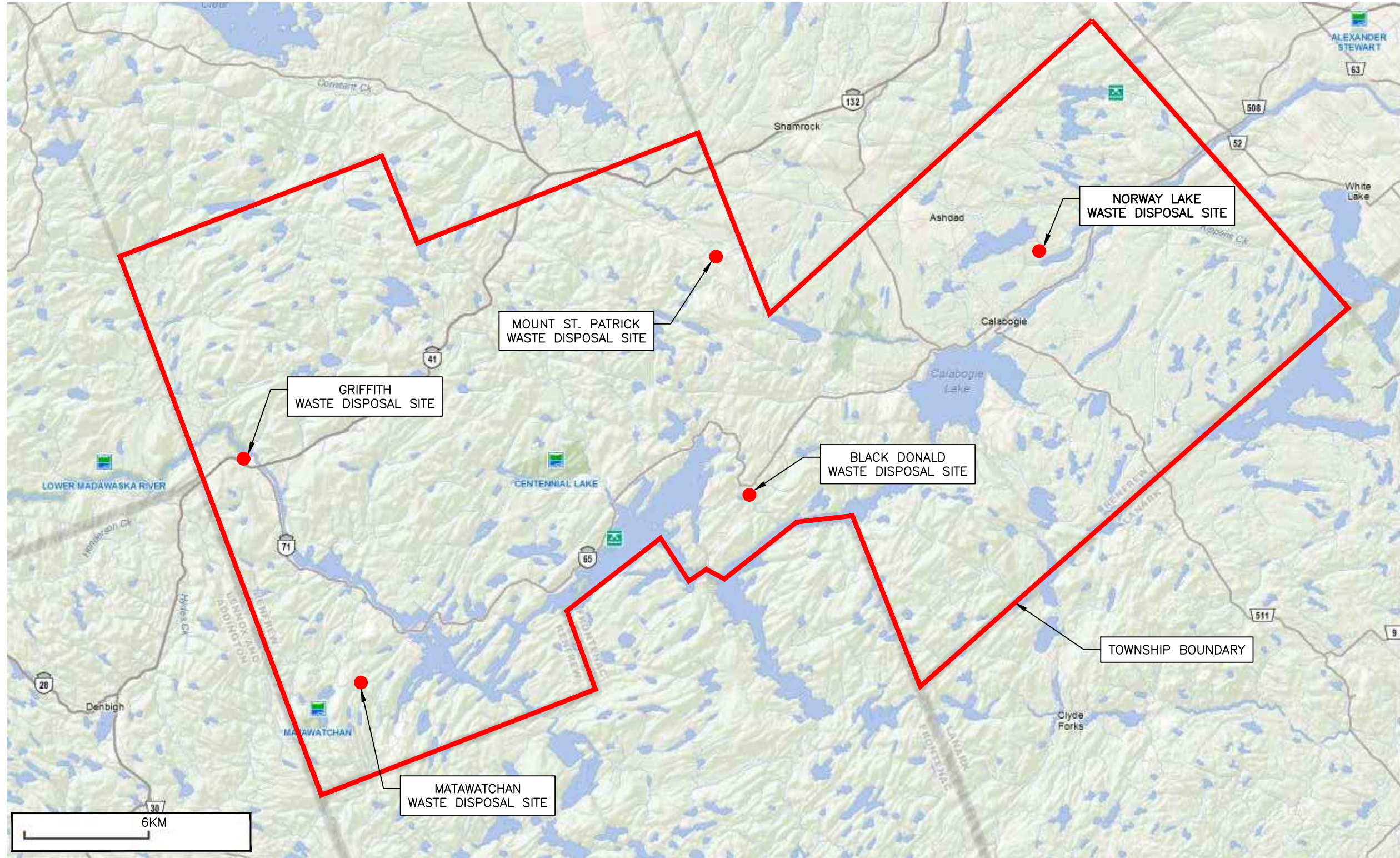
Notes:  
1. Provincial Water Quality Objectives (PWQO).  
2. Calculated using Total Ammonia and field analysis.  
3. Results obtained from field analysis.

All results are expressed in mg/L unless otherwise stated.  
Bold and shaded values exceed the PWQO.  
N/L indicates No Limit.  
\*- indicates the parameter was not analyzed.

## Figures







SOURCE: ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY, LAND INFORMATION ONTARIO, 2016.



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Bancroft, Ontario  
613.332.0057  
greenview-environmental.ca

No.	DATE	BY	REMARKS
1	MAR18-22	MAG	ISSUED FOR MECP REVIEW
0	DEC22-21	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY:	CHECKED BY:
MAG	DMH
DESIGNED BY:	APPROVED BY:
MAG	DMH
SCALE:	DATE:
AS NOTED	MAR 2022



PROJECT:

REGIONAL LOCATION PLAN  
2021 ANNUAL REPORT  
NORWAY LAKE WASTE DISPOSAL SITE  
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:  
102.21.013

FIGURE:  
**1**  
1 OF 7





☆ Property Parcels - 470600601519350

574 NORWAY LAKE RD

[Add to Results](#) [View Additional Details](#)



SOURCE: COUNTY OF RENFREW GIS, 2021.

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0	DEC22-21	MAG	ISSUED FOR CLIENT REVIEW

DRAWN BY: MAG	CHECKED BY: DMH
DESIGNED BY: MAG	APPROVED BY: DMH
SCALE: AS NOTED	DATE: MAR 2022

CLIENT:

THE TOWNSHIP OF  
**GREATER MADAWASKA**

PROJECT:

PROPERTY PLAN  
2021 ANNUAL REPORT  
NORWAY LAKE WASTE DISPOSAL SITE  
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:  
102.21.013

FIGURE:  
**2**

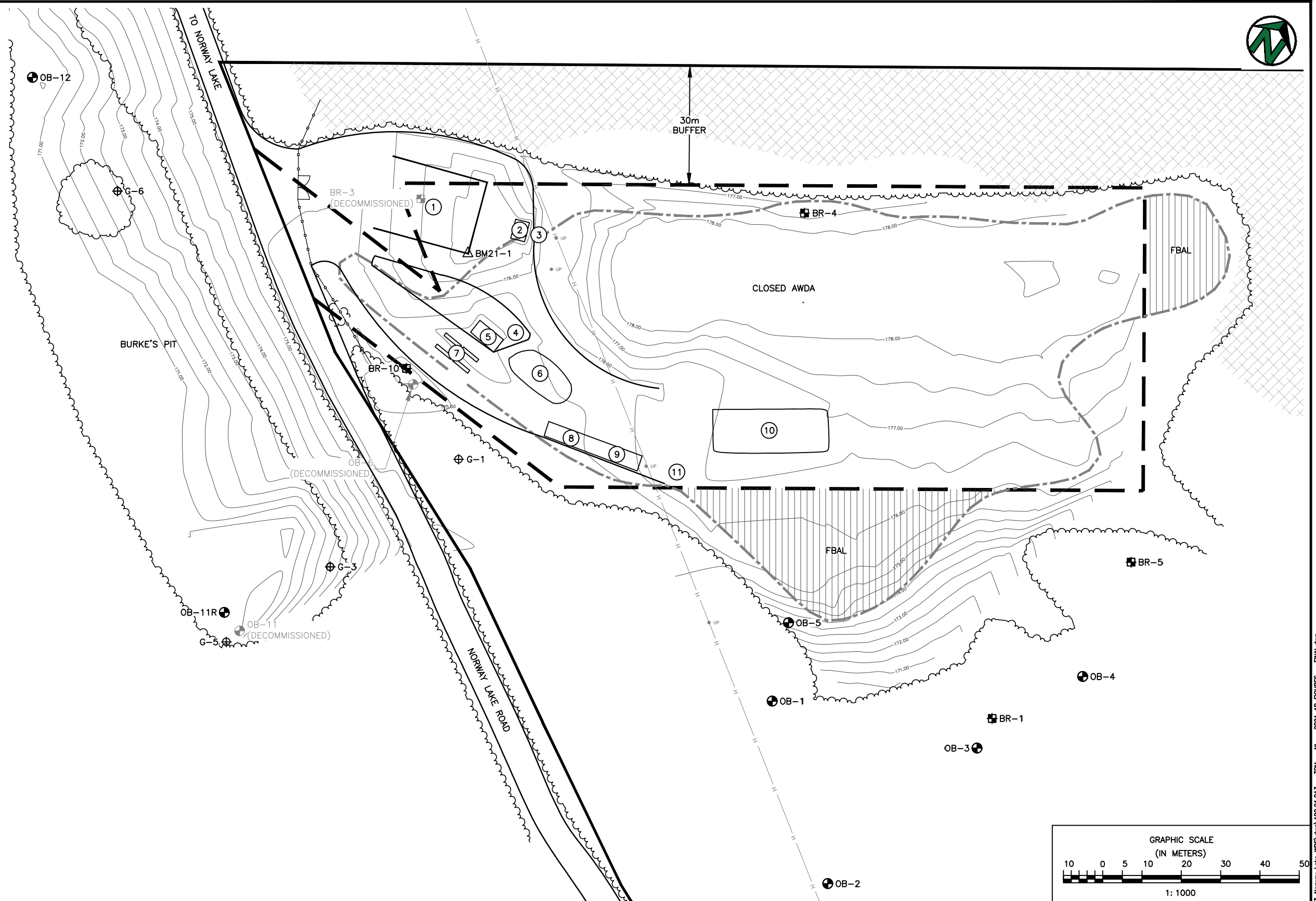
2 OF 7

G:\V\102\102 - Greater Madawaska\013 Norway Lake WDS\013 Norway Lake WDS\013 - TGM - NL - 2021 AP FIGURES - FINAL.dwg



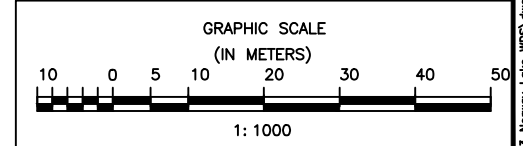
**LEGEND**

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA (AWDA)
- - - LIMIT OF EXISTING WASTE
- 178.00 — TOPOGRAPHIC CONTOUR LINE
- ON-SITE ROAD
- FENCELINE
- APPROXIMATE TREE LINE
- ▨ ROCK OUTCROP
- H OVERHEAD UTILITIES
- UP OVERHEAD UTILITY POLE
- ▨▨▨ FILL BEYOND APPROVED LIMITS (FBAL)
- ⊕ G-1 PIEZOMETER
- OB-11 OVERBURDEN GROUNDWATER MONITORING WELL
- ⊕ BR-1 BEDROCK GROUNDWATER MONITORING WELL
- △ BM BENCHMARK
- ① MSW & BLUE BOX RECYCLING TRANSFER STATION
- ② ATTENDANT'S OFFICE & PRIVY
- ③ ORGANIC WASTE
- ④ WASTE ELECTRICAL & ELECTRONIC EQUIPMENT (WEEE)
- ⑤ ANCILLARY STORAGE BUILDING
- ⑥ TIRES
- ⑦ CONSTRUCTION + DEMOLITION (C+D) & BULKY WASTE
- ⑧ REFRIGERANT APPLIANCES
- ⑨ SCRAP METAL & WHITE GOODS
- ⑩ CLEAN WOOD, BRUSH & LEAF + YARD (L+Y) WASTE
- ⑪ EMPTY ROLL OFF BIN STORAGE AREA



**NOTES**

1. BENCHMARKS  
BM21-1  
PAINTED TARGET ON SE CORNER OF TRANSFER STATION  
ELEVATION = 177.35m
2. DRAWING BASED ON DIGITAL INFORMATION PROVIDED BY GOLDER ASSOCIATES, 2006.
3. TOPOGRAPHICAL SURVEY CONDUCTED BY GREENVIEW ENVIRONMENTAL ON AUGUST 12, 2021.



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DRAWN BY: MAG	CHECKED BY: DMH
DESIGNED BY: MAG	APPROVED BY: DMH
SCALE: 1:1000	DATE: MAR 2022

CLIENT:

PROJECT:  
 EXISTING SITE CONDITIONS PLAN  
 2021 ANNUAL REPORT  
 NORWAY LAKE WASTE DISPOSAL SITE  
 TOWNSHIP OF GREATER MADAWASKA

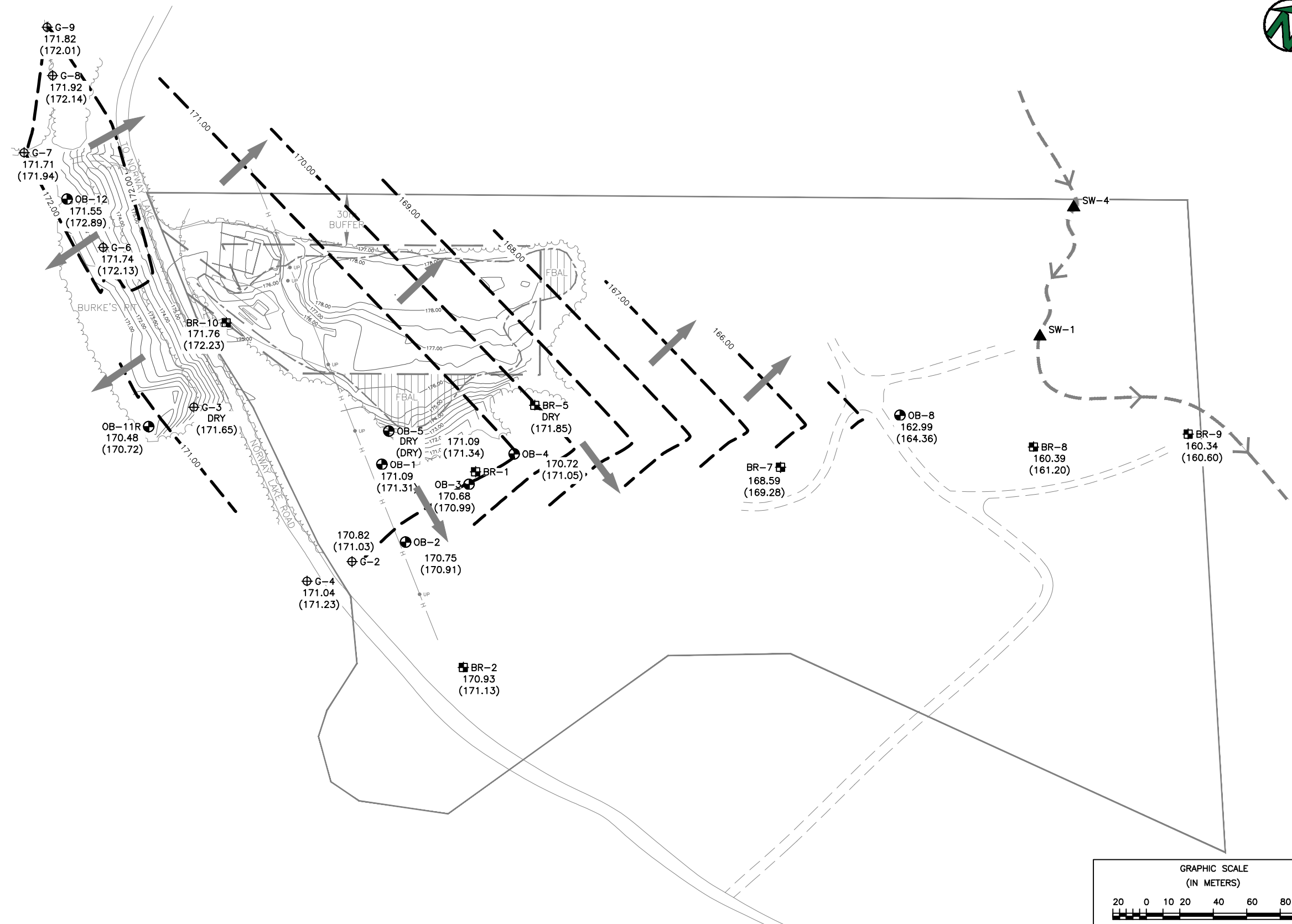
PROJECT No:  
102.21.013

FIGURE:  
3

3 OF 7

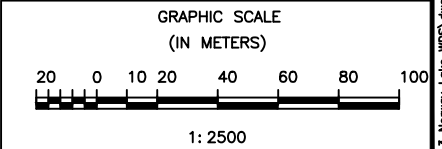
**LEGEND**

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- - - LIMIT OF EXISTING WASTE
- 178.00— TOPOGRAPHIC CONTOUR LINE
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- ▲ SW-1 SURFACE WATER SAMPLING LOCATION
- - - 169.00 EQUIPOTENTIAL CONTOUR (MAY 17, 2021)
- 171.23 GROUNDWATER ELEVATIONS AUGUST 19, 2021 (171.44) MAY 17, 2021)
- ➔ GROUNDWATER FLOW DIRECTION
- △ BM BENCHMARK
- ||||| FILL BEYOND APPROVED LIMITS (FBAL)



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SCALE: 1:2500	DATE: MAR 2022

CLIENT:

PROJECT:

ENVIRONMENTAL MONITORING LOCATION PLAN – SPRING OVERBURDEN  
2021 ANNUAL REPORT  
NORWAY LAKE WASTE DISPOSAL SITE  
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:  
102.21.013

FIGURE:  
**4**

4 OF 7

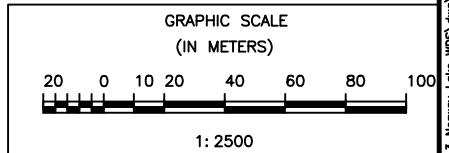
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(171.44) AUGUST 19, 2021 (MAY 17, 2021)
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- △ BM BENCHMARK
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SCALE: 1:2500	DATE: MAR 2022

CLIENT:  
**THE TOWNSHIP OF  
GREATER MADAWASKA**

PROJECT:  
ENVIRONMENTAL MONITORING LOCATION PLAN – SPRING BEDROCK  
2021 ANNUAL REPORT  
NORWAY LAKE WASTE DISPOSAL SITE  
TOWNSHIP OF GREATER MADAWASKA

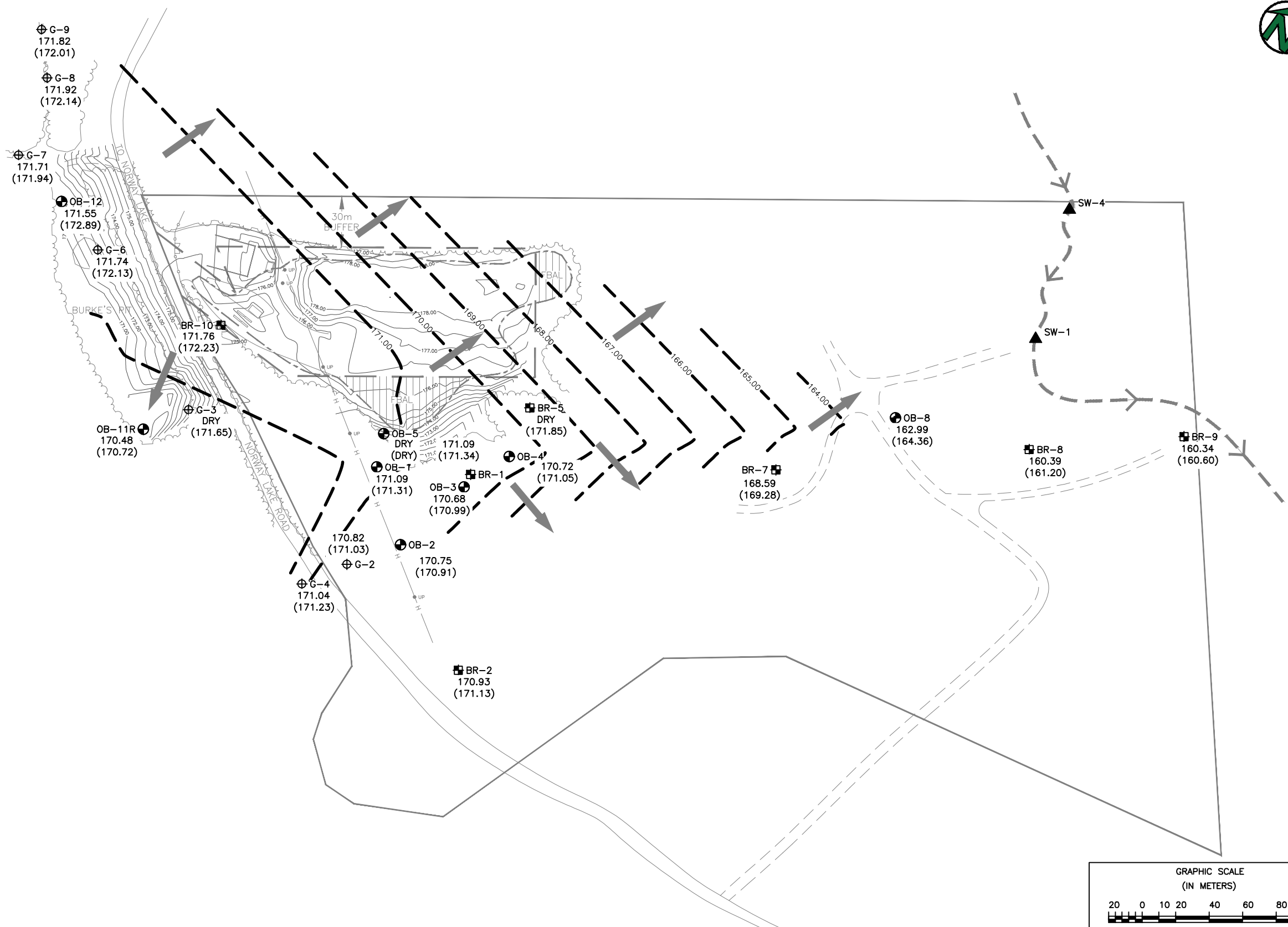
PROJECT No:  
102.21.013

FIGURE:  
**5**  
5 OF 7



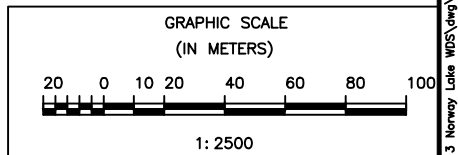
**LEGEND**

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- - - APPROVED WASTE DISPOSAL AREA
- - - LIMIT OF EXISTING WASTE
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SCALE: 1:2500	DATE: MAR 2022

CLIENT:

PROJECT:  
ENVIRONMENTAL MONITORING LOCATION PLAN – SUMMER OVERBURDEN  
2021 ANNUAL REPORT  
NORWAY LAKE WASTE DISPOSAL SITE  
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:  
102.21.013

FIGURE:  
**6**

6 OF 7

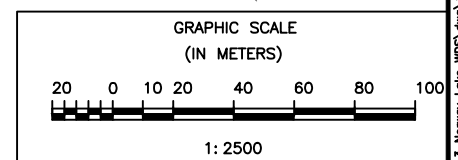
**LEGEND**

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**NOTES**

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CLIENT:

THE TOWNSHIP OF  
**GREATER MADAWASKA**

PROJECT:  
ENVIRONMENTAL MONITORING LOCATION PLAN – SUMMER BEDROCK  
2021 ANNUAL REPORT  
NORWAY LAKE WASTE DISPOSAL SITE  
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:  
102.21.013

FIGURE:  
**7**  
7 OF 7

## Appendix A







**AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL**

NUMBER A411702

Notice No. 1

Issue Date: September 26, 2013

The Corporation of the Township of Greater Madawaska  
1101 Francis St  
Post Office Box, No. 180  
Greater Madawaska, Ontario  
K0J 1H0

Site Location: Norway Lake Waste Disposal Site  
574 Norway Lake Road  
Lot Part of 20, Concession 7  
Greater Madawaska Township, County of Renfrew

*You are hereby notified that I have amended Approval No. A411702 issued on April 9, 2013 for a 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station, as follows:*

**The following Condition is hereby added to the ECA:**

4.5 The Trigger Mechanism Plans and Contingency Plans to address potential off-site exceedances related to groundwater and surface water shall be carried out by the *Owner* in accordance with Item 30 in Schedule "A".

**The following Condition is hereby amended as follows:**

5.1 The contingency plan to reduce or otherwise control, to prevent adverse impacts resultant from leachate, noise, dust, odour, litter, traffic, or vermin associated with the operation of the *Site* carried out by the *Owner* in accordance with Item 30 in Schedule "A".

**The following Item is hereby added to Schedule "A":**

30. Letter report dated May 31, 2013 addressed to Director, Environmental Approvals Branch from Mr. Dan Hagan, Greenview Environmental Management Limited providing various contingency plans related to groundwater, surface water, litter, noise, odour, traffic, dust and vermin.

**The reasons for this amendment to the Approval are as follows:**

*1. The reasons for Condition Nos. 4.5 and 5.1 is to incorporate and approve the trigger mechanism plan into the ECA. This is to ensure the long-term health and safety of the public and the environment.*

**This Notice shall constitute part of the approval issued under Approval No. A411702 dated April 9, 2013**

*In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:*

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as*

CONTENT COPY OF ORIGINAL

*those contained in an approval that is amended or revoked by this environmental compliance approval.*

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, Suite 1500  
Toronto, Ontario  
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of  
the Environmental Protection Act  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

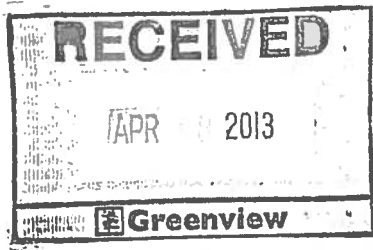
**\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at:  
Tel: (416) 212-6349, Fax: (416) 314-3717 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)**

*The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.*

DATED AT TORONTO this 26th day of September, 2013

Tesfaye Gebrezghi, P.Eng.  
Director  
appointed for the purposes of Part II.1 of the  
*Environmental Protection Act*

DG/  
c: District Manager, MOE Ottawa  
Dan Hagan, Greenview Environmental Management

**AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL**NUMBER A411702  
Issue Date: April 9, 2013

The Corporation of the Township of Greater Madawaska  
1101 Francis St.  
PO Box 180  
Greater Madawaska, Ontario  
K0J 1H0

Site Location: Norway Lake Waste Disposal Site  
574 Norway Lake Road  
Part Lot 20, Concession 7, Geographic Township of Bagot  
Township of Greater Madawaska, County of Renfrew

*You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:*

a Waste Disposal Site consisting of a closed landfill and a transfer station.

*For the purpose of this environmental compliance approval, the following definitions apply:*

- "Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedule "A"
- "Buffer" means those lands between the limit of fill and the boundaries of the property owned by the Township, that shall in no instance be less than 30 meters, as identified in Schedule "A"
- "Director" means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part V of the EPA
- "District Manager" means the District Manager of the local district office of the Ministry in which the Site is geographically located
- "Engineer" means a professional engineer licenced under the Ontario Professional Engineers Act
- "EPA" means Environmental Protection Act, R.S.O. 1990, c. E. 19, as amended
- "Landfill" means the part of the Site comprising the Limit of Fill and the Buffer

- "Limit of Fill" means the area in which waste is approved for final disposal according to this Approval
- "Ministry" and "MOE" means the Ontario Ministry of the Environment
- "ODWS" and/or "ODWQS" means the Ontario Drinking Water Quality Standards as amended from time to time.
- "Operator" means any person, other than the Owner's employees, authorized by the Owner as having the charge, management or control of any aspect of the Site and includes its successors or assigns
- "organic waste" means waste from kitchens, restaurants, food processing operations, waste of vegetable and animal origin, packaging materials that have been in direct contact with and are contaminated by these wastes and waste of a similar nature and characteristics, including waste that is liable to become putrid, rotten or decayed
- "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c. O.40, as amended
- "Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to section 5 of the OWRA or section 5 of the EPA or section 17 of PA
- "PWQO" means the Provincial Water Quality Objectives included in the July 1994 publication entitled Water Management Policies, Guidelines, Provincial Water Quality Objectives, as amended from time to time
- "Regional Director" means the Regional Director of the local Regional Office of the Ministry in which the Site is located
- "Regulation 347" or "Reg. 347" means Regulation 347, R.R.O. 1990, General - Waste Management made under the EPA, as amended from time to time
- "Site" means the property, located at 574 Norway Lake Road, Part Lot 20, Concession 7, Geographic Township of Bagot, Township of Greater Madawaska, County of Renfrew
- "Township" means the Corporation of the Township of Greater Madawaska
- "Trained personnel" means knowledgeable in the following through instruction and/or practice:
  - (a) relevant waste management legislation, regulations and guidelines
  - (b) major environmental concerns pertaining to the waste to be handled
  - (c) occupational health and safety concerns pertaining to the processes and wastes to be handled
  - (d) management procedures including the use and operation of equipment for the processes and wastes to be handled
  - (e) emergency response procedures
  - (f) specific written procedures for the control of nuisance conditions
  - (g) specific written procedures for refusal of unacceptable waste loads

(h) the requirements of this Approval

- "waste electrical and electronic equipment" means devices listed in Schedules 1 through 7 of Ontario Regulation 393/04, Waste Electrical and Electronic Equipment made under the Waste Diversion Act 2002

*You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:*

## TERMS AND CONDITIONS

### 1.0 General

- 1.1 This Approval revokes all previously issued Approvals issued under Part V, EPA, for this Site. The Approval given herein, including the Terms and Conditions set out, replaces all previously issued Approvals and related Terms and Conditions under Part V, EPA for this Site.
- 1.2 The Site shall be constructed and operated in accordance with Item 1 in Schedule "A" (the Site Development, Operation and Closure Report) and in accordance with all other applicable construction and operation documents listed in Schedule "A" to this Approval.
- 1.3 Schedules A and B are integral parts of these Conditions of Approval.
- 1.4 Pursuant to Section 197 of the EPA, neither the Township nor any person having an interest in the Property shall deal with the Property in any way without first giving a copy of this Approval to each person acquiring an interest in the Property as a result of the dealing.
- 1.5 Should there be any discrepancies between items in Schedule "A", and the conditions in this Approval, the conditions shall take precedence. In all matters requiring the interpretation and implementation of this Approval, the conditions of the Approval shall take precedence, followed in descending order by: the Township's application; and the documentation referred to in this Approval which is submitted in support of the application, with the most recent documents taking precedence.
- 1.6 The Township shall comply with the Conditions and schedules in this Approval. The requirements specified in this Approval are minimum requirements and do not abrogate the need to take all reasonable steps to avoid violating the provisions of other applicable legislation.
- 1.7 The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval, due to any circumstances, is held invalid, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected thereby.
- 1.8 The Township shall allow MOE personnel, or a MOE authorized representative(s), upon presentation of credentials, to:
  - (a) carry out any and all inspections authorized by the EPA, OWRA, or the Pesticides Act, R.S.O.

1990, as amended from time to time, of any place to which this Approval relates, and without restricting the generality of the foregoing, to:

- (b) (i) enter upon the premises or the location where the records required by the conditions of this Approval are kept
- (ii) have access to and copy, at any reasonable time, any records required by the conditions of this Approval
- (iii) inspect, at reasonable times, any facilities, equipment (including monitoring and control equipment), practices or operations required by the conditions of this Approval
- (iv) sample and monitor, at reasonable times, for the purposes of assuring compliance with the conditions of this Approval

- 1.9 The Township shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the EPA), furnish any information requested by such persons with respect to compliance with this Approval, including but not limited to, any records required to be kept under this Approval.

In the event, the Township provides the Ministry with information, records, documentation or notification in accordance with this Approval (for the purposes of this condition referred to as "Information")

- (a) the receipt of Information by the Ministry
- (b) the acceptance by the Ministry of the Information's completeness or accuracy
- (c) the failure of the Ministry to prosecute, or to require the Township to take any action, under this Approval or any statute or regulation in relation to the Information

shall not be construed as an approval, excuse or justification by the Ministry of any act or omission of the Township relating to the Information, amounting to non-compliance with this Approval or any statute or regulation.

- 1.10 The Township shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:
- (a) change of owner or operator of the Site or both
  - (b) change of address or address of the new owner or operator
  - (c) change of partners where the owner or operator is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, 1991 shall be included in the notification to the Director

## **Closed Landfill**

### **2.0 Site Design and Development**

- 2.1 Any significant design optimization or modification not otherwise requiring an amendment to this Approval shall be submitted to the Regional Director for approval at least 60 days prior to its implementation along with an explanation of the reasons.

- 2.2 Waste may only have been disposed at the Norway Lake waste disposal site in accordance with

Items 8, 9, 10, and 12 of Schedule A and the Amendment to the Approval (A411702) dated January 15, 2001.

- 2.3 The Buffer shall not be used for waste disposal but may be used for receiving and recording waste arrivals, monitoring, surface water management, and the operation of other approved ancillary waste management facilities to include, but not necessarily be limited to, scrap metal recycling piles, tire recycling piles, recycling bins, a re-use area, brush and wood chipping and storage areas, and a concrete storage area, all in accordance with Items 1, 8, 9, 10, 12, 15, 18, 20, and 21 in Schedule "A". All parts of the Buffer, other than roadways, parking areas and structures shall be maintained with a healthy vegetative cover or other appropriate surface treatment which will minimize erosion.
- 2.4 The Township shall ensure compliance with MOE Guideline B-7 Reasonable Use Concept, at the property line.
- 3.0 Site Operations
  - 3.1 Equipment maintenance and administrative functions may occur at any time. Upon reasonable notification of the District Manager, contingency actions may proceed outside of the normal hours of operation. Emergency response may occur at any time, as required.
  - 3.2 During non-operating hours, the Landfill entrance and exit gates will be locked or otherwise secured against access by unauthorized persons.
  - 3.3 Access to the Landfill shall be via the existing main entrance from Norway Lake Road, as shown in Figure 3 in Item 1 of Schedule "A" (Site Development, Operation and Closure Report). Any changes to the main Landfill entrance or exit shall be submitted to the Director for prior approval. Other service entrances may be established for access by Township staff or contractors, or for contingency or emergency use, provided that they are secured from entry when not in use.
  - 3.4 Scavenging at the Norway Lake WDS is prohibited, except at a designated re-use area under the supervision of the Site attendant.
  - 3.5 The Township shall take all practical steps to prevent the escape of litter from the Site. Periodic pick-up of litter at the Site and along the Access Road in the vicinity of the Site shall be carried out as required. Private property adjacent to the Landfill shall be inspected weekly and litter shall be collected if necessary, with permission of access from the property owner.
  - 3.6 The Township shall ensure that all employees that operate any aspect of the Site, receive initial and ongoing training with respect to the following: the Approval and Conditions attached to the Approval, the Design & Operations Report; relevant waste management regulations and legislation; environmental concerns related to the waste being handled at the site; occupational health and safety concerns pertaining to the waste being handled at the Site; fire fighting protocol; and emergency and contingency measures for the preventing of off-site impacts.
  - 3.7 No water obtained from surface water or from a well constructed on the Site shall be used for

drinking purposes without prior approval from the District Manager. Any water supply system that obtains water from a well or surface water source on the Site shall be clearly marked to indicate that the water is not potable.

3.8 Where existing cover material has eroded such that waste is exposed, the cover material shall be promptly replaced.

#### 4.0 Monitoring

4.1 The Township shall monitor groundwater and surface water as per Schedule "B". The Township may amend Schedule "B" from time-to-time with the prior written consent of the Director.

4.2 All monitoring wells which form part of any monitoring program shall be properly capped, locked and protected from damage. Any groundwater monitoring wells that are damaged shall be repaired, replaced forthwith or properly abandoned.

4.3 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and/or PWQO has occurred as a result of the operation of the Landfill Site, the Township shall notify the Regional Director as soon as reasonably possible and specify the following:

- (a) details of the off-site exceedance, confirmatory monitoring requirements and the potential off-site impacts to surface water and groundwater users
- (b) the extent and timing of contingency measures to be implemented
- (c) modifications, if any, which should be made to the monitoring program
- (d) other mitigation measures, if any, which may be necessary to reduce or prevent off-site impacts

4.4 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and/or PWQO can reasonably be predicted to occur, the Township shall include in the annual report:

- (a) the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based
- (b) a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance
- (c) a discussion of the modifications, if any, which should be made to the monitoring program
- (d) a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts

#### 5.0 Contingency Plans

5.1 The Township shall have in place a written contingency plan to reduce or otherwise control, to prevent adverse impacts resultant from leachate, noise, dust, odour, litter, traffic, or vermin associated with the operation of the Site. The contingency plan shall be submitted for approval to the Director by June 3, 2013.



## 6.0 Closure

6.1 The Township shall continue to be responsible for the operation, maintenance and monitoring of the Site until such time as the Township can demonstrate to the Director that the leachate being produced at the site would not cause an exceedance of the PWQO, ODWS, Reasonable Use Guideline and/or all other relevant statutes and policies respecting groundwater and surface water as may be applicable at that time.

## 7.0 Reporting

7.1 An Annual Report on the development, operation and monitoring of the Site shall be submitted by the Township to the District Manager no later than March 31 of the year following the period being reported upon.

7.2 The Report shall be prepared by, or under the direction of, a qualified Engineer and shall include, as a minimum, the following elements:

(a) Executive Summary

(i) A summary of findings, conclusions and recommendations.

(b) Site Operations

(i) A Site plan of the landfilling area showing: the final extent of the Limit of Fill with contours and any changes to the Site layout.

(ii) A summary of complaints regarding the Site operations and the Township's response.

(iii) An assessment as to whether or not the Township is operating the Site in a manner consistent with the Conditions of this Approval.

(c) Environmental Quality Monitoring

(i) Site plan only if there has been any changes to the monitoring network.

(ii) An analysis and interpretation of the surface water and groundwater monitoring data.

(iii) An assessment of the surface water quality at the Site boundaries with respect to PWQO.

(iv) An assessment of the adequacy of the natural attenuation of leachate generated by the Landfill.

(v) An assessment of the physical condition of the groundwater monitoring well installations.

(d) Information about the inspections conducted, the results and the remedial actions taken, as required by Condition 8.1:

(i) quarterly inspection of cover

(ii) biannual inspection of vegetative cover

(iii) quarterly inspection of leachate seeps

(iv) quarterly inspection of slope erosion

(v) quarterly inspection of other nuisance factors

(e) Recommendations

(i) Recommendations respecting any proposed changes to the surface water or

groundwater monitoring programs or any repairs required to the monitoring well network.

- (ii) Recommendations respecting any proposed changes to the operation of the landfill.
- (iii) Recommendations respecting the requirement for any remedial works or contingency actions based on the monitoring results or operation of the Site.

## 8.0 Inspection

8.1 Following the application of the cover and seeding, the Township shall:

- (a) inspect the cover integrity on a quarterly basis. If cover integrity is damaged, then the necessary remedial measure shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).
- (b) inspect the vegetative cover in the fall and spring seasons. Any deficiencies in the vegetative cover shall be repaired as soon as weather and equipment availability permits.
- (c) inspect for leachate seeps on a quarterly basis. If a leachate seep is observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).
- (d) inspect for slope erosion on a quarterly basis. If erosion is observed, then the necessary remediation measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).
- (e) inspect for other nuisance factors (litter, rodents, bears) on a quarterly basis. If any problems are observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting).

## Transfer Station

### 9.0 Waste Types and Processes

- 9.1 The Transfer Station (TS) shall only accept wastes generated by ratepayers in the Township or from a municipality that abuts the Township.
- 9.2 The Transfer Station shall be designed, developed, built, operated, maintained, and the management and disposal of all waste shall be carried out, in accordance with the EPA, Regulation 347, and except as otherwise provided by this Approval, with the application for this Approval, dated June 8, 2007, and the supporting documentation listed in Schedule "A". At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.
- 9.3 All waste shall be inspected by Trained personnel prior to being accepted at the Transfer Station to ensure that the waste is of a type approved for acceptance under this Approval.
- 9.4 The Transfer Station shall only accept the following types of residential and industrial, commercial, and institutional (IC&I) waste and recyclables:
  - (a) residential and IC&I waste

- (b) blue-box recyclables
- (c) source separated organics (SSO)
- (d) waste tires
- (e) leaf and yard waste
- (f) waste electrical and electronic equipment (WEEE)
- (g) refrigerant appliances
- (h) scrap metal
- (i) construction and demolition (C&D) and bulky waste

9.5 The maximum amount of solid non-hazardous waste and recyclables that can be accepted at the Site is 200 cubic metres per day.

- 9.6 (a) The maximum amount of non-hazardous solid waste and recyclable materials to be stored or be present at the Site at any given time shall not exceed 910 cubic metres, as per Condition 9.6 (b).
- (b) The maximum amount of each type non-hazardous solid waste and recyclable materials to be stored or be present at the Site at any give time shall be:
- (i) residential and IC&I waste - 120 cubic metres
  - (ii) blue-box recycables - 240 cubic metres
  - (iii) source separated organics (SSO) contained in locking, bear-proof roll-off container - 20 cubic metres
  - (iv) waste tires - 100 cubic metres
  - (v) leaf and yard waste - 200 cubic metres
  - (vi) waste electrical and electronic equipment (WEEE) - 40 cubic metres
  - (vii) refrigerant appliances - 25 cubic metres
  - (viii) scrap metal - 60 cubic metres
  - (ix) construction and demolition (C & D) and bulky waste contained in two (2) forty (40) cubic metre containers and one (1) twenty-five (25) cubic metre container - 105 cubic metres

- 9.7 (a) Normal operating hours of the Transfer Station shall be:
- Wednesday - 8:00 a.m. to 4:00 p.m.
  - Saturday - 8:00 a.m. to 4:00 p.m.
  - Sunday (Victoria Day to Thanksgiving) - 10:00 a.m. to 8:00 p.m.
  - Sunday (Thanksgiving to Victoria Day) - 10:00 a.m. to 6:00 p.m.
  - Holiday Monday (Victoria Day to Thanksgiving) - 12:00 p.m. to 8:00 p.m.
- (b) The Township may provide alternative hours of operation providing that they are correctly posted at the Site gate, that suitable public notice is given of any change and that there are no objections or complaints from the public regarding the hours of operation.
- (c) The Township shall notify the District Manager of the new proposed operating hours fourteen (14) business days prior to their implementation. The notification shall include the details on the public notification undertaken by the Township and the public's response to the proposal.

9.8 All waste bins shall be clearly marked showing the type of waste they are to contain.

## 10.0 Nuisance Control

- 10.1 All waste stored on site shall be appropriately protected from rodents, animals and weather to prevent nuisance impacts such as dust, litter, odour, run-off and leachate generation.
- 10.2 Scavenging is prohibited, except at a designated re-use area under the supervision of the Site attendant.

## 11.0 Burn Operations

- 11.1 (a) The leaf and yard waste collection management area, shall include segregated collection and burn areas.
- (b) Burn operations shall be undertaken while the Site is not open to residents, during optimal weather conditions (non windy days).
- (c) The burn area shall be designed and operated in accordance with MOE Guideline C-7 Burning at Landfill Sites.
- (d) Once burned, ash material shall be transferred to the Township's other waste disposal sites or to an approved facility for disposal or use as an alternative daily cover.

## 12.0 Annual report

- 12.1 By March 31 the Township shall prepare and retain on-site an annual report covering the previous calendar year. Each report shall include, as a minimum, the following information:
- (a) a detailed monthly summary of the type and quantity of all wastes received and transferred from the TS
- (b) any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site and during the facility inspections and any mitigative actions taken
- (c) a statement as to compliance with all Conditions of this Approval and with the inspection and reporting requirements of the Conditions herein
- (d) any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs in this regard

## 13.0 Signage and Security

- 13.1 A sign shall be posted and maintained at the Transfer Station in a manner that is clear and legible, and shall include the following information:
- (a) the name of the Transfer Station and Township
- (b) this Approval number
- (c) the name of the Operator
- (d) the normal hours of operation
- (e) the allowable and prohibited waste types
- (f) a telephone number to which complaints may be directed
- (g) a twenty-four (24) hour emergency telephone number (if different from above)

(h) a warning against dumping outside the Transfer Station

13.2 The Transfer Station shall be operated and maintained in a secure manner, such that unauthorized persons cannot enter the Transfer Station.

#### 14.0 Site Inspection

14.1 All incoming and outgoing wastes shall be inspected by trained personnel prior to being received, transferred and/or shipped to ensure wastes are being managed and disposed of in accordance with the EPA and Reg. 347.

14.2 An inspection of the entire Transfer Station and all equipment on the Transfer Station shall be conducted each week the Transfer Station is in operation to ensure that: the Transfer Station is secure; that the operation of the Transfer Station is not causing any nuisances; that the operation of the Transfer Station is not causing any adverse effects on the environment; and that the Transfer Station is being operated in compliance with this Approval. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Transfer Station if needed.

#### 15.0 Record Keeping

15.1 A record of the inspections, including the following information, shall be kept in the weekly log book:

- (a) the name and signature of person that conducted the inspection
- (b) the date and time of the inspection
- (c) a list of any deficiencies discovered
- (d) any recommendations for remedial action
- (e) the date, time and description of actions taken

15.2 A log shall be maintained, either electronically or in written format, and shall include the following information as a minimum:

- (a) the date
- (b) quantity and source of waste received
- (c) quantity of waste at the Transfer Station at the end of the operating week
- (d) quantities and destination of each type of waste shipped from the Transfer Station
- (e) a record of inspections required by this Approval
- (f) a record of any spills or process upsets at the site, the nature of the spill or process upset and the action taken for the clean up or correction of the spill, the time and date of the spill or process upset, and for spills, the time that the Ministry and other persons were notified of the spill in fulfilment of the reporting requirements in the EPA
- (g) a record of any waste refusals which shall include: amounts, reasons for refusal and actions taken
- (h) the signature of the Trained Personnel conducting the inspection and completing the report

#### 16.0 Organic Waste

- 16.1 (a) The Township shall ensure that containers used to store source separated organic (SSO) waste are leakproof, lockable and bear resistant.
- (b) The Township shall monitor the containers in which SSO waste are stored for:
- (i) decomposition to ensure that the organic waste has not decomposed to the point where it is unacceptable for the intended receiving facility
  - (ii) odours
- (c) The Owner shall empty the containers used to store organic waste and transfer the organic waste from the Site forthwith when:
- (i) the maximum capacity approved in Condition 9.6(b) has been reached
  - (ii) the organic waste has decomposed to the point where it is unacceptable to the receiving facility
  - (iii) the organic waste is creating odours that are creating a negative impact on Site users or off-site

#### 17.0 Transfer Site Closure Plan

- 17.1 (a) Six (6) months prior to the permanent closure of the Site, the Township shall submit to the Director, written notification of the decision to cease activities at this Site. The written notification shall also include, for approval by the Director, a closure plan detailing a list of activities and schedule for the implementation of those activities necessary for the decommissioning of the Site.
- (b) Within ten (10) business days after closure of the Site, the Township must notify the Director, in writing, that the Site is closed and that the Site closure plan has been implemented.

#### SCHEDULE "A"

1. A report entitled Site Development, Operation and Closure Report, Norway Lake Landfill Site, PC of A No. A411702, dated September, 1998 and prepared by The Greer Galloway Group Inc.
2. A report entitled Hydrogeology, Norway Lake Waste Disposal Site, Township of Bagot, Blythfield and Brougham, dated September, 1998 and prepared by Golder Associates Ltd.
3. A completed Ministry of the Environment form entitled Application for Approval of a Waste Disposal Site dated February 8, 2000 (revised) with a cover letter dated February 7, 2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE.
4. Letter dated February 1, 2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Andrew Polley, MOE.
5. Fax dated December 2, 1999, from Brian Whitehead, Janota Patrick & Associates Ltd., to MOE.
6. Letter dated August 6, 1998, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE.

7. Letter dated September 14, 1998, from Kevin Mooder, The Greer Galloway Group Inc., to A. Dominski, MOE.
8. Letter dated June 23, 2000, to Tesfaye Gebrezghi, MOE, from Brian whitehead, Jonata Patrick & Associates Ltd.
9. Final Contour Plan (Drawing No.1), dated June 2000.
10. Application for a Provisional Certificate of Approval and supporting information, dated July 24, 2002, including report entitled, "Design and Operations Report: Proposed Municipal Solid Waste Transfer Station: Township of Greater Madawaska, Norway Lake Waste Disposal Site." prepared by SGS Lakefield Research.
11. Facsimile dated September 30, 2002, from Philippa McPhee, Project Manager, SGS Lakefiled Research to David Lee, MOE supplying requested information.
12. Interim Closure Plan, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated May 2003.
13. 2002 Annual Report, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated March 20, 2003.
14. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated June 8, 2007 and signed by John A. Baird, CAO, the Township of Greater Madawaska, including all supporting documentation.
15. Document entitled "Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated June 29, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer site.
16. Response letter to MOE dated August 24, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited.
17. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated May 1, 2008 and signed by John A. Baird, CAO/Clerk, the Corporation of the Township of Greater Madawaska, including all supporting documentation.
18. Document entitled "Revised Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated May 12, 2008 (Revision to June 29, 2007 Version), prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer Site.



19. E-mails from Tyler Peters addressed to Jim Chisholm of the Ministry of Environment dated July 21, 2008 and July 30, 2008.
20. Letter dated September 8, 2011 from Tyler Peters, Greenview Environmental Management Ltd., with attached application for an Approval for a Waste Disposal Site signed by Angela Yolkowskie, the Corporation of the Township of Greater Madawaska, dated September 6, 2011.
21. Letter dated September 26, 2011 from Tyler Peters, Greenview Environmental Management Ltd.
22. Final Contour & Site Plan dated June 6, 2000 submitted by Janota Patrick & Associates Ltd.
23. Letter dated June 21, 2010 from Tyler Peters, Greenview Environmental Management Ltd. to MOE Ottawa D.O. re Amendment to Operational Hours.
24. MOE TSS surface water review dated March 5, 2012 of the 2010 Annual Report.
25. MOE TSS groundwater review dated October 4, 2012 of the 2011 Annual Monitoring Report.
26. E-mail dated October 31, 2012 from Dan Hagan, Greenview Environmental Management Ltd. to Roman Lysiak, MOE.
27. E-mail dated December 12, 2012 from. Emily Tieu, MOE Ottawa District Office to Ms. Holtzhauer, Township of Greater Madawaska with attached Addendum, 2011 Annual Monitoring Report, Norway Lake Waste Disposal Site A411702.
28. Addendum, 2011 Annual Monitoring Report, Norway Lake Waste Disposal Site A411702, prepared by Shawn Kinney, MOE TSS dated December 11, 2012.
29. E-mail dated January 28, 2013 from Dan Hagan, Greenview Environmental Management Ltd. to Roman Lysiak, MOE.

## SCHEDULE "B"

### Groundwater and Surface Water Monitoring Program

#### 1. Groundwater Monitoring

Monitoring Requirement	Sampling Location	Parameters	Sampling Frequency
Surveillance	BR-1, BR-2, BR-9, BR-10  OB-11, OB-12  1 QA/QC	Alkalinity, aluminum, ammonia, barium, boron, calcium, chloride, COD, chromium, cobalt, copper, DOC, hardness, iron, magnesium, manganese, nitrate, potassium, sodium, silicon, strontium, sulphate, total phosphorus, TKN, TDS, zinc  Field Measurements: conductivity, pH, temperature	Twice (2) annually: - in the spring (April/May/June) - in late summer (August/September)
Routine	OB3, OB8, BR-8  1 QA/QC	Alkalinity, boron, chloride, DOC, hardness, iron, manganese, sodium, TDS  Field Measurements: conductivity, pH, temperature	Twice (2) annually: - in the spring (April/May/June) - in late summer (August/September)
Volatile Organic Compounds	BR-1	VOC – EPA 624	Once (1) annually: - in late summer (August/September)
Groundwater Elevations	Monitoring Wells: BR-1, BR-2, BR-4, BR-5, BR-7, BR-8, BR-9, BR-10  OB-1, OB-2, OB-3, OB-4, OB-5, OB-7, OB-8, OB-11, OB-12  Piezometers: G-1, G-2, G-3, G-4, G-5, G-6, G-7, G-8, G-9	Groundwater elevation measurements (in metres)	Twice (2) annually: - in the spring (April/May/June) - in late summer (August/September)

2. Surface Water Monitoring

Sampling Location	Parameters	Sampling Frequency
SW-1, SW-4  1 QA/QC	Alkalinity, aluminum, ammonia, barium, boron, BOD, calcium, chloride, COD, chromium, cobalt, copper, DOC, hardness, iron, magnesium, manganese, nitrate, nitrite, phenols, potassium, sodium, silicon, strontium, total phosphorus, TKN, TDS, TSS, zinc  Field Measurements: pH, conductivity, dissolved oxygen, temperature, unionized Ammonia (calculation)	Twice (2) annually: - in the spring (April/May/June) - in late fall (October/November)

*The reasons for the imposition of these terms and conditions are as follows:*

The reason for Condition 1.1, 1.2, 1.3 and 1.5 is to ensure that the environment is protected and the Site is operated in accordance with the application and supporting documentation submitted by the Township, and not in a manner which the Director has not been asked to consider.

The reason for Condition 1.4 is pursuant to subsection 197(1) of the EPA, to ensure that any persons having an interest in the site are aware that the land has been approved and used for the purposes of waste disposal.

The reason for Conditions 1.6 and 1.7 is to clarify the legal rights and responsibilities of the Township (severable, violation of EPA).

The reason for Conditions 1.8 and 1.9 is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site.

The reason for Condition 1.10 to clarify the legal rights and responsibilities of the Township.

The reason for Condition 2.1 is to ensure that the proposed detailed design for the engineering works are submitted for the Director's approval in a timely manner and approved prior to the commencement of the construction.

The reason for Condition 2.2 is to ensure that enough physical space around the fill area is available and in the event a need arises for mitigative measures in the future.

The reason for Condition 2.3 is specify the Buffer area.

The reason for Condition 2.4 is to ensure that the issue of FBAL is addressed as soon as possible in an environmentally acceptable way.

The reason for Conditions 3.1 and 3.2 is to specify the operating hours of the site and ensure security against access by unauthorized persons.

The reason for Condition 3.3 is to specify access to landfill.

The reason for Conditions 3.4, 3.5 and 3.7 is to ensure that certain activities are not carried out at the site that are not environmentally acceptable and not safe for human health, and to minimize litter impacts resulting from the operating activities of the Site.

The reason for Condition 3.6 is to ensure that the Township properly trained the staff operating the site to ensure that the operations are undertaken in accordance with the requirements of this Approval.

The reason for Condition 3.8 is to ensure that the waste is adequately covered with a suitable material, to minimize the environmental impacts from the landfilling operations.

The reason for Condition 4 is to require the Township to undertake the monitoring activities in accordance with the methods acceptable to the Ministry, in order to demonstrate that the site is performing as designed and the impacts on the natural environment are acceptable.

The reason for Condition 5 is to ensure that there is a plan with an organized set of procedures for identifying and responding to unforeseen but possible problems at the site. A contingency plan is necessary to ensure protection of the natural environment.

The reason for Condition 6 is to ensure that final closure of the site is completed in an aesthetically pleasing manner and to ensure the long term protection of the natural environment.

The reason for Condition 7 is to ensure that regular review of site development, operations and monitoring is documented and any possible improvements to site design, operations or monitoring programs are identified.

The reason for Condition 8 is to minimize the potential for negative environmental impacts from the landfill.

The reason for Condition 9.1 is to ensure that the Site is operated in accordance with the application and supporting information submitted by the Applicant, and not in a manner which the Director has not been asked to consider.

The reason for Condition 9.2 is to ensure that the Transfer Station is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 9.3 is to ensure that all incoming wastes are inspected to ensure compliance

with this Certificate.

The reasons for Conditions 9.4, 9.5, and 9.6 are to specify the approved the types of waste that may be accepted at the Transfer Station, the amounts of waste that may be stored and processed at the Transfer Station, and the maximum rate at which the Transfer Station may receive waste.

The reason for Condition 9.7 is to specify the hours of operation for the Transfer Station and a mechanism for amendment of the hours of operation, as required.

The reason for Conditions 9.8, 10.1, 10.2 and 11.1 is to ensure that the site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 12.1 is to ensure that the Site is designed, operated and maintained in accordance with the application and supporting documentation submitted by the Township, and not in a manner which the Director has not been asked to consider.

The reasons for Conditions 13.1 and 13.2 is to ensure that users of the Transfer Station are fully aware of important information and restrictions related to Transfer Station operations and access under this Approval.

The reason for Condition 14.1 is to ensure that the Transfer Station is operated by properly Trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

The reasons for Conditions 14.2 and 15.1 are to ensure that routine Transfer Station inspections are completed, and that detailed records of Transfer Station inspections are recorded and maintained for inspection and information purposes.

The reason for Condition 15.2 is to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Approval, the EPA and its regulations.

The reason for Condition 16.1 is to make sure that SSO waste are handled in a manner that won't create an adverse affect.

The reason for Condition 17.1 is to ensure that the Site is closed in accordance with MOE standards and to protect the health and safety of the environment.

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A411702 issued on May 24, 2000**

*In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:*

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed

*Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.*

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
 Environmental Review Tribunal  
 655 Bay Street, Suite 1500  
 Toronto, Ontario  
 M5G 1E5

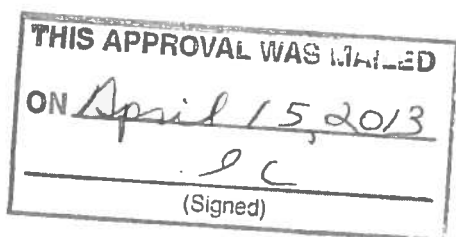
AND

The Director appointed for the purposes of  
 Part II.1 of the Environmental Protection Act  
 Ministry of the Environment  
 2 St. Clair Avenue West, Floor 12A  
 Toronto, Ontario  
 M4V 1L5

\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)

*The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.*

DATED AT TORONTO this 9th day of April, 2013

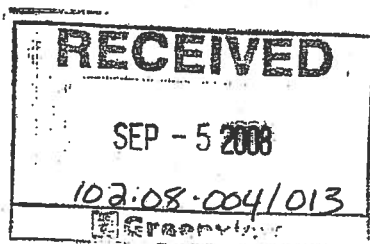


*Dale D. Gable*

\_\_\_\_\_  
 Dale Gable, P.Eng.  
 Director  
 appointed for the purposes of Part II.1 of the  
*Environmental Protection Act*

RL/

c: District Manager, MOE Ottawa  
 Tyler Peters, P.Eng., Greenview Environmental Management Ltd. ✓



Ministry of the Environment  
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF  
APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A411702  
Notice No. 5  
Issue Date: August 28, 2008

The Corporation of the Township of Greater Madawaska  
1101 Francis St  
Post Office Box, No. 180  
Greater Madawaska, Ontario  
K0J 1H0

Site Location: Norway Lake Waste Disposal Site  
Lot Part of 20, Concession 7  
Greater Madawaska Township, County of Renfrew

*You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000 and amended on January 15, 2001, December 2, 2002, December 24, 2003 and September 25, 2007 for a 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station, as follows:*

**I. The following definitions are hereby added to the Certificate:**

1.1.17 "**waste electrical and electronic equipment**" means devices listed in Schedules 1 through 7 of Ontario Regulation 393/04, Waste Electrical and Electronic Equipment made under the *Waste Diversion Act* 2002; and

1.1.18 "**organic waste**" means waste from kitchens, restaurants, food processing operations, waste of vegetable and animal origin, packaging materials that have been in direct contact with and are contaminated by these wastes and waste of a similar nature and characteristics, including waste that is liable to become putrid, rotten or decayed;

**II. Conditions 14 and 15 of the Certificate are hereby revoked and replaced with the following:**

14. The maximum amount of solid non-hazardous waste and recyclables that can be accepted at the site is 200 cubic metres per day.

15. (a) The maximum amount of non-hazardous solid waste and recyclable materials to be stored or be present

at the Site at any given time shall not exceed 637 cubic metres.

(b) The maximum amount of each type non-hazardous solid waste and recyclable materials to be stored or be present at the Site at any give time shall be as follows:

- a. domestic household waste - 120 cubic metres;
- b. blue-box recyclables - 240 cubic metres;
- c. source separated organics (SSO) contained in two MOLOK Deep Collection System containers (or equivalent) - 2 cubic metres;
- d. waste tires - 100 cubic metres;
- e. leaf and yard waste - 50 cubic metres;
- f. waste electrical and electronic equipment (WEEE) - 40 cubic metres;
- g. refrigerant appliances - 25 cubic metres; and
- h. scrap metal - 60 cubic metres.

**III. The following new Condition is hereby added to the Certificate**

31. (a) The Owner shall ensure that containers used to store source separated organic (SSO) waste are leakproof, lockable and bear resistant; and

(b) The Owner shall monitor the containers in which SSO waste are stored for:

(i) decomposition to ensure that the organic waste has not decomposed to the point where it is unacceptable for the intended receiving facility; and

(ii) odours; and

(c) The Owner shall empty the containers used to store organic waste and transfer the organic waste from the Site forthwith when:

(i) the maximum capacity approved in Condition 15 (b) has been reached; or

(ii) the organic waste has decomposed to the point where it is unacceptable to the receiving facility; or

(iii) the organic waste is creating odours that are creating a negative impact on Site users or off-Site.

**IV. The following items are hereby added to Schedule "A"**

16. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated May 1, 2008 and signed by John A. Baird, CAO/Clerk, the Corporation of the Township of Greater Madawaska, including all supporting documentation.



17. Document entitled "Revised Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated May 12, 2008 (Revision to June 29, 2007 Version), prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer Site.

18. E-mails from Tyler Peters addressed to Jim Chisholm of the Ministry of Environment dated July 21, 2008 and July 30, 2008.

**The reasons for this amendment to the Certificate of Approval are as follows:**

1. The new definitions are given to give clarity to the meaning of their usage in the Certificate.
2. The reason for Condition No. 14 is to accept the application from the proponent to reduce from 262 cubic metres per day of non-hazardous solid waste that can be accepted per day to 200 cubic metres per day.
3. The reason for Condition No. 15 is to accept the application from the proponent to increase the allowable storage of non-hazardous solid waste and recyclables to 637 cubic metres from 597 cubic metres.
4. The reason for Condition No. 31 is to make sure that SSO waste are handled in a manner that won't create an adverse affect.
5. The reason for accepting the revised Revised Design and Operations Plan as noted in item 18 of Schedule "A" is to accept the Plan and in particular to allow the waste Site to be moved from its original planned location at the landfill Site to a different location at the landfill Site.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000**

*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
655 Bay Street, 15th Floor  
Toronto, Ontario  
M5G 1E5

AND

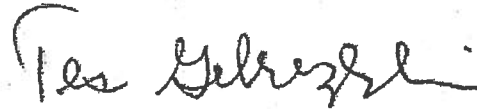
The Director  
Section 39, *Environmental Protection Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)

*The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.*

DATED AT TORONTO this 28th day of August, 2008

THIS NOTICE WAS MAILED
ON <u>sep. 02, 2008</u>
<u>N.P</u>
(Signed)



Tesfaye Gebrezghi, P.Eng.  
Director  
Section 39, *Environmental Protection Act*

JC/

c: District Manager, MOE Ottawa  
Tyler Peters, P. Eng., Greenview Environmental Management Limited ✓

RECEIVED  
OCT 09 2007



Ministry of the Environment  
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A411702  
Notice No. 4  
Issue Date: September 25, 2007

The Corporation of the Township of Greater Madawaska  
1101 Francis St  
Post Office Box, No. 180  
Greater Madawaska, Ontario  
K0J 1H0

Site Location: Norway Lake Waste Disposal Site  
Lot Part of 20, Concession 7, Geographic Township of Bagot  
Greater Madawaska Township, County of Renfrew

*You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000, and amended on January 15, 2001, December 2, 2002, and December 24, 2003 for a 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station , as follows:*

**The following changes apply to the operation of the *Transfer Station* only.**

**Condition 11 is hereby revoked and replaced with:**

11. The *Transfer Station* shall be designed, developed, built, operated, maintained, and the management and disposal of all waste shall be carried out, in accordance with the *EPA , Regulation 347* , and except as otherwise provided by this *Certificate* , with the application for this *Certificate* , dated **June 8, 2007**, and the supporting documentation listed in Schedule "A". At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

**Condition 12 is hereby revoked and replaced with:**

12. All waste shall be inspected by *Trained personnel* prior to being accepted at the *Transfer Station* to ensure that the waste is of a type approved for acceptance under this *Certificate* .

**Condition 13 is hereby revoked and replaced with:**

13. The *Transfer Station* shall only accept the following types of waste:
- a. domestic household waste;
  - b. blue-box recyclables;
  - c. source separated organics (SSO);

- d. waste tires;
- e. leaf and yard waste;
- f. waste electrical and electronic equipment (WEEE);
- g. refrigerant appliances; and
- h. scrap metal.

**Condition 14 is hereby revoked and replaced with:**

14. The total amount of waste and recyclables to be stored at the Site at any given time shall not exceed 597 m<sup>3</sup>.

**Condition 15 is hereby revoked and replaced with:**

15. The maximum storage capacity of waste and recyclable materials shall be as follows:
- a. domestic household waste - 80 m<sup>3</sup>;
  - b. blue-box recyclables - 240 m<sup>3</sup>;
  - c. source separated organics (SSO) - 2 m<sup>3</sup>;
  - d. waste tires - 100 m<sup>3</sup>;
  - e. leaf and yard waste - 50 m<sup>3</sup>;
  - f. waste electrical and electronic equipment (WEEE) - 40 m<sup>3</sup>;
  - g. refrigerant appliances - 25 m<sup>3</sup>; and
  - h. scrap metal - 60 m<sup>3</sup>.

**Condition 16 is hereby revoked and replaced with:**

16. (a) Normal operating hours of the *Transfer Station* shall be as follows:
- Sunday and Holiday Monday(s) - 12:00 p.m. to 2:00 p.m.
  - Wednesday - 8:00 a.m. to 12:00 p.m.
  - Saturday - 8:00 a.m. to 12:00 p.m.
- (b) The Municipality may provide alternative hours of operation providing that they are correctly posted at the Site gate, that suitable public notice is given of any change and that there are no objections or complaints from the public regarding the hours of operation.
- (c) The Municipality shall notify the District Manager of the new proposed operating hours fourteen (14) business days prior to their implementation. The notification shall include the details on the public notification undertaken by the Municipality and the public's response to the proposal.

**The following new Conditions are hereby added:**

25. A sign shall be posted and maintained at the *Transfer Station* in a manner that is clear and legible, and shall include the following information:

- a. the name of the *Transfer Station* and *Owner* ;
  - b. this *Certificate* number;
  - c. the name of the *Operator* ;
  - d. the normal hours of operation;
  - e. the allowable and prohibited waste types;
  - f. a telephone number to which complaints may be directed;
  - g. a twenty-four (24) hour emergency telephone number (if different from above); and
  - h. a warning against dumping outside the *Transfer Station* .
26. The *Transfer Station* shall be operated and maintained in a secure manner, such that unauthorized persons cannot enter the *Transfer Station* .
27. All incoming and outgoing wastes shall be inspected by trained personnel prior to being received, transferred and/or shipped to ensure wastes are being managed and disposed of in accordance with the *EPA* and *Reg. 347*.
28. An inspection of the entire *Transfer Station* and all equipment on the *Transfer Station* shall be conducted each week the *Transfer Station* is in operation to ensure that: the *Transfer Station* is secure; that the operation of the *Transfer Station* is not causing any nuisances; that the operation of the *Transfer Station* is not causing any adverse effects on the environment; and that the *Transfer Station* is being operated in compliance with this *Certificate* . Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the *Transfer Station* if needed.
29. A record of the inspections, including the following information, shall be kept in the weekly log book:
- a. the name and signature of person that conducted the inspection;
  - b. the date and time of the inspection;
  - c. a list of any deficiencies discovered;
  - d. any recommendations for remedial action; and
  - e. the date, time and description of actions taken.
30. A log shall be maintained, either electronically or in written format, and shall include the following information as a minimum:
- a. the date;
  - b. quantity and source of waste received;
  - c. quantity of waste at the *Transfer Station* at the end of the operating week;
  - d. quantities and destination of each type of waste shipped from the *Transfer Station*;
  - e. a record of inspections required by this *Certificate*;
  - f. a record of any spills or process upsets at the site, the nature of the spill or process upset and the action taken for the clean up or correction of the spill, the time and date of the spill or process upset, and for spills, the time that the *Ministry* and other persons were

- g. notified of the spill in fulfilment of the reporting requirements in the *EPA* .  
a record of any waste refusals which shall include; amounts, reasons for refusal and actions taken; and
- h. the signature of the *Trained Personnel* conducting the inspection and completing the report.

**The following Items are hereby added to Schedule "A":**

- 13. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated June 8, 2007 and signed by John A. Baird, CAO, the Township of Greater Madawaska, including all supporting documentation.
- 14. Document entitled "Design and Operations Plan Municipal Solid Waste Transfer Station - Norway Lake Waste Disposal Site" dated June 29, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited, describing the design and operation of the transfer site.
- 15. Response letter to MOE dated August 24, 2007, prepared by Tyler H. Peters, P.Eng., Project Manager of Greenview Environmental Management Limited.

The reasons for this amendment to the Certificate of Approval are as follows:

- 1. The reason for Condition 11 is to ensure that the Transfer Station is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.
- 2. The reason for Condition 12 is to ensure that all incoming wastes are inspected to ensure compliance with this *Certificate*.
- 3. The reasons for Conditions 13, 14, and 15 are to specify the approved the types of waste that may be accepted at the Transfer Station, the amounts of waste that may be stored and processed at the Transfer Station, and the maximum rate at which the Transfer Station may receive waste.
- 4. The reason for Condition 16 is to specify the hours of operation for the Transfer Station and a mechanism for amendment of the hours of operation, as required.
- 5. The reasons for Conditions 25 and 26 is to ensure that users of the Transfer Station are fully aware of important information and restrictions related to Transfer Station operations and access under this Certificate of Approval.
- 6. The reason for Condition 27 is to ensure that the Transfer Station is operated by properly Trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.
- 7. The reasons for Conditions 28 and 29 are to ensure that routine Transfer Station inspections are completed, and that detailed records of Transfer Station inspections are recorded and maintained for inspection and information purposes.

8. The reason for Condition 30 is to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Certificate of Approval, the EPA and its regulations.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000, as amended.**

*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., Suite 1700  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

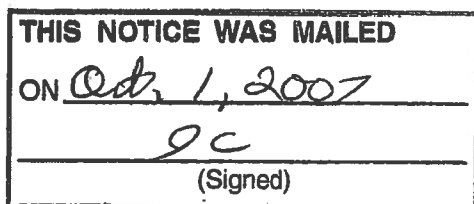
AND

The Director  
Section 39, *Environmental Protection Act*  
Ministry of the Environment  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)

*The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.*

DATED AT TORONTO this 25th day of September, 2007



Tesfaye Gebrezghi, P.Eng.  
Director

Section 39, *Environmental Protection Act*

AT/

c: District Manager, MOE Ottawa  
Tyler H. Peters, P.Eng., Greenview Environmental Management Limited ✓





Ontario

Ministry of the Environment  
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL  
WASTE DISPOSAL SITE  
NUMBER A411702  
Notice No. 3

The Corporation of the Township of Greater Madawaska  
1101 Francis Street  
Bagot, Blythfield And Brougham, Ontario  
K0J 1H0

Site Location: Norway Lake Waste Disposal Site  
Part of Lot 20, Concession 7  
Greater Madawaska Township, County of Renfrew

*You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000, as amended on January 15, 2001 and December 2, 2002 for a 18.47 hectare Waste Disposal Site consisting of a 1.37 hectare landfill and a transfer station, as follows:*

**The following Condition is hereby revoked:**

Condition 20 (a)

**The following Condition is hereby added:**

22. Prior to June 30, 2004, the Township shall complete closure activities which shall include:
- (a) regrading of the slope of the waste pile to not less than 5% and not more than 25% on all sides in accordance with Figure No. 4 of Item 12 of Schedule "A";
  - (b) application of a minimum of 300 mm of cover material; and
  - (c) seeding with both annual and perennial plant species.
23. Following the application of the cover and seeding, the Township shall:
- (a) inspect the cover integrity on a quarterly basis. If cover integrity is damaged, then the necessary remedial measure shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);
  - (b) inspect the vegetative cover in the fall and spring seasons. Any deficiencies in the vegetative cover shall be repaired as soon as weather and equipment availability permits;
  - (c) inspect for leachate seeps on a quarterly basis. If a leachate seep is observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);

- (d) inspect for slope erosion on a quarterly basis. If erosion is observed, then the necessary remediation measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);
  - (e) inspect for other nuisance factors (litter, rodents, bears) on a quarterly basis. If any problems are observed, then the necessary remedial measures shall be undertaken by the Township within five (5) working days following the day of inspection (weather permitting);
24. Prior to June 30, 2005, the Township shall:
- (a) submit an application to the Director to expand the landfill for the purpose of resuming landfilling operations; or
  - (b) carry out final closure activities consisting of increasing the granular cover material to a depth of 0.6 m and applying 0.15 m of topsoil, seeded with both annual and perennial plant species, except for those areas previously approved for the establishment of a transfer station.

The following is hereby added to Schedule "A":

- 11. Interim Closure Plan, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated May 2003.
- 12. 2002 Annual Report, Norway Lake Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by SGS Lakefield Research Limited, dated March 20, 2003.

The reason(s) for this amendment to the Certificate of Approval is (are) as follows:

*Condition 20(a) was revoked because the Condition has been satisfied.*

*The reason for Condition 22 and 23 is to ensure minimize the potential for negative environmental impacts from the landfill during the period that the Township is conducting its Waste Management Strategy Plan.*

*The reason for Condition 24 is to ensure that the landfill is closed in accordance with Ontario Regulation 347 and the Guidance Manual for Landfill Sites Receiving Municipal Waste in a timely fashion.*

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000**

*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

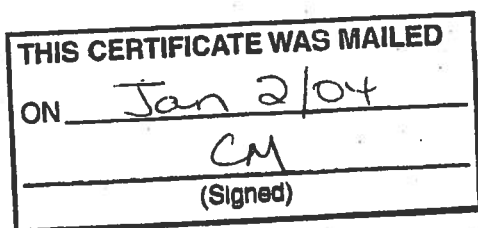
AND

The Director  
Section 39, *Environmental Protection Act*  
Ministry of Environment and Energy  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)

*The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.*

DATED AT TORONTO this 24th day of December, 2003



Ian Parrott, P.Eng.  
Director  
Section 39, *Environmental Protection Act*

VP/

c: District Manager, MOE Ottawa  
Philippa McPhee, Project Manager, SGS Lakefield Research Limited

file: SIRE BA C07 25



Ministry of Environment and Energy / Ministère de l'Environnement et de l'Énergie

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE NUMBER A411702



The Corporation of the Township of Greater Madawaska
1101 Francis Street
Bagot, Blythfield And Brougham, Ontario
K0J 1H0

Site Location: Norway Lake Waste Disposal Site
Part of Lot 20, Concession 7, BAGOT TWP.
Greater Madawaska Township, County of Renfrew

You are hereby notified that I have amended Provisional Certificate of Approval No. A411702 issued on May 24, 2000 and amended January 15, 2001 for a waste disposal site (landfill), as follows:

DEFINITIONS

Condition 1.1.6 is hereby revoked and replaced with:

1.1.6 "Township" means the Corporation of the Township of Greater Madawaska;

SITE OPERATIONS

The following conditions are hereby added:

- (10) The Transfer Station (TS) shall only accept wastes generated by ratepayers in the Township.
(11) The TS shall be maintained and operated in accordance with the items listed in Schedule "A".
(12) The Township shall ensure that no wastes be received or removed at the TS unless a Site Supervisor and/or designated alternate(s) are present to supervise the operation.
(13) The TS shall only accept municipal waste, with the exception of:
(a) household appliances;
(b) construction and demolition waste;
(c) scrap metals;
(d) tires;
(e) propane tanks; and

- (f) brush.
- (14) The TS shall not accept more than sixty (60) cubic metres of domestic waste per week;
- (15) (a) All domestic waste must be stored in two (2) roll-off bins of approximately thirty (30) cubic metre capacity with solid or screened lids that shall be closed while the site is not in operation;
- (b) All recyclable waste must be segregated and stored into:
  - (i) one (1) compartmentalized roll-off bin of approximately fifteen (15) cubic metre capacity;
  - (ii) two (2) cardboard recycling containers; and
  - (iii) one (1) polystyrene recycling container,with all containers being sealed by solid or screened lids while the site is not in operation.
- (16) (a) During the winter months (November 1st to March 31st), all solid waste containers and bins shall be emptied when they become full or every thirty days (30) days, whichever comes first; and
- (b) At all other times, the solid waste containers shall be emptied when they become full or every seven (7) days, whichever comes first; and
- (c) All containers or bins with recyclables shall be emptied when they become full.
- (17) All waste bins shall be clearly marked showing the type of waste they are to contain.
- (18) All waste stored on site shall be appropriately protected from rodents, animals and weather to prevent nuisance impacts such as dust, litter, odour, run-off and leachate generation.
- (19) No scavenging of waste is permitted at the site.

#### CLOSURE PLAN

- (20) (a) By May 31, 2003, the Township shall submit to the Director for approval, an written interim closure plan for the Site. This plan must include, as a minimum, a description of the work that will be done to facilitate temporary closure of the Site and a schedule for completion of that work. The plan must also outline the Township's future plans on site expansion and permanent closure of the Site;
- (b) Upon commencement of the Transfer Station, the Township shall begin to implement interim closure tasks including grading and compaction of side slopes and application of interim cover material; and
- (c) If, at any time, the Township decides to permanently close the site, a permanent closure plan

shall be submitted, for approval by the Director, four (4) months prior to closure of the Site. This plan shall include, as a minimum, the following information:

- (i) changes to the final contour plan that have been previously identified in the annual reports or recommended in the development of the detailed closure plan;
- (ii) fencing and access control;
- (iii) details of any vegetative planting planned;
- (iv) the sequence and scheduling for final cover installation;
- (v) post-closure and end-use plans;
- (vi) plans and schedules for the management and continued monitoring of the surface water and groundwater;
- (vii) plans and schedules for routine monitoring and maintenance of stormwater facilities; and
- (viii) plans and schedules for the routine monitoring of leachate seeps, the final cover and Site settlement.

#### ANNUAL REPORT

(21) By **March 31, 2003**, and on an annual basis thereafter, the Company shall prepare and retain on-site an annual report covering the previous calendar year. Each report shall include, as a minimum, the following information:

- (a) a detailed monthly summary of the type and quantity of all wastes received and transferred from the TS;
- (b) any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site and during the facility inspections and any mitigative actions taken;
- (c) a statement as to compliance with all Conditions of this Provisional Certificate of Approval and with the inspection and reporting requirements of the Conditions herein; and
- (d) any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs in this regard.

#### SCHEDULE "A"

The following items are hereby amended to Schedule "A":

- (8) Letter dated June 23, 2000, to Tesfaye Gebrezghi, MOE, from Brian whitehead, Jonata Patrick & Associates Ltd.
- (9) Final Contour Plan (Drawing No.1), dated June 2000.
- (10) Application for a Provisional Certificate of Approval and supporting information, dated July 24, 2002, including report entitled, "Design and Operations Report: Proposed Municipal Solid Waste Transfer Station: Township of Greater Madawaska, Norway Lake Waste Disposal Site." prepared by SGS Lakefield Research.
- (11) Facsimile dated September 30, 2002, from Philippa McPhee, Project Manager, SGS Lakefiled Research to David Lee, MOE supplying requested information.

The reasons for this amendment to the Certificate of Approval are as follows:

*The reason for Condition (10), (11), (12), (14) and (22) is to ensure that the Site is operated in accordance with the application and supporting information submitted by the Applicant, and not in a manner which the Director has not been asked to consider.*

*The reason for Condition (13) is to ensure the types and amounts of wastes received at the waste transfer station are in accordance with that approved under the Certificate of Approval.*

*The reason for Conditions (15), (16), (17), (18) and (19) is to ensure that the site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.*

*The reason for Condition (20) is to ensure that the Site is closed in accordance with Ministry standards and to protect the health and safety of the public and the environment.*

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A411702 dated May 24, 2000.**

*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*The Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;

7. The name of the Director;  
8. The municipality within which the waste disposal site is located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary\*  
Environmental Review Tribunal  
2300 Yonge St., 12th Floor  
P.O. Box 2382  
Toronto, Ontario  
M4P 1E4

AND

The Director  
Section 39, *Environmental Protection Act*  
Ministry of Environment and Energy  
2 St. Clair Avenue West, Floor 12A  
Toronto, Ontario  
M4V 1L5

\* Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or [www.ert.gov.on.ca](http://www.ert.gov.on.ca)

*The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.*

DATED AT TORONTO this 2nd day of December, 2002

<b>THIS CERTIFICATE WAS MAILED</b>
ON <u>Dec. 12, 2002</u>
<u>IC</u>
(Signed)



Ian Parrott, P.Eng.  
Director  
Section 39, *Environmental Protection Act*

DL/

c: District Manager, MOEE Ottawa ✓  
Michael J. Lord, SGS Lakefield Research Design





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PROVISIONAL CERTIFICATE OF APPROVAL  
FOR A WASTE DISPOSAL SITE (LANDFILL)

NO. A 411702

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*Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:*

Corporation of the Township of Bagot, Blythfield & Brougham  
P.O.Box 180  
Calabogie, Ontario  
K0J 1H0

for the use and operation of a 1.37 hectare landfilling area within an 18.47 hectare landfill site property,

all in accordance with the following plans and specifications:

As per the attached Schedule A

Located: Part Lot 20, Concession 7  
Township of Bagot  
The Corporation of the Township of Bagot, Blythfield and Brougham

*which includes the use of the site only for the disposal of solid municipal waste (Note: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval)*

## 1. Definition of Terms

1.1 In this Certificate of Approval ("Certificate"), the following definitions shall apply:

- 1.1.1 "Certificate" means this Certificate of Approval No. A411702 as amended from time to time and all Schedules attached to and forming part of this Certificate;
- 1.1.2 "District Manager" means the Manager of the Ministry of the Environment, Ottawa District Office.
- 1.1.3 "Director" means the one or more persons who from time to time so designated for the purpose of Part V of the Environmental Protection Act, R.S.O. 1990, as amended from time to time;
- 1.1.4 "Engineer" means a professional engineer licenced under the Ontario Professional Engineers Act;
- 1.1.5 "EPA" means the Environmental Protection Act, R.S.O. 1990, as amended;
- 1.1.6 "Township" means the Corporation of the Township of Bagot, Blythfield and Brougham;



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- 1.1.7 "Buffer" means those lands between the limit of fill and the boundaries of the property owned by the Township, that shall in no instance be less than 30 meters, as identified in Schedule "A".
- 1.1.8 "Landfill" means the part of the Site comprising the Limit of Fill and the Buffer
- 1.1.9 "Limit of Fill" means the area in which waste is approved for final disposal according to this Certificate;
- 1.1.10 "Ministry" or "MOE" means the Ontario Ministry of Environment;
- 1.1.11 "MNR" means Ontario Ministry of Natural Resources;
- 1.1.12 "ODWO" means the Ontario Drinking Water Objectives as amended from time to time;
- 1.1.13 "OWRA" means the Ontario Water Resources Act, R.S.O. 1990, c.0.40, as amended;
- 1.1.14 "PWQO" means the Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time;
- 1.1.15 "Regional Director" means the Director, Eastern Ontario Region, Ministry of Environment;
- 1.1.16 "Site" means the property owned by the Township for the purposes of waste disposal, described as Part Lot 20, Concession 7, Township of Bagot.

## 2. General

- 2.1 This Certificate revokes all previously issued Provisional Certificates of Approval issued under Part V, EPA, for this site. The approval given herein, including the Terms and Conditions set out, replaces all previously issued approvals and related Terms and Conditions under Part V, EPA for this Site.
- 2.2 The site shall be constructed and operated in accordance with Item 1 in Schedule "A" (the Site Development, Operation and Closure Report) and in accordance with all other documents listed in Schedule "A" to this Certificate.
- 2.3 Schedules A and B are integral parts of these Conditions of Approval.
- 2.4 Pursuant to Section 197 of the EPA, neither the Company nor any person having an interest in the Property shall deal with the Property in any way without first giving a copy of this Certificate to each person acquiring an interest in the Property as a result of the dealing. In addition, the Company shall,
- (a) within 60 days of the date of issuance of this Certificate, submit to the Director for the Director's signature two copies of a completed Certificate of Prohibition containing a registrable description of the Property, in accordance with Form 1 of O. Reg. 14/92; and



recycling bins, a re-use area, brush and wood chipping and storage areas, and a concrete storage area, all in accordance with Item 1 in Schedule "A" (Site Development, Operation and Closure Report). All parts of the Buffer, other than roadways, parking areas and structures shall be maintained with a healthy vegetative cover or other appropriate surface treatment which will minimize erosion.

- 3.4 Final cover shall be applied progressively, as weather conditions permit, as each part of the Limit of Fill reaches its final grades. The design of the final cover shall comply with the specifications contained in Item 1 in Schedule "A" (Site Development, Operation and Closure Report). Vegetation of completed final cover using drought-resistant, low-nutrient requirement grass and legume blends which regenerate annually shall occur within one month of its placement and final grading, or as soon as weather permits.
- 3.5 Within 30 days of the date of issuance of this Certificate of Approval, the Township shall submit to the Director, for approval, final site and contour plans for the site which show how the remaining waste capacity of the Site will be utilized and how the Fill Beyond Approved Limits (FBAL) will be incorporated without a change to the approved waste volume capacity of 36,000 m<sup>3</sup>, excluding final cover. Plans shall include the current and final extent of the Limit of Fill with contours and any changes to the Site layout.

#### 4. Site Operations

- 4.1 The maximum waste disposal operating hours of the Landfill shall be 7:00 a.m. to 9:00 p.m. everyday. Equipment maintenance and administrative functions may occur at any time. Upon reasonable notification of the District Manager, contingency actions may proceed outside of the normal hours of operation. Emergency response may occur at any time, as required.
- 4.2 During non-operating hours, the Landfill entrance and exit gates will be locked or otherwise secured against access by unauthorized persons.
- 4.3 No waste shall be received for disposal at the Landfill except during the operating hours and under the supervision of the landfill attendants.
- 4.4 Only solid, non-hazardous wastes shall be disposed of in the Landfill.
- 4.5 The Township shall record the name and vehicle license for any load rejected for disposal in the Landfill along with the reason for rejection.
- 4.6 Access to the Landfill shall be *via* the existing main entrance from Norway Lake Road, as shown in Figure 3 in Item 1 of Schedule "A" (Site Development, Operation and Closure Report). Any changes to the main Landfill entrance or exit shall be submitted to the Regional Director for prior approval. Other service entrances may be established for access by Township staff or contractors, or for contingency or emergency use, provided that they are secured from entry when not in use.
- 4.7 The burning of wastes at the Landfill is prohibited.
- 4.8 Scavenging at the Landfill is prohibited, except at the designated re-use area and under the supervision of the landfill attendant.



- 4.9 The Township shall take all practical steps to prevent the escape of litter from the site. Periodic pick-up of litter at the Site and along the Access Road in the vicinity of the Site shall be carried out as required. Private property adjacent to the Landfill shall be inspected weekly and litter shall be collected if necessary, with permission of access from the property owner.
- 4.10 The Township shall ensure that all Landfill supervisors receive initial and ongoing training with respect to the following: the Certificate and Conditions attached to the Certificate, the Design & Operations Report; relevant waste management regulations and legislation; environmental concerns related to the waste being handled at the site; occupational health and safety concerns pertaining to the waste being handled at the site; fire fighting protocol; and emergency and contingency measures for the preventing of off-site impacts.
- 4.11 No water obtained from surface water or from a well constructed on the Site shall be used for drinking purposes without prior approval from the District Manager. Any water supply system that obtains water from a well or surface water source on the Site shall be clearly marked to indicate that the water is not potable.
- 4.12 Waste shall be deposited in a manner that minimizes the area of exposed waste at the Landfill working face and shall be compacted before cover material is applied according to the requirements of this Certificate.
- 4.13 At the end of each working day, and within two hours of the entrance gate closure, weather permitting, cover material consisting of a minimum of 0.15 m thickness of soil, as described in Item 1 (Site Development, Operations and Closure Report), Schedule "A", shall be applied to all exposed waste. Any alternative cover material must be approved by the Ministry unless it allowed as noted in the MOE's 1998 Landfill Standards Guideline.
- 4.14 In landfilling areas where waste placement is below the final approved contours and landfilling is to be suspended for one month or more, an interim cover consisting of a minimum of 0.30 m thickness of soil shall be applied.
- 4.15 Where existing cover material has eroded such that waste is exposed, the cover material shall be promptly replaced.

## 5. Monitoring

- 5.1 The Township shall monitor groundwater and surface water as per Schedule "B". The Township may amend Schedule "B" from time-to-time with the prior written consent of the District Manager.
- 5.2 All monitoring wells which form part of any monitoring program shall be properly capped, locked and protected from damage. Any groundwater monitoring wells that are damaged shall be repaired, replaced forthwith or properly abandoned.
- 5.3 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and/or PWQO has occurred as a result of the operation of the



Landfill Site, the Township shall notify the Regional Director as soon as reasonably possible and specify the following:

- a) details of the off-site exceedance, confirmatory monitoring requirements and the potential off-site impacts to surface water and groundwater users;
- b) the extent and timing of contingency measures to be implemented;
- c) modifications, if any, which should be made to the monitoring program; and
- d) other mitigation measures, if any, which may be necessary to reduce or prevent off-site impacts.

5.4 In the event that the results of the monitoring programs listed in Schedule "B" are such that an off-site exceedance of the Reasonable Use Policy and/or PWQO can reasonably be predicted to occur, the Township shall include in the annual report:

- a) the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;
- b) a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;
- c) a discussion of the modifications, if any, which should be made to the monitoring program; and
- d) a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts.

## 6. Contingency Plans

6.1 If it is determined by the District Manager that leachate, noise, dust, odour, litter, traffic, or vermin associated with the operation of the Site must, in the opinion of the District Manager, be reduced or otherwise controlled to prevent adverse impacts, the Township shall implement reasonable contingency measures as directed by the District Manager.

## 7. Closure

7.1 Unless a new application for expansion is submitted for this Site, the Township shall submit a complete plan for the closure, long term maintenance, long term monitoring and after use of the Site to the Director. The plan shall be developed in consultation with the public. The plan shall include, but not be limited to, the following:

- a) plans for fencing and access control;
- b) details of any additional cover required;
- c) details of any vegetative cover required;



- d) post-closure land use plans, including any further grading, filling or landscaping and the need for any structures;
- e) the need for any municipal or provincial approvals that would be required to implement the proposed closure plan and the schedule for obtaining such approvals;
- f) plans for the continued maintenance, operation and monitoring of stormwater management system, and landfill gas collection/destruction system (if implemented);
- g) plans for the continued monitoring of landfill gas, surface water and groundwater;
- h) updated contingency plans to mitigate potential impacts from landfill gas, leachate and stormwater; and
- i) details of post-closure ownership of the Site.

7.2 The Township shall continue to be responsible for the operation, maintenance and monitoring of the Site until such time as the Township can demonstrate to the Director that the leachate and gas being produced at the site would not cause an exceedance of the PWQO, ODWO, Reasonable Use Guideline and/or all other relevant statutes and policies respecting groundwater, surface water and air as may be applicable at that time.

### 8. Reporting

8.1 A periodic Status Report on the development, operation and monitoring of the Site shall be submitted by the Township to the District Manager. The Status Report shall be submitted annually for at least the first five (5) years from the date of issuance of this approval. Thereafter, the frequency of the report may be reduced with prior written permission of the District Manager, and provided that the Township demonstrates to the District Manager that the site operations and monitoring results have become routine and consistent. Notwithstanding any approved change in reporting frequency, the District Manager may at any time require the Township to return to annual submission of the Status Report if there is reasonable evidence to conclude that the site operations or monitoring results are no longer routine or consistent.

8.2 Each Status Report shall be submitted no later than March 31 of the year following the period being reported upon.

8.3 The Status Report shall be prepared by, or under the direction of, a qualified Engineer and shall include, as a minimum, the following elements:

a) *Executive Summary*

- i) A summary of findings, conclusions and recommendations;

b) *Site Operations*

- i) A site plan of the landfilling area showing: the current and final extent of the Limit of Fill with contours and cross-sections; and any changes to the Site layout;



8. Condition No. 3.1 is included to ensure that the proposed detailed design for the engineering works are submitted for the Director's approval in a timely manner and approved prior to the commencement of the construction.
9. Conditions No. 3.2 and 3.4 are included to ensure that enough physical space around the fill area is available for the purposes described under Condition 3.4 and in the event a need arises for mitigative measures in the future.
10. Condition No. 3.6 is included to ensure that the issue of FBAL is addressed as soon as possible in an environmentally acceptable way.
11. Conditions No. 4.1 and 4.2 are included to specify the operating hours of the site and ensure security against access by unauthorized persons.
12. Condition No.4.3 is included to ensure that landfilling of waste is done under supervision of a properly trained person, to ensure that it is done in accordance with the requirements of this Certificate.
13. Condition No. 4.5 is included to ensure that the Township accurately estimates the amount of waste brought to the site so that compliance with this Certificate can be verified.
14. Condition No.4.6 is included to specify access to landfill.
15. Conditions Nos. 4.7, 4.8, 4.9 and 4.11 are included to ensure that certain activities are not carried out at the site that are not environmentally acceptable and not safe for human health, and to minimize litter impacts resulting from the operating activities of the Site.
16. Condition No. 4.10 is included to ensure that the Township properly trained the staff operating the site to ensure that the operations are undertaken in accordance with the requirements of this Certificate.
17. Condition No. 4.12 is included to ensure that efficient and environmentally sound procedures are employed during the operation of the landfill site.
18. Conditions Nos. 4.13 and 4.15 are included to ensure that the waste is adequately covered with a suitable material, to minimize the environmental impacts from the landfilling operations.
19. Condition 4.14 is included to ensure that the waste is covered with a suitable final cover material in a timely manner, to minimize the environmental impacts from the disposal of waste.



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20. Condition No. 5 is included to require the Township to undertake the monitoring activities in accordance with the methods acceptable to the Ministry, in order to demonstrate that the site is performing as designed and the impacts on the natural environment are acceptable.
21. Condition No. 6 is included to ensure that there is a plan with an organized set of procedures for identifying and responding to unforeseen but possible problems at the site. A contingency plan is necessary to ensure protection of the natural environment.
22. Condition No. 7 is included to ensure that final closure of the site is completed in an aesthetically pleasing manner and to ensure the long term protection of the natural environment.
23. Condition No. 8 is included to ensure that regular review of site development, operations and monitoring is documented and any possible improvements to site design, operations or monitoring programs are identified.
25. Condition No. 9 is included is to ensure that the Township has a plan to adequately address public complaints in order to minimize the impacts from the operations at the site.
26. Condition No. 9. is included so that if any complaints are caused by the Facility the complaints are addressed in a timely manner and action is taken to prevent further complaints.





**Schedule A: Supporting Documents**

1. A report entitled *Site Development, Operation and Closure Report, Norway Lake Landfill Site, PC of A No. A411702*, dated September, 1998 and prepared by The Greer Galloway Group Inc.
2. A report entitled *Hydrogeology, Norway Lake Waste Disposal Site, Township of Bagot, Blythfield and Brougham*, dated September, 1998 and prepared by Golder Associates Ltd.
3. A completed Ministry of the Environment form entitled *Application for Approval of a Waste Disposal Site* dated February 8, 2000 (revised) with a cover letter dated February 7, 2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE
4. Letter dated February 1, 2000, from Brian Whitehead, Janota Patrick & Associates Ltd., to Andrew Polley, MOE
5. Fax dated December 2, 1999, from Brian Whitehead, Janota Patrick & Associates Ltd., to MOE
6. Letter dated August 6, 1998, from Brian Whitehead, Janota Patrick & Associates Ltd., to Tesfaye Gebrezghi, MOE
7. Letter dated September 14, 1998, from Kevin Mooder, The Greer Galloway Group Inc., to A. Dominski, MOE



## Schedule B: Surface Water and Groundwater Monitoring Program

Groundwater and Surface water sampling will be carried out twice a year, one in the Spring (April/May) and the second in late Summer (August/September).

### 1. Groundwater:

#### **Sampling Locations for routine groundwater monitors:**

OB-3, OB-8, OB-10, BR-8

The following parameters shall be tested on water samples collected from all routine groundwater monitors:

chloride, hardness, sodium, boron, iron, manganese, alkalinity, DOC and TDS

#### **Surveillance groundwater monitors:**

BR-1, BR-2, BR-9

The following parameters shall be tested on water samples collected from all groundwater surveillance monitors:

Calcium, magnesium, sodium, potassium, aluminum, barium, boron, chromium, cobalt, copper, iron, manganese, total phosphorus, silicon, strontium, zinc, ammonia, nitrate, sulphate, alkalinity, TDS, chloride, TKN, COD, DOC, hardness (calculated from laboratory calcium and magnesium analyses), Volatile organics (EPA 624 list) on BR-1 during the late summer session only.

#### **Field measured parameters shall include:**

Groundwater levels in all sample monitors, Temperature, Conductivity and pH.

### 2. Surface Water

#### **Sampling Locations for routine surface water monitors:**

SW-1 and SW-2

The following parameters shall be tested on water samples collected from all surveillance surface water stations:

Calcium, magnesium, sodium, potassium, aluminum, barium, boron, chromium, cobalt, copper, iron, manganese, total phosphorus, silicon, strontium, zinc, total ammonia with un-ionized ammonia determination, BOD, phenol, alkalinity, TDS, chloride, TKN, COD, DOC, hardness (calculated from laboratory calcium and magnesium analyses).



**Field measured parameters shall include:**

Temperature, Conductivity, pH and Dissolved Oxygen.

*In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990 c. E-19, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, as amended provides that the Notice requiring a hearing shall state:*

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*In addition to these legal requirements, the Notice should also include:*

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

*And the Notice should be signed and dated by the appellant.*

*This Notice must be served upon:*

The Secretary,  
 Environmental Appeal Board,  
 2300 Yonge St., 12th Floor,  
 P.O. Box 2382  
 Toronto, Ontario  
 M4P 1E4

AND

The Director,  
 Section 39, Environmental Protection Act,  
 Ministry of Environment,  
 2 St. Clair Ave., West, 12A Floor,  
 Toronto, Ontario.  
 M4V 1L5

DATED AT TORONTO this 24th day of May, 2000.

THIS IS A TRUE COPY OF THE  
 ORIGINAL CERTIFICATE MAILED

ON 1/6/2000

RA  
 (Signed)

A. Dominski, P. Eng.,  
 Director, Section 39,  
 Environmental Protection Act

TG/aq  
 c:

District Manager, MOE Ottawa District Office.  
 C. Reddy, Clerk Corporation of the Township of Bagot, Blythfield & Brougham

## Appendix B



From: [Dan Hagan \(Greenview\)](#)  
To: [Ponalo, Thandeka \(MECP\)](#); [Davis, Greg \(MECP\)](#); [Tieu, Emily \(MECP\)](#)  
Cc: [Solutions - Greenview](#); [Tyler Peters \(Greenview\)](#); [Leonard Emon \(TGM\)](#)  
Subject: Req for Virtual MECP Pre-Sub ECA Mtg-Rev Design and Operations Plans-MSP WDS and NL WDS (102.21.015 & 102.21.013)  
Date: January 4, 2022 3:05:16 PM  
Attachments: [102.21.013 - TGM - NL WDS - Revised DOP - DRAFT FOR MECP PRE-SUBMISSION REVIEW \(ALL - SR\) - Dec22-21.pdf](#)  
[image001.png](#)  
Importance: High

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Good afternoon, Thandeka, Greg, and Emily –

Further to our communications in December 2021 requesting proposed dates for a Pre-Submission Meeting with the MECP in January 2022 (see email string below) relative to the proposed *Revised Design and Operation Plan* for the Mount St. Patrick Waste Disposal Site, we are requesting that the proposed scope of the meeting be expanded to include discussion on the attached *Revised Design and Operation Plan* for the Norway Lake Waste Disposal Site as well.

The content and intent of the *Revised Design and Operation Plan* for the Norway Lake Waste Disposal Site is generally consistent with the *Revised Design and Operation Plan* previously provided for the Mount St. Patrick Waste Disposal Site.

In the interest of time-savings for all parties, and given that the request for changes to operations between the Mount St. Patrick and Norway Lake Waste Disposal Sites are very similar, we feel that combining the Pre-Submission Meetings into one combined meeting would be beneficial to everyone.

Similarly, no changes to the existing groundwater and surface water monitoring program for the Norway Lake Waste Disposal Site are proposed as part of this *Revised Design and Operation Plan*, and therefore we assume that the MECP Technical Support Section (groundwater and surface water) will not be interested in participating in the proposed meeting (as was noted below in the email string related to the Mount St. Patrick Waste Disposal Site's *Revised Design and Operation Plan*).

We trust you will find this submission and this request to be in order.

If you could please advise by Friday January 14<sup>th</sup>, 2022 as to proposed dates for the combined Pre-Submission Meeting in January 2022 for Greenview's and the Township of Greater Madawaska's review and confirmation of a workable date/time. The Township of Greater Madawaska is very eager to proceed to the formal ECA Application Submission stage for both of these site's *Revised Design and Operation Plans*.

Thank you and Happy New Year -

Sincerely,

**Dan Hagan, P. Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105

[www.greenview-environmental.ca](http://www.greenview-environmental.ca)

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---

From: [Ponalo, Thandeka \(MECP\)](#)  
To: [Dan Hagan \(Greenview\)](#)  
Cc: [Solutions - Greenview](#); [Tyler Peters \(Greenview\)](#); [Leonard Emon \(TGM\)](#); [Tieu, Emily \(MECP\)](#)  
Subject: Req for Virtual MECP Pre-Sub ECA Mtg - Rev Design and Ope Plans - MSP WDS and NL WDS (102.21.015 & 102.21.013)  
Date: January 10, 2022 10:57:27 AM  
Attachments: [image001.png](#)

---

Good morning,

Ministry staff are available for a pre-consultation meeting. Our availability is listed below.

Wednesday January 12<sup>th</sup> – 9 am to 3pm

Thursday January 13<sup>th</sup> – 1pm to 3 pm

Friday January 14<sup>th</sup> – 9 am to 3 pm

Thursday January 20<sup>th</sup> – 1 pm to 3 pm

Friday January 21<sup>st</sup> – 9 am to 3 pm

Ahead of the meeting, are there any specific issues or questions you would like to discuss?

Thank you,

**Thandeka Ponalo**

Senior Environmental Officer  
Ontario Ministry of the Environment, Conservation and Parks  
Ottawa District Office  
2430 Don Reid Drive  
Ottawa ON K1H 1E1  
Tel: 613-858-0695 | Fax: 613-521-5437  
Spills Action Centre (SAC): 1-800-268-6060  
[Thandeka.Ponalo@ontario.ca](mailto:Thandeka.Ponalo@ontario.ca) | [www.ene.gov.on.ca](http://www.ene.gov.on.ca)

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**From:** Dan Hagan (Greenview) <dan.hagan@greenview-environmental.ca>

**Sent:** January 4, 2022 2:04 PM

**To:** Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>; Davis, Greg (MECP) <Greg.Davis@ontario.ca>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>

**Cc:** Solutions - Greenview <solutions@greenview-environmental.ca>; Tyler Peters (Greenview) <tyler.peters@greenview-environmental.ca>; Leonard Emon (TGM) <lemon@greatermadawaska.com>

**Subject:** Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plans - Mount St. Patrick WDS and Norway Lake WDS (102.21.015 & 102.21.013)

**Importance:** High

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

From: [Dan Hagan \(Greenview\)](#)  
To: [Ponalo, Thandeka \(MECP\)](#)  
Cc: [Solutions - Greenview](#); [Tyler Peters \(Greenview\)](#); [Leonard Emon \(TGM\)](#); [Tieu, Emily \(MECP\)](#)  
Subject: Req for Virtual MECP Pre-Sub ECA Mtg - Rev Design and OP - MSP WDS and NL WDS (102.21.015 & 102.21.013)  
Date: January 11, 2022 12:20:56 PM  
Attachments: [image001.png](#)

---

Good day, Thandeka –

On behalf of the Township of Greater Madawaska, we would like to book MECP Ministry Staff for the Pre-Submission Meeting regarding the *Revised Design and Operations Plans* for the Mount St. Patrick WDS and Norway Lake WDS for Thursday January 20, 2022 from 1pm to 3pm.

The intent of the meeting is to meet with the pre-submission requirements of the MECP relative to the planned, formal submission of the Plans and associated ECA Applications for both sites (at our earliest opportunity).

As has been previously noted by MECP Ottawa District Staff, the MECP Technical Support Section (groundwater and surface water scientists) are understood to not be providing comments on the Plans, as there are no planned changes to the existing environmental monitoring programs for both sites.

With respect to specific topics for the discussion, we are most interested in the following:

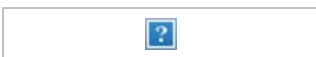
1. Are any changes identified in the Plans for waste and recycling transfer station operations at both sites been flagged by MECP staff, or are they generally deemed to be acceptable as written?
2. Are there any potential impediments to the MECP Ottawa District Office providing written approval for both Plans, identifying the MECP Ottawa District Office's general concurrence/acceptance of the Plans in principle, for inclusion in the ECA Application for both sites?
3. From the MECP's perspective, may the Township proceed with formal submission of the ECA Applications for both sites? If not, please identify any items that should be discussed during the Pre-Submission Meeting.

As the noted *Revised Design and Operations Plans* for both sites have been prepared in order to receive MECP approval for revised organization/operations of the existing transfer stations at both sites to better meet with the levels of service expected by the Township's ratepayers, we would like to streamline this process as much as possible so that we could expect to expedite the review and approval process for revised ECAs for both sites to the furthest extent possible. With that in mind, it would be appreciated that any potential issues that the MECP has identified at this time based on their review of the proposed *Revised Design and Operations Plans* be communicated at the Pre-Submission Meeting, so that we can collaborate together and determine a mutually agreeable path forward towards the formal submission of the ECA application packages.

Many thanks in advance for your time. We look forward to meeting with you all on January 20<sup>th</sup>.

Sincerely,

**Dan Hagan, P. Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105  
[www.greenview-environmental.ca](http://www.greenview-environmental.ca)

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---

**From:** Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>  
**Sent:** Monday, January 10, 2022 10:57 AM  
**To:** Dan Hagan (Greenview) <dan.hagan@greenview-environmental.ca>  
**Cc:** Solutions - Greenview <solutions@greenview-environmental.ca>; Tyler Peters (Greenview) <tyler.peters@greenview-environmental.ca>; Leonard Emon (TGM) <lemon@greatermadawaska.com>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>  
**Subject:** RE: Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plans - Mount St. Patrick WDS and Norway Lake WDS (102.21.015 & 102.21.013)

Good morning,

Ministry staff are available for a pre-consultation meeting. Our availability is listed below.

Wednesday January 12<sup>th</sup> – 9 am to 3pm

Thursday January 13<sup>th</sup> – 1pm to 3 pm

Friday January 14<sup>th</sup> – 9 am to 3 pm

Thursday January 20<sup>th</sup> – 1 pm to 3 pm

Friday January 21<sup>st</sup> – 9 am to 3 pm

Ahead of the meeting, are there any specific issues or questions you would like to discuss?

Thank you,

**Thandeka Ponalo**

Senior Environmental Officer

Ontario Ministry of the Environment, Conservation and Parks

Ottawa District Office

2430 Don Reid Drive

Ottawa ON K1H 1E1

Tel: 613-858-0695 | Fax: 613-521-5437

Spills Action Centre (SAC): 1-800-268-6060

[Thandeka.Ponalo@ontario.ca](mailto:Thandeka.Ponalo@ontario.ca) | [www.ene.gov.on.ca](http://www.ene.gov.on.ca)

We want to hear from you. How was my service? You can provide feedback at 1-888-745-8888 or [ontario.ca/inspectionfeedback](http://ontario.ca/inspectionfeedback)

---

**From:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>  
**Sent:** January 4, 2022 2:04 PM  
**To:** Ponalo, Thandeka (MECP) <[Thandeka.Ponalo@ontario.ca](mailto:Thandeka.Ponalo@ontario.ca)>; Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>; Tieu, Emily (MECP) <[Emily.Tieu@ontario.ca](mailto:Emily.Tieu@ontario.ca)>  
**Cc:** Solutions - Greenview <[solutions@greenview-environmental.ca](mailto:solutions@greenview-environmental.ca)>; Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>; Leonard Emon (TGM) <[lemon@greatermadawaska.com](mailto:lemon@greatermadawaska.com)>



**Subject:** Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plans - Mount St. Patrick WDS and Norway Lake WDS (102.21.015 & 102.21.013)

**Importance:** High

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Good afternoon, Thandeka, Greg, and Emily –

Further to our communications in December 2021 requesting proposed dates for a Pre-Submission Meeting with the MECP in January 2022 (see email string below) relative to the proposed *Revised Design and Operation Plan* for the Mount St. Patrick Waste Disposal Site, we are requesting that the proposed scope of the meeting be expanded to include discussion on the attached *Revised Design and Operation Plan* for the Norway Lake Waste Disposal Site as well.

The content and intent of the *Revised Design and Operation Plan* for the Norway Lake Waste Disposal Site is generally consistent with the *Revised Design and Operation Plan* previously provided for the Mount St. Patrick Waste Disposal Site.

In the interest of time-savings for all parties, and given that the request for changes to operations between the Mount St. Patrick and Norway Lake Waste Disposal Sites are very similar, we feel that combining the Pre-Submission Meetings into one combined meeting would be beneficial to everyone.

Similarly, no changes to the existing groundwater and surface water monitoring program for the Norway Lake Waste Disposal Site are proposed as part of this *Revised Design and Operation Plan*, and therefore we assume that the MECP Technical Support Section (groundwater and surface water) will not be interested in participating in the proposed meeting (as was noted below in the email string related to the Mount St. Patrick Waste Disposal Site's *Revised Design and Operation Plan*).

We trust you will find this submission and this request to be in order.

If you could please advise by Friday January 14<sup>th</sup>, 2022 as to proposed dates for the combined Pre-Submission Meeting in January 2022 for Greenview's and the Township of Greater Madawaska's review and confirmation of a workable date/time. The Township of Greater Madawaska is very eager to proceed to the formal ECA Application Submission stage for both of these site's *Revised Design and Operation Plans*.

Thank you and Happy New Year -

Sincerely,

**Dan Hagan, P.Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105  
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---

**From:** Dan Hagan (Greenview)

**Sent:** Tuesday, December 7, 2021 2:05 PM

**To:** Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Cc:** Solutions - Greenview <[solutions@greenview-environmental.ca](mailto:solutions@greenview-environmental.ca)>; Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>; Ponaló, Thandeka (MECP) <[Thandeka.Ponaló@ontario.ca](mailto:Thandeka.Ponaló@ontario.ca)>; Tieu, Emily (MECP) <[Emily.Tieu@ontario.ca](mailto:Emily.Tieu@ontario.ca)>; Leonard Emon (TGM) <[lemon@greatermadawaska.com](mailto:lemon@greatermadawaska.com)>

**Subject:** RE: Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)

**Importance:** High

Thank you, Greg –

We will include this email from you as part of the ECA Application Submission to MECP Client Services & Permissions Branch as confirmation that Technical Support Section was consulted on the submission, in order to satisfy the requirements of Section 5.4.4 of the ECA Application Form.

We will wait for Thandeka from the MECP Ottawa District Office to advise of proposed dates for a Pre-Submission Meeting in early January 2022 with representatives of the Township of Greater Madawaska and Greenview Environmental, per our original email request dated December 1, 2021.

We will also advise staff at the Township of Greater Madawaska of the next steps in this process, accordingly.

Thank you for your assistance with this matter, and we look forward to hearing back from the MECP Ottawa District Office in the New Year.

Sincerely,

**Dan Hagan, P. Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105  
[www.greenview-environmental.ca](http://www.greenview-environmental.ca)

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---

**From:** Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Sent:** Tuesday, December 7, 2021 1:51 PM

**To:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>

**Cc:** Solutions - Greenview <[solutions@greenview-environmental.ca](mailto:solutions@greenview-environmental.ca)>; Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>; Ponaló, Thandeka (MECP) <[Thandeka.Ponaló@ontario.ca](mailto:Thandeka.Ponaló@ontario.ca)>; Tieu, Emily (MECP) <[Emily.Tieu@ontario.ca](mailto:Emily.Tieu@ontario.ca)>; Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Subject:** RE: Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)

Good afternoon,

I have had the chance to ask our technical support staff about your site/amendment and they do not feel their attendance at the pre-submission meeting is necessary.

As previously discussed please touch base in January '22 with Thandeka to set the meeting.

Thank you,

Greg Davis  
Environmental Officer  
Ministry of the Environment, Conservation and Parks  
Ottawa District Office  
2430 Don Reid Drive  
Ottawa, ON, K1H 1E1  
T: 613-521-3450 x227  
F: 613-521-5437  
C: 613-866-0926  
Toll Free: 1-800-860-2195

---

**From:** Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Sent:** December-02-21 2:36 PM

**To:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>

**Cc:** Solutions - Greenview <[solutions@greenview-environmental.ca](mailto:solutions@greenview-environmental.ca)>; Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>

**Subject:** RE: Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)

Afternoon,

I will ask tech support leads if they want their staff involved with this amendment.

Thank you,

Greg Davis  
Environmental Officer  
Ministry of the Environment, Conservation and Parks  
Ottawa District Office  
2430 Don Reid Drive  
Ottawa, ON, K1H 1E1  
T: 613-521-3450 x227  
F: 613-521-5437  
C: 613-866-0926  
Toll Free: 1-800-860-2195

---

**From:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>

**Sent:** December-02-21 2:01 PM

**To:** Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Cc:** Solutions - Greenview <[solutions@greenview-environmental.ca](mailto:solutions@greenview-environmental.ca)>; Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>

**Subject:** RE: Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi Greg –

I don't believe the 2020 Annual Report for the Mount St. Patrick WDS has been reviewed by MECP TSS – at least to my knowledge we have not received anything like that. A copy of the 2020 Annual Report is included as an Appendix to the Revised Design and Operations Plan. You are correct – we have not proposed any changes to the existing groundwater and surface water monitoring program for the Mount St. Patrick WDS.

It is just my understanding from previous Pre-Submission Reviews that representatives focused on groundwater and surface water generally attend the meetings and provide guidance/approval of the proposed project, and often an engineer from Toronto who would be reviewing the application generally (but not always) would attend as well. In my experience in these Pre-Submission Meetings, everyone has reviewed the draft document before the meeting so that everyone knows exactly what is being proposed.

Per Section 5.4.4 - Landfill Site of the ECA Application Form:

*Note: The Hydrogeological Assessment, effluent criteria, and surface water assessment must be discussed and prepared with the Ministry's regional technical support section during a pre-application meeting(s) and consultation(s) with the Ministry. A proof of concurrence from technical support must be included as part of the ECA application package.*

Per the above, we will need written proof of concurrence from MECP TSS for inclusion in the Application Package, so I believe we should be distributing the documents to TSS for review as soon as possible, so that they can review it prior to the planned meeting in January 2022.

Please advise if MECP expectations for the ECA Application process has changed from the most recent ECA Application Form that we have on file (last downloaded on November 24, 2021).

If we don't need a clearance letter from the MECP TSS, that's okay too, but we will need a similar clearance letter (after we complete the Pre-Submission Meeting requirements) from the MECP Ottawa District Office for inclusion in the ECA Application Package that would take the place of MECP TSS approval required by Section 5.4.4 of the ECA Application Form, so that our application doesn't get rejected immediately by an Application Assessment Officer at Client Services & Permissions Branch.

Let me know your thoughts, and whatever we need to do on our end, I'll make sure it gets done -

Sincerely,

**Dan Hagan, P. Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105

[www.greenview-environmental.ca](http://www.greenview-environmental.ca)

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---

**From:** Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Sent:** Thursday, December 2, 2021 2:34 PM

**To:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>

**Subject:** RE: Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)

Afternoon,

I can certainly send to our technical support but reading the documentation I did not see that there was to be any alteration to the monitoring program. Perhaps there are some outstanding issues that I am not aware based on my quick review. I would say normally for an update such as this technical reviews would not be needed. I can dig a little deeper to see if tech support (what staff members) are involved already or who would be involved. Was your 2020 amr reviewed this year by tech support? That would give me a starting point for discussion with tech support

Thank you,

Greg Davis  
Environmental Officer  
Ministry of the Environment, Conservation and Parks  
Ottawa District Office  
2430 Don Reid Drive  
Ottawa, ON, K1H 1E1  
T: 613-521-3450 x227  
F: 613-521-5437  
C: 613-866-0926  
Toll Free: 1-800-860-2195

---

**From:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>

**Sent:** December-02-21 1:25 PM

**To:** Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Cc:** Tieu, Emily (MECP) <[Emily.Tieu@ontario.ca](mailto:Emily.Tieu@ontario.ca)>; Ponalo, Thandeka (MECP) <[Thandeka.Ponalo@ontario.ca](mailto:Thandeka.Ponalo@ontario.ca)>; [lemon@greatermadawaska.com](mailto:lemon@greatermadawaska.com); Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>

**Subject:** RE: Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Hi Greg –

Thanks for your quick response.

My sense at this time is that we could wait for a January 2022 Pre-Submission Meeting, but the documents should be forwarded to MECP Technical Support Section (TSS) right away, so that the groundwater and surface water scientists that will be participating in the meeting have ample time to review the submission in advance of the Pre-Submission Meeting.

Our intent following the Pre-Submission Meeting would be to address any comments the groundwater and surface water scientists may have regarding the draft document right away, and then have the MECP prepare the Pre-Submission approval letter (or equivalent) for inclusion in the ECA Application Package so that we could submit the package without delay.

Please confirm your understanding of the above, our intent regarding timelines, and document distribution.

Thanks and have a great day -

Sincerely,

**Dan Hagan, P. Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105

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---

**From:** Davis, Greg (MECP) <[Greg.Davis@ontario.ca](mailto:Greg.Davis@ontario.ca)>

**Sent:** Thursday, December 2, 2021 12:43 PM

**To:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>

**Cc:** Tieu, Emily (MECP) <[Emily.Tieu@ontario.ca](mailto:Emily.Tieu@ontario.ca)>; Ponalo, Thandeka (MECP) <[Thandeka.Ponalo@ontario.ca](mailto:Thandeka.Ponalo@ontario.ca)>; [lemon@greatermadawaska.com](mailto:lemon@greatermadawaska.com); Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>

**Subject:** Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)

Good morning,

Thank you for the documents related to your proposed amendments at this landfill site and your request to have a meeting prior to your application submission to the Ministry's Client Services and Permissions Branch.

My colleague Thandeka is currently away from the office until the end of December so I propose the meeting to take place in January '22 when Thandeka returns. If there is a need to proceed quicker than this I can certainly attend a pre-submission meeting.

Thank you,

Greg Davis  
Environmental Officer  
Ministry of the Environment, Conservation and Parks  
Ottawa District Office  
2430 Don Reid Drive  
Ottawa, ON, K1H 1E1  
T: 613-521-3450 x227  
F: 613-521-5437  
C: 613-866-0926  
Toll Free: 1-800-860-2195

**From:** Dan Hagan (Greenview) <[dan.hagan@greenview-environmental.ca](mailto:dan.hagan@greenview-environmental.ca)>  
**Sent:** December 1, 2021 3:08 PM  
**To:** Ponalo, Thandeka (MECP) <[Thandeka.Ponalo@ontario.ca](mailto:Thandeka.Ponalo@ontario.ca)>  
**Cc:** Tieu, Emily (MECP) <[Emily.Tieu@ontario.ca](mailto:Emily.Tieu@ontario.ca)>; Leonard Emon (TGM) <[lemon@greatermadawaska.com](mailto:lemon@greatermadawaska.com)>; Tyler Peters (Greenview) <[tyler.peters@greenview-environmental.ca](mailto:tyler.peters@greenview-environmental.ca)>; Solutions - Greenview <[solutions@greenview-environmental.ca](mailto:solutions@greenview-environmental.ca)>  
**Subject:** Request for Virtual MECP Pre-Submission ECA Meeting - Revised Design and Operations Plan - Mount St. Patrick WDS (102.21.015)  
**Importance:** High

**CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.**

Good afternoon, Ms. Ponalo –

On behalf of the Township of Greater Madawaska (Township), Greenview Environmental Management Limited (Greenview) is reaching out to you and the Ontario Ministry of the Environment, Conservation, and Parks (MECP) Ottawa District Office to request a *Virtual Pre-Submission ECA Meeting* related to a proposed Environmental Compliance Approval (ECA) Application for the Township's Mount St. Patrick Waste Disposal Site (WDS; A411901).

Copies of the DRAFT FOR MECP PRE-SUBMISSION REVIEW version of the *Revised Design and Operations Plan* for the Mount St. Patrick WDS are attached for MECP Ottawa District Office and Technical Support Services review prior to the requested Pre-Submission Meeting.

As part of the attached DRAFT FOR MECP PRE-SUBMISSION REVIEW *Revised Design and Operations Plan*, the Township has proposed the following:

- Revised locations for stockpile/staging areas for waste and recyclables (Figure 6; attached).
- Increase of approved stockpile volume for scrap metal and white goods from 60 cubic metres (m<sup>3</sup>) to 120 m<sup>3</sup>.
- Increase of approved stockpile volume for unprocessed Construction and Demolition (C&D) and Bulky Waste from 200 m<sup>3</sup> to 2,000 m<sup>3</sup>, prior to processing and landfilling at the site.
- Increase of approved stockpile volume for Clean Wood, Brush, and Leaf and Yard (L&Y) waste from 200 m<sup>3</sup> to 1,000 m<sup>3</sup>, prior to processing and landfilling at the site.

Initiation of diversion operations at the Mount St. Patrick Waste Disposal Site transfer station of single-use and rechargeable batteries, refillable propane tanks (i.e. BBQ tanks), non-refillable propane cylinders (i.e. Coleman-brand cylinders), compact fluorescent light bulbs (CFLs), and automotive plastics (i.e. empty oil and antifreeze containers).

No changes to the approved wastes for disposal, or to the approved Environmental Monitoring Program (groundwater and surface water), are proposed as part of the *Revised Design and Operations Plan* application to the MECP.

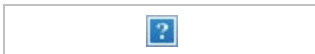
At this time, the Township has not contacted any adjacent landowners regarding the proposed ECA Application; however, contact of any/all adjacent landowners would be included as part of the ECA Application process per MECP expectations for this type of ECA application. Copies of the DRAFT adjacent landowner notification letters are included in the "Appendices" attached to this email.

We would like to submit this *Revised Design and Operations Plan* and related ECA Application for the Mount St. Patrick Waste Disposal Site at the earliest possible time, and as such, we are requesting the MECP's availability for a *Virtual Pre-Submission Meeting* in December 2021 or January 2022. If you could please provide us with (ideally) three (3) dates and times that would work for your MECP Team for this *Virtual Pre-Submission Meeting* I can cross-reference those dates and times with the representatives of the Township who would like to participate in the meeting, and advise back to you.

Many thanks in advance for your time, and if you have any questions regarding this submission, please contact me at any time.

Sincerely,

**Dan Hagan, P. Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105  
[www.greenview-environmental.ca](http://www.greenview-environmental.ca)

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From: [Dan Hagan \(Greenview\)](#)  
To: [Thandeka Ponalo \(MECP\): abdul.guyum@ontario.ca](#)  
Cc: [Emily Tieu \(MOECC\)](#); [Leonard Emon \(TGM\)](#); [Tyler Peters \(Greenview\)](#); [Solutions - Greenview](#)  
Subject: Thank-you for Pre-Sub Mtg - ECA App - Rev Design & OP - NL WDS & MSPWDS - TGM (1023.21.013/015)  
Date: January 20, 2022 3:31:54 PM  
Attachments: [image001.png](#)

---

Good afternoon, Thandeka and Abdul –

On behalf of the Township of Greater Madawaska (Township), I wanted to extend our thanks for your time today for the *Pre-Submission Meeting* regarding our planned Environmental Compliance Approval (ECA) Applications for the Norway Lake Waste Disposal Site (A411702) and Mount St Patrick Waste Disposal Site (A411901).

Based on our discussions during the meeting, we anticipate the following to be our next steps in the process:

1. **Norway Lake WDS** – prepare final version of *Revised Design and Operations Plan*, and associated ECA Application (and any other required supporting documents), and proceed to submit to the MECP.
2. **Mount St Patrick WDS** – we will wait to submit the *Revised Design and Operations Plan* for the site until the *2021 Annual Report* has been finalized (anticipated prior to the March 31, 2022 submission date), and submit it to Thandeka with an accompanying cover letter requesting a review of the *2021 Annual Report* (to allow Technical Support Services [TSS] the opportunity to review the minor change [addition] of an additional background monitoring well to the Environmental Monitoring Program for the site). Once the report has been reviewed by TSS and they have provided their thoughts on the *2021 Annual Report* to Thandeka, then we will proceed to formally submit the ECA Application Package to the MECP.

As part of both submissions, and given Abdul's involvement with the Pre-Submission Meeting, we will make a request with both submissions that the MECP consider assigning both reviews to him.

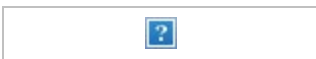
Thank you again everyone, we really appreciate your time on these important projects for the Township.

Stay warm and stay safe!

Dan.

Sincerely,

**Dan Hagan, P. Geo.**  
Senior Project Manager / Geologist



613.332.0057 x 105  
[www.greenview-environmental.ca](http://www.greenview-environmental.ca)

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## Appendix C



Project No: 10392-015

## Log of Borehole: BR-10

Project: Norway Lake WDS

Client: Township of Greater Madawaska

Location: See Site Plan

Logged By: STM

Depth	Strata Plot	Description	Samples				Well Installation	Remarks
			Number	Type	% Recovery	SPT (n)		
-1		Ground Surface					Stick-up: 0.83m	
0		Sandy Soil					Well equipped with lockable steel casing and weather proof lock.	
1		Sand	1	AS	-	-	Concrete	
2		Brown, fine-medium						
3		Fill Mixed waste (plastic, burn material, metal), brown, fine to medium sand, dry	2	SS	15	4	Bentonite Holeplug	
4								
5								
6								
7								
8								
9		Sand and Gravel	3	SS	10	3	Filter Sand	
10								
11			4	SS	20	3	Screen: 1.52m x 0.03m	
12								
13			5	SS	20	6		
14								
15			6	SS	5	50		
16								
17		Bedrock Granite with horizontal fractures					MOE Well Tag No.: A008438 UTM Coord.: 5,021,881 mN 367,380 mE.	
18								
19								
20								
21								
22								
23		Borehole terminated in bedrock						
24								
25								
26								

Drill Method: Hollow Stem Auger/Diamond Bit Core

Drill Date: August 30, 2004

Input by: STM

Checked by: DFB

Sheet: 1 of 1

Project No: 10392-015

## Log of Borehole: OB-11

Project: Norway Lake WDS

Client: Township of Greater Madawaska

Location: See Site Plan

Logged By: STM

Depth	Strata Plot	Description	Samples				Well Installation	Remarks
			Number	Type	% Recovery	SPT (n)		
ft -3 -2 -1 0		Ground Surface Sandy Soil					Stick-up: 0.91m Well equipped with lockable steel casing and weather proof lock.	
m -1 -2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13		Sand Brown to grey, medium to coarse, stratified, moist to wet, trace gravel	1	AS	-	-	Concrete	
			2	SS	40	3	Bentonite Holeplug	
			3	SS	60	10		
			4	SS	100	8		
			5	SS	55	25	Filter Sand Screen: 1.52m x 0.05m	
		Silty Gravel Grey, some cobble					MOE Well Tag No: A008438	
		Borehole terminated in silty gravel					UTM Coord: 5,021,905 mN 367,236 mE	

Drill Method: Hollow Stem Auger - CME 75

Drill Date: August 30, 2004

Input by: STM

Checked by: DFB

Sheet: 1 of 1

Project No: 10392-015

## Log of Borehole: OB-12

Project: Norway Lake WDS

Client: Township of Greater Madawaska

Location: See Site Plan

Logged By: SR

Depth	Strata Plot	Description	Samples				Well Installation	Remarks
			Number	Type	% Recovery	SPT (n)		
ft m -1 -3 -2 -1 0 0		Ground Surface Sandy Soil					Stick-up: 0.97m Well equipped with lockable steel casing and weather proof lock.	
1 2		Sand Brown, medium, some gravel	1	SS	-	-	Concrete Bentonite Holeplug	
3 4 5 6		Sand Brown, fine to medium, some cobbles	2	SS	50	52	Filter Sand Screen: 1.52m x 0.05m	
5 6			3	SS	5	50 3cm		
7 8 9 10 11		Assumed bedrock					MOE Well Tag No.: A008438 UTM Coord.: 5,021,905 mN 367,236 mE	

Drill Method: Hollow Stem Auger - CME 75

Drill Date: August 30, 2004

Input by: STM

Checked by: DFB

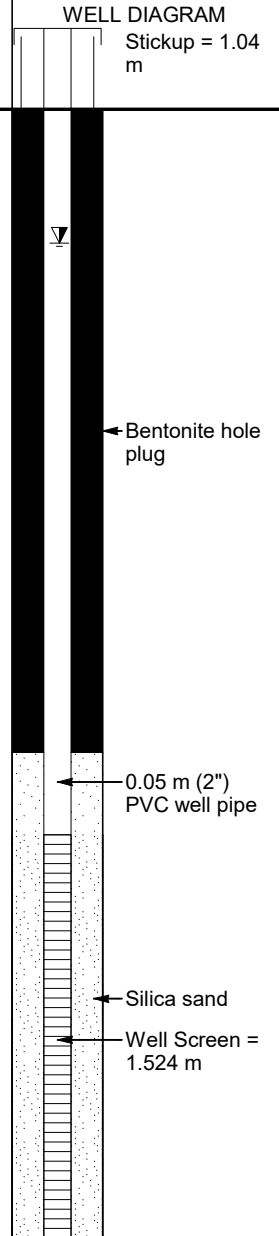
Sheet: 1 of 1

**CLIENT** Township of Greater Madawaska  
**PROJECT NUMBER** 102.18.013  
**DATE STARTED** 10/29/18 **COMPLETED** 10/29/18  
**DRILLING CONTRACTOR** OGS Inc.  
**DRILLING METHOD** Hollow Stem Auger (0.1524 m)  
**LOGGED BY** DMH **CHECKED BY** THP  
**NOTES** Replacement well for OB-11

**PROJECT NAME** Norway Lake Waste Disposal Site  
**PROJECT LOCATION** Burnstown, Ontario  
**GROUND ELEVATION** 171.74 m **HOLE SIZE** 0.1524 m (6")  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**1hrs AFTER DRILLING** 0.50 m / Elev 171.24 m

GREENVIEW - MW LOG - MAY-18-2011 102.18.013 - NORWAY LAKE WDS - BOREHOLE LOG (OB-11R) - OCT29-18.GPJ GINT STD CANADA GDT 1/24/19

DEPTH (m)	DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	▲ SPT N VALUE ▲	WELL DIAGRAM
			0.00 Brown topsoil, dry					
	1		Grey, fine-grained sand, damp	SS 1	49	1-4-5-5 (9)		
	2							
			0.76 Grey, medium to fine-grained sand, wet	SS 2	49	2-8-26-36 (34)		
1	3							
	4							
	5							
	6			SS 3	16	2-22-50 (72)		
2	7							
	8		2.29 Grey, medium to fine-grained sand with gravel, wet	SS 4	34	2-2-4-6 (6)		
	9							
	10		3.05 No sample due to gravel plug in splitspoon (interpreted to be grey, medium to fine-grained sand with gravel, wet)	SS 5	0	3-50		
3	11							
	12							
	13							
4			4.22 Refusal encountered - interpreted bedrock Bottom of hole at 4.22 m.					



## Appendix D















## Appendix E



C.O.C.: G103251

REPORT No. B21-15060

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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

DATE RECEIVED: 19-May-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 10-Jun-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	OB-3	OB-8	BR-8	QAQC- (Routine)
					Sample I.D.	B21-15060-1	B21-15060-2	B21-15060-3	B21-15060-4
					Date Collected	17-May-21	17-May-21	17-May-21	17-May-21
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	01-Jun-21/O	651	257	250	652	
Chloride	mg/L	0.5	SM4110C	26-May-21/O	201	95.0	55.1	164	
Nitrate (N)	mg/L	0.05	SM4110C	26-May-21/O					
Sulphate	mg/L	1	SM4110C	26-May-21/O					
Phosphorus-Total	mg/L	0.01	E3199A.1	03-Jun-21/K					
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	03-Jun-21/K					
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	04-Jun-21/K					
TDS (Calc. from Cond.)	mg/L	1	Calc.	02-Jun-21	999	419	347	999	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-May-21/O	4.1	4.9	4.1	5.2	
COD	mg/L	5	SM5220C	21-May-21/K					
Hardness (as CaCO3)	mg/L	1	SM 3120	21-May-21/O	817	347	307	812	
Aluminum	mg/L	0.01	SM 3120	21-May-21/O					
Barium	mg/L	0.001	SM 3120	21-May-21/O					
Boron	mg/L	0.005	SM 3120	21-May-21/O	0.573	0.079	0.191	0.568	
Calcium	mg/L	0.02	SM 3120	21-May-21/O					
Chromium	mg/L	0.001	EPA 200.8	02-Jun-21/O					
Cobalt	mg/L	0.0001	EPA 200.8	02-Jun-21/O					
Copper	mg/L	0.0001	EPA 200.8	02-Jun-21/O					
Iron	mg/L	0.005	SM 3120	21-May-21/O	0.088	0.063	0.161	0.089	
Magnesium	mg/L	0.02	SM 3120	21-May-21/O					
Manganese	mg/L	0.001	SM 3120	21-May-21/O	0.394	0.002	0.054	0.391	
Potassium	mg/L	0.1	SM 3120	21-May-21/O					
Silicon	mg/L	0.01	SM 3120	21-May-21/O					
Sodium	mg/L	0.2	SM 3120	21-May-21/O	76.8	27.8	17.4	76.6	
Strontium	mg/L	0.001	SM 3120	21-May-21/O					
Zinc	mg/L	0.005	SM 3120	21-May-21/O					



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

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

Michelle Dubien  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

C.O.C.: G103251

REPORT No. B21-15060

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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

DATE RECEIVED: 19-May-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 10-Jun-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			Client I.D.	OB-3	OB-8	BR-8	QAQC- (Routine)	
			Sample I.D.	B21-15060-1	B21-15060-2	B21-15060-3	B21-15060-4	
			Date Collected	17-May-21	17-May-21	17-May-21	17-May-21	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				



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Michelle Dubien  
 Lab Manager

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C.O.C.: G103251

REPORT No. B21-15060

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**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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

DATE RECEIVED: 19-May-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 10-Jun-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		BR-1	BR-2	BR-9	BR-10
			Reference Method	Date/Site Analyzed	B21-15060-5	B21-15060-6	B21-15060-7	B21-15060-8
					17-May-21	17-May-21	17-May-21	17-May-21
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	01-Jun-21/O	788	328	253	512
Chloride	mg/L	0.5	SM4110C	26-May-21/O	11.8	56.4	6.0	469
Nitrate (N)	mg/L	0.05	SM4110C	26-May-21/O	0.08	0.15	0.17	0.66
Sulphate	mg/L	1	SM4110C	26-May-21/O	7	20	11	33
Phosphorus-Total	mg/L	0.01	E3199A.1	03-Jun-21/K	0.02	0.10	0.03	0.20
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	03-Jun-21/K	0.8	0.2	0.1	13.4
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	04-Jun-21/K	0.28	0.02	< 0.01	12.6
TDS (Calc. from Cond.)	mg/L	1	Calc.	02-Jun-21	975	413	254	1336
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-May-21/O	10.0	3.9	2.8	5.2
COD	mg/L	5	SM5220C	21-May-21/K	37	15	8	44
Hardness (as CaCO3)	mg/L	1	SM 3120	21-May-21/O	875	363	259	664
Aluminum	mg/L	0.01	SM 3120	21-May-21/O	0.10	0.07	0.05	0.10
Barium	mg/L	0.001	SM 3120	21-May-21/O	0.154	0.156	0.068	0.762
Boron	mg/L	0.005	SM 3120	21-May-21/O	0.823	0.012	0.013	0.415
Calcium	mg/L	0.02	SM 3120	21-May-21/O	189	110	70.9	193
Chromium	mg/L	0.001	EPA 200.8	02-Jun-21/O	< 0.001	< 0.001	< 0.001	0.002
Cobalt	mg/L	0.0001	EPA 200.8	02-Jun-21/O	0.0096	0.0003	0.0001	0.0116
Copper	mg/L	0.0001	EPA 200.8	02-Jun-21/O	0.0051	0.0011	0.0014	0.0020
Iron	mg/L	0.005	SM 3120	21-May-21/O	1.01	0.643	0.006	21.2
Magnesium	mg/L	0.02	SM 3120	21-May-21/O	98.0	21.5	20.0	44.2
Manganese	mg/L	0.001	SM 3120	21-May-21/O	0.610	0.034	0.001	5.26
Potassium	mg/L	0.1	SM 3120	21-May-21/O	17.4	6.5	2.8	25.2
Silicon	mg/L	0.01	SM 3120	21-May-21/O	6.13	5.13	3.67	9.72
Sodium	mg/L	0.2	SM 3120	21-May-21/O	67.7	21.5	3.7	212
Strontium	mg/L	0.001	SM 3120	21-May-21/O	0.808	0.200	0.136	0.603
Zinc	mg/L	0.005	SM 3120	21-May-21/O	< 0.005	< 0.005	< 0.005	< 0.005



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Michelle Dubien  
 Lab Manager

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REPORT No. B21-15060

**Report To:**

**Greenview Environmental Management**

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 19-May-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 10-Jun-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

					Client I.D.	OB-11R	OB-12	QA/QC (Surveillance)	
					Sample I.D.	B21-15060-9	B21-15060-10	B21-15060-11	
					Date Collected	17-May-21	17-May-21	17-May-21	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed					
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	01-Jun-21/O	403	243	244		
Chloride	mg/L	0.5	SM4110C	26-May-21/O	865	147	154		
Nitrate (N)	mg/L	0.05	SM4110C	26-May-21/O	2.18	0.10	0.16		
Sulphate	mg/L	1	SM4110C	26-May-21/O	64	10	11		
Phosphorus-Total	mg/L	0.01	E3199A.1	03-Jun-21/K	0.45	0.07	0.08		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	03-Jun-21/K	0.3	0.2	0.2		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	04-Jun-21/K	0.05	0.02	0.02		
TDS (Calc. from Cond.)	mg/L	1	Calc.	02-Jun-21	2042	497	505		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-May-21/O	2.1	1.5	1.6		
COD	mg/L	5	SM5220C	21-May-21/K	19	10	12		
Hardness (as CaCO3)	mg/L	1	SM 3120	21-May-21/O	703	319	324		
Aluminum	mg/L	0.01	SM 3120	21-May-21/O	0.10	0.06	0.05		
Barium	mg/L	0.001	SM 3120	21-May-21/O	0.462	0.126	0.129		
Boron	mg/L	0.005	SM 3120	21-May-21/O	0.040	0.009	0.010		
Calcium	mg/L	0.02	SM 3120	21-May-21/O	210	92.0	94.1		
Chromium	mg/L	0.001	EPA 200.8	02-Jun-21/O	< 0.002	< 0.001	< 0.001		
Cobalt	mg/L	0.0001	EPA 200.8	02-Jun-21/O	< 0.001	< 0.0001	< 0.0001		
Copper	mg/L	0.0001	EPA 200.8	02-Jun-21/O	0.0021	0.0013	0.0013		
Iron	mg/L	0.005	SM 3120	21-May-21/O	0.011	0.005	0.005		
Magnesium	mg/L	0.02	SM 3120	21-May-21/O	43.2	21.6	21.7		
Manganese	mg/L	0.001	SM 3120	21-May-21/O	0.002	0.020	0.020		
Potassium	mg/L	0.1	SM 3120	21-May-21/O	4.7	2.8	2.8		
Silicon	mg/L	0.01	SM 3120	21-May-21/O	4.59	3.33	3.32		
Sodium	mg/L	0.2	SM 3120	21-May-21/O	469	61.2	61.1		
Strontium	mg/L	0.001	SM 3120	21-May-21/O	0.522	0.212	0.211		



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

Michelle Dubien  
 Lab Manager

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C.O.C.: G103251

REPORT No. B21-15060

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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

DATE RECEIVED: 19-May-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 10-Jun-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	OB-11R	OB-12	QA/QC (Surveillance)
					Sample I.D.	Date Collected		
Zinc	mg/L	0.005	SM 3120	21-May-21/O	B21-15060-9	17-May-21	B21-15060-10	17-May-21
					B21-15060-11			17-May-21
						< 0.005	< 0.005	< 0.005



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

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

Michelle Dubien  
 Lab Manager

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C.O.C.: G103252

REPORT No. B21-15059

**Report To:**

**Greenview Environmental Management**

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 19-May-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 10-Jun-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	SW-1	QAQC (SW)		
					Sample I.D.	B21-15059-1	B21-15059-2		
					Date Collected	17-May-21	17-May-21		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	01-Jun-21/O		128	127		
pH @25°C	pH Units		SM 4500H	01-Jun-21/O		7.95	7.90		
Conductivity @25°C	µmho/cm	1	SM 2510B	01-Jun-21/O		260	260		
Chloride	mg/L	0.5	SM4110C	26-May-21/O		1.0	1.0		
Nitrite (N)	mg/L	0.05	SM4110C	26-May-21/O		0.07	0.07		
Nitrate (N)	mg/L	0.05	SM4110C	26-May-21/O		0.13	0.14		
BOD(5 day)	mg/L	3	SM 5210B	20-May-21/K		< 3	< 3		
Total Suspended Solids	mg/L	3	SM2540D	19-May-21/K		< 3	< 3		
Phosphorus-Total	mg/L	0.01	E3199A.1	03-Jun-21/K		0.02	0.04		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	03-Jun-21/K		0.4	0.5		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	04-Jun-21/K		0.01	0.01		
TDS (Calc. from Cond.)	mg/L	1	Calc.	02-Jun-21		133	133		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	26-May-21/O		9.5	9.4		
Phenolics	mg/L	0.001	MOEE 3179	26-May-21/K		< 0.001	< 0.001		
COD	mg/L	5	SM5220C	19-May-21/K		23	31		
Hardness (as CaCO3)	mg/L	1	SM 3120	25-May-21/O		139	142		
Aluminum	mg/L	0.01	SM 3120	25-May-21/O		0.17	0.16		
Barium	mg/L	0.001	SM 3120	25-May-21/O		0.064	0.065		
Boron	mg/L	0.005	SM 3120	25-May-21/O		0.026	0.026		
Calcium	mg/L	0.02	SM 3120	25-May-21/O		38.7	39.7		
Chromium	mg/L	0.001	EPA 200.8	03-Jun-21/O		< 0.001	< 0.001		
Cobalt	mg/L	0.0001	EPA 200.8	03-Jun-21/O		0.0002	0.0002		
Copper	mg/L	0.0001	EPA 200.8	03-Jun-21/O		0.0015	0.0019		
Iron	mg/L	0.005	SM 3120	25-May-21/O		0.268	0.240		
Magnesium	mg/L	0.02	SM 3120	25-May-21/O		10.2	10.3		
Manganese	mg/L	0.001	SM 3120	25-May-21/O		0.025	0.022		
Potassium	mg/L	0.1	SM 3120	25-May-21/O		1.0	1.0		



R.L. = Reporting Limit

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

Michelle Dubien  
 Lab Manager

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C.O.C.: G103252

REPORT No. B21-15059

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

285 Dalton Ave  
 Kingston Ontario K7K 6Z1  
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DATE RECEIVED: 19-May-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 10-Jun-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	SW-1	QAQC (SW)		
Silicon	mg/L	0.01	SM 3120	25-May-21/O	3.71	3.73		
Sodium	mg/L	0.2	SM 3120	25-May-21/O	1.9	1.9		
Strontium	mg/L	0.001	SM 3120	25-May-21/O	0.112	0.112		
Zinc	mg/L	0.005	SM 3120	25-May-21/O	0.013	0.015		



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 Lab Manager

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C.O.C.: G100095

REPORT No. B21-26544 (I)

**Report To:**

**Greenview Environmental Management**

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

285 Dalton Ave

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Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 20-Aug-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 30-Aug-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	OB-3	OB-8	BR-8	QAQC Routine			
					Sample I.D.	Date Collected	OB-3	OB-8	BR-8	QAQC Routine		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Aug-21/O	B21-26544-1	19-Aug-21	B21-26544-2	19-Aug-21	B21-26544-3	B21-26544-4	19-Aug-21	637
Chloride	mg/L	0.5	SM4110C	26-Aug-21/O								341
Nitrate (N)	mg/L	0.05	SM4110C	26-Aug-21/O								
Sulphate	mg/L	1	SM4110C	26-Aug-21/O								
Phosphorus-Total	mg/L	0.01	E3199A.1	26-Aug-21/K								
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	26-Aug-21/K								
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	26-Aug-21/K								
TDS (Calc. from Cond.)	mg/L	1	Calc.	25-Aug-21		1091	607	361				1097
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	23-Aug-21/O		2.9	4.3	3.6				4.3
COD	mg/L	5	SM5220C	24-Aug-21/K								
Hardness (as CaCO3)	mg/L	1	SM 3120	24-Aug-21/O		956	548	327				948
Aluminum	mg/L	0.01	SM 3120	24-Aug-21/O								
Barium	mg/L	0.001	SM 3120	24-Aug-21/O								
Boron	mg/L	0.005	SM 3120	24-Aug-21/O		0.621	0.107	0.259				0.618
Calcium	mg/L	0.02	SM 3120	24-Aug-21/O								
Chromium	mg/L	0.001	EPA 200.8	25-Aug-21/O								
Cobalt	mg/L	0.0001	EPA 200.8	25-Aug-21/O								
Copper	mg/L	0.002	SM 3120	24-Aug-21/O								
Iron	mg/L	0.005	SM 3120	24-Aug-21/O		0.215	0.154	0.232				0.213
Magnesium	mg/L	0.02	SM 3120	24-Aug-21/O								
Manganese	mg/L	0.001	SM 3120	24-Aug-21/O		0.461	0.006	0.064				0.456
Potassium	mg/L	0.1	SM 3120	24-Aug-21/O								
Sodium	mg/L	0.2	SM 3120	24-Aug-21/O		87.6	38.2	18.7				87.3
Silicon	mg/L	0.01	SM 3120	24-Aug-21/O								
Strontium	mg/L	0.001	SM 3120	24-Aug-21/O								
Zinc	mg/L	0.005	SM 3120	24-Aug-21/O								

*M. Dubien*

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Michelle Dubien  
 Lab Manager

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C.O.C.: G100095

REPORT No. B21-26544 (i)

**Report To:**

**Greenview Environmental Management**

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

**Attention:** Riley Betson

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285 Dalton Ave

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Fax: 613-544-2770

DATE RECEIVED: 20-Aug-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 30-Aug-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

			<b>Client I.D.</b>	OB-3	OB-8	BR-8	QAQC Routine
			<b>Sample I.D.</b>	B21-26544-1	B21-26544-2	B21-26544-3	B21-26544-4
			<b>Date Collected</b>	19-Aug-21	19-Aug-21	19-Aug-21	19-Aug-21
<b>Parameter</b>	<b>Units</b>	<b>R.L.</b>	<b>Reference Method</b>	<b>Date/Site Analyzed</b>			



Michelle Dubien  
 Lab Manager

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REPORT No. B21-26544 (i)

**Report To:**

**Greenview Environmental Management**

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 20-Aug-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 30-Aug-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	BR-1	BR-2	BR-9	BR-10
					Sample I.D.	Date Collected	19-Aug-21	19-Aug-21	19-Aug-21
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Aug-21/O	B21-26544-5	705	338	256	571
Chloride	mg/L	0.5	SM4110C	26-Aug-21/O	B21-26544-6	241	91.7	21.8	987
Nitrate (N)	mg/L	0.05	SM4110C	26-Aug-21/O	B21-26544-7	< 0.05	< 0.05	0.06	< 0.5
Sulphate	mg/L	1	SM4110C	26-Aug-21/O	B21-26544-8	80	25	18	64
Phosphorus-Total	mg/L	0.01	E3199A.1	26-Aug-21/K		0.01	0.22	0.04	0.13
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	26-Aug-21/K		0.6	0.3	0.1	13.6
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	26-Aug-21/K		0.22	0.03	0.01	12.8
TDS (Calc. from Cond.)	mg/L	1	Calc.	25-Aug-21		1045	469	287	2266
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	23-Aug-21/O		5.9	3.0	3.0	4.8
COD	mg/L	5	SM5220C	24-Aug-21/K		28	19	9	60
Hardness (as CaCO3)	mg/L	1	SM 3120	24-Aug-21/O		943	428	300	1260
Aluminum	mg/L	0.01	SM 3120	24-Aug-21/O		0.10	0.08	0.06	0.13
Barium	mg/L	0.001	SM 3120	24-Aug-21/O		0.172	0.197	0.086	1.40
Boron	mg/L	0.005	SM 3120	24-Aug-21/O		0.752	0.016	0.026	0.476
Calcium	mg/L	0.02	SM 3120	24-Aug-21/O		208	132	83.2	374
Chromium	mg/L	0.001	EPA 200.8	25-Aug-21/O		< 0.001	< 0.001	< 0.001	< 0.002
Cobalt	mg/L	0.0001	EPA 200.8	25-Aug-21/O		0.0084	0.0003	0.0001	0.0174
Copper	mg/L	0.002	SM 3120	24-Aug-21/O		0.002	< 0.002	< 0.002	< 0.002
Iron	mg/L	0.005	SM 3120	24-Aug-21/O		1.77	0.604	0.011	30.3
Magnesium	mg/L	0.02	SM 3120	24-Aug-21/O		103	23.9	22.4	79.9
Manganese	mg/L	0.001	SM 3120	24-Aug-21/O		0.564	0.049	0.002	8.03
Potassium	mg/L	0.1	SM 3120	24-Aug-21/O		17.3	7.8	3.4	33.6
Sodium	mg/L	0.2	SM 3120	24-Aug-21/O		81.1	26.4	6.5	444
Silicon	mg/L	0.01	SM 3120	24-Aug-21/O		6.82	6.39	4.35	10.7
Strontium	mg/L	0.001	SM 3120	24-Aug-21/O		0.885	0.229	0.184	1.09
Zinc	mg/L	0.005	SM 3120	24-Aug-21/O		< 0.005	< 0.005	< 0.005	0.005



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

Michelle Dubien  
 Lab Manager

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C.O.C.: G100095

REPORT No. B21-26544 (I)

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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

DATE RECEIVED: 20-Aug-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 30-Aug-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

					Client I.D.	OB-11R	OB-12	QA/QC Surveillance	
					Sample I.D.	B21-26544-9	B21-26544-10	B21-26544-11	
					Date Collected	19-Aug-21	19-Aug-21	19-Aug-21	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed					
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	24-Aug-21/O	409	253	253		
Chloride	mg/L	0.5	SM4110C	26-Aug-21/O	912	132	131		
Nitrate (N)	mg/L	0.05	SM4110C	26-Aug-21/O	2.07	< 0.05	< 0.05		
Sulphate	mg/L	1	SM4110C	26-Aug-21/O	74	12	12		
Phosphorus-Total	mg/L	0.01	E3199A.1	26-Aug-21/K	0.04	0.10	0.10		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	26-Aug-21/K	0.2	0.2	0.2		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	26-Aug-21/K	0.04	0.05	0.04		
TDS (Calc. from Cond.)	mg/L	1	Calc.	25-Aug-21	2036	449	447		
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	23-Aug-21/O	1.8	1.7	1.8		
COD	mg/L	5	SM5220C	24-Aug-21/K	11	< 5	11		
Hardness (as CaCO3)	mg/L	1	SM 3120	24-Aug-21/O	678	305	312		
Aluminum	mg/L	0.01	SM 3120	24-Aug-21/O	0.10	0.06	0.06		
Barium	mg/L	0.001	SM 3120	24-Aug-21/O	0.489	0.145	0.149		
Boron	mg/L	0.005	SM 3120	24-Aug-21/O	0.044	0.013	0.015		
Calcium	mg/L	0.02	SM 3120	24-Aug-21/O	206	89.4	91.5		
Chromium	mg/L	0.001	EPA 200.8	25-Aug-21/O	< 0.002	< 0.001	< 0.001		
Cobalt	mg/L	0.0001	EPA 200.8	25-Aug-21/O	< 0.001	0.0002	0.0002		
Copper	mg/L	0.002	SM 3120	24-Aug-21/O	< 0.002	< 0.002	< 0.002		
Iron	mg/L	0.005	SM 3120	24-Aug-21/O	0.021	0.009	0.006		
Magnesium	mg/L	0.02	SM 3120	24-Aug-21/O	39.6	19.9	20.3		
Manganese	mg/L	0.001	SM 3120	24-Aug-21/O	0.003	0.421	0.430		
Potassium	mg/L	0.1	SM 3120	24-Aug-21/O	5.3	3.4	3.5		
Sodium	mg/L	0.2	SM 3120	24-Aug-21/O	499	70.0	71.4		
Silicon	mg/L	0.01	SM 3120	24-Aug-21/O	5.64	4.59	4.62		
Strontium	mg/L	0.001	SM 3120	24-Aug-21/O	0.504	0.224	0.229		



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

Michelle Dubien  
 Lab Manager

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C.O.C.: G100095

REPORT No. B21-26544 (I)

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

285 Dalton Ave  
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 Fax: 613-544-2770

DATE RECEIVED: 20-Aug-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 30-Aug-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	OB-11R	OB-12	QA/QC Surveillance	
Zinc	mg/L	0.005	SM 3120	24-Aug-21/O	< 0.005	< 0.005	0.007	

Client I.D.	OB-11R	OB-12	QA/QC Surveillance	
Sample I.D.	B21-26544-9	B21-26544-10	B21-26544-11	
Date Collected	19-Aug-21	19-Aug-21	19-Aug-21	



R.L. = Reporting Limit

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

Michelle Dubien  
 Lab Manager

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C.O.C.: G100095

REPORT No. B21-26544 (ii)

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Crt., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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

DATE RECEIVED: 20-Aug-21

DATE REPORTED: 30-Aug-21

SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Norway Lake WDS

P.O. NUMBER: 102.21.013

WATERWORKS NO.

			Client I.D.	BR-1			
			Sample I.D.	B21-26544-5			
			Date Collected	19-Aug-21			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Acetone	µg/L	30	EPA 8260	23-Aug-21/R	< 30		
Benzene	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Bromobenzene	µg/L	0.4	EPA 8260	23-Aug-21/R	< 0.4		
Bromodichloromethane	µg/L	2	EPA 8260	23-Aug-21/R	< 2		
Bromoform	µg/L	5	EPA 8260	23-Aug-21/R	< 5		
Bromomethane	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Carbon Tetrachloride	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2		
Chloroethane	µg/L	3	EPA 8260	23-Aug-21/R	< 3		
Chloroform	µg/L	1	EPA 8260	23-Aug-21/R	< 1		
Chloromethane	µg/L	2	EPA 8260	23-Aug-21/R	< 2		
Chlorotoluene,2-	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2		
Chlorotoluene,4-	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2		
Dibromo-3-Chloropropane, 1,2-	µg/L	0.6	EPA 8260	23-Aug-21/R	< 0.6		
Dibromochloromethane	µg/L	2	EPA 8260	23-Aug-21/R	< 2		
Dibromoethane, 1,2- (Ethylene Dibromide)	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2		
Dibromomethane	µg/L	0.1	EPA 8260	23-Aug-21/R	< 0.1		
Dichlorobenzene, 1,2-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Dichlorobenzene, 1,3-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Dichlorobenzene, 1,4-	µg/L	0.5	EPA 8260	23-Aug-21/R	1.1		
Dichlorodifluoromethane	µg/L	2	EPA 8260	23-Aug-21/R	< 2		
Dichloroethane, 1,1-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Dichloroethane, 1,2-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Dichloroethylene, 1,1-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Dichloroethene, cis-1,2-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		
Dichloroethene, trans-1,2-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5		



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 Lab Manager

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REPORT No. B21-26544 (ii)

**Report To:**

**Greenview Environmental Management**  
 13 Commerce Ct., PO Box 100  
 Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

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

DATE RECEIVED: 20-Aug-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 30-Aug-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Client I.D.		BR-1	
			Reference Method	Date/Site Analyzed	Sample I.D.	
					B21-26544-5	
					19-Aug-21	
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	23-Aug-21/R	< 5	
Dichloropropane, 1,2-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Dichloropropane, 1,3-	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2	
Dichloropropene, cis-1,3-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Dichloropropene, trans-1,3-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Dichloropropene, 1,1-	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2	
Ethylbenzene	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Hexachlorobutadiene	µg/L	0.6	EPA 8260	23-Aug-21/R	< 0.6	
Hexane	µg/L	5	EPA 8260	23-Aug-21/R	< 5	
Isopropylbenzene	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2	
Isopropyltoluene, 4-	µg/L	0.2	EPA 8260	23-Aug-21/R	< 0.2	
Methyl Butyl Ketone	µg/L	5	EPA 8260	23-Aug-21/R	< 5	
Methyl Ethyl Ketone	µg/L	20	EPA 8260	23-Aug-21/R	< 20	
Methyl Isobutyl Ketone	µg/L	20	EPA 8260	23-Aug-21/R	< 20	
Methyl-t-butyl Ether	µg/L	2	EPA 8260	23-Aug-21/R	< 2	
Monochlorobenzene (Chlorobenzene)	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Naphthalene	µg/L	0.4	EPA 8260	23-Aug-21/R	< 0.4	
n-Butylbenzene	µg/L	0.4	EPA 8260	23-Aug-21/R	< 0.4	
n-Propylbenzene	µg/L	0.1	EPA 8260	23-Aug-21/R	< 0.1	
sec-Butylbenzene	µg/L	0.1	EPA 8260	23-Aug-21/R	< 0.1	
Styrene	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
tert-Butylbenzene	µg/L	0.1	EPA 8260	23-Aug-21/R	< 0.1	
Tetrachloroethane, 1,1,1,2-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Tetrachloroethane, 1,1,2,2-	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Tetrachloroethylene	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	
Toluene	µg/L	0.5	EPA 8260	23-Aug-21/R	< 0.5	



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

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

Michelle Dubien  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

C.O.C.: G100095

REPORT No. B21-26544 (ii)

**Report To:**

**Greenview Environmental Management**

13 Commerce Crt., PO Box 100

Bancroft Ontario K0L1C0

**Attention:** Riley Betson

**Caduceon Environmental Laboratories**

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 20-Aug-21

JOB/PROJECT NO.: Norway Lake WDS

DATE REPORTED: 30-Aug-21

P.O. NUMBER: 102.21.013

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	Sample I.D.	Date Collected
Trichlorobenzene, 1,2,3-	µg/L	0.5	EPA 8260	23-Aug-21/R	BR-1	B21-26544-5	19-Aug-21
Trichlorobenzene, 1,2,4-	µg/L	0.5	EPA 8260	23-Aug-21/R			
Trichloroethane, 1,1,1-	µg/L	0.5	EPA 8260	23-Aug-21/R			
Trichloroethane, 1,1,2-	µg/L	0.5	EPA 8260	23-Aug-21/R			
Trichloroethylene	µg/L	0.5	EPA 8260	23-Aug-21/R			
Trichlorofluoromethane	µg/L	5	EPA 8260	23-Aug-21/R			
Trichloropropane, 1,2,3-	µg/L	0.5	EPA 8260	23-Aug-21/R			
Trimethylbenzene, 1,2,4-	µg/L	1	EPA 8260	23-Aug-21/R			
Trimethylbenzene, 1,3,5-	µg/L	0.1	EPA 8260	23-Aug-21/R			
Vinyl Chloride	µg/L	0.2	EPA 8260	23-Aug-21/R			
Xylene, m,p-	µg/L	1.0	EPA 8260	23-Aug-21/R			
Xylene, o-	µg/L	0.5	EPA 8260	23-Aug-21/R			



R.L. = Reporting Limit

Test methods may be modified from specified reference method unless indicated by an \*

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

Michelle Dubien  
 Lab Manager

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from

## Appendix F



## Appendix D-Monitoring and Screening Checklist General Information and Instructions

**General Information:** The checklist is to be completed, and submitted with the Monitoring Report.

**Instructions:** A complete checklist consists of:

- (a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
- (b) completed contact information for the Competent Environmental Practitioner (CEP)
- (c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

**Definition of Groundwater CEP:**

For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:

- (a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
- (b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..

**Definition of Surface water CEP:**

A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

### Monitoring Report and Site Information

Waste Disposal Site Name: Norway Lake WDS  
Location (e.g. street address, lot, concession): Part of Lot 20, Concession 7, geographic Township of Bagot, Township of Greater Madawaska  
GPS Location (taken within the property boundary at front gate/front entry):  
North American Datum (NAD83) are 367326.0 metres (m) East, 5021906.0 m North, in Zone 18T  
Municipality: Township of Greater Madawaska

Client and/or Site Owner: Township of Greater Madawaska

Monitoring Period (Year): 2021

This Monitoring Report is being submitted under the following:

- Certificate of Approval No.: A411702
- Director's Order No.: \_\_\_\_\_
- Provincial Officer's Order No.: \_\_\_\_\_
- Other: \_\_\_\_\_

Report Submission Frequency: Annual  Other  specify : \_\_\_\_\_

The site is: active  inactive  closed

If closed, specify C of A, control or authorizing document closure date: Amendment to PC of A (A411702) dated December 24, 2003

Has the nature of the operations at the site changed during this monitoring period? Yes  No

If yes, provide details: \_\_\_\_\_

**Groundwater WDS Verification:**

Based on all available information about the site and site knowledge, it is my opinion that:

**Sampling and Monitoring Program Status:**

- 1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:

Yes       No

If no, list exceptions:

- 2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):

Yes       No       Not applicable

If no, list exceptions below or attach information.

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date



3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.

Yes       No       Not applicable

b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:

Yes       No       Not applicable

If no, list exceptions or attach additional information.

Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
See Report		

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):

Yes       No

If no, specify:

**Sampling and Monitoring Program Results/WDS Conditions and Assessment:**

- 5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.

Yes       No

If no, the potential design and operational concerns/exceptions are as follows:

See Report

- 6) The site meets compliance and assessment criteria.

Yes       No

If no, list and explain exceptions

See Report

- 7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.

Yes       No

If no, list exceptions and explain reason for increase/change.

See Report

8) Is one or more of the following risk reduction practices in place at the site:

- (a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or
- (b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or
- (c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):
  - i. The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and
  - ii. Seasonal and annual water levels and water quality fluctuations are well understood.

Yes Note which practice(s): (a)  b)  c)   
 No

9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):

Yes  No  Not applicable

If yes, list value(s) that are/have been exceeded and follow-up action taken

See Report

**Groundwater CEP Declaration:**

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated: \_\_\_\_\_.

**Recommendations:**

Based on my technical review of the monitoring results for the waste disposal site:

- No changes to the monitoring program are recommended
- The following change(s) to the monitoring program is/are recommended:

Recommendation to revise groundwater sampling program from Spring & Summer to Spring & Fall.

See Section 5.0 of 2020 Annual Report.

- No changes to the site design and operation are recommended
- The following change(s) to the site design and operation is/are recommended:

\_\_\_\_\_  
\_\_\_\_\_

Name: Dan Hagan, P.Geo.

Seal:

Signature: 

Date: Mar21-22



**CEP Contact Information:**

Company: Greenview Environmental Address:

Telephone No.: 613-332-0057 Fax No. :

E-mail Address:

dan.hagan@greenview-environmental.ca

Co-signers for additional expertise provided:

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Surface Water WDS Verification:**

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s) Un-named seasonally-inundated creek

Distance(s) See report

Based on all available information and site knowledge, it is my opinion that:

**Sampling and Monitoring Program Status:**

- 1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:

Yes       No

If no, identify issues.

See Report. Next sampling event in 2021.

- 2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):

Yes       No       Not applicable (No C of A, authorizing/control document applies)

If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
See Report		

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.

Yes       No       Not applicable

b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:

Yes       No       Not applicable

If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
See Report		

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):

Yes       No

If no, specify:

**Sampling and Monitoring Program Results/WDS Conditions and Assessment:**

- 5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):

Yes       No

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

See Report. Next sampling event in 2021.

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
See report		

- 6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?

Yes       No

If yes, specify

See Report. Next sampling event in 2023.



- 7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.

Yes       No

If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range.

See Report. Next sampling event in 2023.

- 8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):

Yes       No       Not known       Not applicable

If yes, provide details and whether remedial measures are necessary.

See report

- 9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):

Yes       No       Not applicable

If yes, list value(s) that are/have been exceeded and follow-up action taken.

X

**Surface Water CEP Declaration:**

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated: \_\_\_\_\_.

**Recommendations:**

Based on my technical review of the monitoring results for the waste disposal site:

- No changes to the monitoring program are recommended
- The following change(s) to the monitoring program is/are recommended:

\_\_\_\_\_

- No changes to the site design and operation are recommended
- The following change(s) to the site design and operation is/are recommended:

\_\_\_\_\_

\_\_\_\_\_  \_\_\_\_\_

CEP Signature:: \_\_\_\_\_  
Relevant Discipline P.Geo.  
Date: (yyyy/mm/dd): Mar21-22

CEP Contact Information:  
Company: Greenview Environmental Management Limited  
Address: 13 Commerce Court, Bancroft, Ontario, K0L 1C0  
Telephone No.: 613-332-0057  
Fax No. :  
E-mail Address: dan.hagan@greenview-environmental.ca

## Appendix G



## Statement of Service Conditions & Limitations

***The following conditions and limitations shall form an integral part of any agreement between Greenview and the Client. In the event of duplication or conflict, the most stringent shall supercede the other.***

### **Provision of Services and Payment**

Upon documented acceptance of Greenview's proposed services and conditions in written form by the Client, Greenview may commence work on the proposed services directly.

Greenview's offers for services in the form of proposals, quotations, bids, tenders, or other like an offering to a Client are formulated upon available information at the time of the offer submission. In the event of discovery of unknown conditions, or any other unknown circumstance that may arise following the presentation of Greenview's offer to the Client, Greenview reserves the right to negotiate terms with the Client with respect to changes in scope, fees, disbursements, or the like as may be fair and reasonable considering the discovery.

Upon retention of Greenview's services related to any commission, the Client agrees to remit payment for the services rendered for the specified period within (30) days of the invoice date as invoiced by Greenview on a typical monthly basis, unless otherwise arranged between the Client and Greenview. In the event of non-payment by the Client, Greenview reserves the right, without external influence or expense, to discontinue services and retain any documentation, data, reports, or other project information until such time as payment is received by Greenview. Interest on any overdue accounts may be applied accordingly.

### **Warranty, Limitations, and Reliance**

Greenview relies on background and historical information from the Client to determine the appropriate scope of services to meet the Client's objectives, in accordance with applicable legislation, guidelines, industry practices, and accepted methodologies.

Greenview provides its services under the specific terms and conditions of a specific proposal (and where necessary formal contract), in accordance with the above requirements and the *Limitations Act 2002*, as amended, only.

The hypotheses, results, conclusions, and recommendations presented in documentation authored by Greenview are founded on the information provided by the Client to Greenview in preparation for the work. Facts, conditions, and circumstances discovered by Greenview during the performance of the work requested by the Client are assumed by Greenview to be part of preparatory information provided by the Client as part of the proposal stage of the project. Greenview assumes that, until notified or discovered otherwise, that the information provided by, or obtained by Greenview from, the Client is factual, accurate, and represents a true depiction of the circumstances that exist related to the time of the work.

Greenview relies on its Clients to inform Greenview if there are changes to any related information to the work. Greenview does not review, analyze, or attempt to verify the accuracy or completeness of the information or materials provided, or circumstances encountered, other than in accordance with applicable accepted industry practice. Greenview will not be responsible for matters arising from incomplete, incorrect, or misleading information or from facts or circumstances that are not fully disclosed to, or that are concealed from Greenview during the period that proposals, services, work, or documentation preparation was performed by Greenview.

Facts, conditions, information, and circumstances may vary with time and locations and Greenview's services are based on a review of such matters as they existed at the time and location indicated in its documentation. No assurance is made by Greenview that the facts, conditions, information, circumstances or any underlying assumptions made by Greenview in connection with the work performed will not change after the work is completed and documentation is submitted. If any such changes occur or additional information is obtained, Greenview should be advised and

requested to consider if the changes or additional information affect its findings or results.

When preparing documentation, Greenview considers applicable legislation, regulations, governmental guidelines, and policies to the extent they are within its knowledge, but Greenview is not qualified to advise with respect to legal matters. The presentation of information regarding applicable legislation, regulations, not intended to and should not be interpreted as constituting a legal opinion concerning the work completed or conditions outlined in a report. All legal matters should be reviewed and considered by an appropriately qualified legal practitioner.

Greenview's services, work and reports are provided solely for the exclusive use of the Client which has retained the services of Greenview and to which its reports are addressed. Greenview is not responsible for the use of its services, work or reports by any other party, or for the reliance on, or for any decision which is made by any party using the services or work performed by or a report prepared by Greenview without Greenview's express written consent. Any party that uses, relies on, or makes a decision based on services or work performed by Greenview or a report prepared by Greenview without Greenview's express written consent, does so at its own risk. Except as set out herein, Greenview specifically disclaims any liability or responsibility to any third party for any loss, damage, expense, fine, penalty or other such thing which may arise or result from the use of, reliance on or decision based on any information, recommendation or other matter arising from the services, work or reports provided by Greenview.

### **Site Reviews and Assessments**

A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Greenview's work or report considers any locations or times other than those from which information, sample results and data were specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those based on extrapolations.

Only conditions, and substances, at the site and locations chosen for study by the Client are evaluated; no adjacent or other properties are evaluated unless specifically requested by the Client. Any physical or other aspects of the site that were not chosen for study by the Client, or any other matter not specifically addressed in a report prepared by Greenview, are beyond the scope of the work performed by Greenview and such matters have not been investigated or addressed.

### **Confidentiality**

Greenview provides its proposals, reports, assessments, designs, and any other work for the sole party identified as the Client or potential Client in the case of proposals.

For proposals specifically, the information contained therein is strictly confidential, proprietary information, and shall not be reproduced or disclosed to any other party than to that of the addressee of the original proposal submission, without prior written permission of Greenview. Any such unauthorised reproduction, in whole or in part, is considered a breach of trust or contract, as applicable by law.

Greenview retains all rights to its working/editable files, documents, calculations, drawings, and all other such information utilized in the preparation of its end deliverables to its Clients. Working documentation is considered to be proprietary, and the sole ownership of Greenview and its subconsultants/subcontractors.