



2022 Annual Report

Mount St. Patrick Waste Disposal Site (A411901)

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

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13 Commerce Court
Bancroft, Ontario
613-332-0057
www.greenview-environmental.ca



Executive Summary

This report has been prepared to document the results of the 2022 environmental monitoring program for the Township of Greater Madawaska's Mount St. Patrick Waste Disposal Site, located on part of Lot 4, Concession 14 within the geographic Township of Brougham, in the Township of Greater Madawaska.

The Mount St. Patrick site operates in accordance with Environmental Compliance Approval A411901, as an active waste disposal site and transfer station, and has an approved waste disposal area of 1.2 hectares within a total property area of 38.25 hectares, owned by the Township of Greater Madawaska. The amended Environmental Compliance Approval approved the continued use of the site as a landfill for approved waste and the establishment of a transfer station for municipal mixed waste and recyclables.

The groundwater configuration at the site in 2022 was interpreted to be generally consistent with historical interpretations, with the predominant direction of groundwater flow in the overburden unit being to the north towards the low-lying areas, and in the general direction of Constant Creek.

Groundwater immediately downgradient of the site at monitors MW06-2, MW06-3, and MW06-4 was interpreted to be impacted by landfill-related activities, winter road maintenance activities, and to naturally-occurring conditions within the adjacent low-lying areas. Results from monitoring well MW06-2 were interpreted to most represent leachate quality at the Mount St. Patrick site in 2022. New background monitoring well MW21-7 was documented to have generally high concentrations for aluminum, dissolved organic carbon, iron and manganese based on the preliminary sampling event in spring 2022. Historically, previously-existing background well MW08-1 has been documented to have naturally high concentrations of aluminum, dissolved organic carbon, iron, and manganese; however, in recent years groundwater quality results at MW08-1 have also been interpreted to display road salt impacts in results associated with the transfer station, Flat Road, and the Township's nearby winter sand storage area adjacent to the site.

Groundwater quality near the north-eastern property boundary and within a low-lying area is monitored at well MW09-5R, and was interpreted to be located partially cross-gradient and northeast of the waste mound. Ontario Drinking Water Standards non-conformances for concentrations of DOC, iron, and manganese in 2022 at monitoring well MW09-5R were attributed to naturally-occurring conditions within the low-lying area northeast of the site and not to landfill-related activities.

Groundwater monitoring well MW09-6R is located approximately 600 m northeast and downgradient of the Mount St. Patrick site and near the north-eastern property boundary. The Ontario Drinking Water Standards non-conformances at MW09-6R for DOC and iron in spring 2022; and DOC, iron, and manganese in fall 2022; as well as the Reasonable Use Concept non-conformance for concentrations of manganese in spring 2022, were all attributed to naturally-occurring conditions within the low-lying area northeast of the site. Documented groundwater quality results were not attributed to landfill-related activities at the Mount St. Patrick site. Given the considerable distance of MW09-6R from the Mount St. Patrick site (approximately 600 metres), its location within the low-lying area northeast of the site, and since it was interpreted to be the downgradient and downstream receiver of groundwater and surface water flow from the vicinity of Flat Road, non-conformances in 2022 groundwater quality results at MW09-6R were interpreted to be resultant of naturally-occurring conditions within the low-lying area and off-site sources.

Based on the Reasonable Use Concept assessment completed in 2022, it was interpreted that the Mount St. Patrick site was in compliance with Guideline B-7 along the northern and north-eastern property boundaries.

Further to the review of 2022 surface water quality results for downstream surface water sampling locations SW-1 and SW-4, Constant Creek was not interpreted to be impacted by landfill-related activities at the Mount St. Patrick site in 2022. Similarly, surface water sampling location SW-3, located near the Mount St. Patrick site and within the low-lying area, was not interpreted to be significantly impacted by landfill-related activities in historical

results.

To calculate the volume of processed construction, demolition, and bulky waste disposed, graded, and compacted at the site in 2022, the topographic survey conducted on December 08, 2022, was compared to the topographic survey conducted on December 14, 2021, for the Mount St. Patrick site. Additionally, with respect to the unprocessed construction and demolition and bulky waste stockpile on-site within the approved waste disposal area on December 08, 2022, a processing and compaction factor of 33% was applied to the stockpile volume in order to estimate the landfill capacity volume that would be utilized following the next processing event at the site. Therefore, based on the topographic survey calculations noted above for the Mount St. Patrick site, the 2022 fill rate was calculated to be approximately 645 cubic metres of waste.

Based on the calculated 2022 fill rate of 645 cubic metres in comparison to the approved final contours at closure of the Mount St. Patrick site, and with consideration of all the grading and compaction operations conducted by the Township in 2022, the remaining site capacity as of December 08, 2022, was approximately 34,874 cubic metres. Given the average (mean) five (5) year fill rate (2018 to 2022) of 881 cubic metres and the remaining capacity of 34,874 cubic metres, the estimated remaining site life for the Mount St. Patrick site is approximately forty (40) years.

Based on Township of Greater Madawaska records, approximately 3,601 vehicles visited the Mount St. Patrick site in 2022, and accepted approximately 9,893 bags and 69 trailer-loads of municipal waste for disposal and/or transfer. Based on information supplied by the Township of Greater Madawaska, 64 tonnes of municipal waste were collected at the Mount St. Patrick site in 2022 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario.

Recycling tonnage records provided by the Township of Greater Madawaska indicated that 24 tonnes of Blue Box recyclables were collected from the Mount St. Patrick Waste Disposal Site in 2022. Blue Box recyclable quantities contributing to this total included 12 tonnes of commingled containers, 7 tonnes of mixed fibres, and 5 tonnes of old corrugated cardboard.

Additionally, approximately 418 cubic metres of construction, demolition, and bulky waste, and 122 cubic metres of leaf and yard waste, was accepted at the Mount St. Patrick site in 2022.

According to Township of Greater Madawaska records, 111 tonnes of scrap metal, 75 refrigerant appliances, 1,723 tires, and 17 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 in 2022.

Based on the results of the 2022 environmental monitoring program, the Mount St. Patrick Waste Disposal Site was interpreted to be in compliance with all conditions of the Environmental Compliance Approval (A411901) and with the inspections, monitoring, and reporting requirements of the conditions therein.

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1.0 Introduction

1.1 Site Information

The Mount St. Patrick Waste Disposal Site operates in accordance with Environmental Compliance Approval (ECA) A411901 issued March 28, 1980, and the most recent amendment dated October 11, 2013 (Appendix A). The Mount St. Patrick Waste Disposal Site is located on part of Lot 4, Concession 14 within the geographic Township of Brougham, in the amalgamated Township of Greater Madawaska (Township, Figures 1 and 2). The Universal Transverse Mercator (UTM) coordinates at the site entrance gate relative to the North American Datum (NAD83) are 351183.0 metres (m) East, 5021553.0 m North, in Zone 18T (Google Earth, 2013). The Mount St. Patrick site is located approximately 1.6 kilometres (km) west of the Village of Mount St. Patrick, and access to the site is provided by Flat Road (Figures 1 and 2).

The site operates as an active waste disposal site and includes a waste and recycling transfer station. The site consists of a 1.2 hectare (ha) landfill and transfer station within a total property area of 38.25 ha, and is approved to accept municipal waste from the entire Township (Appendix A; Figures 2 and 3). A significant portion of the site area is located downgradient of the approved waste disposal area (AWDA), and is currently used for operational buffer and contaminant attenuation zone (CAZ) purposes (Figures 3, 4, and 5). All site lands for operations, operational buffer, and CAZ purposes were registered on title on May 15, 2013, and the Certificate of Requirement for the Mount St. Patrick site is included in Appendix A.

As part of the Township's long-term waste management plan, the Mount St. Patrick site was identified for the establishment of a municipal solid waste and recycling transfer station, similar to the Township's Norway Lake and Griffith sites. Construction of the upgraded transfer station at the Mount St. Patrick site was initiated in late 2009 and operations commenced in August 2010 (Greenview, 2011). In 2022, regular municipal waste (i.e. bagged garbage) and Blue Box recycling accepted at the site was transferred to GFL Environmental Inc. in Moose Creek, Ontario for disposal and processing. Construction and demolition (C&D) and bulky wastes received at the Mount St. Patrick site in 2022 was stockpiled, processed, and landfilled in the AWDA. One (1) C&D and bulky waste processing event occurred at the Mount St. Patrick site in fall 2022.

1.2 Background

As part of the long-term waste management planning in the Township, which included the Mount St. Patrick site having been identified for the establishment and operation of a waste transfer station, an application to amend the ECA was submitted on July 25, 2007 to the Ontario Ministry of the Environment, Conservation, and Parks (MECP, Greenview, 2008), with supporting technical documentation entitled, *Design and Operations Plan, Municipal Solid Waste Transfer Station, Mount St. Patrick Waste Disposal Site* (DOP, Greenview, 2007a). The intent of the 2007 application was to recognize proposed future site operations in the form of the establishment and operation of a solid waste and recycling transfer station, as well as utilization of the remaining capacity at the site for disposal of municipal waste, C&D and bulky waste, and to maintain service to the entire Township. On April 24, 2008, supplemental information was provided to the MECP, including a revised transfer station location and an updated landfill area development plan (Greenview, 2009).

An Amended ECA was issued by the MECP on July 16, 2008 (Appendix A). The Amended ECA approved the continued use of the site as a landfill for approved waste, and the establishment and operation of a transfer station for municipal waste and recyclables (Appendix A; Figure 4). In August 2010, the newly established solid waste and recycling transfer station opened to ratepayers of the Township (Greenview, 2011).

The Mount St. Patrick site was inspected by the MECP on September 12, 2012, and the Township subsequently received a *Solid Non-Hazardous Waste Disposal Site Inspection Report* (Inspection Report), dated September 25, 2012, which detailed the findings. Action items were included in Sections 5.0 and 6.0 of the Inspection Report. The Township first provided a response to Section 6.0 regarding the volume of C&D and bulky waste stored at the site at the time of the MECP inspection in electronic correspondence, dated

October 11, 2012. Further, the Township submitted a response to the MECP in the form of a Compliance Action Plan, dated November 29, 2012, which addressed the action items detailed in Section 5.0 of the Inspection Report. The MECP notified the Township regarding the acceptance of the Compliance Action Plan in electronic correspondence, dated November 30, 2012 (Greenview, 2013). Further, the Township provided follow-up comments in the 2012 Annual Report (Greenview, 2013) regarding action items detailed in the Compliance Action Plan.

On October 31, 2012, the MECP Technical Support Section (TSS) issued groundwater review comments (Greenview, 2013) for the 2011 Annual Report (Greenview, 2012). The MECP TSS requested that leachate indicator parameters be included in the 2012 Annual Report (Greenview, 2013). Additionally, the MECP TSS provided direction to compare groundwater samples collected from monitoring well MW09-6 to the MECP Provincial Water Quality Objectives (PWQO; MECP, 1994b) as the groundwater monitoring location was interpreted to best intercept groundwater which could potentially discharge to Constant Creek (Greenview, 2013).

On May 15, 2013, the operational and CAZ lands acquired from the Crown for the Mount St. Patrick site were registered on title, in order to satisfy Condition 8.0 of the site's ECA (Appendix A).

The Mount St. Patrick site was inspected by the MECP Ottawa District Office on December 1, 2016, and an Inspection Report dated January 25, 2017, was issued to the Township (Greenview, 2017). The Township responded with a Compliance Action Plan via electronic mail on February 6, 2017 (Greenview, 2017), which was approved by the MECP Ottawa District Office on February 15, 2017 (Greenview, 2017).

On December 24, 2018, the Township received an MECP TSS surface water review of the 2017 Annual Report for the Mount St. Patrick site (Greenview, 2019). In the review, the MECP TSS surface water reviewer noted that there were no negative impacts to the surface water system (Constant Creek) located approximately 650 m north and downgradient of the Mount St. Patrick Waste Disposal Site (Figure 3). The reviewer also noted their recommendation to calculate background surface water quality in Constant Creek using the 75th percentile concentrations, rather than the median, for future Annual Reports. This recommendation was initiated in the 2018 Annual Report (Table 6; Greenview, 2019).

On October 16, 2019, the Township received an Inspection Report from the MECP Ottawa District Office regarding the Mount St. Patrick site, dated October 8, 2019 (Greenview, 2020a). The Inspection Report included action items to be addressed by the Township, which were addressed in an Action Plan prepared by Greenview dated November 25, 2019, and sent to the MECP Ottawa District Office on November 26, 2019 (Greenview, 2020a). The MECP Ottawa District Office acknowledged receipt of the Action Plan on November 27, 2019, and approval of the Action Plan and related compliance dates was received from the MECP Ottawa District Office on December 3, 2019 (Greenview, 2020a). As part of the response, the Township was required to submit photographs to the MECP in accordance with their request. The Township submitted their response to the MECP Ottawa District Office on February 14, 2020, and the MECP approved the submission in an electronic communication dated February 18, 2020 (Greenview, 2020a). The final action items related to the Inspection Report included the requirement to prepare an *Emergency Response Plan* (Greenview, 2020b) and *Contingency Plan* (Greenview, 2020c) for the Mount St. Patrick site. These two (2) documents were completed and submitted to the MECP Ottawa District for their file on March 31, 2020.

On May 06, 2021, Greenview installed a new background monitoring well at the Mount St. Patrick site, east of the transfer station and designated MW21-7 (Figures 5 and 6; Appendix B). The new, shallow, background monitoring well was installed at the site as the existing background monitoring well MW08-1 has been interpreted in recent years to have been impacted by road salt application at the transfer station and along Flat Road (Tables 3 and 4). Once sufficient database of groundwater analytical results are available for MW21-7, then it is recommended that median background groundwater quality at the site be solely calculated based on MW21-7 results (i.e. after five [5] sampling events). Until that time, use of historical groundwater results from a combination of MW08-1 and MW21-7 should be used for the calculation of background groundwater quality for the Mount St. Patrick Waste Disposal Site.

Throughout 2021 and early 2022, the Township and Greenview prepared a *Revised Design and Operations Plan* (DOP) for the Mount St. Patrick Waste Disposal Site as part of a proposed application to amend the ECA for the site, with the intent of modifying transfer station operations and stockpiling quantities for various wastes and recyclables. On January 20, 2022, a Pre-Submission Meeting was held between representatives of the MECP, the Township, and Greenview to review the proposed Revised DOP and discuss whether the proposed Revised DOP generally met with MECP expectations for the ECA Application (Appendix C). Based on the Pre-Submission Meeting, it was recommended by the MECP that the Township wait to submit the ECA Application until the 2021 Annual Report (due for submission to the MECP Ottawa District Office by March 31, 2022) was available for inclusion as an appendix to the Revised DOP. The Township submitted the ECA Application and Revised DOP to the MECP for review and approval on May 03, 2022. Receipt of submission was received on May 30, 2022.

Greenview was retained by the Township to complete the 2022 environmental monitoring and reporting program at the Mount St. Patrick Waste Disposal 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 Mount St. Patrick Waste Disposal Site, and to satisfy Condition 22 of the ECA, 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 and capacity assessment (Section 4.3).
- Conclusions and recommendations (Section 5.0).

2.0 Site Description

The following sections present a summary of the physical characteristics for the Mount St. Patrick Waste Disposal Site. Locations of features described in this report are referenced to grid north.

2.1 Topography and Drainage

The vicinity of the Mount St. Patrick site is bound by a regional feature known as the Mount St. Patrick Mountains, which are a topographic divide for the region, located approximately 1.5 km to the west of the site. Surface water drainage from the eastern side of the Mount St. Patrick Mountains is directed by local topography north-easterly, towards Constant Creek and the Mount St. Patrick site (Figure 3).

Locally, topographic highs exist to the north and south of the waste mound, thereby influencing and directing local drainage in the general direction of Constant Creek to the north and northeast. There are no defined surface water drainage systems in close proximity to the waste footprint; however, low-lying areas where water collects during wet seasonal conditions exist within the property boundary. Additionally, approximately 450 metres (m) north of the site, a small, northeast trending creek is observed to transect the Township property with eventual discharge into Constant Creek (Figure 3). In 2007, the low-lying area to the northeast of the site (Figure 2) was characterized by a natural heritage specialist, and the limits of the low-lying area were defined in the vicinity of the site (Greenview, 2007b). A poorly-drained area existing within the low-lying area is sampled by surface water monitoring location SW-3 (Figure 3). Surface water location SW-3 has only been sampled six (6) times since spring 2016 due to generally low surface water conditions at the sampling location; all sampling events at SW-3 since 2013 have been during the spring sampling event (Table 6). Representative photographs of each surface water sampling location at the Mount St. Patrick site are included in Section 4.2 of this report.

Constant Creek is located approximately 625 m north of the existing limit of waste at the site (adjacent to monitoring well MW09-6R; Figure 3), and flows west to east towards Calabogie Lake, approximately 11 km southeast of site. Constant Creek is a permanent surface water system, and is sampled upstream of the site at sampling location SW-2 (background), and downstream of the site at sampling location SW-1 (Figure 3). In 2009, an additional surface water location (SW-4) on Constant Creek was included as part of the environmental monitoring program at the Mount St. Patrick site, approximately mid-way between sampling locations SW-2 (background) and SW-1, near the eastern property boundary and adjacent to monitoring well MW09-6R (Figure 3). SW-4 was added to the environmental monitoring program in order to monitor surface water quality on Constant Creek near the downgradient property boundary.

2.2 Hydrogeological and Geological Conditions

As part of the 2006 environmental work program at the site, four (4) monitoring wells were installed at the site, one (1) was installed upgradient of the site to monitor background groundwater quality (MW06-1), while three (3) were installed downgradient of the site to monitor water quality downgradient of the site (MW06-2, MW06-3, and MW06-4; Figures 5 and 6). Borehole logs for these monitoring wells are included in Appendix B.

During the groundwater well installations, the overburden geology in the low-lying area immediately adjacent to the site (MW06-2 and MW06-3) was noted to consist of fine to coarse sands, with some boulders and dispersed pockets of sand with some silt and gravel (Appendix B). The subsurface materials in the upland areas in the vicinity of the AWDA of the Mount St. Patrick site (MW06-1 and MW06-4) were observed to consist primarily of fine to coarse grained sand with gravel, with the bedrock interface interpreted to be located in the range of 4.21 m to 6.10 m below ground surface, at monitoring wells MW06-4 and MW06-1, respectively (Cambium, 2006; Appendix B).

In August 2008, background monitoring well MW06-1 was decommissioned prior to construction of the site's waste transfer station. A new background well, MW08-1, was installed on August 18, 2008, within the property boundary, and upgradient of the waste mound (Figures 5 and 6). The overburden observed during the installation

of MW08-1 (background) included fine to medium grained sand with small cobbles (Appendix B).

Further to MECP TSS comments (November 5, 2007, Greenview, 2008) and the Amended ECA (July 16, 2008, Appendix A), two (2) additional drive-point groundwater monitoring wells were installed on June 23, 2009, along the northeast property boundary. Monitoring well MW09-5 was installed approximately 300 m northeast of the southeast corner of the AWDA, cross-gradient to the direction of groundwater flow at the site, and near the north-eastern property boundary (Figures 3, 5 and 6). Monitoring well MW09-6 was installed approximately 600 m north of the northeast corner of the AWDA, near the downgradient north-eastern property boundary and adjacent to Constant Creek and surface water location SW-4 (Figures 3, 5 and 6). The two (2) additional groundwater monitoring wells were installed in low-lying areas north and northeast of the site, in order to verify conformance with MECP Guideline B-7 at the downgradient property boundary.

Based on documented groundwater quality results from drive-point monitoring wells MW09-5 and MW09-6 between 2009 and 2014, it became apparent that groundwater quality at both monitoring wells was impacted from drive-point monitoring well construction materials (Table 4, Appendix B). In summer 2014, replacement shallow groundwater monitoring wells MW09-5R and MW09-6R were installed by the Township, using a hand auger and 2-inch PVC well materials, adjacent to drive-point monitoring wells MW09-5 and MW09-6, and the PVC well screens were appropriately backfilled with well sand (Figures 5 and 6; Appendix B). During the installation of MW09-5R, dark brown organic material (peat) was observed from ground surface to approximately 1.02 m bgs, underlain by grey clay (Appendix B). Similarly, during the installation of MW09-6R, dark brown organic material (peat) was observed from ground surface to approximately 0.3 m bgs, underlain by fine to medium grained sand to approximately 1.02 m bgs, followed by grey clay (Appendix B). The existence of grey clay at approximately one (1) m bgs at both monitoring wells MW09-5R and MW09-6R was interpreted to be an important factor related to the poorly-drained characteristics of the low-lying area north and east of the Mount St. Patrick site (Figures 5 and 6).

As noted in Section 1.2, a new shallow, background monitoring well was installed at the Mount St. Patrick site in May 2021, designated as MW21-7 (Appendix B; Figures 5 and 6). The new, shallow, background monitoring well MW21-7 was installed at the site given that recent historical groundwater results from the existing background well MW08-1 have been interpreted to be impacted by road salt use in the transfer station and along Flat Road (Table 4).

Based on the historical groundwater elevations measured at the mini-piezometers (MP1 through MP7) and the on-site groundwater monitoring wells, groundwater flow at the Mount St. Patrick site in 2022 was interpreted to be predominantly to the north (Table 3; Figures 5 and 6).

Borehole logs for all monitoring wells are provided in Appendix B. The available borehole logs include details regarding well construction for the corresponding monitoring wells.

2.3 Land Use

The land use designation for the Mount St. Patrick site is Waste Disposal (WD), per the County's Official Plan. The property is bound to the south and north by vacant land within Lot 4, designated as Rural (RU). Within the WD parcel and to the east and south of the property are lands designated as Extractive Industrial Reserve (EMR). Immediately west of Flat Road, the DACA Centre (community hall and outdoor recreational facility), and a small Township Operations Yard, utilized for public works operations and stockpiling of winter sand, are located on land designated as community facility (CF).

The nearest residence to the Mount St. Patrick Waste Disposal Site is located approximately 150 m west and upgradient of the site on Flat Road.

2.4 Operational Setting

The Mount St. Patrick Waste Disposal Site currently consists of a 1.2 ha landfill and transfer station within a total

property area of 38.25 ha (Figures 2, 3, and 4). The 38.25 ha total property area at the Mount St. Patrick site is interpreted to be sufficient for operational buffer and CAZ purposes.

Currently, the Mount St. Patrick site operates as an active waste disposal site and transfer station, and is approved to receive municipal waste and recyclables generated within the Township. Access to the site is provided by Flat Road. The site is surrounded by forested and agricultural lands, and is bound to the north by Constant Creek (Greenview, 2007a).

On July 16, 2008, an Amended ECA was issued by the MECP, approving the continued use of the site as a landfill for approved waste and for the establishment and operation of a waste and recycling transfer station (Appendix A). Construction of the transfer station at the Mount St. Patrick site was initiated in late 2009, with operations commencing on August 18, 2010.

On October 11, 2013, an Amendment to the ECA was issued by the MECP, approving the burning of clean wood and brush at the site. Additionally, the Amendment to the ECA updated the approved maximum waste storage capacities at the site's transfer station (Appendix A).

3.0 2022 Environmental Monitoring Program

The following sections present a methodology of the environmental monitoring program conducted at the Mount St. Patrick Waste Disposal Site in 2022.

3.1 Groundwater Monitoring

Groundwater monitoring and sampling activities were conducted at the site by Greenview on May 17, 2022, and November 02, 2022, from the network of groundwater monitoring wells as part of the 2022 environmental monitoring program (Table 1). The UTM coordinates of the groundwater monitoring wells were confirmed or measured by Greenview personnel during site visits in 2022 using a handheld geographic positioning system (GPS) instrument with an anticipated accuracy of within +/- 5 m (Table 2). During the 2022 spring and fall 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 elevations were also measured at the piezometers on-site, using an electronic water level tape (Table 3).

During the spring 2022 sampling event, all monitoring wells were sampled and all piezometers at the site were observed to have sufficient groundwater for groundwater elevation measurements (Appendix E). During the fall 2022 sampling event, new background monitoring well MW21-7 was observed to have insufficient water for sampling purposes and a groundwater sample was not obtained for analysis, while piezometers MP4 and MP5 were documented to be dry (Appendix E).

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.

Residential groundwater quality is historically monitored during both the spring and fall sampling events at location GLL7, which is located at 199 Mount St. Patrick Road and approximately 550 m east of the existing limit of waste at the Mount St. Patrick site (Figure 3). In 2022, residential groundwater samples were not collected at the GLL7 location due to not being able to make contact with the property owner.

Per MECP TSS hydrogeological review comments, dated October 31, 2012, a report on drinking water wells within 500 m of the site is included in Appendix D.

Duplicate groundwater samples were collected for Quality Assurance and Quality Control (QA/QC) purposes from monitoring well MW06-4 during the 2022 spring sampling event and from MW06-3 during the 2022 fall sampling event, respectively (Appendix F).

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, dissolved oxygen (DO), and temperature were recorded at all groundwater wells immediately following the collection of the groundwater samples. Field sampling records completed during the 2022 monitoring program are included in Appendix E. 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 2022 groundwater monitoring program are presented in Section 4.1 of this report.

3.2 Surface Water Monitoring

Surface water monitoring and sampling were conducted by Greenview on May 17, 2022, and November 02,

2022, from the established surface water monitoring locations at the site, including SW-1, SW-2 (background), SW-3, and SW-4 (Table 1; Figure 3). The UTM coordinates of the surface monitoring locations were confirmed or measured by Greenview personnel during site visits in 2022 using a handheld GPS instrument with an anticipated accuracy of within +/- 5 m (Table 2).

Samples were not collected from SW-3 during the fall 2022 monitoring event as the sampling location was observed to have insufficient water for sampling purposes (Appendix E; Figure 3), while no discernible flow conditions were observed at location SW-3 during the spring 2022 sampling event (Appendix E). Beaver activity was observed in the vicinity of SW-4 during the spring 2022 sampling event (Appendix E).

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.

Duplicate surface water samples were collected for QA/QC purposes from surface water sampling location SW-1 during the spring 2022 sampling event and SW-2 during the fall 2022 sampling event, respectively (Appendix E).

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 respective surface water sampling location immediately following the collection of the surface water samples. Physical characteristics including depth, width, and flow velocity of each respective surface water location were recorded at the time of sampling. Field sampling records completed for the 2022 monitoring program are included in Appendix E. The surface water samples were recorded on a laboratory Chain of Custody Form, and placed in coolers packed with contained ice for preservation for transport to the analytical laboratory.

The results of the 2022 surface water monitoring program are presented in Section 4.2 of this report.

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 site. The waste mound at the Mount St. Patrick site is covered with porous soil materials, allowing natural gas flux to the atmosphere. Overburden geology at the site is characterized by fine to coarse sands, with some boulders and dispersed pockets of sand with some silt and gravel, overlying a dense bedrock unit. These overburden 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 Mount St. Patrick Waste Disposal Site was conducted regularly to document routine waste disposal and recycling activities at the site.

A topographic survey was conducted at the Mount St. Patrick site on December 08, 2022, to determine the current capacity status for continued disposal operations at the site and to update site features (Figure 2).

All monitoring wells at the Mount St. Patrick site were observed to be in good condition and in compliance with

Ontario Regulation 903 (O. Reg. 903), as amended, in 2021.

Daily waste records (summary forms) were completed at the Mount St. Patrick site as part of regular operations at the site to monitor landfilling activities, vehicular traffic, and transfer station operations.

The Township submits annual waste diversion reports in accordance with the Municipal Datacall, inclusive of the Mount St. Patrick site, to the Resource Productivity and Recovery Authority (RPRRA).

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 of the 2022 environmental monitoring program conducted at the Mount St. Patrick Waste Disposal Site.

4.1 Groundwater Quality Assessment

The results of the 2022 groundwater monitoring program conducted at the site are presented as follows.

4.1.1 Groundwater Configuration

Historically, the groundwater configuration at the site has been interpreted to flow generally towards the north and northeast, in the general direction of the low-lying area and Constant Creek (Greenview, 2022).

Groundwater elevation data obtained during the 2022 environmental monitoring program at the site are provided in Table 3. Average horizontal gradients in the vicinity of the waste mound and to the northeast of the waste mound were calculated as follows:

Location	Horizontal Gradient (Spring 2022)	Predominant Direction	Horizontal Gradient (Fall 2022)	Predominant Direction
Vicinity of Waste Mound	0.012	North	0.007	North
Northeast of Waste Mound	0.011	North	0.013	North

Based on the characterization of overburden geology at the Mount St. Patrick site, which consists of medium to fine sand with some gravel, underlain by coarse-grained sand with some silt, estimates of hydraulic conductivity were interpreted at the site to range from 1×10^{-1} to 1×10^{-5} centimetres per second (cm/s, Bear, 1972). Similarly, the hydraulic conductivity for organic materials (peat) observed in the low-lying area northeast of the site in the vicinity of monitoring wells MW09-5R and MW09-6R was interpreted to be in the range of 1×10^{-2} to 1×10^{-4} cm/s (Bear, 1972).

4.1.2 Groundwater Quality

The results of the 2022 groundwater monitoring program are presented in Table 4 and the accredited laboratory Certificates of Analysis (SGS) are attached in Appendix F. Analytical data were compared to the Ontario Drinking Water Standards (ODWS; MECP, 2006), median background water quality at the site, and MECP Guideline B-7 and the RUC (MECP, 1994a). Background groundwater quality was calculated using the median of a minimum of the previous ten (10) sampling event results from background monitoring wells MW08-1 and MW21-7. Once sufficient database of groundwater analytical results are available for new background well MW21-7, then it is recommended that median background groundwater quality at the site be solely calculated based on MW21-7 results (i.e. after five [5] sampling events). Trend analysis was completed using results from the previous five (5) years and only significant trends are discussed in the report.

Further, and in accordance with MECP TSS hydrogeological review comments, dated October 31, 2012 (Greenview, 2013), for the 2011 Annual Report (Greenview, 2012), groundwater samples from monitoring well MW09-6 were also compared to the PWQO (MECP, 1994b) as MW09-6 was interpreted to best intercept groundwater which would could potentially discharge to Constant Creek (Greenview, 2013). As MW09-6 was replaced with new shallow groundwater monitoring well MW09-6R in summer 2014, results from MW09-6R were compared to the PWQO in spring and fall 2022 (Table 5; Figures 5 and 6). Downgradient groundwater quality results were compared to PWQO and are included in Table 5 of this report. Given that monitoring well MW09-6R is located approximately 560 m northeast and downgradient of the northeastern corner of the AWDA at the Mount St. Patrick site, the potential of observable landfill-related impacts at this sampling location is interpreted to be low.

It was requested in the October 31, 2012, MECP TSS hydrogeological review comments (Greenview, 2013), that typical leachate parameters for the Mount St. Patrick site be defined in future reports. Further to a review of the current parameter list for the site, and excluding parameters deemed to be naturally-occurring upgradient of the site, naturally-elevated within the adjacent low-lying area, or have alternative sources (i.e. winter road maintenance activities), the parameters identified to best represent leachate indicators for a municipal waste disposal site of this size and operational practices (i.e. processed C&D and bulky waste disposal) are barium, boron, copper, nitrate, and sulphate.

The blind duplicate samples collected at monitoring wells MW06-4 during the spring 2022 sampling event and MW06-3 during fall 2022 sampling event, respectively, were similar to the identified samples, indicating that the results of the 2022 groundwater monitoring program can be interpreted with confidence.

Historically, background groundwater quality at the Mount St. Patrick site was assessed at monitoring well MW06-1, which was located approximately 45 m south and upgradient from the AWDA at the site. In 2008, MW06-1 was decommissioned in advance of construction of the waste and recycling transfer station at the site (Figure 2). Following the decommissioning of MW06-1, a replacement background groundwater monitoring well, MW08-1, was installed upgradient of the waste mound and 70 m north of MW06-1 (Figures 5 and 6). In 2022, few parameter concentrations in the spring and many parameter concentrations in the fall 2022 samples collected from background well MW08-1 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background groundwater monitoring location MW08-1 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW08-1 (background)	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Aluminum Iron 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> No significant trends

Historically, aluminum, dissolved organic carbon (DOC), hardness, iron, manganese, and total dissolved solids (TDS) have been observed at high concentrations in the background, and based on recent groundwater quality results at MW08-1 it appears that groundwater quality at this monitor has been impacted by winter road maintenance activities from the transfer station and Flat Road, and by winter sand storage at the municipal depot located on the west side of Flat Road (Table 4). Groundwater results at MW08-1 are not interpreted to be impacted by landfill-related activities in 2022 (Table 4). In future sampling events, new background monitoring well MW21-7 is anticipated to better represent background groundwater conditions at the Mount St. Patrick site than monitoring well MW08-1 (Figures 3, 5, and 6).

New background monitoring well MW21-7 was installed on May 06, 2021, approximately 30 m east and upgradient of the transfer station at the Mount St. Patrick site (Figures 5 and 6). Monitoring well MW21-7 was installed using a hand auger to the total depth of 1.08 m below ground surface (bgs). New background well MW21-7 was sampled during the spring 2022 sampling event; however, it was observed to have insufficient groundwater for sampling purposes during the fall 2022 sampling event (Appendix E). In 2022, some parameter concentrations in the spring 2022 samples collected from new background well MW21-7 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at background groundwater monitoring location MW21-7 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW21-7 (background)	<ul style="list-style-type: none"> Dissolved Organic Carbon (DOC) Manganese 	<ul style="list-style-type: none"> Insufficient water for sampling purposes 	<ul style="list-style-type: none"> Insufficient data for trend analysis 	<ul style="list-style-type: none"> Insufficient data for trend analysis

Based on preliminary results from new background well MW21-7, background groundwater quality in the vicinity

of MW21-7 is interpreted to have naturally high concentrations of aluminum, DOC, iron, and manganese (Table 4). Additional results in future groundwater monitoring events for MW21-7 are required in order to establish typical (median) background groundwater quality. Once a sufficient databased of results are available (i.e. after five [5] sampling events), then it is recommended that median background groundwater quality for the Mount St. Patrick Waste Disposal Site be calculated solely based on results from MW21-7. Until that time, a combination of historical results from background monitoring wells MW08-1 and MW21-7 should be utilized to calculate median background groundwater quality for the site.

Monitoring well MW06-2 is located approximately 20 m east of the eastern AWDA boundary, in the low-lying area, and was used to establish groundwater quality downgradient and northeast of the waste mound (Figure 3). In 2022, most parameter concentrations in the spring and fall 2022 samples collected from MW06-2 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location MW06-2 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW06-2	<ul style="list-style-type: none"> Total Dissolved Solids (TDS) 	<ul style="list-style-type: none"> Aluminum Iron Manganese TDS 	<ul style="list-style-type: none"> Conductivity (field-tested) 	<ul style="list-style-type: none"> No significant trends

As historically reported at the site (Golder, 2007), manganese was interpreted to be naturally-elevated in the background groundwater at the site, while concentrations of aluminum, DOC, hardness, iron, and TDS were also noted to be elevated in historical background groundwater quality results at MW08-1 (Table 4). Consistent with historical assessments, groundwater at MW06-2 was interpreted to be impacted from landfill-related activities; however, the documented parameter concentrations at MW06-2 were interpreted to also be partially-elevated by natural conditions due to its location within the low-lying area northeast of the site (Table 4; Figures 5 and 6). In 2022, results from monitoring well MW06-2 were interpreted to be most representative of leachate quality at the site. Recent groundwater quality results at MW06-2 were interpreted to suggest that impacts related to winter road maintenance activities at the site have been diminishing in the vicinity of monitoring well MW06-2 (Table 4; Figures 5 and 6).

Groundwater quality downgradient and north of the site is characterized using monitoring well MW06-3, located in the low-lying area approximately 25 m northeast of the northeastern corner of the AWDA (Figures 5 and 6). In 2022, some parameter concentrations in the spring and fall 2022 samples collected from MW06-3 were above median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location MW06-3 were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW06-3	<ul style="list-style-type: none"> DOC Manganese 	<ul style="list-style-type: none"> Manganese 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> Ammonia Chemical Oxygen Demand (COD)

Recent groundwater quality results at MW06-3 were interpreted to suggest that impacts related to winter road maintenance activities at the site have been diminishing in the vicinity of monitoring well MW06-3 (Table 4; Figures 5 and 6).

Monitoring well MW06-4 is located within the AWDA limits and approximately 10 m northwest of the existing limit of waste at the site (Figure 2). In 2022, many parameter concentrations in the spring and fall 2022 samples collected from MW06-4 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location MW06-4 were as follows

(Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW06-4	<ul style="list-style-type: none"> • pH (low; field tested) • TDS 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • No significant trends 	<ul style="list-style-type: none"> • No significant trends

Groundwater quality at MW06-4 was not interpreted to be significantly impacted by landfill-related activities; however, the parameter concentrations were not completely analogous to concentrations documented at monitoring wells MW06-2 and MW06-3 (Table 4). It is likely that the differences in parameter concentrations are related to the reduced impact of low-lying area conditions characteristic of groundwater quality results at MW06-2 and MW06-3 in the low-lying area northeast of the site, as MW06-4 is not located within the low-lying area and was interpreted to be partially cross-gradient to the active waste disposal area (Figures 2, 5, and 6). Consistent with results at MW08-1, groundwater quality at MW06-4 was interpreted to be impacted from winter road maintenance activities, likely related to winter sand stockpiles at the municipal depot located upgradient and on the west side of Flat Road (Figures 3, 5, and 6).

Monitoring well MW09-5R is located approximately 300 m east of the AWDA, and is used to establish groundwater quality near the northeastern property boundary at the site (Figures 3, 5, and 6). Consistent with historical results (Greenview, 2022), MW09-5R was interpreted to be located cross-gradient to the direction of groundwater flow, as calculated from groundwater elevations in 2022 (Table 3). Drive-point well MW09-5 was replaced on July 3, 2014, with shallow well MW09-5R (constructed of PVC well materials), as impacts interpreted to be resultant of drive-point well construction materials were apparent in historical groundwater quality results for MW09-5 (Table 4). In 2022, few parameter concentrations in the spring and fall 2022 samples collected from MW09-5R were above median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater monitoring location MW09-5R were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW09-5R	<ul style="list-style-type: none"> • DOC • Iron • Manganese 	<ul style="list-style-type: none"> • DOC • Iron • Manganese 	<ul style="list-style-type: none"> • No significant trends 	<ul style="list-style-type: none"> • No significant trends

Given that MW09-5R was installed in approximately 1.02 m of dark brown organic peat material (Appendix B), the 2022 non-conformances of DOC, iron and manganese were anticipated and were interpreted to be resultant of naturally-occurring conditions within the low-lying area (Table 4). MW09-5R was not interpreted to be impacted by landfill-related activities in 2022, and groundwater quality results were interpreted to suggest that groundwater quality at MW09-5R was consistent with expected background groundwater quality results within a low-lying environment with dominantly peat overburden characteristics (Table 4).

Monitoring well MW09-6R is located approximately 560 m northeast of the northeastern corner of the AWDA at the Mount St. Patrick site and adjacent to a small creek draining from the upland and low-lying areas to the southwest and transecting Flat Road, and near Constant Creek, in order to establish groundwater quality at the downgradient property boundary (Figures 2, 3, 5, and 6). As described in Section 2.2 of this report, drive-point well MW09-6 was replaced on July 3, 2014 with shallow well MW09-6R (constructed of PVC well materials), as impacts interpreted to be resultant of the drive-point well construction materials were apparent in historical groundwater quality results (Table 4; Appendix B). Some parameter concentrations in spring 2022 and many parameter concentrations in samples collected from MW09-6R in fall 2022 were above the median background concentrations (Table 4). Non-conformances of ODWS and significant groundwater trends at groundwater

monitoring location MW09-6R were as follows (Table 4):

Monitoring Well	ODWS Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
MW09-6R	<ul style="list-style-type: none"> • DOC • Iron 	<ul style="list-style-type: none"> • DOC • Iron • Manganese 	<ul style="list-style-type: none"> • No significant trends 	<ul style="list-style-type: none"> • Chemical Oxygen Demand (COD)

Given that MW09-6R was installed into approximately 0.3 m of dark brown organic peat material and 0.62 m of fine to medium grained sand (Appendix B), the high concentrations of DOC, iron, and manganese in 2022 were anticipated and were interpreted to be resultant of naturally-occurring conditions within the low-lying area (Table 4). 2022 results from MW09-6R were interpreted to be generally consistent with parameter concentrations documented in upgradient monitoring well MW09-5R (Table 4; Figures 5 and 6). Similarly, the high aluminum concentration noted in historical results was attributed to naturally-occurring conditions in the vicinity of MW09-6R, and not to landfill-related factors. Given the considerable distance of MW09-6R from the existing limit of waste at the Mount St. Patrick site (approximately 600 m), and as MW09-6R was interpreted to be the downgradient and downstream receiver of groundwater and surface water flow from the vicinity of Flat Road (Figures 3, 5, and 6), high chloride, sodium, and TDS concentrations in results from MW09-6R in 2022 (though not exceeding ODWS) were interpreted to be resultant of winter road maintenance activities on Flat Road and the storage of winter sand material at the Township’s operations yard adjacent to the Mount St. Patrick site. Monitoring well MW09-6R was not interpreted to be significantly impacted by landfill-related activities in 2022.

Further to MECP TSS hydrogeological review comments, dated October 31, 2012, it was interpreted that there was potential for leachate impacted groundwater to discharge to Constant Creek. It was noted that MW09-6 (now MW09-6R) was the best monitoring well to characterize potential impacts of groundwater discharge to Constant Creek, and therefore groundwater quality results at MW09-6R should be compared with PWQO. In 2022, non-conformances of PWQO at monitoring location MW09-6R were as follows (Table 4). A comparison of groundwater quality results from background wells MW08-1 and MW21-7 have been included for comparison purposes:

Monitoring Well	PWQO Non-Conformance	
	Spring 2022	Fall 2022
MW08-1 (background)	<ul style="list-style-type: none"> • Phosphorus 	<ul style="list-style-type: none"> • Aluminum • Iron • Phosphorus
MW21-7 (background)	<ul style="list-style-type: none"> • Aluminum • Copper • Phosphorus 	<ul style="list-style-type: none"> • Insufficient water for sampling purposes
MW09-6R	<ul style="list-style-type: none"> • Copper • Iron • Phosphorus 	<ul style="list-style-type: none"> • Iron • Phosphorus

Given that the concentrations of phosphorus (total) in 2022 at downgradient well MW09-6R in spring and fall 2022 were significantly less than the historical concentrations documented for background well MW08-1 (Table 5), it is likely that the noted concentrations of phosphorus (total) were related to naturally-occurring conditions in the vicinity of the Mount St. Patrick site. Similarly, the elevated iron concentrations in 2022 and historically documented aluminum concentrations for MW09-6R were attributed to naturally-occurring conditions within the low-lying area and were not interpreted to represent significant landfill-related impacts. At this time, monitoring well MW09-6R is not interpreted to be significant impacted from landfill-related activities, based on recent groundwater quality results (Tables 4 and 5).

Residential groundwater quality was not sampled during both the spring and fall 2022 sampling events at location GLL7, which is located at 199 Mount St. Patrick Road, approximately 550 m east of the existing limit of waste at the Mount St. Patrick site (Figure 3). Attempts to contact the owner of the property were made in both spring and fall 2022. Based on the interpreted direction of groundwater flow in the vicinity of the Mount St. Patrick site, the distance of residential sampling location GLL7 from the waste mound, and historical results, the likelihood of groundwater at residential location GLL7 being impacted by landfill-related factors associated with the Mount St. Patrick Waste Disposal Site was interpreted to be minimal.

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 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, 1994), specifically using the median value of individual background parameter concentrations from monitoring wells MW08-1 and MW21-7, to characterize natural groundwater quality at the site. Groundwater monitoring wells MW09-5R and MW09-6R were used for monitoring potential impacts along the north-eastern property boundary downgradient and cross-gradient of the AWDA at the Mount St. Patrick site, and for assessing site compliance with the RUC (Figures 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 Mount St. Patrick Waste Disposal Site. The trigger concentrations used to assess RUC compliance for the groundwater regime at the site are based on the RUC for each of the respective parameters.

The RUC values for individual parameters should be generated each year based on analytical results obtained from the groundwater monitoring program. 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 district MECP office should be held to develop an appropriate contingency plan, as necessary and appropriate for the particular site.

Monitoring well MW09-5R was used for the RUC analysis near the north-eastern property boundary, cross-gradient to the Mount St. Patrick site, and approximately 300 m east of the AWDA (Figures 3, 5 and 6). Non-conformances of RUC in spring and fall 2022 from groundwater results at cross-gradient well MW09-5R are included in the table below. RUC non-conformances noted in groundwater quality results from background monitoring wells MW08-1 and MW21-7 were included for comparison purposes:

Monitoring Well	RUC Non-Conformance	
	Spring 2022	Fall 2022
MW08-1 (background)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Aluminum • Iron
MW21-7 (background)	<ul style="list-style-type: none"> • Aluminum • DOC • Iron • Manganese 	<ul style="list-style-type: none"> • Insufficient water for sampling purposes
MW09-5R	<ul style="list-style-type: none"> • DOC • Iron • Manganese 	<ul style="list-style-type: none"> • DOC • Iron • Manganese

The Mount St. Patrick site was interpreted to be in compliance with RUC and conformance with MECP Guideline B-7 in 2022 cross-gradient to the waste mound at the north-eastern property boundary in the vicinity of MW09-5R (Figures 5 and 6).

Monitoring well MW09-6R was used to assess RUC compliance approximately 560 m northeast of the northeastern corner of the AWDA at the Mount St. Patrick Waste Disposal Site and near the downgradient property boundary (Figures 2, 5 and 6). MW09-6R is located within the low-lying area northeast of the site, adjacent to the small northeast trending creek which transects the site property and Flat Road, and Constant Creek (Figure 3). Evidence of beaver activity has historically been observed near surface water location SW-4 on Constant Creek, and adjacent to MW09-6R; in spring 2022, beaver-related activity was noted in the vicinity of SW-4 and MW09-6R, on Constant Creek (Appendix E). Non-conformances of RUC in spring and fall 2022 from groundwater results at downgradient monitoring well MW09-6R are included in the table below. RUC non-conformances at background monitoring wells MW08-1 and MW21-7 were included for comparison purposes.

Monitoring Well	RUC Non-Conformance	
	Spring 2022	Fall 2022
MW08-1 (background)	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Aluminum • Iron
MW21-7 (background)	<ul style="list-style-type: none"> • Aluminum • DOC • Iron • Manganese 	<ul style="list-style-type: none"> • Insufficient water for sampling purposes
MW09-6R	<ul style="list-style-type: none"> • DOC • Iron • Manganese 	<ul style="list-style-type: none"> • DOC • Iron • Manganese

High manganese concentrations in 2022 was interpreted to be related to naturally-occurring conditions within the low-lying area and off-site sources in the vicinity of Flat Road, and not to landfill-related activities (Table 4). With due consideration of the above noted interpreted sources, the Mount St. Patrick site was interpreted to be in compliance with RUC and MECP Guideline B-7 in 2022 at the downgradient northern property boundary in the vicinity of MW09-6R. Further sampling of replacement monitoring well MW09-6R is required to monitor groundwater quality results at the downgradient property boundary of the Mount St. Patrick Waste Disposal Site. In 2022, monitoring well MW09-6R was not interpreted to be significantly impacted by landfill-related activities.

In 2022, the total property area of 38.25 ha owned by the Township was considered sufficient for operational buffer and CAZ purposes at the Mount St. Patrick site. Further groundwater monitoring as part of future annual monitoring programs at monitoring wells MW09-5R and MW09-6R is anticipated to assist in verifying the suitability of the CAZ lands for future RUC assessments and conformance with MECP Guideline B-7.

4.2 Surface Water Quality Assessment

As part of the 2022 surface water monitoring program, physical characteristics of sampling locations SW-1, SW-2 (background), SW-3, and SW-4 were recorded (Figure 3; Appendix E).

For the spring 2022 sampling event, depth (m), width (m), velocity (metres per second, m/s), and discharge (cubic metres per second, m³/s) were measured and calculated with results as follows:

Spring 2022				
Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m ³ /s)
SW-1	0.20	15.00	0.25	0.600
SW-2 (background)	0.25	10.00	0.20	0.400
SW-3	Insufficient water for sampling purposes			
SW-4	0.20	15.00	0.25	0.600

For the fall 2022 sampling event, depth (m), width (m), velocity (m/s), and discharge (m³/s) were measured and calculated with results as follows:

Fall 2022				
Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m ³ /s)
SW-1	0.20	10.00	No discernible flow	
SW-2 (background)	0.20	10.00	No discernible flow	
SW-3	Insufficient water for sampling purposes			
SW-4	0.30	10.00	No discernible flow	

Surface water quality results for the Mount St. Patrick site were compared to PWQO (MECP, 1994b) and the results of the 2022 surface water monitoring program are presented in Table 6. Additionally, surface water quality results were compared with the Canadian Water Quality Guidelines (CWQG; Canadian Council of Resource and Environment Ministers [CCREM], 1987) 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 F. Background surface water quality was established as the 75th percentile of a minimum of the previous ten (10) sampling event results from background surface water monitoring location SW-2. 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 location SW-1 during the spring 2022 sampling event and SW-2 during the fall 2022 sampling event, respectively, were similar to the identified samples, indicating that the results of the 2022 surface water monitoring program can be interpreted with confidence.

Consistent with historical surface water quality assessments, background surface water quality at the Mount St. Patrick site was evaluated at surface water location SW-2 (Greenview, 2022). SW-2 is located on Constant Creek, approximately 700 m northwest and upstream of the existing limit of waste at the Mount St. Patrick site (Figure 3). Representative photographs of background surface water sampling location SW-2 are included below:

Photograph 1: Background Surface Water Location SW-2 (Spring 2021 [left], Fall 2021 [right])



In 2022, some parameter concentrations at background location SW-2 were above the 75th percentile background surface water quality at the site (Table 6). Non-conformances of PWQO, and significant trends, at background surface water sampling location SW-2 were as follows (Table 6):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
SW-2 (background)	<ul style="list-style-type: none"> Phosphorus 	<ul style="list-style-type: none"> Phosphorus 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> Zinc

In 2022, no non-conformances of Table B of the TGD were documented at background location SW-2. The noted non-conformances of PWQO for the concentrations of phosphorus in spring and fall 2022 were not interpreted to be resultant of landfill-related activities, and were interpreted to be resultant of naturally-occurring conditions upstream of the site and/or off-site sources (Table 6). Results from SW-2 were interpreted to be representative of background surface water quality at the Mount St. Patrick site in 2022.

Downstream surface water quality adjacent to the downgradient property boundary and along Constant Creek was established in 2009 with the initiation of sampling of surface water monitoring location SW-4 (Figure 3). Surface water quality results at SW-4 in 2022 were generally analogous to results at the upstream background location SW-2 (Appendix E; Table 6). Representative photographs of downstream surface water sampling location SW-4 are included below:

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



Some parameter concentrations at SW-4 were above the 75th percentile background surface water quality at the site for the spring and fall 2022 sampling events (Table 6). Non-conformances of PWQO, and significant trends, at surface water sampling location SW-4 were as follows (Table 6):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
SW-4	<ul style="list-style-type: none"> Iron Phosphorus 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> No significant trends

The concentration of cadmium at downstream location SW-4 was documented to be in non-conformance with the concentration limit of Table B of the TGD in spring 2022. The non-conformance of the PWQO for the concentration of phosphorus at SW-4 in spring 2022 was consistent with the concentration documented upstream at background location SW-2 (Table 6), and therefore was interpreted to naturally-occurring conditions in the background of the site (as high phosphorus concentrations have historically been documented in both background groundwater quality and surface water at the site; Tables 4 and 6). Based on the above, surface water sampling location SW-4 was not interpreted to be significantly impacted by landfill-related factors associated with the Mount St. Patrick Waste Disposal Site.

Surface water quality downstream of SW-4 on Constant Creek is monitored at surface water location SW-1 (Figure 3). Parameter concentrations at SW-1 were generally analogous to the upstream surface water quality at background sampling location SW-2 (Table 6). Representative photographs of furthest downstream surface water sampling location SW-1 are included below:

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



In 2022, few parameter concentrations at SW-1 were above the 75th percentile background surface water quality at the site (Table 6). Non-conformances of PWQO, and significant trends, at surface water sampling location SW-1 were as follows (Table 6):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
SW-1	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> Phosphorus 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> No significant trends

In 2021, no non-conformances of Table B of the TGD were documented at downstream location SW-1. The non-conformances of the PWQO for the concentrations of phosphorus in fall 2022 results and historically in iron results from SW-1 were interpreted to naturally-occurring conditions upstream and in the vicinity of the Mount St. Patrick Waste Disposal Site. Based on the above, surface water sampling location SW-1 was not interpreted to

be significantly impacted by landfill-related factors associated with the Mount St. Patrick Waste Disposal Site.

Surface water quality in the low-lying area north of, and in close proximity to, the waste mound is assessed at surface water sampling location SW-3. SW-3 is not hydrologically connected to the surface water sampling locations on Constant Creek (SW-1, SW-2, and SW-4). Historically, SW-3 has been observed to be a small, poorly drained area with leaves and other submerged organic debris, existing within the low-lying area (Figures 5 and 6). SW-3 was last sampled in spring 2021 and the sampling area was observed to be a shallow, pooled area of standing water with no discernible flow conditions (Appendix E). SW-3 was not sampled in spring and fall 2022 as it was observed to have insufficient water for sampling (Appendix E). SW-3 has only been sampled six (6) times since spring 2016 due to generally low surface water conditions at the sampling location; all sampling events at SW-3 since 2013 have been during the spring sampling event (Table 6). Representative photographs of surface water sampling location SW-3 are included below:

Photograph 4: Surface Water Location SW-3 (Spring 2021 [left], Fall 2021 [right])



Non-conformances of PWQO, and significant trends, at surface water sampling location SW-3 were as follows (Table 6):

Monitoring Well	PWQO Non-Conformance		Five (5) Year Trend Analysis	
	Spring 2022	Fall 2022	Increasing	Decreasing
SW-3	<ul style="list-style-type: none"> Insufficient water for sampling purposes 	<ul style="list-style-type: none"> Insufficient water for sampling purposes 	<ul style="list-style-type: none"> No significant trends 	<ul style="list-style-type: none"> No significant trends

Historically, the concentration of nitrite was documented to be equal to the limit of Table B of the TGD. The non-conformance of the PWQO for the concentration of phosphorus in historical results from SW-3 was attributed to naturally-occurring conditions upstream and in the vicinity of the Mount St. Patrick Waste Disposal Site. Based on the above, surface water sampling location SW-3 was not interpreted to be significantly impacted by landfill-related factors associated with the Mount St. Patrick Waste Disposal Site.

Based on the results of the 2022 surface water monitoring program, the surface water system in the vicinity of the Mount St. Patrick site was not interpreted to be significantly impacted from landfill-related activities.

4.3 Operations Summary

A summary of 2022 waste management operations at the Mount St. Patrick Waste Disposal Site is presented below.

4.3.1 Site Operations

The site is currently operating as a municipal solid waste landfill and transfer station, accepting municipal waste

and recyclables from ratepayers of the Township. Accepted regular municipal waste (i.e. bagged garbage) and Blue Box recycling is transferred to GFL in Moose Creek, Ontario for disposal and processing. The Mount St. Patrick site currently services the Township of Greater Madawaska, and operates in accordance with ECA A411901 (Appendix A). C&D and bulky waste is accepted for stockpiling, processing, and landfilling at the Mount St. Patrick site (Figures 2 and 4). In 2022, C&D and bulky waste materials were processed on-site in fall 2022, and disposed in the landfill area. A quantity of unprocessed C&D and bulky waste was stockpiled on-site and within the AWDA at the time of the annual waste capacity survey on December 08, 2022. As part of site operations, the Mount St. Patrick site is approved for accepting and diversion of the following waste and recyclable materials:

Waste / Recyclable Material	Quantity (units)
Regular Municipal Waste (Residential & IC&I)	80 m ³
Organic Waste	20 m ³
Waste Electronic and Electrical Equipment (WEEE)	40 m ³
Blue Box Recyclables (mixed fibres / commingled containers / old corrugated cardboard)	325 m ³
Tires	100 m ³
Leaf and Yard Waste	200 m ³
C&D and Bulky Waste	200 m ³
Scrap Metal and White Goods	60 m ³
Refrigerants	25 units

A sign is posted at the entrance to the site in accordance with Condition 13.4 of the ECA. The sign provides the ECA number for the site, hours of operation, permitted users, accepted waste and recycling materials, emergency and Township contact information, and a warning against dumping waste outside of the site. The Mount St. Patrick site is located approximately 1.6 km west of the village of Mount St. Patrick, and access to the site is provided by Flat Road.

The hours of operation at the Mount St. Patrick site in 2022 were as follows:

Day of the Week	Hours of Operation
Wednesday	12:00 p.m. – 2:00 p.m.
Saturday	8:00 a.m. – 12:00 p.m.
Sunday	8:00 a.m. – 12:00 p.m.
Holiday Monday	Closed

Access to the Mount St. Patrick site is restricted by a lockable gate at the site entrance. The site is surrounded by forested lands, which provide adequate screening and restricted access for vehicular traffic, aside of the maintained site entrance-way.

The site access road extending from Flat Road has sufficient width at the entrance and within the site 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 in 2022.

4.3.2 Waste Disposal / Transfer Summary

The Mount St. Patrick Waste Disposal Site currently receives municipal waste and recyclables from the Township of Greater Madawaska. C&D and bulky waste processing operations were completed in fall 2022 at the Mount St. Patrick site. The volume of waste disposed of at the Mount St. Patrick Waste Disposal Site in 2022 was determined by a specialized survey and design technique referred to as digital terrain modelling (DTM). The DTM method is a computer-based process that compares two (2) topographic surfaces or digital terrain models,

and calculates the prismatic volumetric difference.

To calculate the volume of processed C&D and bulky waste disposed, graded, and compacted at the site in 2022, the topographic survey conducted on December 08, 2022, was compared to the topographic survey conducted on December 14, 2021, for the Mount St. Patrick site. Additionally, with respect to the unprocessed C&D and bulky waste stockpile on-site within the AWDA on December 08, 2022, a processing and compaction factor of 33% was applied to the stockpile volume in order to estimate the landfill capacity volume that would be utilized following the next processing event at the site. Therefore, based on the topographic survey calculations noted above for the Mount St. Patrick site, the 2022 fill rate was calculated to be approximately 645 cubic meters (m³) of waste.

Based on the calculated 2022 fill rate of 645 m³ in comparison to the approved final contours at closure (FCC) of the Mount St. Patrick site, and with consideration of all the grading and compaction operations conducted by the Township in 2022, the remaining site capacity as of December 08, 2022, was approximately 34,874 m³. Given the average (mean) five (5) year fill rate (2018 to 2022) of 881 m³ and the remaining capacity of 34,874 m³, the estimated remaining site life for the Mount St. Patrick site is approximately forty (40) years.

As processed C&D and bulky wastes are approved as alternative daily cover (ADC) for the Mount St. Patrick site (Appendix A), no aggregate-based cover material (i.e. sand, etc.) was utilized as part of operations in 2022.

Based on Township records, approximately 3,601 vehicles visited the Mount St. Patrick site in 2022, and accepted approximately 9,893 bags and 69 trailer-loads of municipal waste for disposal and/or transfer. Based on information supplied by the Township, 64 tonnes of municipal waste were collected at the Mount St. Patrick site in 2022 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario.

Recycling tonnage records provided by the Township indicated that 24 tonnes of Blue Box recyclables were collected from the Mount St. Patrick Waste Disposal Site in 2022. Blue Box recyclable quantities contributing to this total included 12 tonnes of commingled containers, 7 tonnes of mixed fibres, and 5 tonnes of OCC. Additionally, approximately 418 m³ of C&D and bulky waste, and 122 m³ of leaf and yard waste, was accepted at the Mount St. Patrick site in 2022.

According to Township records, 111 tonnes of scrap metal, 75 refrigerant appliances, 1,723 tires, and 17 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.

Waste operations training for Township waste operation staff was conducted by JP2G Consultants on October 13, 2022. 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 AWDA and property at the Mount St. Patrick site were conducted by Greenview on May 17, 2022, and November 02, 2022, during the spring and fall sampling events, and on December 08, 2022, during the topographic survey of the site. The Township also conducted periodic investigations to verify the compliance status of the site.

4.3.4 Complaints

There were no reported complaints received by the Township with respect to waste management operations at the Mount St. Patrick Waste Disposal Site in 2022.

4.3.5 Monitoring and Screening Checklist

In accordance with the MECP TGD (MECP, 2010b), the Monitoring and Screening Checklist for the Mount St. Patrick Waste Disposal Site is included as Appendix G of this report.

5.0 Conclusions and Recommendations

Based on the results of the 2022 environmental monitoring program completed for the Mount St. Patrick Waste Disposal Site, the following conclusions are provided:

- The groundwater configuration at the site in the spring and fall of 2022 was similar to historical interpretations with the predominant direction of groundwater flow in the overburden unit interpreted to be to the north towards the low-lying area, and in the general direction of Constant Creek. Average horizontal gradients in the vicinity of the waste mound were calculated in spring and fall 2022 to be approximately 0.012 and 0.007 to the north, respectively. Average horizontal gradients to the northeast of the waste mound were calculated in spring and fall 2022 to be approximately 0.011 and 0.013, respectively, generally to the north.
- Background groundwater quality at the Mount St. Patrick site has been historically assessed at monitoring well MW08-1. Generally, concentrations of aluminum, DOC, hardness, iron, manganese, and TDS have been high in historical background groundwater quality results at the Mount St. Patrick site. Since 2017, background monitor MW08-1 has been interpreted to have been impacted from winter road maintenance activities from the transfer station and winter sand storage at the municipal depot located on the west side of Flat Road.
- In spring 2021, a new background monitoring well MW21-7 was installed at the site, upgradient and approximately 30 m to the east of the transfer station. Based on results from the spring 2022 sampling event, naturally high concentrations of aluminum, DOC, iron, and manganese were documented for new background monitoring well MW21-7. MW21-7 was observed to have insufficient water to sample during the fall 2022 sampling event.
- Groundwater immediately downgradient of the site at monitoring wells MW06-2, MW06-3, and MW06-4 was interpreted to be impacted by landfill-related activities at the site; however, naturally-occurring conditions within the low-lying area at the site (MW06-2 and MW06-3), and winter road maintenance activities (MW06-4), were also interpreted to be contributing factors to documented groundwater quality results in the vicinity of the Mount St. Patrick site. Groundwater quality results at monitoring well MW06-2 were interpreted to best represent leachate quality in 2022.
- Groundwater monitoring well MW09-5R is located partially cross-gradient and northeast of the waste mound and near the north-eastern property boundary within a low-lying area. ODWS non-conformances for DOC, iron and manganese in spring and fall 2022 were attributed to naturally-occurring conditions within the low-lying area east of the site and not to landfill-related activities.
- Groundwater monitoring well MW09-6R is located approximately 600 m northeast and downgradient of the Mount St. Patrick site and near the north-eastern property boundary. ODWS non-conformances for DOC and iron spring 2022 and DOC, iron, and manganese in fall 2022 at MW09-6R were attributed to naturally-occurring conditions within the low-lying area northeast of the site. RUC non-conformances for concentrations of DOC, iron, and manganese occurred in during the 2022 sampling events for cross-gradient well MW09-5R and downgradient well MW09-6R. Documented groundwater quality results were not attributed to landfill-related activities at the Mount St. Patrick site. Given the considerable distance of MW09-6R from the Mount St. Patrick site (approximately 600 m), its location within the low-lying area northeast of the site, and since it was interpreted to be the downgradient and downstream receiver of groundwater and surface water flow from the vicinity of Flat Road, ODWS and RUC non-conformances in 2022 groundwater quality results at MW09-6R were interpreted to be resultant of naturally-occurring conditions within the low-lying area and off-site sources.
- Based on the RUC assessment completed in 2022, it was interpreted that the Mount St. Patrick site was in compliance with MECP Guideline B-7 and RUC along the northern and northeastern property

boundaries. It was interpreted that the total property area of 38.25 ha owned by the Township, inclusive of the 1.2 ha landfill and transfer station, was sufficient for operational buffer and CAZ purposes at the Mount St. Patrick site.

- Results from surface water location SW-2 were interpreted to be representative of background surface water quality at the Mount St. Patrick site in 2022. Based on a review of 2022 surface water quality results for downstream surface water sampling locations SW-1 and SW-4, Constant Creek was not interpreted to be significantly impacted by landfill-related activities at the Mount St. Patrick site. Surface water sampling location SW-3, located near the Mount St. Patrick site and within the low-lying area, was historically not interpreted to be significantly impacted by landfill-related activities.
- To calculate the volume of processed C&D and bulky waste disposed, graded, and compacted at the site in 2022, the topographic survey conducted on December 08, 2022, was compared to the topographic survey conducted on December 14, 2021, for the Mount St. Patrick site. Additionally, with respect to the unprocessed C&D and bulky waste stockpile on-site within the AWDA on December 08, 2022, a processing and compaction factor of 33% was applied to the stockpile volume in order to estimate the landfill capacity volume that would be utilized following the next processing event at the site. Therefore, based on the topographic survey calculations noted above for the Mount St. Patrick site, the 2022 fill rate was calculated to be approximately 645 cubic meters (m³) of waste.
- Based on the calculated 2022 fill rate of 645 m³ in comparison to the approved final contours at closure of the Mount St. Patrick site, and with consideration of all the grading and compaction operations conducted by the Township in 2022, the remaining site capacity as of December 08, 2022, was approximately 34,874 m³. Given the average (mean) five (5) year fill rate (2018 to 2022) of 881 m³ and the remaining capacity of 34,874 m³, the estimated remaining site life for the Mount St. Patrick site is approximately forty (40) years.
- Based on Township records, approximately 3,601 vehicles visited the Mount St. Patrick site in 2022, and accepted approximately 9,893 bags and 69 trailer-loads of municipal waste for disposal and/or transfer. Based on information supplied by the Township, 64 tonnes of municipal waste were collected at the Mount St. Patrick site in 2022 and transported for final disposal to the approved waste disposal facility of GFL in Moose Creek, Ontario.
- Recycling tonnage records provided by the Township indicated that 24 tonnes of Blue Box recyclables were collected from the Mount St. Patrick Waste Disposal Site in 2022. Blue Box recyclable quantities contributing to this total included 12 tonnes of commingled containers, 7 tonnes of mixed fibres, and 5 tonnes of OCC. Additionally, approximately 418 m³ of C&D and bulky waste, and 122 m³ of leaf and yard waste, was accepted at the Mount St. Patrick site in 2022.
- According to Township records, 111 tonnes of scrap metal, 75 refrigerant appliances, 1,723 tires, and 17 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.
- Based on the results of the 2022 environmental monitoring program, the Mount St. Patrick Waste Disposal Site was in compliance with all conditions of the ECA (A411901), and with the inspections, monitoring, and reporting requirements of the conditions therein.

The following recommendations are provided to the Township for consideration as part of the 2022 environmental work program for the Mount St. Patrick Waste Disposal Site:

- The 2023 groundwater monitoring program for the site should continue to include sampling events in the spring and fall at monitoring wells MW08-1, MW06-2, MW06-3, MW06-4, MW09-5R, MW09-6R, and MW21-7 for the parameter suite shown in Table 1 for the groundwater regime at the site.
- In 2023, the surface water monitoring program at the site should continue to include sampling events in

the spring and fall, inclusive of surface water sampling stations SW-1, SW-2 (background), SW-3, and SW-4 in accordance with the parameter suite presented in Table 1, to monitor the surface water regime at the site. Collection of surface water samples during scheduled sampling events should only be conducted if sufficient quantities of water are available at the sampling location to avoid potentially biased results caused by low or no-flow conditions.

- In 2023, it is recommended that the Township complete a grade stake survey at the Mount St. Patrick Waste Disposal Site in order to assist Township operations staff with further landfilling activities.

6.0 Closing

Greenview has prepared the 2022 Annual Report in accordance with MECP guidelines and Condition 22.0 of the ECA (A411901) to document annual site operations, and the results of the 2022 environmental monitoring program for the Mount St. Patrick Waste Disposal Site.

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

All respectfully submitted by,

Greenview Environmental Management Limited



Tyler H. Peters, P.Eng.
Project Director



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Tables



Table 1
2022 Groundwater and Surface Water Monitoring Program
Mount St. Patrick Waste Disposal Site

Location		Frequency	Parameters		
Groundwater					
MW08-1	MW06-2	Twice (2x)	Alkalinity	Aluminum	Ammonia (total)
MW06-3	MW06-4		Barium	Boron	Cadmium
MW09-5R	MW09-6R		Calcium	Chloride	COD
MW21-7			Conductivity	Copper	DOC
			Hardness	Iron	Magnesium
GLL7 (residential)			Manganese	Nitrate	Nitrite
			pH	Phosphorus (total)	Potassium
1x QA/QC		(Spring & Fall)	Silicon	Sodium	Strontium
			Sulphate	TDS	TKN
			Zinc		
			Field Measurements		
			Conductivity	Dissolved Oxygen	pH
			Temperature		
COUNT =	9				
Surface Water					
SW-1	SW-2	Twice (2x)	Alkalinity	Ammonia (total)	Arsenic
SW-3	SW-4		Barium	Boron	BOD
			Cadmium	Calcium	Chloride
			Chromium	COD	Conductivity
			Copper	DOC	Hardness
1x QA/QC			Iron	Lead	Magnesium
			Manganese	Mercury	Nitrate
		(Spring & Fall)	Nitrite	pH	Phenols
			Phosphorus (total)	Potassium	Sodium
			Strontium	Sulphate	TDS
			TKN	TSS	Zinc
			Field Measurements		
			Conductivity	Dissolved Oxygen	pH
			Temperature	Un-ionized Ammonia (calculation)	
COUNT =	5				

Table 2
Groundwater Monitoring Well and Surface Water Sampling Locations
Mount St. Patrick Waste Disposal Site

Groundwater			
Monitor	Zone	Northing	Easting
MW06-2	18T	5021685	351295
MW06-3	18T	5021738	351260
MW06-4	18T	5021687	351201
MW08-1	18T	5021601	351209
MW09-5	18T	5021831	351480
MW09-5R	18T	5021831	351480
MW09-6	18T	5022284	351377
MW09-6R	18T	5022278	351375
MW21-7	18T	5021559	351308

Surface Water			
Monitor	Zone	Northing	Easting
SW-1	18T	5022270	351742
SW-2	18T	5022324	351013
SW-3	18T	5021777	351212
SW-4	18T	5022286	351369

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



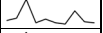
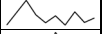

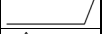
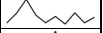

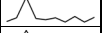
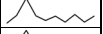

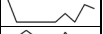

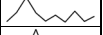

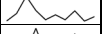

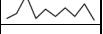
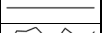

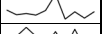
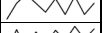

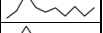
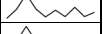

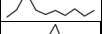


Table 3
Groundwater Elevations
Mount St. Patrick Waste Disposal Site

Monitor	Ground Elevation (m)	Top of Pipe Elevation (m)	Original Stick-Up (m)	Depth of Well (m)	Well Diameter (mm)	Water Elevation (m)													
						25-May-16	27-Oct-16	09-May-17	26-Oct-17	08-May-18	31-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22
MW08-1 ²	97.69	98.58	0.77	5.78	50.8	94.47	93.07	95.29	93.79	94.94	93.09	94.93	92.90	94.86	93.57	94.64	93.51	94.72	93.59
MW06-2 ¹	93.93	94.86	0.93	2.22	50.8	93.55	92.54	93.67	93.32	93.61	92.86	93.62	92.76	93.61	93.10	93.57	93.04	93.61	93.07
MW06-3 ¹	93.29	94.26	0.97	2.85	50.8	92.99	92.20	93.01	92.82	93.00	92.67	93.00	92.52	93.00	92.70	93.00	92.60	92.98	92.61
MW06-4 ¹	95.66	96.57	0.91	3.82	50.8	94.18	92.63	94.65	93.64	94.46	92.96	94.47	92.77	94.43	93.28	94.21	93.22	94.27	93.29
MW09-5R ⁵	92.08	93.28	1.12	1.10	50.8	91.94	91.63	91.98	91.93	91.69	91.93	91.99	91.92	91.98	91.97	91.92	91.87	91.88	91.87
MW09-6R ⁵	89.30	90.53	0.94	1.07	50.8	88.90	88.82	Flooded	88.92	89.56	88.92	89.08	88.83	88.95	88.84	88.98	88.82	88.95	88.80
MW21-7 ⁶	94.97	95.52	0.54	1.14	50.8	-	-	-	-	-	-	-	-	-	-	94.75	94.03	94.84	94.04
MP3R	93.51	94.45	0.91	0.89	19.0	92.70	92.62	93.72	93.37	93.66	92.93	93.64	92.70	93.54	93.15	93.64	-	93.55	93.27
MP4	95.93	96.71	0.74	0.74	19.0	94.32	-	94.94	-	94.69	-	94.92	-	94.65	-	94.38	-	94.41	-
MP5	92.86	93.65	0.78	0.70	19.0	92.49	-	92.64	92.50	92.58	-	92.77	-	92.72	-	92.75	-	92.73	-
MP6	93.02	93.67	0.66	0.57	19.0	92.83	92.18	92.86	92.75	92.87	92.42	93.07	92.60	93.06	92.85	93.08	92.77	93.07	92.76
MP7	92.81	93.47	0.71	0.71	19.0	92.57	92.12	92.57	92.50	92.72	92.36	92.54	92.34	92.52	92.44	92.51	92.37	92.52	92.37

Notes:






























1. Ground elevations and top of pipe elevations surveyed by Greenview on October 30, 2007.
 2. Ground elevations and top of pipe elevations surveyed by Greenview on November 22, 2007.
 3. Ground elevations and top of pipe elevations surveyed by Greenview on January 14, 2010.
 4. Decommissioned
 5. Monitoring wells MW09-5R and MW09-6R were installed on July 03, 2014 to replace MW09-5 and MW09-6.
 6. Monitoring well MW21-7 installed on May 6, 2021.
- All elevations are relative to a site specific benchmark elevation of 100.00 m.
 "-" indicates data is not available.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	MW08-1 (Background)														5-year Trends (sparkline)
				25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	30-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	276	388	30 - 500	276	325	241	328	239	292	249	310	236	275	248	299	241	307	
Aluminum	0.073	0.09	0.1	0.02	0.03	0.11	0.05	0.05	0.07	0.09	0.23	0.05	0.03	0.07	0.19	0.05	0.16	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.01	0.10	0.06	0.03	0.05	0.07	0.23	0.03	0.06	0.03	0.02	0.13	0.04	0.03	
Barium	0.12	0.34	1	0.088	0.145	0.299	0.103	0.089	0.160	0.231	0.147	0.101	0.141	0.088	0.163	0.103	0.127	
Boron	0.011	1.3	5	< 0.005	< 0.005	< 0.005	0.016	0.008	0.006	0.008	0.011	0.006	0.015	0.009	0.013	0.005	0.013	
Cadmium	0.000015	0.0013	0.005	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000070	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000020	
Calcium	96	N/L	N/L	73.6	110	170	90.3	79.7	116	170	109	80.2	104	75.0	117	79.1	100	
Chemical Oxygen Demand	24	N/L	N/L	93	65	57	35	25	8	21	38	37	115	5	22	20	26	
Chloride	40	145	250	29.2	39.0	277	18.6	23.8	62.9	301	55.2	41.9	63.8	16.1	78.4	16.6	67.3	
Conductivity (µS/cm) ³	715	N/L	N/L	581	-	1670	715	499	796	1500	783	608	771	540	835	539	769	
Conductivity (µS/cm) ⁴	526	N/L	N/L	416	510	1127	545	320	548	916	500	352	722	362	719	290	556	
Copper	0.002	0.5	1	< 0.002	0.002	< 0.002	< 0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0014	< 0.002	0.0028	0.0022	
Dissolved Organic Carbon	1.7	3.4	5	1.2	1.4	0.7	1.7	1.2	2.0	2.7	2.0	2.0	1.0	2.5	1.4	1.9	0.3	
Hardness (as CaCO ₃)	311	405	500	246	359	586	280	262	375	568	368	266	341	253	388	259	325	
Iron	0.037	0.2	0.3	< 0.005	< 0.005	< 0.005	< 0.005	0.022	0.011	0.052	0.695	0.019	< 0.005	0.099	0.447	0.021	0.455	
Magnesium	18	N/L	N/L	15.1	20.8	39.1	13.3	15.2	20.8	34.8	23.3	15.9	19.9	16.0	22.9	14.9	18.3	
Manganese	0.003	0.03	0.05	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	0.003	0.049	0.001	< 0.001	0.007	0.038	0.002	0.021	
Nitrate (as N)	0.7	3	10	1.1	0.6	1.14	0.39	0.40	0.63	1.5	0.4	0.84	0.5	0.9	0.5	1.09	0.33	
Nitrite (as N)	0.05	0.29	1	< 0.1	< 0.1	0.19	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.48	7.29	6.54	5.90	6.16	7.38	7.36	7.59	7.01	6.77	7.52	7.10	6.64	7.32	
Phosphorus (total)	1.07	N/L	N/L	2.68	3.75	5.62	1.06	1.66	0.84	1.08	0.77	1.59	4.64	0.01	1.35	0.20	1.37	
Potassium	2.0	N/L	N/L	1.2	1.8	2.5	1.9	1.3	2.0	2.4	2.0	1.6	2.2	1.5	2.3	1.5	2.0	
Silicon	5.11	N/L	N/L	4.01	5.71	4.96	4.79	4.05	5.22	4.15	5.09	4.43	5.18	4.62	5.41	4.69	5.25	
Sodium	33	116	200	19.2	34.5	78.9	62.4	15.4	35.3	83.5	44.2	31.4	43.3	20.3	47.2	20.4	43.6	
Strontium	0.19	N/L	N/L	0.140	0.213	0.401	0.165	0.140	0.213	0.339	0.217	0.151	0.205	0.153	0.229	0.153	0.187	
Sulphate	13	256	500	13	11	22	15	8	16	28	16	11	12	9	12	9	13	
Total Dissolved Solids	402	451	500	321	414	921	393	258	418	818	411	316	404	290	440	279	403	
Total Kjeldahl Nitrogen	0.60	N/L	N/L	1.2	1.7	2.2	0.6	0.9	0.6	0.6	0.4	0.7	2.1	0.1	0.6	0.2	0.5	
Zinc	0.005	2.5	5	0.008	< 0.005	< 0.005	0.010	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
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.
N/L indicates No Limit.
*- indicates the parameter was not analyzed.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	MW06-2													5-year Trends (sparkline)
				25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	30-Oct-18	16-May-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	276	388	30 - 500	387	349	360	328	318	305	326	332	310	326	340	334	346	
Aluminum	0.073	0.09	0.1	0.04	0.03	0.08	0.06	0.06	0.08	0.07	0.07	0.05	0.08	0.16	0.06	0.45	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.01	0.06	0.02	0.05	0.05	0.11	0.10	0.06	0.06	0.03	0.06	0.02	0.05	
Barium	0.12	0.34	1	0.234	0.259	0.296	0.369	0.205	0.242	0.258	0.266	0.251	0.232	0.284	0.293	0.260	
Boron	0.011	1.3	5	0.208	0.137	0.273	0.172	0.109	0.071	0.175	0.169	0.107	0.201	0.112	0.245	0.125	
Cadmium	0.000015	0.0013	0.005	< 0.00002	0.00002	< 0.000014	0.000019	< 0.000015	< 0.000015	< 0.000015	< 0.000028	< 0.000015	< 0.000015	< 0.000015	< 0.000028	0.000033	
Calcium	96	N/L	N/L	115	129	110	162	103	110	131	136	118	118	139	137	120	
Chemical Oxygen Demand	24	N/L	N/L	124	270	81	69	48	284	29	47	79	9	131	47	64	
Chloride	40	145	250	114	102	84.8	153	64.3	76.8	106	124	81.7	99.3	95.2	119	100	
Conductivity (µS/cm) ³	715	N/L	N/L	1040	-	1050	1260	772	871	1010	1060	902	973	1020	1080	966	
Conductivity (µS/cm) ⁴	526	N/L	N/L	803	720	708	847	522	598	622	587	656	634	684	629	696	
Copper	0.002	0.5	1	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0014	< 0.002	0.0014	0.0041	
Dissolved Organic Carbon	1.7	3.4	5	1.6	1.4	2.7	1.6	1.9	2.5	4.4	2.4	1.3	2.6	2.9	2.2	0.7	
Hardness (as CaCO ₃)	311	405	500	388	428	385	532	339	358	439	455	394	400	469	452	406	
Iron	0.037	0.2	0.3	0.007	< 0.005	< 0.005	< 0.005	0.007	0.081	< 0.005	0.006	0.039	0.005	0.365	0.005	1.10	
Magnesium	18	N/L	N/L	24.2	25.8	26.9	31.0	19.8	20.3	27.1	27.9	24.0	25.5	29.5	26.7	25.5	
Manganese	0.003	0.03	0.05	0.040	0.265	0.038	0.304	0.056	0.021	0.024	0.015	0.034	0.011	0.146	0.007	0.501	
Nitrate (as N)	0.7	3	10	0.7	0.2	0.50	0.13	0.37	< 0.05	0.6	0.44	0.1	0.5	0.2	0.49	0.18	
Nitrite (as N)	0.05	0.29	1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.39	7.57	7.23	7.55	7.34	7.19	7.47	7.17	7.30	7.18	7.55	7.22	7.31	
Phosphorus (total)	1.07	N/L	N/L	3.58	4.18	3.84	1.23	1.03	6.90	0.62	0.85	1.04	0.05	2.65	0.35	0.85	
Potassium	2.0	N/L	N/L	2.7	3.9	2.7	3.8	2.4	3.8	2.7	2.6	3.8	2.5	3.8	2.8	3.6	
Silicon	5.11	N/L	N/L	5.41	7.26	6.40	6.92	4.75	6.54	5.19	5.21	6.61	5.50	6.07	5.97	6.81	
Sodium	33	116	200	57.3	70.8	66.7	67.9	57.4	62.3	52.2	57.9	61.8	54.3	62.3	59.4	55.8	
Strontium	0.19	N/L	N/L	0.238	0.290	0.293	0.327	0.192	0.224	0.275	0.274	0.257	0.254	0.294	0.282	0.251	
Sulphate	13	256	500	38	38	30	32	25	25	34	38	30	39	49	42	35	
Total Dissolved Solids	402	451	500	588	559	577	694	404	460	539	569	478	536	547	577	514	
Total Kjeldahl Nitrogen	0.60	N/L	N/L	3.8	5.1	2.2	1.2	0.7	4.7	0.7	0.8	1.1	0.2	3.2	0.6	1.1	
Zinc	0.005	2.5	5	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.006	< 0.005	< 0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

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.













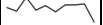





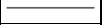
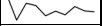




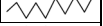
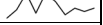



Bold and shaded values exceed the ODWS.

Bold and italic values exceed RUC limits.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	MW06-3														5-year Trends (sparkline)
				25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	30-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	276	388	30 - 500	246	292	204	311	257	258	184	279	176	260	222	266	214	284	
Aluminum	0.073	0.09	0.1	0.04	0.03	0.04	0.05	0.05	0.06	0.03	0.06	0.01	0.03	0.05	0.02	0.04	0.03	
Ammonia, Total (as N)	0.1	N/L	N/L	0.03	0.01	0.02	0.02	0.10	0.13	0.08	0.03	0.04	0.04	0.04	0.03	0.04	0.03	
Barium	0.12	0.34	1	0.137	0.233	0.166	0.269	0.177	0.241	0.127	0.205	0.135	0.219	0.138	0.221	0.156	0.231	
Boron	0.011	1.3	5	0.014	0.025	0.006	0.048	0.027	0.030	0.028	0.049	0.020	0.041	0.029	0.036	0.030	0.032	
Cadmium	0.000015	0.0013	0.005	0.00002	0.00006	0.00003	0.000043	0.000044	0.000039	0.000035	0.000044	0.000022	0.000125	0.000028	0.000037	< 0.000039	0.000035	
Calcium	96	N/L	N/L	52.8	83.3	65.7	93.7	75.7	85.9	55.4	78.1	59.4	88.9	59.9	89.2	64.4	93.9	
Chemical Oxygen Demand	24	N/L	N/L	37	10	32	30	133	33	32	15	29	25	27	28	26	13	
Chloride	40	145	250	62.9	134	58	89.8	62.8	97.3	43.3	75.5	60.4	99.8	54.4	89.1	52.7	124	
Conductivity (µS/cm) ³	715	N/L	N/L	631	-	666	972	656	850	552	783	592	863	621	824	608	925	
Conductivity (µS/cm) ⁴	526	N/L	N/L	467	714	374	746	366	582	304	856	285	649	375	618	312	665	
Copper	0.002	0.5	1	0.003	0.003	0.005	0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0019	< 0.002	0.0065	0.0019	
Dissolved Organic Carbon	1.7	3.4	5	12.4	4.2	9.9	6.4	7.8	6.3	12.1	6.7	8.6	6.1	8.9	8.9	9.3	1.9	
Hardness (as CaCO ₃)	311	405	500	173	275	208	306	246	277	184	257	193	293	202	298	212	314	
Iron	0.037	0.2	0.3	0.062	< 0.005	0.010	0.008	0.017	0.033	0.014	< 0.005	0.012	0.014	0.029	0.028	0.016	0.009	
Magnesium	18	N/L	N/L	9.96	16.1	10.7	17.4	13.8	15.2	11.0	15.1	10.9	17.3	12.6	18.2	12.5	19.3	
Manganese	0.003	0.03	0.05	0.679	0.775	0.622	0.723	0.498	0.452	0.454	0.472	0.188	0.198	0.366	0.307	0.342	0.343	
Nitrate (as N)	0.7	3	10	< 0.1	0.6	0.3	0.41	0.07	0.10	0.2	< 0.1	0.12	0.1	< 0.1	0.2	0.06	0.05	
Nitrite (as N)	0.05	0.29	1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.32	7.33	7.37	7.38	8.02	7.05	7.70	7.61	7.21	7.39	7.25	7.58	7.41	7.37	
Phosphorus (total)	1.07	N/L	N/L	0.15	0.11	0.19	0.12	3.65	0.25	0.09	0.07	0.13	0.07	0.08	0.10	0.11	0.07	
Potassium	2.0	N/L	N/L	0.6	1.3	0.7	1.3	0.6	1.2	0.6	1.1	0.6	1.1	0.6	1.2	0.8	1.3	
Silicon	5.11	N/L	N/L	3.97	5.82	4.54	5.49	3.67	5.34	3.80	4.63	3.43	4.72	3.89	5.00	4.32	5.39	
Sodium	33	116	200	59.3	118	71	104	61.9	89.7	51.5	81.3	54.5	84.4	58.5	74.4	53.8	72.7	
Strontium	0.19	N/L	N/L	0.098	0.157	0.109	0.173	0.126	0.155	0.104	0.153	0.104	0.169	0.117	0.174	0.123	0.182	
Sulphate	13	256	500	16	20	20	21	14	19	29	17	29	24	16	20	18	20	
Total Dissolved Solids	402	451	500	350	557	366	535	341	449	276	411	307	456	336	434	315	491	
Total Kjeldahl Nitrogen	0.60	N/L	N/L	0.7	0.6	0.6	0.4	1.9	0.6	0.4	0.3	0.4	0.4	0.4	0.5	0.5	0.3	
Zinc	0.005	2.5	5	0.009	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

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.

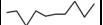







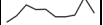

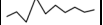

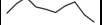




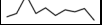
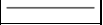
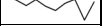

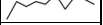
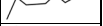
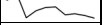
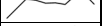

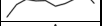
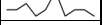

Bold and shaded values exceed the ODWS.

Bold and italic values exceed RUC limits.

N/L indicates No Limit.

*- indicates the parameter was not analyzed.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	MW06-4														5-year Trends (sparkline)
				25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	30-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	276	388	30 - 500	300	331	294	296	298	302	264	302	289	294	294	327	286	320	
Aluminum	0.073	0.09	0.1	0.04	0.04	0.08	0.07	0.04	0.05	0.08	0.11	0.06	0.03	0.06	0.03	0.06	0.04	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.01	0.02	< 0.01	0.02	0.04	0.07	0.12	0.03	0.07	0.07	0.03	0.02	0.02	0.02	
Barium	0.12	0.34	1	0.267	0.210	0.297	0.241	0.151	0.219	0.221	0.225	0.223	0.212	0.187	0.247	0.259	0.203	
Boron	0.011	1.3	5	0.011	0.005	0.013	0.022	0.012	0.018	0.036	0.028	0.047	0.041	0.057	0.083	0.078	0.044	
Cadmium	0.000015	0.0013	0.005	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	0.000071	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000028	< 0.000010	
Calcium	96	N/L	N/L	128	100	99.9	105	70.7	95.5	112	106	106	97.6	92.4	118	124	98.6	
Chemical Oxygen Demand	24	N/L	N/L	72	184	63	58	7	< 5	23	6	24	49	10	< 5	17	< 5	
Chloride	40	145	250	226	68.9	133	107	48.1	71.4	114	96.2	97.6	68.3	68.4	75.1	144	83.6	
Conductivity (µS/cm) ³	715	N/L	N/L	1220	-	1110	999	688	861	934	911	916	841	834	937	1030	880	
Conductivity (µS/cm) ⁴	526	N/L	N/L	955	602	710	716	452	573	304	964	518	751	554	693	565	630	
Copper	0.002	0.5	1	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.0015	< 0.002	0.0009	0.0026	
Dissolved Organic Carbon	1.7	3.4	5	0.7	1.2	1.5	1.3	1.5	2.7	3.5	2.3	2.0	1.6	2.4	2.9	1.3	0.4	
Hardness (as CaCO ₃)	311	405	500	432	331	357	346	232	310	377	356	354	330	315	400	412	332	
Iron	0.037	0.2	0.3	< 0.005	< 0.005	< 0.005	0.029	< 0.005	0.008	0.154	0.294	< 0.005	< 0.005	< 0.005	0.010	< 0.005	< 0.005	
Magnesium	18	N/L	N/L	27.1	19.6	26.0	20.4	13.4	17.3	23.6	22.1	21.6	20.9	20.4	25.2	24.8	20.8	
Manganese	0.003	0.03	0.05	< 0.001	< 0.001	< 0.001	0.030	< 0.001	0.001	0.012	0.020	< 0.001	0.018	< 0.001	0.002	< 0.001	0.002	
Nitrate (as N)	0.7	3	10	1.7	1.0	1.08	0.45	0.53	0.70	1.7	0.7	1.01	0.6	0.9	0.8	0.98	0.35	
Nitrite (as N)	0.05	0.29	1	< 0.1	< 0.1	0.10	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.33	7.54	6.99	6.28	8.07	7.73	7.40	7.77	7.34	7.07	7.55	7.81	6.45	7.63	
Phosphorus (total)	1.07	N/L	N/L	1.59	1.16	5.13	0.94	0.91	0.40	1.16	0.32	0.68	2.86	0.04	0.32	0.52	0.13	
Potassium	2.0	N/L	N/L	2.4	2.4	2.7	2.7	2.0	2.7	2.5	2.7	2.6	3.0	2.4	2.9	2.8	2.6	
Silicon	5.11	N/L	N/L	4.46	5.46	5.63	5.43	4.20	5.16	4.83	4.86	4.88	5.30	4.93	5.16	5.13	5.22	
Sodium	33	116	200	65.8	73.7	70.1	88.8	82.7	92.7	57.6	67.7	72.4	73.4	62.0	63.2	60.8	57.4	
Strontium	0.19	N/L	N/L	0.239	0.187	0.251	0.192	0.120	0.167	0.214	0.208	0.194	0.195	0.187	0.230	0.238	0.189	
Sulphate	13	256	500	22	23	17	15	13	28	28	33	35	32	36	50	26	31	
Total Dissolved Solids	402	451	500	659	485	611	549	357	455	496	483	486	443	462	498	552	466	
Total Kjeldahl Nitrogen	0.60	N/L	N/L	0.5	0.7	1.7	0.4	0.3	0.3	0.4	0.2	0.3	0.6	0.2	0.3	0.3	0.2	
Zinc	0.005	2.5	5	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:
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.
N/L indicates No Limit.
*- indicates the parameter was not analyzed.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	MW09-5R														5-year Trends (sparkline)
				25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	30-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	276	388	30 - 500	215	219	159	236	177	221	165	185	164	217	196	222	192	250	
Aluminum	0.073	0.09	0.1	0.03	0.05	0.04	0.05	0.04	0.05	0.04	0.06	0.04	0.02	0.05	0.02	0.05	0.03	
Ammonia, Total (as N)	0.1	N/L	N/L	0.19	0.08	< 0.01	0.14	0.15	0.12	0.23	0.10	0.08	0.07	0.12	0.08	0.16	0.09	
Barium	0.12	0.34	1	0.099	0.141	0.094	0.148	0.094	0.133	0.080	0.123	0.092	0.138	0.099	0.126	0.128	0.136	
Boron	0.011	1.3	5	0.005	< 0.005	< 0.005	0.015	0.007	0.005	0.009	0.013	0.006	0.012	0.009	0.009	0.011	0.008	
Cadmium	0.000015	0.0013	0.005	< 0.00002	0.00003	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	0.000016	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000010	
Calcium	96	N/L	N/L	60.5	88.3	47.0	84.1	61.5	85.3	58.7	75.3	62.9	86.9	65.0	83.3	69.9	78.8	
Chemical Oxygen Demand	24	N/L	N/L	790	781	381	190	182	282	410	631	375	322	10	439	338	253	
Chloride	40	145	250	9.0	9.1	7.0	11.7	13.3	17.0	12.2	16.8	18.3	22.2	15.7	19.2	13.4	17.3	
Conductivity (µS/cm) ³	715	N/L	N/L	423	-	351	503	362	519	379	457	401	525	441	504	438	511	
Conductivity (µS/cm) ⁴	526	N/L	N/L	316	355	234	373	238	329	233	308	216	373	281	337	254	354	
Copper	0.002	0.5	1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	0.0010	< 0.002	0.0010	0.0009	
Dissolved Organic Carbon	1.7	3.4	5	14.2	17.1	15.7	19.1	11.6	16.7	17.0	24.2	13.5	18.8	17.6	18.9	18.6	16.9	
Hardness (as CaCO ₃)	311	405	500	205	295	165	279	206	281	202	254	213	294	223	283	233	267	
Iron	0.037	0.2	0.3	0.586	0.157	0.498	0.408	0.429	0.080	0.443	0.109	0.176	0.239	0.405	0.126	0.432	0.364	
Magnesium	18	N/L	N/L	13.2	18.1	11.4	16.8	12.6	16.6	13.5	15.9	13.5	18.6	14.8	18.2	14.1	16.9	
Manganese	0.003	0.03	0.05	0.081	0.056	0.057	0.093	0.050	0.038	0.053	0.042	0.039	0.052	0.046	0.025	0.071	0.071	
Nitrate (as N)	0.7	3	10	0.1	0.1	< 0.05	0.14	0.07	0.11	0.3	0.3	0.13	0.1	0.1	0.1	0.17	0.06	
Nitrite (as N)	0.05	0.29	1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.84	7.22	7.45	7.56	7.66	7.76	7.81	7.93	6.88	7.65	7.04	7.99	7.34	7.11	
Phosphorus (total)	1.07	N/L	N/L	0.47	0.44	3.40	0.49	0.36	0.41	0.61	1.06	0.55	0.51	0.09	0.82	0.35	0.35	
Potassium	2.0	N/L	N/L	1.1	1.0	1.1	1.1	1.2	0.6	1.3	0.6	1.2	1.2	1.3	0.9	1.2	1.2	
Silicon	5.11	N/L	N/L	3.97	5.15	3.88	5.52	3.46	4.32	3.45	4.68	3.77	5.47	4.44	5.09	4.37	5.26	
Sodium	33	116	200	5.2	5.9	5.0	6.3	5.5	6.7	6.0	7.9	6.9	9.8	7.5	9.5	8.0	9.3	
Strontium	0.19	N/L	N/L	0.128	0.186	0.117	0.176	0.120	0.168	0.127	0.169	0.124	0.191	0.147	0.181	0.152	0.174	
Sulphate	13	256	500	7	32	7	5	4	17	6	24	10	11	5	12	5	3	
Total Dissolved Solids	402	451	500	227	284	193	277	186	269	195	236	207	272	228	261	226	265	
Total Kjeldahl Nitrogen	0.60	N/L	N/L	6.0	6.0	7.0	4.9	4.0	4.0	7.3	10.3	5.5	4.6	0.5	8.2	4.4	3.7	
Zinc	0.005	2.5	5	0.009	0.009	0.005	0.010	0.005	0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	

Notes:

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.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	MW09-6R													5-year Trends (sparkline)
				25-May-16	27-Oct-16	26-Oct-17	07-May-18	30-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	276	388	30 - 500	247	243	249	232	228	217	272	217	215	204	229	222	257	
Aluminum	0.073	0.09	0.1	0.04	0.05	0.07	0.07	0.07	0.07	0.07	0.07	0.05	0.07	0.13	0.05	0.06	
Ammonia, Total (as N)	0.1	N/L	N/L	0.06	0.12	0.10	0.07	0.12	0.15	0.10	0.05	0.08	0.08	0.08	0.07	0.10	
Barium	0.12	0.34	1	0.160	0.185	0.200	0.095	0.154	0.123	0.200	0.159	0.164	0.107	0.164	0.145	0.172	
Boron	0.011	1.3	5	< 0.005	< 0.005	0.015	0.010	< 0.005	0.008	0.013	0.005	0.017	0.008	0.010	0.007	0.010	
Cadmium	0.000015	0.0013	0.005	< 0.00002	0.000030	< 0.000014	0.000026	0.000019	0.000026	0.000025	0.000022	0.000016	< 0.000015	0.000037	< 0.000015	< 0.000010	
Calcium	96	N/L	N/L	107	106	123	93.0	100	101	107	112	108	83	113	94.0	107	
Chemical Oxygen Demand	24	N/L	N/L	76	143	68	152	57	106	142	60	95	55	51	64	40	
Chloride	40	145	250	104	111	81.2	31.4	84.4	58.2	80.4	90.5	91.5	57.6	85.0	65.1	98.4	
Conductivity (µS/cm) ³	715	N/L	N/L	793	-	818	528	746	647	817	762	777	621	758	670	805	
Conductivity (µS/cm) ⁴	526	N/L	N/L	663	291	693	366	449	420	527	436	728	422	471	376	599	
Copper	0.002	0.5	1	< 0.002	< 0.002	0.002	0.003	< 0.002	0.002	0.002	0.003	< 0.002	0.0042	< 0.002	0.0097	0.0021	
Dissolved Organic Carbon	1.7	3.4	5	9.9	12.6	14.3	19.9	12.2	28.0	16.6	14.2	9.9	16.5	13.7	17.2	7.3	
Hardness (as CaCO ₃)	311	405	500	343	336	384	284	309	317	338	352	342	266	365	293	340	
Iron	0.037	0.2	0.3	0.649	0.544	0.788	2.47	0.443	0.337	0.391	0.151	0.464	0.326	1.20	0.658	1.04	
Magnesium	18	N/L	N/L	18.2	17.2	18.7	12.6	14.3	15.6	17.1	17.4	17.4	14.1	19.9	14.1	17.5	
Manganese	0.003	0.03	0.05	0.074	0.074	0.076	0.289	0.046	0.045	0.041	0.048	0.050	0.024	0.123	0.035	0.052	
Nitrate (as N)	0.7	3	10	< 0.1	0.2	0.08	0.05	0.67	0.2	< 0.1	0.11	0.1	< 0.1	0.1	0.08	0.06	
Nitrite (as N)	0.05	0.29	1	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.60	7.63	7.68	7.59	7.90	7.31	7.85	7.13	7.22	7.35	7.74	7.05	7.44	
Phosphorus (total)	1.07	N/L	N/L	0.33	0.30	0.20	0.65	0.19	0.48	0.72	< 0.01	0.49	0.03	0.10	0.08	0.06	
Potassium	2.0	N/L	N/L	1.2	1.7	1.6	1.0	1.2	0.9	1.6	1.2	1.6	0.9	1.6	1.1	1.6	
Silicon	5.11	N/L	N/L	4.80	6.38	7.14	3.73	5.38	4.61	5.35	4.59	6.39	4.52	5.76	4.94	6.50	
Sodium	33	116	200	21.2	60.7	36.1	20.9	34.4	21.0	48.1	25.2	43.0	25.9	37.5	33.5	37.6	
Strontium	0.19	N/L	N/L	0.260	0.268	0.306	0.219	0.240	0.258	0.293	0.279	0.293	0.229	0.295	0.245	0.293	
Sulphate	13	256	500	16	22	16	13	15	26	34	32	35	23	24	18	23	
Total Dissolved Solids	402	451	500	417	467	450	273	390	336	430	399	407	328	396	348	423	
Total Kjeldahl Nitrogen	0.60	N/L	N/L	1.0	1.4	1.0	2.2	1.0	1.6	2.1	0.8	1.6	0.7	0.8	0.9	0.8	
Zinc	0.005	2.5	5	0.008	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	

Notes:

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.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	MW21-7 (Background)		5-year Trends (sparkline)
				06-May-21	17-May-22	
Alkalinity (as CaCO ₃)	276	388	30 - 500	160	200	n/a
Aluminum	0.073	0.09	0.1	0.16	0.09	n/a
Ammonia, Total (as N)	0.1	N/L	N/L	0.18	0.12	n/a
Barium	0.12	0.34	1	0.034	0.034	n/a
Boron	0.011	1.3	5	0.020	0.052	n/a
Cadmium	0.000015	0.0013	0.005	0.000033	< 0.000035	n/a
Calcium	96	N/L	N/L	64	30.7	n/a
Chemical Oxygen Demand	24	N/L	N/L	133	136	n/a
Chloride	40	145	250	15.5	8.7	n/a
Conductivity (µS/cm) ³	715	N/L	N/L	449	496	n/a
Conductivity (µS/cm) ⁴	526	N/L	N/L	314	356	n/a
Copper	0.002	0.5	1	0.0033	0.0053	n/a
Dissolved Organic Carbon	1.7	3.4	5	25.1	22.3	n/a
Hardness (as CaCO ₃)	311	405	500	216	101	n/a
Iron	0.037	0.2	0.3	0.094	0.220	n/a
Magnesium	18	N/L	N/L	13.8	5.83	n/a
Manganese	0.003	0.03	0.05	0.033	0.078	n/a
Nitrate (as N)	0.7	3	10	0.2	0.23	n/a
Nitrite (as N)	0.05	0.29	1	< 0.1	< 0.05	n/a
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.41	7.75	n/a
Phosphorus (total)	1.07	N/L	N/L	0.04	1.07	n/a
Potassium	2.0	N/L	N/L	1.1	1.6	n/a
Silicon	5.11	N/L	N/L	5.20	5.61	n/a
Sodium	33	116	200	8.8	87.6	n/a
Strontium	0.19	N/L	N/L	0.159	0.093	n/a
Sulphate	13	256	500	39	37	n/a
Total Dissolved Solids	402	451	500	240	257	n/a
Total Kjeldahl Nitrogen	0.60	N/L	N/L	1.2	2.2	n/a
Zinc	0.005	2.5	5	0.029	0.007	n/a

Notes:

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.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

Table 4
Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC ¹	ODWS ²	GLL7 (Residential)												5-year Trends (sparkline)
				21-May-14	23-Oct-14	27-May-15	20-Oct-15	25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	31-Oct-18	16-May-19	29-Oct-19	
Alkalinity (as CaCO ₃)	276	388	30 - 500	85	197	216	212	217	206	205	205	204	187	190	195	
Aluminum	0.073	0.09	0.1	0.402	0.0197	0.0172	0.018	0.03	0.03	0.05	0.04	0.05	0.05	0.05	0.05	
Ammonia, Total (as N)	0.1	N/L	N/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01	< 0.01	0.03	0.02	0.05	0.03	0.02	
Barium	0.12	0.34	1	0.0069	0.200	0.202	0.155	0.184	0.211	0.216	0.211	0.204	0.189	0.180	0.188	
Boron	0.011	1.3	5	0.009	0.0078	0.0147	0.0116	< 0.005	< 0.005	< 0.005	0.010	0.009	< 0.005	0.007	0.008	
Cadmium	0.000015	0.0013	0.005	< 0.000003	< 0.000003	< 0.000003	< 0.000003	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	96	N/L	N/L	37.8	67.4	70.7	66.5	60.5	72.8	75.5	71.8	71.7	68.6	67.3	68.5	
Chemical Oxygen Demand	24	N/L	N/L	< 8	< 8	< 8	< 8	< 5	< 5	7	12	< 5	6	< 5	< 5	
Chloride	40	145	250	1.0	1.3	1	1	0.9	0.7	0.6	1.2	1.3	1.3	1.0	< 0.5	
Conductivity (µS/cm) ³	715	N/L	N/L	-	-	-	-	402	-	409	410	379	386	391	392	
Conductivity (µS/cm) ⁴	526	N/L	N/L	278	350	305	385	351	348	305	348	309	309	285	269	
Copper	0.002	0.5	1	0.00255	0.00437	0.00202	0.00298	0.006	0.003	0.032	0.005	0.002	0.028	0.012	0.022	
Dissolved Organic Carbon	1.7	3.4	5	1.4	< 1	1.5	< 1	1.1	1.2	0.9	1.1	1.0	1.5	2.5	1.8	
Hardness (as CaCO ₃)	311	405	500	94.7	216	225	215	199	236	242	231	229	218	218	221	
Iron	0.037	0.2	0.3	0.015	0.119	0.018	0.010	0.006	0.056	0.048	0.022	0.021	0.067	0.011	< 0.005	
Magnesium	18	N/L	N/L	0.091	11.6	11.9	12.0	11.5	13.1	12.9	12.6	12.1	11.3	12.2	12.2	
Manganese	0.003	0.03	0.05	0.0004	0.168	0.485	0.430	0.374	0.244	0.522	0.400	0.340	0.067	0.110	0.005	
Nitrate (as N)	0.7	3	10	< 0.06	< 0.06	1.58	< 0.06	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	
Nitrite (as N)	0.05	0.29	1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	
pH (units) ⁴	7.19	6.5 - 8.5	6.5 - 8.5	7.41	7.79	7.63	7.59	7.82	6.13	7.96	7.96	7.76	8.30	8.13	8.16	
Phosphorus (total)	1.07	N/L	N/L	< 0.03	< 0.03	< 0.03	< 0.03	0.02	0.01	< 0.01	< 0.01	0.01	< 0.01	0.02	< 0.01	
Potassium	2.0	N/L	N/L	6.80	2.11	2.22	1.99	1.8	2.1	2.1	2.2	2.1	1.8	1.9	1.9	
Silicon	5.11	N/L	N/L	15.5	4.58	4.64	4.49	3.86	4.59	4.68	4.54	4.01	3.89	3.87	3.87	
Sodium	33	116	200	3.0	1.7	1.9	1.8	2.1	2.1	1.9	2.0	2.1	1.8	1.8	1.9	
Strontium	0.19	N/L	N/L	0.309	0.194	0.185	0.188	0.166	0.208	0.199	0.195	0.189	0.176	0.192	0.202	
Sulphate	13	256	500	18	12	12	11	12	12	10	9	10	10	10	7	
Total Dissolved Solids	402	451	500	131	223	240	240	219	229	225	226	195	199	201	202	
Total Kjeldahl Nitrogen	0.60	N/L	N/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.1	0.2	0.1	< 0.1	< 0.1	1.0	< 0.1	< 0.1	
Zinc	0.005	2.5	5	0.004	0.012	0.009	0.008	0.013	0.008	0.008	0.007	0.010	< 0.005	0.006	< 0.005	

Notes:

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.

N/L indicates No Limit.

"-" indicates the parameter was not analyzed.

Table 5
Groundwater Quality Compared to PWQO
Mount St. Patrick Waste Disposal Site

Parameter	PWQO ¹	MW08-1 (Background)														5-year Trends
		25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	30-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	(sparkline)
Alkalinity (as CaCO ₃)	< 25% decrease	276	325	241	328	239	292	249	310	236	275	248	299	241	307	
Aluminum	0.075	0.02	0.03	0.11	0.05	0.05	0.07	0.09	0.23	0.05	0.03	0.07	0.19	0.05	0.16	
Ammonia, Total (as N)	N/L	< 0.01	0.10	0.06	0.03	0.05	0.07	0.23	0.03	0.06	0.03	0.02	0.13	0.04	0.03	
Barium	N/L	0.088	0.145	0.299	0.103	0.089	0.160	0.231	0.147	0.101	0.141	0.088	0.163	0.103	0.127	
Boron	0.2	< 0.005	< 0.005	< 0.005	0.016	0.008	0.006	0.008	0.011	0.006	0.015	0.009	0.013	0.005	0.013	
Cadmium	0.0002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000070	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	0.000020	
Calcium	N/L	73.6	110	170	90.3	79.7	116	170	109	80.2	104	75	117	79.1	100	
Chemical Oxygen Demand	N/L	93	65	57	35	25	8	21	38	37	115	5	22	20	26	
Chloride	N/L	29.2	39.0	277	18.6	23.8	62.9	301	55.2	41.9	63.8	16.1	78.4	16.6	67.3	
Conductivity (µS/cm) ²	N/L	581	-	1670	715	499	796	1500	783	608	771	540	835	539	769	
Conductivity (µS/cm) ³	N/L	416	510	1127	545	320	548	916	500	352	722	362	719	290	556	
Copper	0.005	< 0.002	0.002	< 0.002	< 0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.001	< 0.002	0.0028	0.0022	
Dissolved Organic Carbon	N/L	1.2	1.4	0.7	1.7	1.2	2.0	2.7	2.0	2.0	1.0	2.5	1.4	1.9	0.3	
Hardness (as CaCO ₃)	N/L	246	359	586	280	262	375	568	368	266	341	253	388	259	325	
Iron	0.3	< 0.005	< 0.005	< 0.005	< 0.005	0.022	0.011	0.052	0.695	0.019	< 0.005	0.099	0.447	0.021	0.455	
Magnesium	N/L	15.1	20.8	39.1	13.3	15.2	20.8	34.8	23.3	15.9	19.9	16	22.9	14.9	18.3	
Manganese	N/L	< 0.001	< 0.001	< 0.001	0.001	< 0.001	0.001	0.003	0.049	0.001	< 0.001	0.007	0.038	0.002	0.021	
Nitrate (as N)	N/L	1.1	0.6	1.14	0.39	0.40	0.63	1.5	0.4	0.8	0.5	0.9	0.5	1.09	0.33	
Nitrite (as N)	N/L	< 0.1	< 0.1	0.19	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ³	6.5 - 8.5	7.48	7.29	6.54	5.90	6.16	7.38	7.36	7.59	7.01	6.77	7.96	7.10	6.64	7.32	
Phosphorus (total)	0.03	2.68	3.75	5.62	1.06	1.66	0.84	1.08	0.77	1.59	4.64	0.01	1.35	0.20	1.37	
Potassium	N/L	1.2	1.8	2.5	1.9	1.3	2.0	2.4	2.0	1.6	2.2	1.5	2.3	1.5	2.0	
Silicon	N/L	4.01	5.71	4.96	4.79	4.05	5.22	4.15	5.09	4.43	5.18	4.62	5.41	4.69	5.25	
Sodium	N/L	19.2	34.5	78.9	62.4	15.4	35.3	83.5	44.2	31.4	43.3	20.3	47.2	20.4	43.6	
Strontium	N/L	0.140	0.213	0.401	0.165	0.140	0.213	0.339	0.217	0.151	0.205	0.153	0.229	0.153	0.187	
Sulphate	N/L	13	11	22	15	8	16	28	16	11	12	9	12	9	13	
Total Dissolved Solids	N/L	321	414	921	393	258	418	818	411	316	404	290	440	279	403	
Total Kjeldahl Nitrogen	N/L	1.2	1.7	2.2	0.6	0.9	0.6	0.6	0.4	0.7	2.1	0.1	0.6	0.2	0.5	
Zinc	0.02	0.008	< 0.005	< 0.005	0.010	< 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 5
Groundwater Quality Compared to PWQO
Mount St. Patrick Waste Disposal Site

Parameter	PWQO ¹	MW21-7 (Background)		5-year Trends
		06-May-21	17-May-22	(sparkline)
Alkalinity (as CaCO ₃)	< 25% decrease	160	200	n/a
Aluminum	0.075	0.16	0.09	n/a
Ammonia, Total (as N)	N/L	0.18	0.12	n/a
Barium	N/L	0.034	0.034	n/a
Boron	0.2	0.020	0.052	n/a
Cadmium	0.0002	0.000033	< 0.000035	n/a
Calcium	N/L	64	30.7	n/a
Chemical Oxygen Demand	N/L	133	136	n/a
Chloride	N/L	15.5	8.7	n/a
Conductivity (µS/cm) ²	N/L	449	496	n/a
Conductivity (µS/cm) ³	N/L	314	356	n/a
Copper	0.005	0.003	0.0053	n/a
Dissolved Organic Carbon	N/L	25.1	22.3	n/a
Hardness (as CaCO ₃)	N/L	216	101	n/a
Iron	0.3	0.094	0.220	n/a
Magnesium	N/L	13.8	5.83	n/a
Manganese	N/L	0.033	0.078	n/a
Nitrate (as N)	N/L	0.2	0.23	n/a
Nitrite (as N)	N/L	< 0.1	< 0.05	n/a
pH (units) ³	6.5 - 8.5	7.39	7.75	n/a
Phosphorus (total)	0.03	0.04	1.07	n/a
Potassium	N/L	1.1	1.6	n/a
Silicon	N/L	5.20	5.61	n/a
Sodium	N/L	8.8	87.6	n/a
Strontium	N/L	0.159	0.093	n/a
Sulphate	N/L	39	37	n/a
Total Dissolved Solids	N/L	240	257	n/a
Total Kjeldahl Nitrogen	N/L	1.2	2.2	n/a
Zinc	0.02	0.029	0.007	n/a

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 5
Groundwater Quality Compared to PWQO
Mount St. Patrick Waste Disposal Site

Parameter	PWQO ¹	MW09-6R													5-year Trends
		25-May-16	27-Oct-16	26-Oct-17	07-May-18	30-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	(sparkline)
Alkalinity (as CaCO ₃)	< 25% decrease	247	243	249	232	228	217	272	217	215	204	229	222	257	
Aluminum	0.075	0.04	0.05	0.07	0.07	0.07	0.07	0.07	0.07	0.05	0.07	0.13	0.05	0.06	
Ammonia, Total (as N)	N/L	0.06	0.12	0.10	0.07	0.12	0.15	0.10	0.05	0.08	0.08	0.08	0.07	0.10	
Barium	N/L	0.160	0.185	0.200	0.095	0.154	0.123	0.200	0.159	0.164	0.107	0.164	0.145	0.172	
Boron	0.2	< 0.005	< 0.005	0.015	0.010	< 0.005	0.008	0.013	0.005	0.017	0.008	0.010	0.007	0.010	
Cadmium	0.0002	< 0.00002	0.00003	< 0.000014	0.000026	0.000019	0.000026	0.000025	0.000022	0.000016	< 0.000015	0.000037	< 0.000015	< 0.000010	
Calcium	N/L	107	106	123	93.0	100	101	107	112	108	83	113	94.0	107	
Chemical Oxygen Demand	N/L	76	143	68	152	57	106	142	60	95	55	51	64	40	
Chloride	N/L	104	111	81.2	31.4	84.4	58.2	80.4	90.5	91.5	57.6	85.0	65.1	98.4	
Conductivity (µS/cm) ²	N/L	793	-	818	528	746	647	817	762	777	621	758	670	805	
Conductivity (µS/cm) ³	N/L	663	291	693	366	449	420	527	436	728	422	471	376	599	
Copper	0.005	< 0.002	< 0.002	0.002	0.003	< 0.002	0.002	0.002	0.003	< 0.002	0.004	< 0.002	0.0097	0.0021	
Dissolved Organic Carbon	N/L	9.9	12.6	14.3	19.9	12.2	28.0	16.6	14.2	9.9	16.5	13.7	17.2	7.3	
Hardness (as CaCO ₃)	N/L	343	336	384	284	309	317	338	352	342	266	365	293	340	
Iron	0.3	0.649	0.544	0.788	2.47	0.443	0.337	0.391	0.151	0.464	0.326	1.20	0.658	1.04	
Magnesium	N/L	18.2	17.2	18.7	12.6	14.3	15.6	17.1	17.4	17.4	14.1	19.9	14.1	17.5	
Manganese	N/L	0.074	0.074	0.076	0.289	0.046	0.045	0.041	0.048	0.050	0.024	0.123	0.035	0.052	
Nitrate (as N)	N/L	< 0.1	0.2	0.08	0.05	0.67	0.2	< 0.1	0.11	0.1	< 0.1	0.1	0.08	0.06	
Nitrite (as N)	N/L	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.1	< 0.1	< 0.05	< 0.1	< 0.1	< 0.1	< 0.05	< 0.05	
pH (units) ³	6.5 - 8.5	7.6	7.63	7.68	7.59	7.90	7.31	7.85	7.13	7.22	7.76	7.74	7.05	7.44	
Phosphorus (total)	0.03	0.33	0.30	0.20	0.65	0.19	0.48	0.72	< 0.01	0.49	0.03	0.10	0.08	0.06	
Potassium	N/L	1.2	1.7	1.6	1.0	1.2	0.9	1.6	1.2	1.6	0.9	1.6	1.1	1.6	
Silicon	N/L	4.80	6.38	7.14	3.73	5.38	4.61	5.35	4.59	6.39	4.52	5.76	4.94	6.50	
Sodium	N/L	21.2	60.7	36.1	20.9	34.4	21.0	48.1	25.2	43.0	25.9	37.5	33.5	37.6	
Strontium	N/L	0.260	0.268	0.306	0.219	0.240	0.258	0.293	0.279	0.293	0.229	0.295	0.245	0.293	
Sulphate	N/L	16	22	16	13	15	26	34	32	35	23	24	18	23	
Total Dissolved Solids	N/L	417	467	450	273	390	336	430	399	407	328	396	348	423	
Total Kjeldahl Nitrogen	N/L	1.0	1.4	1.0	2.2	1.0	1.6	2.1	0.8	1.6	0.7	0.8	0.9	0.8	
Zinc	0.02	0.008	< 0.005	< 0.005	0.006	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008	< 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
Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO ¹	SW-1														5-year Trends (sparkline)
			25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	31-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	147	25 % Decrease	231	128	131	204	176	125	117	148	119	110	133	139	151	133	
Ammonia, Total (as N)	0.1	N/L	< 0.01	0.04	< 0.01	0.02	0.02	0.02	0.04	0.03	0.02	0.02	0.03	0.02	0.02	0.02	
Ammonia, Un-ionized (as N) ²	0.00097	0.02	0.00014	0.00003	0.00012	0.00019	0.00040	0.00020	0.00093	0.00067	0.00004	0.00003	0.00049	0.00015	0.00024	0.00004	
Arsenic	0.00020	0.005	0.0001	< 0.0001	0.0003	0.0002	0.0003	0.0001	0.0001	0.0001	< 0.0001	0.0001	< 0.0001	0.0001	0.0001	0.0001	
Barium	0.080	N/L	0.0910	0.0760	0.042	0.066	0.069	0.078	0.061	0.079	0.068	0.060	0.062	0.066	0.071	0.065	
Biological Oxygen Demand	4	N/L	< 3	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	3	< 3	< 3	< 3	< 3	
Boron	0.009	0.2	0.0050	< 0.005	< 0.005	0.011	0.009	0.006	0.005	0.008	0.009	0.007	0.007	0.009	0.006	0.008	
Cadmium	0.000015	0.0002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	47	N/L	70.3	45.6	43.7	59.8	57.2	44.8	41.2	43.2	48.3	37.5	42.0	39.6	46.7	40.1	
Chemical Oxygen Demand	22	N/L	10	7	20	19	21	22	15	19	25	18	21	14	23	9	
Chloride	8	N/L	2	7	1.3	2.1	1.6	8.5	7.2	9.3	7.6	9.3	8.0	9.1	8.4	8.4	
Chromium	0.001	0.001	< 0.002	< 0.002	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Conductivity (µS/cm) ⁴	304	N/L	431	-	269	391	349	283	269	277	280	265	289	281	314	276	
Conductivity (µS/cm) ³	272	N/L	353	184	165	277	254	181	256	220	230	402	203	172	237	206	
Copper	0.0005	0.005	0.00020	0.00060	0.0005	0.0001	0.0003	0.0033	0.0004	0.0004	0.0004	0.0003	0.0005	0.0005	0.0006	0.0003	
Dissolved Oxygen ³	11.86	5	11.5	7.83	12.66	9.53	7.41	13.75	8.50	8.62	7.06	9.30	12.75	12.29	5.65	10.11	
Dissolved Organic Carbon	8	N/L	5.8	6.9	4.8	10.1	5.6	6.7	7.0	7.2	5.7	6.6	7.1	8.0	8.5	7.6	
Hardness (as CaCO ₃)	155	N/L	225	153	139	194	182	151	130	144	154	123	135	132	152	133	
Iron	0.089	0.3	0.090	0.089	0.034	0.119	0.026	0.205	0.050	0.115	0.045	0.064	0.066	0.338	0.097	0.046	
Lead	0.000058	0.005	< 0.00002	0.00081	0.00004	< 0.00002	< 0.00002	0.00025	< 0.00002	0.00006	0.00005	0.00003	0.00004	0.00016	0.00007	< 0.00002	
Magnesium	9.0	N/L	12.10	9.56	7.3	10.90	9.56	9.6	6.61	8.86	8.02	7.06	7.33	8.06	8.62	8.04	
Manganese	0.057	N/L	0.0140	0.0410	0.003	0.018	0.008	0.077	0.023	0.017	0.027	0.026	0.031	0.117	0.078	0.017	
Mercury	0.00002	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	
Nitrate (as N)	0.10	N/L	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.1	< 0.05	0.1	0.09	0.10	
Nitrite (as N)	0.05	N/L	< 0.1	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.05	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	8.2425	6.5 - 8.5	7.94	-	8.00	8.27	7.96	7.91	8.13	8.00	7.85	-	8.15	8.14	8.14	7.43	
pH (units) ³	8.03	6.5 - 8.5	7.62	6.75	7.95	7.77	7.68	8.65	7.90	8.19	7.11	7.06	7.90	7.90	7.72	7.12	
Phenols	0.0020	0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus (total)	0.0225	0.03	< 0.01	0.020	0.010	0.01	0.02	0.02	0.02	0.03	< 0.01	0.05	0.03	0.04	0.02	0.04	
Potassium	1.3	N/L	0.90	1.20	0.6	1.4	1.1	1.3	1.0	1.2	1.0	0.9	1.0	1.1	1.2	1.1	
Sodium	5.5	N/L	2.30	5.80	1.2	2.2	2.1	6.3	4.6	5.2	5.5	5.0	5.5	5.2	5.7	5.2	
Strontium	0.146	N/L	0.168	0.162	0.105	0.142	0.135	0.158	0.110	0.141	0.125	0.108	0.119	0.119	0.137	0.123	
Sulphate	7	N/L	5.0	7	5	2	5	7	5	12	7	7	6	6	6	5	
Total Dissolved Solids	185	N/L	231	157	148	215	179	145	138	155	143	136	150	144	161	141	
Total Kjeldahl Nitrogen	0.5	N/L	0.26	0.4	0.6	0.3	0.3	0.5	0.3	0.5	0.2	0.4	0.4	0.5	0.4	0.4	
Total Suspended Solids	4	N/L	< 3	8	< 3	3	< 3	14	< 3	4	3	< 3	4	19	< 3	4	
Zinc	0.0085	0.02	< 0.005	< 0.005	< 0.005	0.099	< 0.005	0.011	0.005	0.007	0.006	0.014	0.008	0.010	< 0.005	< 0.005	






































Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.
4. Results obtained from lab 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
Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO ¹	SW-2 (Background)														5-year Trends (sparkline)
			25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	31-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	147	25 % Decrease	141	128	113	137	181	125	112	116	114	109	134	137	148	146	
Ammonia, Total (as N)	0.1	N/L	< 0.01	0.04	< 0.01	0.03	0.02	0.02	0.05	0.02	0.02	0.01	0.02	0.02	0.03	0.02	
Ammonia, Un-ionized (as N) ²	0.00097	0.02	0.00025	0.00019	0.00014	0.00065	0.00032	0.00027	0.00129	0.00145	0.00019	0.00008	0.00042	0.00033	0.00086	0.00019	
Arsenic	0.00020	0.005	< 0.0001	< 0.0001	0.0003	0.0001	< 0.0001	< 0.0001	0.0001	0.0001	< 0.0001	< 0.0001	0.0001	0.0001	0.0001	0.0001	
Barium	0.080	N/L	0.074	0.073	0.051	0.070	0.114	0.081	0.062	0.072	0.063	0.063	0.059	0.069	0.077	0.079	
Biological Oxygen Demand	4	N/L	< 3	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	
Boron	0.009	0.2	< 0.005	< 0.005	< 0.005	0.013	0.009	0.006	< 0.005	0.006	0.008	0.007	0.007	0.010	0.006	0.009	
Cadmium	0.000015	0.0002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	< 0.000015	0.000022	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	47	N/L	45.8	43.4	37.6	40.0	64.9	46.5	40.8	39.4	45.2	38.1	40.6	43.2	47.9	46.7	
Chemical Oxygen Demand	22	N/L	12	10	11	14	27	15	21	13	25	15	22	11	22	8	
Chloride	8	N/L	6.1	6.7	5.5	6.2	5.7	8.2	7.3	8.4	7.5	9.3	8.0	8.8	8.3	7.9	
Chromium	0.001	0.001	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Conductivity (µS/cm) ⁴	304	N/L	304	-	252	296	335	282	265	302	275	266	285	286	306	300	
Conductivity (µS/cm) ³	272	N/L	350	190	160	223	232	172	178	94	165	237	202	163	213	198	
Copper	0.0005	0.005	< 0.0001	< 0.0001	0.0003	0.0001	0.0004	0.0005	0.0009	0.0002	0.0003	0.0003	0.0005	0.0005	0.0005	0.0005	
Dissolved Oxygen ³	11.86	5	9.83	7.90	14.00	9.59	9.75	14.54	11.13	8.73	12.28	11.38	11.86	14.55	10.05	10.60	
Dissolved Organic Carbon	8	N/L	6.0	6.8	6.1	8.1	3.2	6.6	7.0	6.4	5.9	6.6	7.4	6.3	8.1	6.9	
Hardness (as CaCO ₃)	155	N/L	149	146	121	133	211	158	129	133	143	125	131	144	156	155	
Iron	0.089	0.3	0.059	0.059	0.051	0.052	0.053	0.108	0.095	< 0.005	0.073	0.112	0.063	0.051	0.135	0.050	
Lead	0.000058	0.005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00018	0.00012	< 0.00002	0.00004	0.00005	0.00005	0.00003	0.00008	0.00002	
Magnesium	9.0	N/L	8.33	9.17	6.51	7.92	11.9	10.2	6.61	8.31	7.35	7.20	7.17	8.65	8.93	9.34	
Manganese	0.057	N/L	0.063	0.042	0.009	0.032	0.020	0.032	0.035	0.034	0.031	0.057	0.028	0.017	0.089	0.025	
Mercury	0.00002	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	
Nitrate (as N)	0.10	N/L	< 0.1	0.1	< 0.05	0.16	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.1	< 0.05	0.10	< 0.05	0.17	
Nitrite (as N)	0.05	N/L	< 0.1	0.2	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.05	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	8.2425	6.5 - 8.5	8.00	-	8.08	8.31	7.96	8.03	8.13	8.06	7.87	-	8.08	8.09	8.06	7.65	
pH (units) ³	8.03	6.5 - 8.5	7.90	7.49	7.98	8.04	8.07	8.17	8.04	8.59	7.74	7.70	8.02	8.23	7.98	7.78	
Phenols	0.0020	0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus (total)	0.0225	0.03	< 0.01	0.02	0.01	0.02	0.02	< 0.01	0.02	0.01	< 0.01	0.04	0.04	0.03	0.03	0.03	
Potassium	1.3	N/L	1.0	1.1	0.6	1.0	1.4	1.3	1.0	1.2	1.1	0.9	0.9	1.2	1.3	1.2	
Sodium	5.5	N/L	5.1	5.3	3.9	4.9	6.1	6.5	4.8	5.1	5.9	5.0	5.4	5.6	5.7	5.4	
Strontium	0.146	N/L	0.137	0.154	0.105	0.128	0.186	0.173	0.111	0.134	0.117	0.111	0.111	0.131	0.145	0.141	
Sulphate	7	N/L	7	7	5	5	5	7	6	6	7	7	6	6	6	7	
Total Dissolved Solids	185	N/L	158	156	139	163	172	144	136	142	141	383	149	147	157	154	
Total Kjeldahl Nitrogen	0.5	N/L	0.29	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.4	0.3	0.3	0.4	0.3	
Total Suspended Solids	4	N/L	< 3	4	< 3	6	< 3	4	6	< 3	6	< 3	4	10	< 3	< 3	
Zinc	0.0085	0.02	< 0.005	< 0.005	< 0.005	< 0.005	0.026	0.011	0.006	0.006	0.012	0.008	0.010	0.010	< 0.005	< 0.005	

Notes:
1. Provincial Water Quality Objectives (PWQO).
2. Calculated using Total Ammonia and field analysis.
3. Results obtained from field analysis.
4. Results obtained from lab 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
Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO ¹	SW-3						5-year Trends (sparkline)
			25-May-16	09-May-17	07-May-18	16-May-19	28-Apr-20	06-May-21	
Alkalinity (as CaCO ₃)	147	25 % Decrease	312	220	257	241	240	284	
Ammonia, Total (as N)	0.1	N/L	< 0.01	< 0.01	0.02	0.09	< 0.01	0.01	
Ammonia, Un-ionized (as N) ²	0.00097	0.02	0.0001	0.00004	0.00059	0.00156	0.00010	0.00016	
Arsenic	0.00020	0.005	0.0001	0.0006	< 0.0001	< 0.0001	< 0.0001	< 0.0001	
Barium	0.080	N/L	0.247	0.129	0.199	0.162	0.177	0.201	
Biological Oxygen Demand	4	N/L	< 3	< 2	< 2	< 3	< 3	< 3	
Boron	0.009	0.2	0.008	< 0.005	0.009	0.005	0.008	0.009	
Cadmium	0.000015	0.0002	0.00002	< 0.000014	< 0.000015	< 0.000015	< 0.000015	< 0.000015	
Calcium	47	N/L	87.3	61.6	76.8	64.7	74.5	77.4	
Chemical Oxygen Demand	22	N/L	21	7	16	14	18	31	
Chloride	8	N/L	93.5	36.1	59.3	37.8	55.3	59.7	
Chromium	0.001	0.001	< 0.002	0.001	< 0.001	< 0.001	< 0.001	< 0.001	
Conductivity (µS/cm) ⁴	304	N/L	864	577	632	597	664	699	
Conductivity (µS/cm) ³	272	N/L	737	380	489	376	386	502	
Copper	0.0005	0.005	0.0011	0.0008	0.0007	0.0009	0.0007	0.0008	
Dissolved Oxygen ³	11.86	5	4.48	15.4	12.85	13.89	12.38	12.00	
Dissolved Organic Carbon	8	N/L	5.8	3.0	3.2	5.0	4.1	5.0	
Hardness (as CaCO ₃)	155	N/L	291	211	257	216	247	260	
Iron	0.089	0.3	0.040	0.009	0.009	0.016	0.024	0.020	
Lead	0.000058	0.005	0.00005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00003	
Magnesium	9.0	N/L	17.6	13.8	15.9	13.1	14.9	16.3	
Manganese	0.057	N/L	0.018	0.002	0.002	0.001	0.002	0.002	
Mercury	0.00002	0.0002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	
Nitrate (as N)	0.10	N/L	< 0.1	0.28	< 0.05	0.05	0.12	< 0.05	
Nitrite (as N)	0.05	N/L	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	0.06	
pH (units) ⁴	8.2425	6.5 - 8.5	7.94	8.20	8.17	8.28	8.05	8.19	
pH (units) ³	8.03	6.5 - 8.5	7.67	7.45	7.92	8.03	7.79	7.95	
Phenols	0.0020	0.001	< 0.001	0.004	< 0.001	< 0.002	< 0.002	< 0.001	
Phosphorus (total)	0.0225	0.03	< 0.01	0.01	0.01	0.01	< 0.01	0.06	
Potassium	1.3	N/L	1.4	0.5	1.4	1.2	1.1	1.2	
Sodium	5.5	N/L	73.9	37.9	46.2	41.5	43.8	45.4	
Strontium	0.146	N/L	0.162	0.110	0.131	0.111	0.118	0.138	
Sulphate	7	N/L	10	10	10	10	10	10	
Total Dissolved Solids	185	N/L	471	317	328	310	345	380	
Total Kjeldahl Nitrogen	0.5	N/L	0.33	0.3	0.2	0.2	0.2	0.4	
Total Suspended Solids	4	N/L	8	< 3	< 3	4	< 3	22	
Zinc	0.0085	0.02	< 0.005	< 0.005	0.006	0.006	0.007	0.008	

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

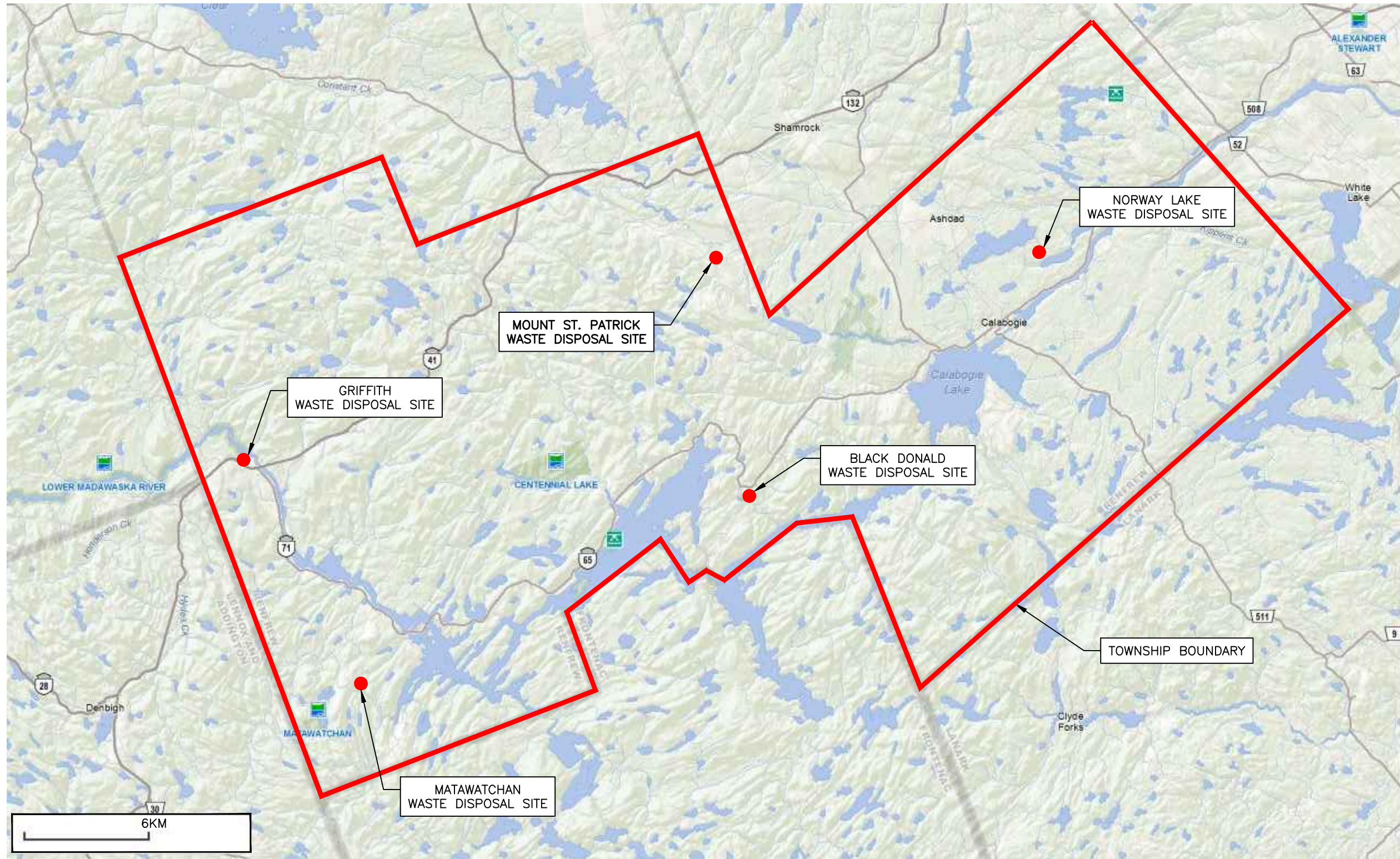
Table 6
Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (75th Percentile)	PWQO ¹	SW-4														5-year Trends (sparkline)
			25-May-16	27-Oct-16	09-May-17	26-Oct-17	07-May-18	31-Oct-18	16-May-19	29-Oct-19	28-Apr-20	28-Oct-20	06-May-21	23-Nov-21	17-May-22	02-Nov-22	
Alkalinity (as CaCO ₃)	147	25 % Decrease	155	128	133	133	162	133	117	120	115	218	133	138	217	134	
Ammonia, Total (as N)	0.1	N/L	< 0.01	0.04	< 0.01	0.02	0.02	0.02	0.05	0.02	0.01	0.04	0.03	0.05	0.04	0.02	
Ammonia, Un-ionized (as N) ²	0.00097	0.02	0.00003	0.00026	0.00007	0.00042	0.00032	0.00027	0.00111	0.00092	0.00004	0.00010	0.00081	0.00039	0.00063	0.00019	
Arsenic	0.00020	0.005	0.0001	< 0.0001	0.0003	< 0.0001	< 0.0001	0.0002	< 0.0001	0.0001	0.0001	0.0005	0.0001	< 0.0001	0.0003	< 0.0001	
Barium	0.080	N/L	0.081	0.073	0.043	0.067	0.057	0.092	0.058	0.075	0.044	0.158	0.063	0.067	0.113	0.067	
Biological Oxygen Demand	4	N/L	< 3	< 2	< 2	< 2	< 2	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	< 3	
Boron	0.009	0.2	< 0.005	< 0.005	< 0.005	0.013	0.006	< 0.005	0.007	0.008	0.006	0.008	0.008	0.018	0.010	0.007	
Cadmium	0.000015	0.0002	< 0.00002	< 0.00002	< 0.000014	< 0.000014	< 0.000015	0.000024	< 0.000015	< 0.000015	< 0.000015	0.000085	< 0.000015	< 0.000015	0.000025	< 0.000015	
Calcium	47	N/L	49.9	44.0	45.7	39.6	57.2	56.0	39.8	41.8	35.6	87.0	42.8	42.7	69.0	41.2	
Chemical Oxygen Demand	22	N/L	18	8	20	18	21	27	20	21	27	74	22	12	67	10	
Chloride	8	N/L	15.7	7.7	1.8	6.2	2.0	14.5	8.7	13.6	7.6	71.4	8.1	9.7	39.3	9.3	
Chromium	0.001	0.001	< 0.002	< 0.002	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Conductivity (µS/cm) ⁴	304	N/L	358	-	275	293	307	324	277	304	277	735	290	283	527	283	
Conductivity (µS/cm) ³	272	N/L	278	185	153	221	211	187	191	199	246	583	208	162	265	250	
Copper	0.0005	0.005	0.0002	< 0.0001	0.0005	0.0001	0.0006	0.0067	0.0004	0.0005	0.0006	0.0051	0.0003	0.0008	0.0018	0.0003	
Dissolved Oxygen ³	11.86	5	9.82	10.47	11.69	9.97	9.24	14.40	9.52	9.75	7.98	10.78	11.00	14.10	8.46	10.38	
Dissolved Organic Carbon	8	N/L	8.0	7.0	5.2	8.1	5.4	11.8	7.2	8.2	7.2	15.8	7.1	6.5	28.6	7.4	
Hardness (as CaCO ₃)	155	N/L	161	148	142	131	173	185	127	140	116	279	137	141	224	136	
Iron	0.089	0.3	0.075	0.075	0.015	0.048	0.021	0.163	0.049	0.008	0.005	1.79	0.067	0.054	0.351	0.044	
Lead	0.000058	0.005	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	0.00023	< 0.00002	< 0.00002	0.00005	0.00102	0.00004	0.00006	0.00029	< 0.00002	
Magnesium	9.0	N/L	8.86	9.27	6.64	7.72	7.42	10.9	6.57	8.63	6.65	15.0	7.34	8.4	12.5	8.15	
Manganese	0.057	N/L	0.056	0.039	0.002	0.034	0.004	0.037	0.021	0.028	< 0.001	0.186	0.031	0.015	0.052	0.022	
Mercury	0.00002	0.0002	< 0.00002	0.00003	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	< 0.00002	
Nitrate (as N)	0.10	N/L	< 0.1	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.08	< 0.1	< 0.05	< 0.1	0.10	0.13	
Nitrite (as N)	0.05	N/L	< 0.1	< 0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.1	< 0.05	< 0.1	< 0.05	< 0.05	
pH (units) ⁴	8.2425	6.5 - 8.5	8.02	-	8.04	8.35	8.00	8.04	8.14	8.06	7.87	-	8.01	8.07	8.04	7.62	
pH (units) ³	8.03	6.5 - 8.5	6.92	7.73	7.74	8.04	8.06	7.96	8.03	8.38	7.36	7.21	8.14	7.90	7.77	7.79	
Phenols	0.0020	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	
Phosphorus (total)	0.0225	0.03	< 0.01	0.01	0.01	0.02	0.02	< 0.01	0.02	0.01	< 0.01	0.11	0.03	0.01	0.06	0.02	
Potassium	1.3	N/L	0.9	1.1	0.7	1.0	0.8	1.0	0.9	1.1	1.0	0.6	1.0	1.2	1.1	1.1	
Sodium	5.5	N/L	11.2	5.7	1.9	5.1	2.3	17.2	5.2	7.5	5.1	41.1	5.7	6.1	35.0	5.8	
Strontium	0.146	N/L	0.142	0.156	0.123	0.125	0.149	0.166	0.106	0.138	0.099	0.195	0.120	0.127	0.163	0.125	
Sulphate	7	N/L	7	7	6	4	4	11	6	11	7	44	6	6	7	6	
Total Dissolved Solids	185	N/L	187	158	151	161	158	166	142	156	142	135	150	145	273	145	
Total Kjeldahl Nitrogen	0.5	N/L	0.42	0.4	0.3	0.4	0.3	0.6	0.3	0.4	0.3	1.4	0.4	0.3	1.2	0.4	
Total Suspended Solids	4	N/L	< 3	3	< 3	< 3	< 3	8	< 3	< 3	< 3	25	3	< 3	61	< 3	
Zinc	0.0085	0.02	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.005	< 0.005	0.005	< 0.005	0.015	0.008	0.011	< 0.005	< 0.005	

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



13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

0	JAN03-23	THP	ISSUED FOR REPORT
No.	DATE	BY	REMARKS

DRAWN BY:	CHECKED BY:
MAG	MAG
DESIGNED BY:	APPROVED BY:
MAG	THP
SCALE:	DATE:
AS NOTED	JAN-23

CLIENT:

PROJECT:

REGIONAL LOCATION PLAN
2022 ANNUAL REPORT
MOUNT ST. PATRICK WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

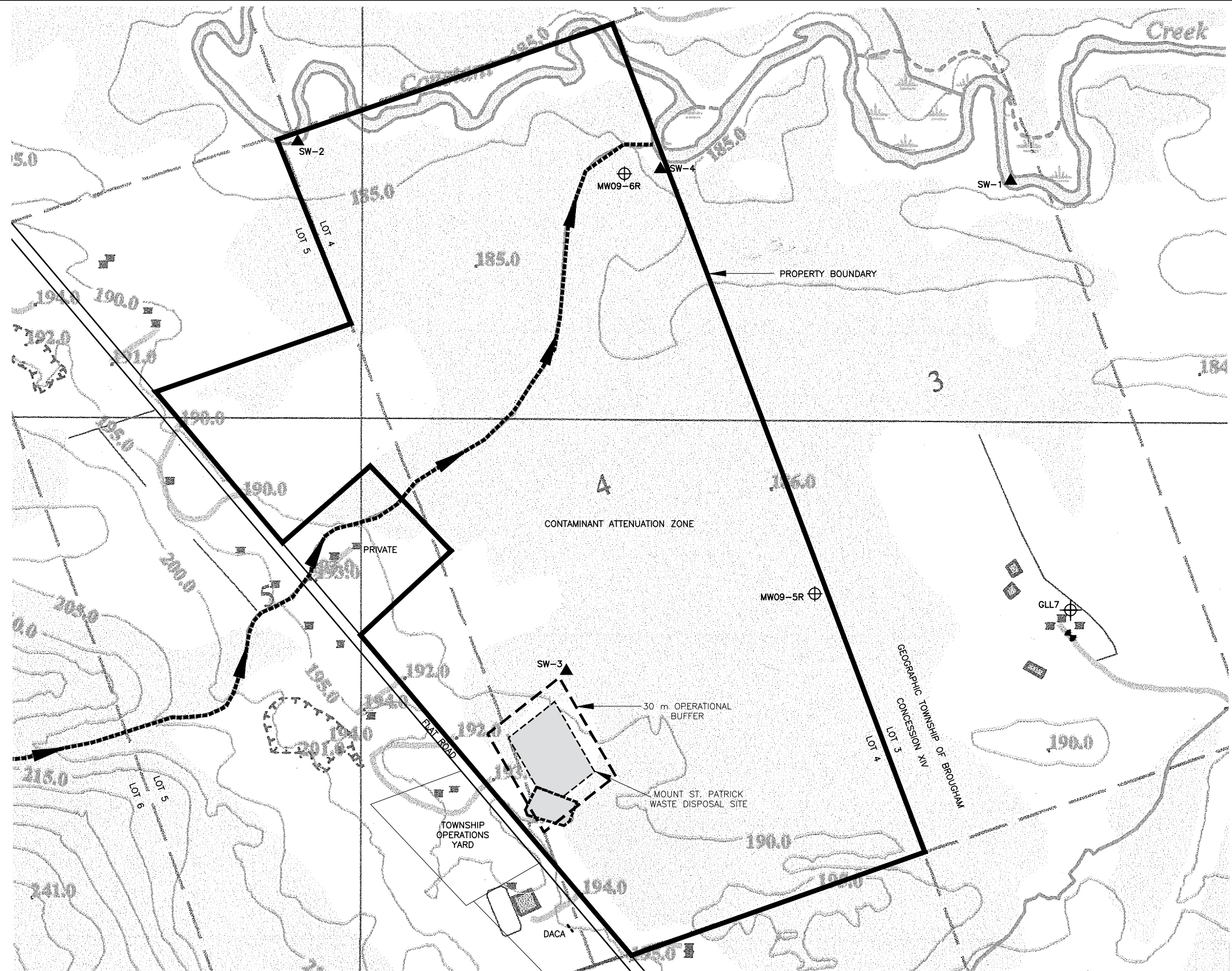
PROJECT No:	102.22.015
FIGURE:	1
	1 OF 6

G:\VatoCAD\02_Greater Madawaska\015 Mount St. Patrick WDS\Fig\102.22.015 - TCM - MSP - 2022 AR FIGURES.dwg



LEGEND

- PROPERTY BOUNDARY
- APPROVED WASTE DISPOSAL AREA
- 30 m BUFFER LIMIT
- TRANSFER STATION AREA
- TOPOGRAPHIC CONTOUR LINE
- ROAD (APPROXIMATE)
- APPROXIMATE SURFACE WATER SYSTEM
- RESIDENTIAL GROUNDWATER WELL LOCATION
- SURFACE WATER SAMPLING LOCATION
- GROUNDWATER MONITORING WELL



NOTES

1. ALL FEATURES APPROXIMATE.
2. BASE IMAGE SOURCE: ONTARIO BASE MAP 10 18 3500 50200.
3. PROPERTY BOUNDARY BASED ON TITLE SEARCH INFORMATION, AND RENFREW COUNTY ONLINE MAPPING, 2008.

Greenview
ENVIRONMENTAL MANAGEMENT

13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

No.	DATE	BY	REMARKS
0	JAN03-23	THP	ISSUED FOR REPORT

DRAWN BY: MAG	CHECKED BY: MAG
DESIGNED BY: MAG	APPROVED BY: THP
SCALE: NTS	DATE: JAN-23

CLIENT:

PROJECT:

EXISTING PROPERTY & SURFACE WATER MONITORING LOCATION PLAN
2022 ANNUAL REPORT
MOUNT ST. PATRICK WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:
102.22.015

FIGURE:
2

2 OF 6

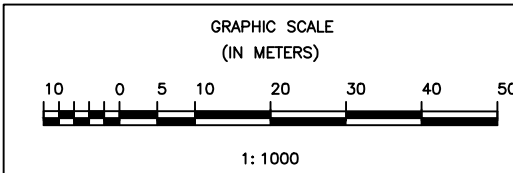
LEGEND

- PROPERTY BOUNDARY
- - - APPROVED WASTE DISPOSAL AREA
- - - LIMIT OF EXISTING WASTE
- 98.00 — MAJOR TOPOGRAPHIC CONTOUR (2m)
- MINOR TOPOGRAPHIC CONTOUR (0.5m)
- == ON-SITE ROAD
- TRANSFER STATION AREA
- 30m BUFFER LIMIT
- ~ ~ ~ APPROXIMATE TREE LINE
- ▲ LOW-LYING AREA
- ⊕ MW08-1 GROUNDWATER MONITORING WELL
- ▲ SW-3 SURFACE WATER SAMPLING LOCATION
- MP5 PIEZOMETER
- L&Y LEAF AND YARD WASTE
- △ BM#19-1 BENCHMARK
- - - CONSTRUCTION & DEMOLITION (C&D) / BULKY WASTE



NOTES

1. BENCHMARKS
BM#19-1
IRON BAR SOUTH-WEST OF METAL SCRAP PILE.
ELEVATION = 97.732m
2. DRAWING BASED ON DIGITAL INFORMATION PROVIDED BY GOLDER ASSOCIATES, 2006.
3. UPDATED TOPOGRAPHIC SURVEY COMPLETED BY GREENVIEW ON DECEMBER, 08 2022.



Greenview
ENVIRONMENTAL MANAGEMENT

13 Commerce Court
Bancroft, Ontario
613.332.0057
greenview-environmental.ca

No.	DATE	BY	REMARKS
0	JAN03-23	THP	ISSUED FOR REPORT

DRAWN BY: MAG	CHECKED BY: MAG
DESIGNED BY: MAG	APPROVED BY: THP
SCALE: 1:1000	DATE: JAN-23

CLIENT:
 THE TOWNSHIP OF
GREATER MADAWASKA

PROJECT:
EXISTING SITE CONDITIONS PLAN
2022 ANNUAL REPORT
MOUNT ST. PATRICK WASTE DISPOSAL SITE
TOWNSHIP OF GREATER MADAWASKA

PROJECT No:
102.22.015

FIGURE:
3

3 OF 6

G:\VatoCAD\102_Greater Madawaska\015 Mount St. Patrick WDS\Fig\102.22.015 - TCM - MSP - 2022 AR FIGURES.dwg

Appendix A



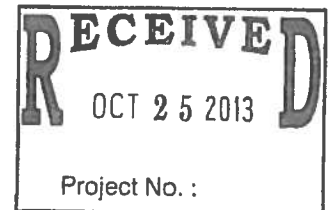
AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A411901

Notice No. 1

Issue Date: October 11, 2013

The Corporation of the Township of Greater Madawaska
19 Parnell Street
Post Office Box, No. 180
Calabogie, Ontario
K0J 1H0



Site Location: Mount St. Patrick Waste Disposal Site
134 Flat Rd
Township of Madawaska Township, County of Renfrew

You are hereby notified that I have amended Approval No. A411901 issued on July 16, 2008 for the use and operation of a 38.25 hectare Waste Disposal Site consisting of a 1.2 hectare Landfill and a Transfer Station , as follows:

The following Definition is hereby amended/added to the ECA:

"Approval " or *"Certificate "* or *"ECA "* means this entire provisional Environmental Compliance Approval document, issued in accordance with Section 20.3 of the *EPA* , and includes any schedules to it, the application and the supporting documentation listed in Schedule "A";

"white goods which contain refrigerants " or *"refrigerant appliances "* means white goods which contain, or may contain refrigerants, and which include, but is not restricted to, refrigerators, freezers and air-conditioning systems.

The following Condition is hereby added to the ECA:

Burning of Waste

- 15.14 (1) Burning of waste is not permitted at the *Site* with the exception of the material under Condition 15.14 (2).
- (2) Only clean wood and brush shall be permitted for burning. Burning of the materials shall be completed as per the Ministry of the Environment Guideline C-7 (Burning at landfill Sites).

- (3) The *Owner* shall ensure that the final maximum storage capacity of the Leaf and Yard Burn Storage Area pile does not exceed 200 m³.

The following Condition is hereby amended as follows:

16.4 The *Owner* shall ensure that the final maximum capacities are not exceeded:

(a) waste destined for final disposal	80 m ³
(b) <i>organic waste</i>	20 m ³
(c) <i>waste electrical and electronic equipment</i>	40 m ³
(d) <i>blue box waste</i>	325 m ³
(e) tires	100 m ³
(f) <i>leaf and yard waste</i>	200 m ³
(g) <i>construction and demolition waste</i>	200 m ³
(h) scrap metal	60 m ³
(i) <i>white goods that contain refrigerants</i>	25 units

16.5 The *Owner* shall ensure that waste is stored in the following manner:

- (a) waste destined for final disposal shall be collected in roll-off containers or equivalent and may be mechanically compacted;
- (b) *blue box waste* shall be collected in roll off containers or equivalent except as noted elsewhere;
- (c) scrap metal shall be collected in a segregated area;
- (d) the tire stockpile shall be located a minimum of 15 metres from the property line, any buildings and the active landfilling area and an area around stockpiles of no less than 4.5 metres shall be kept free of vegetation;
- (e) *organic waste* shall be collected in vector resistant containers;
- (f) *white goods which contain refrigerants* shall be stored in a segregated area in an upright position and in such a manner to allow for the safe handling and removal from the *Site* for removal of refrigerants as required by *Ontario Regulation 189*;
- (g) *waste electrical and electronic equipment* shall be collected in roll-off containers or segregated area.

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

9. Letter dated May 21, 2013 and supporting documentation addressed to Mr. Ian Parrott, Director, Environmental Approvals Branch from Mr. Dan Hagan, Greenview Environmental Management Ltd. submitting an application to amend the volume of SSO and leaf and yard waste and permit the burning of leaf and yard waste. The supporting documentation includes:

- i. Environmental Compliance Approval Application dated May 2, 2013 and signed by Ms.

Alison Haltzauer, CAO/Clerk - Treasurer, Township of Greater Madawaska Valley.

- ii. Figure No. 1 entitled "Mount St. Patrick Waste Disposal Site - Proposed Site Design" prepared by Greenview Environmental Management Ltd. (Project No. 102.13.015) dated May 2013 (saved May 22, 2013)

10. Email dated September 24, 2013 at 5:10 p.m. to Mr. Dale Gable, Ministry of the Environment from Mr. Dan Hagan, Greenview Environmental Management Ltd. providing details and photos of the storage container for organic waste.
11. Email dated September 30, 2013 at 4:10 p.m. to Mr. Dale Gable, Ministry of the Environment from Mr. Dan Hagan, Greenview Environmental Management Ltd. requesting the increase to the storage volume of scrap metals and identifying a storage limit on white goods that contain refrigerants.

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

1. *The reason for Condition 15.14 is to ensure that no waste is burned at the Site other than leaf and yard waste. This is to ensure the leaf and yard waste is managed in a acceptable manner.*
2. *The reason for the amendment to Condition No. 16.4 and 16.5 is to amend the storage volumes at the transfer station.*

This Notice shall constitute part of the approval issued under Approval No. A411901 dated July 16, 2008

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
MSG 1E5

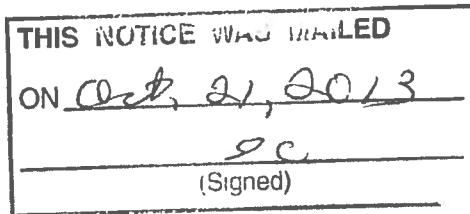
AND

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

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

DATED AT TORONTO this 11th day of October, 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 Limited ✓

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A411901
Issue Date: July 16, 2008

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

Site Location: Mount St. Patrick Waste Disposal Site
134 Flat Road
Part Lot 4, Concession 14, former geographic Township of Brougham
Township of Greater Madawaska, County of Renfrew

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

the use and operation of a 38.25 hectare Waste Disposal Site consisting of a 1.2 hectare Landfill and a Transfer Station.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

- (a) "Act" means the *Environmental Protection Act*, R.S.O. 1990, C.E-19, as amended;
- (b) "blue box waste" means municipal waste that consists solely of waste in one or more of the categories set out in Ontario Regulation 101/94, Schedules 1 and 2, as amended;
- (c) "bulky waste" means large items such as carpet, stumps, furniture, mattresses and other waste of a similar nature;
- (d) "Certificate" means this entire provisional Certificate of Approval document, issued in accordance with section 39 of the *Act*, and includes any schedules to it, the application and the supporting documentation listed in Schedule "A";
- (e) "construction and demolition waste" means waste produced from the construction, renovation or demolition of an industrial, commercial, institutional or residential building;
- (f) "Director" means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the *Act* as a Director for the purposes of Part V of the *Act*;

- (g) **"District Manager"** means the District Manager of the local district office of the Ministry in which the *Site* is geographically located;
- (h) **"landfill"** means the 1.2 hectare area of the *Site* approved for final disposal of waste;
- (i) **"leaf and yard waste"** means waste consisting of natural Christmas trees and other plant materials but not tree limbs or other woody materials in excess of 7 centimetres in diameter;
- (j) **"limit of fill"** means the area in which waste is approved for final disposal according to this *Certificate*;
- (k) **"Ministry"** and **"MOE"** means the Ontario Ministry of the Environment;
- (l) **"Ontario Regulation 189"** means Ontario Regulation 189/94, Refrigerants, or as amended, made under the *Act*;
- (m) **"Ontario Regulation 347"** means Ontario Regulation 347, R.R.O. 1990, General - Waste Management, made under the *Act*, as amended from time to time;
- (n) **"Ontario Regulation 903"** means Ontario Regulation 903 – R.R.O. 1990, Wells, amended to Ontario Regulation 128/03, made under the *OWRA*;
- (o) **"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*;
- (p) **"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;
- (q) **"Owner"** means any person that is responsible for the establishment or operation of the *Site* being approved by this *Certificate*, and includes the Township of Greater Madawaska, its successors and assigns;
- (r) **"OWRA"** means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;
- (s) **"PA"** means the *Pesticides Act*, R.S.O. 1990, c. P-11, as amended from time to time;
- (t) **"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 *Act* or section 17 of *PA*;

- (u) "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;
- (v) "RUP" means the Reasonable Use Policy (Guideline B-7) of the Ministry of the Environment;
- (w) "Site" means the entire 38.25 hectare waste disposal site, including the 1.2 hectare *landfill*, buffer lands and *transfer station* located at 134 Flat Road, legally described as Part Lot 4, Concession 14, Township of Greater Madawaska, County of Renfrew, approved by this *Certificate*;
- (x) "transfer station" means the area of the *Site* approved for the temporary storage of waste destined for final disposal and/or recycling or other waste diversion facilities;
- (y) "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
- (z) "white goods which contain refrigerants" means white goods which contain, or may contain refrigerants, and which include, but is not restricted to, refrigerators, freezers and air-conditioning systems.

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

TERMS AND CONDITIONS

1.0 Revoke and Replace

- 1.1 This *Certificate* revokes all previously issued Provisional Certificates of Approval issued under Part V of the *Act* 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 of the *Act* for this *Site*.

2.0 Compliance

- 2.1 The *Owner* shall ensure compliance with all the conditions of this *Certificate* and shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of this *Certificate* and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.
- 2.2 Any person authorized to carry out work on or operate any aspect of the *Site* shall comply with the conditions of this *Certificate*.

3.0 In Accordance

- 3.1 Except as otherwise provided for in this *Certificate*, the *Site* shall be designed, developed, built, operated and maintained in accordance with the application for this *Certificate*, dated July 16, 2007, and the supporting documentation listed in Schedule "A".

4.0 Interpretation

- 4.1 Where there is a conflict between a provision of any document, including the application, referred to in this *Certificate*, and the conditions of this *Certificate*, the conditions in this *Certificate* shall take precedence.
- 4.2 Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the *Ministry* approved the amendment.
- 4.3 Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.
- 4.4 The conditions of this *Certificate* are severable. If any condition of this *Certificate*, or the application of any condition of this *Certificate* to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this *Certificate* shall not be affected thereby.

5.0 Other Legal Obligations

- 5.1 The issuance of, and compliance with, this *Certificate* does not:
- (a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
 - (b) limit in any way the authority of the *Ministry* to require certain steps be taken or to require the *Owner* to furnish any further information related to compliance with this *Certificate*.
- 5.2 All wastes at the *Site* shall be managed and disposed in accordance with the *Act* and *Ontario Regulation 347*.
- 5.3 The *Owner* shall ensure that:
- (a) all equipment discharging to air operating at the *Site* are approved under Section 9 of the *Act*; and
 - (b) all effluent is discharged in accordance with *OWRA*.

6.0 Adverse Effect

- 6.1 The *Owner* shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the *Site*, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.
- 6.2 Despite an *Owner*, *Operator* or any other person fulfilling any obligations imposed by this *Certificate*, the person remains responsible for any contravention of any other condition of this *Certificate* or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

7.0 Change of Owner

- 7.1 The *Owner* shall notify the *Director*, in writing, and forward a copy of the notification to the *District Manager*, within 30 days of the occurrence of any changes in the following information:
- (a) the ownership of the *Site*;
 - (b) appointment of, or a change in, the *Operator* of the *Site*;
 - (c) the name or address of the *Owner*;
 - (d) the partners, where the *Owner* is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R. S. O. 1990, c. B.17, shall be included in the notification.
- 7.2 No portion of this *Site* shall be transferred or encumbered prior to or after closing of the *Site* unless the *Director* is notified in advance and sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.
- 7.3 In the event of any change in ownership of the works, other than change to a successor municipality, the *Owner* shall notify the successor of and provide the successor with a copy of this *Certificate*, and the *Owner* shall provide a copy of the notification to the *District Manager* and the *Director*.

8.0 Certificate of Requirement

- 8.1 Pursuant to Section 197 of the *Act*, no person having an interest in the *Site* shall deal in any way with the *Site* without first giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.
- 8.2 Two copies of a completed Certificate of Requirement, containing a registerable description of the *Site*, shall be submitted to the *Director* for the *Director's* signature within 60 calendar days of the date of this *Certificate*.

8.3 The Certificate of Requirement shall be registered in the appropriate land registry office on title to the *Site* by the *Owner* within 10 calendar days of receiving the Certificate of Requirement signed by the *Director*, and a duplicate registered copy shall be submitted to the *Director*.

9.0 Inspections

- 9.1 No person shall hinder or obstruct a *Provincial Officer* from carrying out any and all inspections authorized by the *OWRA*, the *Act*, or the *PA*, of any place to which this *Certificate* relates, and without limiting the foregoing:
- (a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this *Certificate* are kept;
 - (b) to have access to, inspect, and copy any records required to be kept by the conditions of this *Certificate*;
 - (c) to inspect the *Site*, related equipment and appurtenances;
 - (d) to inspect the practices, procedures, or operations required by the conditions of this *Certificate*; and
 - (e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Certificate* or the *Act*, the *OWRA* or the *PA*.

10.0 Information and Record Retention

- 10.1 Any information requested, by the *Ministry*, concerning the *Site* and its operation under this *Certificate*, including but not limited to any records required to be kept by this *Certificate* shall be provided to the *Ministry*, upon request, in a timely manner.
- 10.2 The receipt of any information by the *Ministry* or the failure of the *Ministry* to prosecute any person or to require any person to take any action, under this *Certificate* or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:
- (a) an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any term or condition of this *Certificate* or any statute, regulation or other legal requirement; or
 - (b) acceptance by the *Ministry* of the information's completeness or accuracy.
- 10.3 Any information relating to this *Certificate* and contained in *Ministry* files may be made available to the public in accordance with the provisions of the *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, C. F-31.
- 10.4 All records and monitoring data required by the conditions of this *Certificate* must be kept on the *Owner's* premises for a minimum period of five (5) years from the date of their creation.

11.0 Service Area

11.1 This *Site* is approved to receive waste generated in the Township of Greater Madawaska.

12.0 Hours of Operation

- 12.1 (a) The *Owner* shall set hours of operation any day of the week, during daylight hours.
- (b) Hours of operation may be changed by the *Owner* at any time provided that users of the *Site* have been adequately notified of any change.

13.0 Security and Signage

13.1 The *Owner* shall ensure that access to the *Site* is restricted by fencing and/or natural features and that fencing and lockable gate are kept in a state of good repair.

- 13.2 (a) Access to the *landfill* shall be restrict to the *Owner* and *Owner* authorized commercial vehicles; and
- (b) Access to the *transfer station* shall be permitted only under the supervision of a competent attendant.
- (c) During non-operating hours, the *Site* shall be secured to prevent entry by unauthorized persons.

13.3 Scavenging or burning of waste at the *Site* are prohibited.

13.4 The *Owner* shall post a sign at the entrance gate of the *Site* with the following information:

- (a) name of the *Site* and *Owner*;
- (b) Certificate of Approval Number for the *Site*;
- (c) days and hours of operation;
- (d) allowable and prohibited wastes;
- (e) contact telephone number(s) to reach the *Owner* on a 24 hour - 7 day per week basis in the event of a complaint or emergency; and
- (f) a warning against unauthorized access and against dumping outside the *Site*.

14.0 Inspections

14.1 The *Owner* shall ensure that the following inspection schedule is adhered to:

- (a) on each operating day, an inspection of the *landfill* working face, *transfer station* storage areas, facilities, signage, fencing and gate;
- (b) on a monthly basis, an inspection of the areas under final cover for erosion, inspection of the *landfill* for signs of leachate generation, assessment of road condition and property litter inspection; and

- (c) on an annual basis, an inspection of the monitoring wells and a field survey of the *limit of fill* area.
- 14.2 A record of the inspections shall kept in a daily log book that includes:
- (a) the name and signature of person that conducted the inspection;
 - (b) the date and time of the inspection;
 - (c) the list of any deficiencies discovered;
 - (d) the recommendations for remedial action; and
 - (e) the date, time and description of actions taken.
- 15.0 Operations - Landfill**
- 15.1 The *landfill* shall be developed and operated in seven (7) phases as described in Item 5 of Schedule "A".
- 15.2 The operational life of the *landfill* shall be limited to the time until final contours, as shown on Item 6 (new Figure 4) of Schedule "A", have been reached.
- 15.3 Waste shall be deposited in a manner that minimizes the exposure of the working face of the landfilling area and shall be compacted before cover material is applied.
- 15.4 The *Owner* shall mark the boundaries of the *limit of fill*, the current active cell and the working face, so as to be visible throughout the year, to ensure that waste is deposited in accordance with Item 5 of Schedule "A".
- 15.5
- (a) The *landfill* shall be used for the final disposal of *construction and demolition waste* and *bulky waste*.
 - (b) Non-hazardous residential waste may be landfilled on an interim basis until such time as the *transfer station* is commissioned and as a contingency measure when waste can not be transferred off *Site* from the *transfer station*.
 - (c) No subject waste, as defined in *Ontario Regulation 347*, shall be disposed of at the *Site*.
- 15.6 The *Owner* may undertake size reduction, through grinding, shredding or equivalent, of *construction and demolition waste* and *bulky waste*.
- 15.7
- (a) The *Owner* shall designate a 300 m² staging area, consisting of a 0.15 m thick pad of granular material, for stockpiling *construction and demolition waste* and *bulky waste*.
 - (b) The stockpile shall not exceed 200 m³ before undergoing size reduction or being landfilled as is.

- (c) Size reduction shall take place in the designated staging area.
 - (d) All equipment used for size reduction activities shall be approved under Section 9 of the *Act*. The terms and conditions of the Section 9 approval shall govern the equipment's use at this *Site*.
- 15.8 Cover material shall be applied as follows:
- (a) cover, consisting of a minimum 0.15 m of soil or alternate cover material, shall be applied on a weekly basis over the entire working face;
 - (b) intermediate cover, consisting of a minimum of 0.3 m of soil shall be applied in areas where landfilling has been temporarily discontinued for six (6) months or more; and
 - (c) final cover, consisting of a minimum of 0.6 m of soil and 0.15 m of topsoil suitable for maintaining vegetative growth, shall be placed in areas where landfilling has been completed to final contours.
- 15.9 Where existing cover material has eroded such that waste is exposed, the *Owner* shall replace the cover material during the next operating day.
- 15.10 The *Owner* shall apply final cover progressively, as weather conditions permit, as each part of the *limit of fill* reaches its final grades. 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.
- 15.11 The following waste is approved for use as alternative daily cover material:
- (a) *construction and demolition waste* consisting of size reduced concrete, brick, asphalt, gypsum board and porcelain/ceramics;
 - (b) wood, wood furniture, brush and lumber chips,
 - (c) *leaf and yard waste* mixed with sand/soil and compost;
 - (d) asphalt shingles;
 - (e) non-hazardous contaminated soil; and
 - (f) temporary or movable, low permeability, flexible membranes.
- 15.12 Notwithstanding Condition 15.11, alternative cover material shall be non-hazardous, according to *Ontario Regulation 347*, and shall perform at least as well as soil in relation to the following functions:
- (a) control of blowing litter, odours, dust, *landfill* gas, gulls, vectors, vermin and fires;
 - (b) provision for an aesthetic condition of the *landfill* during the active life of the *landfill*;
 - (c) provision for vehicle access to the active tipping face; and
 - (d) compatibility with the design of the *landfill* for groundwater protection, leachate management and *landfill* gas management.

15.13 Use of any other waste or materials as alternative cover requires the *Owner* to submit an application, with supporting information and applicable fee, for a trial use or permanent use, to the *Director*, copied to the *District Manager*.

16.0 Operations - Transfer Station

16.1 The *transfer station* shall be developed and operated in accordance with Items 5 and 7 of Schedule "A".

16.2 (a) This *transfer station* is approved for the following waste management activities:
(i) temporary storage, compaction and transfer of non-hazardous residential waste; and
(ii) temporary storage and transfer of *blue box waste*, waste tires, waste electrical and electronic waste and *organic waste*.

(b) The *transfer station* is not approved for the dismantling of *waste electrical and electronic equipment*.

16.3 Only waste which has been inspected by a competent attendant shall be accepted from the public.

16.4 The *Owner* shall ensure that the final maximum capacities are not exceeded:

(a) waste destined for final disposal	80 m ³
(b) <i>organic waste</i>	2 m ³
(c) <i>waste electrical and electronic equipment</i>	40 m ³
(d) <i>blue box waste</i>	325 m ³
(e) tires	100 m ³
(f) <i>leaf and yard waste</i>	50 m ³
(g) <i>construction and demolition waste</i>	200 m ³

16.5 The *Owner* shall ensure that waste is stored in the following manner:

- (a) waste destined for final disposal shall be collected in roll-off containers or equivalent and may be mechanically compacted;
- (b) *blue box waste* shall be collected in roll off containers or equivalent except as noted elsewhere;
- (c) scrap metal shall be collected in a segregated area with the stockpile not to exceed 25 m³;
- (d) the tire stockpile shall be located a minimum of 15 metres from the property line, any buildings and the active landfilling area and an area around stockpiles of no less than 4.5 metres shall be kept free of vegetation;
- (e) *organic waste* shall be collected in vector resistant containers;
- (f) *white goods which contain refrigerants* shall be stored in a segregated area in an upright position and in such a manner to allow for the safe handling and removal from the *Site* for removal of refrigerants as required by *Ontario Regulation 189*;

- (g) *waste electrical and electronic equipment* shall be collected in roll-off containers or segregated area.

16.6 The *Owner* shall ensure that all waste storage areas and bins are clearly labelled.

16.7 The *Owner* shall ensure that *white goods which contain refrigerants*:

- (a) have the refrigerant removed by a licensed technician, in accordance with *Ontario Regulation 189*, prior to shipment off *Site*; or
- (b) are shipped off *Site* only to facilities where the refrigerants can be removed by a licensed technician in accordance with *Ontario Regulation 189*; and
- (c) a detailed log of all *white goods which contain refrigerants* received is maintained which includes the following information:
 - (i) date of the record;
 - (ii) types, quantities and source of *white goods which contain refrigerants* received;
 - (iii) destination of the white goods; or
 - (iv) the details on removal of refrigerants, if conducted on *Site*, and the quantities and destination of the refrigerants transferred from the *Site*.

17.0 Nuisance Control

17.1 The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

17.2 If at any time vectors or vermin become a nuisance, the *Owner* shall hire a qualified, licensed pest control professional to design and implement a pest control plan for the *Site*. The pest control plan shall then remain in place until the *Site* has been closed.

18.0 Emergency Response and Contingency Planning

18.1 All spills, as defined in the *Act*, shall be immediately reported to the *Ministry's* Spill Action Centre at 1-800-268-6060 and shall be recorded in a written log or an electronic file format, as to the nature of the spill or upset, and action taken for clean-up, correction and prevention of future occurrences.

18.2 The *Owner* shall ensure that *Site* personnel have access to a reliable means of summoning assistance (e.g. telephone, cellular phone, mobile radio) at all times.

- 18.3 (a) The *Owner* shall have in place an emergency response plan which shall include, but is not limited to:
- (i) emergency response procedures to be undertaken in the event of a spill, fire, workplace accident, medical emergency or other emergency;
 - (ii) a list of equipment available for emergency response including names and telephone numbers of companies providing emergency response services; and

- (iii) a notification protocol with names and telephone numbers of persons to be contacted, including the *Owner's* personnel, the *Ministry* Spills Action Centre and District Office, the local fire department, the local Medical Officer of Health and the Ontario Ministry of Labour.
 - (b) A copy of the emergency response plan shall be kept in a location accessible to staff at all times.
 - (c) The *Owner* shall ensure that the equipment outlined in the emergency response plan are in a good state of repair, fully operational and immediately available;
 - (d) The *Owner* shall ensure that all *Site* attendant(s) are fully trained in the emergency response equipment's use and in the procedures to be employed in the event of an emergency.
 - (e) The *Owner* shall review the emergency response plan on an annual basis as a minimum. In particular, the *Owner* shall ensure that the notification information required by Condition 18.3 (a) (iii) is up-to-date.
- 18.4 The *Owner* shall have in place a written contingency plan which details how waste will be stored or disposed of in the event that it cannot be removed from the *Site* in the usual manner. If implementation of the contingency plan is necessary, it shall be effected through written concurrence from the *District Manager*.
- 18.5 The *Owner* shall have in place a contingency plan which specifies, as a minimum, the procedures to be followed in the event of a labour disruption, transportation disruption, inability of receiving sites to accept waste or other business disruption to the operation.
- 19.0 Monitoring**
- 19.1 (a) Groundwater and surface water monitoring shall be conducted by the *Owner* in accordance with Table 4 of Item 8, Schedule "A";
- (b) Within twelve (12) months of the issuance of this *Certificate*, the *Owner* shall review the monitoring program results against the *RUP* and identify any potential *RUP* issues. The *Owner* shall implement any actions required to address the *RUP* issues within 24 months of the issuance of this *Certificate*.
- 19.2 Any changes to the monitoring program shall be approved, in writing, by the *District Manager* prior to implementing the changes.
- 19.3 The *Owner* shall ensure that:
- (a) all monitoring wells which form part of any monitoring program shall be protected from damage; and

- (b) any groundwater monitoring wells that are damaged shall be repaired or replaced forthwith or properly abandoned in accordance with *Ontario Regulation 903*; and
- (c) any monitoring wells which are no longer required for monitoring, or which need to be closed due to operational changes on the *Site*, shall be properly abandoned in accordance with *Ontario Regulation 903*.

20.0 Training

20.1 All attendants shall be trained with respect to the following areas:

- (a) terms, conditions and operating requirements of this *Certificate*;
- (b) operation and management of the *Site*;
- (c) an outline of the responsibilities of the *Site* personnel;
- (d) personnel training protocols;
- (e) any environmental concerns pertaining to the wastes to be accepted at the *Site*;
- (f) proper receiving and recording procedures;
- (g) proper storage, handling, sorting and shipping procedures;
- (h) occupational health and safety concerns pertaining to the wastes received;
- (i) relevant waste management legislation; and
- (j) operation of equipment and procedures to be followed in the event of an emergency situation.

21.0 Record Keeping

21.1 The *Owner* shall maintain, at the *Site*, a log book which records on each day of operation, the following information:

- (a) date of record;
- (b) quantities and destination of waste shipped from the *transfer station* either for final disposal or for recycling; and
- (c) any operational difficulties, complaints and/or emergency situations experienced.

21.2 On a regular basis, the *Owner* shall undertake a field survey of the *landfill* to determine the amount of capacity utilized and estimate the amount of capacity remaining.

22.0 Annual Report

22.1 On March 31st of each year, the *Owner* shall submit to the *District Manager* an annual report covering the preceding calendar year. The annual report shall include the following:

- (a) a monthly summary of waste destined for final disposal, *blue box waste*, waste electrical and electronic equipment, tires and *organic waste* transferred from the *transfer station*;
- (b) calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at in the *landfill* during the reporting period and a calculation of the total volume of *landfill* capacity used during the reporting period and including a calculation of the remaining capacity of the *landfill*;

- (c) a summary of *landfill* operations and development;
- (d) a summary of operational problems experienced during operation of the *transfer station* or the *landfill*, and their resolution;
- (e) recommendations respecting any proposed changes in the operations of the *Site*;
- (f) a summary of inspections;
- (g) site plans showing the existing contours of the *Site*; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; previously existing facilities; facilities installed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;
- (h) tables outlining monitoring locations, analytical parameters sampled, and frequency of sampling;
- (i) an assessment of surface water quality in relation to the trigger concentrations (if and when surface water trigger mechanisms are in place) and the *PWQO*;
- (j) an assessment of groundwater quality in relation to the trigger concentrations (if and when groundwater trigger mechanisms are in place) and the *RUP*;
- (k) conclusions of the monitoring data, a review of the adequacy of monitoring programs and recommendations for any changes to monitoring programs that may be necessary;
- (l) a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
- (l) a summary of complaints made regarding *Site* operations, maintenance and monitoring; and
- (m) a statement as to compliance with all Conditions of this *Certificate* and with the inspections, monitoring and reporting requirements of the Conditions herein.

22.2 In the event that the results of the monitoring program are such that an off-site exceedance of the *RUP* or *PWQO* can reasonably be predicted to occur, the *Owner* 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.

23.0 Closure

23.1 Two (2) years prior to *landfill* closure, the *Owner* shall submit for the *Director's* approval a detailed End Use and Closure Plan. This Plan shall include, but not limited to, the following subjects:

- (a) proposed end use;

- (b) final closure schedule;
- (c) final contour configuration;
- (d) landscaping;
- (e) facilities (if any);
- (f) rodent control;
- (g) groundwater, surface water and *landfill* gas control; and
- (h) post-closure inspection, maintenance, monitoring and reporting.

- 23.2 (a) Four (4) months prior to the permanent closure of the *transfer station*, the *Owner* shall submit to the *District Manager* written notification of the decision to cease activities and a closure plan outlining the activities to be taken to systematically decommission the *transfer station* including a schedule for the implementation of the activities; and
- (b) Within ten (10) days after closure of the *transfer station*, the *Owner* shall notify the *Director* and *District Manager*, in writing, that the *transfer station* is closed and that the closure plan required by Condition 23.2 (a) has been fully implemented.

SCHEDULE "A"

The following Schedule "A" forms part of Certificate of Approval No. A411901.

1. Application for a Provisional Certificate of Approval for a Waste Disposal Site signed by Mr. J.A. Baird, CAO/Clerk, Township of Greater Madawaska, dated July 16, 2007.
2. Design and Operations Plan, Municipal Solid Waste Transfer Station, Mount St. Patrick Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by Greenview Environmental Management, dated July 23, 2007.
3. Letter dated August 10, 1007, from Tyler H. Peters, Greenview Environmental Management, to Environmental Assessment and Approvals Branch, re: justification for maximum storage quantities, vehicle routes, details of staff training and description of contingency plans.
4. Letter dated October 25, 2007, from Tyler H. Peters, Greenview Environmental Management, to Environmental Assessment and Approvals Branch re: clarification of supporting documentation.
5. Letter dated April 24, 2008, from Tyler H. Peters, Greenview Environmental Management, to Environmental Assessment and Approvals Branch re: revised transfer station location and configuration.
6. Figure 4. Mount St. Patrick Waste Disposal Site, Landfill Area Development Plan, prepared by Greenview Environmental Management, Revision 1, dated April 2008.
7. Figure 5. Mount St. Patrick Waste Disposal Site, Proposed Transfer Station Layout, prepared by Greenview Environmental Management, Revision 1, dated April 2008.
8. 2006 Annual Report, Mount St. Patrick Waste Disposal Site, prepared for the Corporation of the Township of Greater Madawaska, prepared by Golder Associates, dated March 2007.

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

The reason for Condition 1.1 is to clarify that the previously issued Certificate of Approval No. A411901 issued on March 28, 1980 is no longer in effect and has been replaced and superseded by the Terms and Conditions stated in this Certificate.

The reason for Conditions 2.1, 2.2, 5.1, 5.2, 5.3, 6.1, 6.2, 10.1, 10.2 and 10.3 is to clarify the legal rights and responsibilities of the Owner under this Certificate.

The reason for Conditions 3.1, 15.1, 15.2, 16.1, 22.1 and 22.2 is to ensure that the Site is designed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

The reason for Conditions 4.1, 4.2, 4.3 and 4.4 is to clarify how to interpret this Certificate in relation to the application and supporting documentation submitted by the Owner.

The reason for Conditions 7.1 are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval.

The reason for Condition 7.2 is to restrict potential transfer or encumbrance of the Site without the approval of the Director. Transfer or encumbrance can be made only on the basis that it will not endanger compliance with this Certificate.

The reason for Condition 7.3 is to ensure that subsequent owners of the Site are informed of the terms and conditions of this Certificate. This also applies to all supporting documentation listed in Schedule "A".

Conditions 8.1, 8.2 and 8.3 are included, pursuant to subsection 197(1) of the Act, to provide 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 Condition 9.1 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act and OWRA.

The reason for Condition 10.4 is to ensure the availability of records and drawings for inspection and information purposes.

The reason for Condition 11.1 is to specify the approved areas from which waste may be accepted at the Site.

The reasons for Condition 12.1 is to specify the hours of operation for the Site and provide a mechanism for amendment of the hours of operation, as required.

The reason for Condition 13.1 is to minimize the risk of unauthorized entry to the Site.

The reason for Condition 13.2 is to ensure that the Site is utilized, particularly by members of the public, on under the supervision of a competent attendant able to ensure compliance with this Certificate.

The reason for Condition 13.3 is that open burning of waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard. Condition 13.3 is also necessary to protect the public from the potential risks inherent with uncontrolled scavenging.

The reason for Condition 13.4 is to ensure that emergency responders and the public have the necessary contact information in the event of an emergency or complaint.

The reason for Conditions 14.1 and 14.2 is to ensure that all equipment and facilities are maintained in good working order.

The reason for Conditions 15.3, 15.4, 15.6, 15.7, 17.1 and 17.2 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 Conditions 15.5, 16.2 and 16.4 is to ensure that the types and quantities of waste received at the Site are in accordance with that approved under this Certificate.

The reasons for Conditions 15.8, 15.9 and 15.10 is to ensure that daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the landfill, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the landfill.

The reasons for Conditions 15.11, 15.12 and 15.13 is to specify the waste approved for use as alternate cover material and for the approval requirements to be followed to designate other waste for use of alternative cover material at the Site.

The reason for Condition 16.3 is to ensure that only waste approved under this Certificate are received at the Site.

Conditions 16.5, 16.6 and 16.7 are included to ensure that waste storage is done 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 18.1 is to ensure that the Owner immediately notifies the Ministry of any spills as required in Part X of the Act so that appropriate spills response can be determined.

The reason for Conditions 18.2 and 18.3 is to ensure that the Owner is prepared and properly equipped to take action in the event of a spill, fire or other emergency.

The reason for Conditions 18.4 and 18.5 is to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site.

The reason for Conditions 19.1 and 19.2 is to demonstrate that the landfill is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial action can be taken.

The reason for Condition 19.3 is to prevent contamination of the groundwater from surface contaminants.

The reason for Condition 20.1 is to ensure that the Site is supervised by properly trained staff.

The reason for Conditions 21.1 and 21.2 is to ensure that detailed records of Site inspections are recorded and maintained for inspection and information purposes.

The reason for Condition 23.1 and 23.2 is to ensure that the Site is closed in accordance with MOE standards and to protect the health and safety of the environment.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A411901 issued on March 28, 1980.

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

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

DATED AT TORONTO this 16th day of July, 2008



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

VP/

c: District Manager, MOE Ottawa



Ministry
of the
Environment

Provisional Certificate No.A 411901

**PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE**

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Township of Brougham
Dacre, Ontario
K0J 1N0

for the use and operation of a 1.2 hectare dump site

all in accordance with the following plans and specifications:


Located: Lot 4, Concession XIV
Township of Brougham
County of Renfrew

which includes the use of the site only for the disposal
of the following categories of waste (NOTE: Use of the site for additional categories of
wastes requires a new application and amendments to the Provisional Certificate of
Approval domestic and 10% other, limited to scrap metal).

and subject to the following conditions:

1. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof has been returned by the applicant to the Director.

Dated this 28th day of March, 1980


Director, Section 30,
The Environmental Protection Act, 1971

Properties

PIN 57385 - 0091 LT
Description PT LTS 4 & 5, CON 14, BROUGHAM, AS IN R402583 & R121176 ; BAGOT BLYTHFLD
 BROUGHAM
Address GRIFFITH

Party From(s)

Name THE CORPORATIO OF THE TOWNSHIP OF GREATER MADAWASKA
Address for Service 1101 Francis Street, P. O. Box 180
 Calabogie, Ontario K0J 1H0

I, Peter Emond, Mayhor and Allison Holtzhauer, CEO/Clerk/Treasurer, have the authority to bind the corporation.

This document is not authorized under Power of Attorney by this party.

Party To(s)*Capacity**Share*

Name THE MINISTRY OF THE ENVIRONMENT
Address for Service Director, Environmental Protection Act
 2 St. Clair Avenue West, 12A
 Toronto, Ontario. M4V 1L5

Statements

Schedule: See Schedules

Signed By

Stephen Arthur Ritchie 92 Centrepointe Drive acting for Signed 2013 05 06
 Nepean
 K1V 9K4 Party From(s)
 Tel 613-224-6674
 Fax 613-729-9105

I have the authority to sign and register the document on behalf of the Party From(s).

Submitted By

STEPHEN A. RITCHIE 92 Centrepointe Drive 2013 05 15
 Nepean
 K1V 9K4
 Tel 613-224-6674
 Fax 613-729-9105

Fees/Taxes/Payment

Statutory Registration Fee \$60.00
Total Paid \$60.00

File Number

Party From Client File Number : MADAWASKA 3407

SCHEDULE "A"

CERTIFICATE OF REQUIREMENT

s. 197(2) of the *Environmental Protection Act*]

This is to certify that pursuant to an AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL for a WASTE DISPOSAL SITE, NUMBER A411901 issued by TESFAYE GEBREZGHI, DIRECTOR, dated July 16, 2008 with respect to:

PIN. No. 57385-0091

Pt Lts 4 & 5, Con 14. Brougham, as I R402583 & R121176; Bagot Blythfld Brougham; Griffith

The following person(s):

The Corporation of the Township of Greater Madawaska

and any other persons having an interest in:

PIN. No. 57385-0091

Pt Lts 4 & 5, Con 14. Brougham, as I R402583 & R121176; Bagot Blythfld Brougham; Griffith

are required, before dealing with the land in any way, to give a copy of the Amendment to Provisional Certificate of Waste Disposal Site, No. A411901, including any amendments that may be made thereto to every person who will acquire an interest in the land as a result of the dealing. Under subsection 197(3) of the *Environmental Protection Act*, this requirement applies to each person who, subsequent to the registration of this certificate, acquires an interest in the land.

Appendix B





Cambium Environmental Inc.
 PO Box 325 • Unit 2 • 2085 Whittington Drive
 Peterborough • Ontario • K9J 6X4

Project No.: 10392-021

Project Name: Mount St. Patrick

Client: Twp of Greater Madawaska

Location: See Figure

Log of Borehole: MW06-1

UTM: 18 T 351249 5021541

Logged By: C. Wolf

Project Manager: C. Wolf

SUBSURFACE PROFILE			SAMPLE				Well Installation	Remarks
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)		
ft m								
0		Ground Surface						
0 to 2	[Sand symbol]	<i>Sand</i> Medium brown, medium grained Sand	1	SS	30	4		
2 to 6	[Sand symbol]		2	SS	5	12		
6 to 8	[Sand symbol]		3	SS	20	44		
8 to 10	[Sand and Gravel symbol]	<i>Sand and Gravel</i> Medium brown, medium grained Sand and Gravel	4	SS		19		
10 to 14	[Sand and Gravel symbol]	<i>Sand and Gravel, Saturated</i> Medium brown, medium grained Sand and Gravel, Saturated, Spoon wet	5	SS	20	51		
14 to 16	[Sand and Gravel symbol]		6	SS		66		
16 to 20	[Auger Refusal symbol]	<i>Auger Refusal at 6.10m</i>					Filter Sand	
20 to 26		End of Borehole					Well Screen: 1.88m x 0.05m	

Drilled By: George Downing Estate Drilling

Drill Method: CME Hollow Stem

Drill Date: October 12/06

Input By: CMW, snr

Checked By: CMW

Sheet: 1 of 1



Cambium Environmental Inc.
 PO Box 325 • Unit 2 • 2085 Whittington Drive
 Peterborough • Ontario • K9J 6X4

Project No.: 10392-021

Project Name: Mount St. Patrick

Client: Twp of Greater Madawaska

Location: See Figure

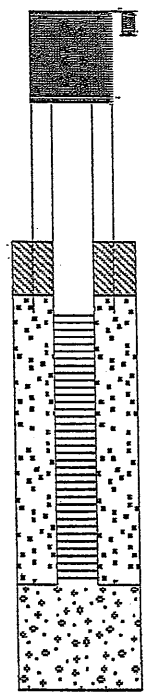
Log of Borehole: MW06-2

UTM: 18 T 351292 5021678

Logged By: C. Wolf

Project Manager: C. Wolf

SUBSURFACE PROFILE			SAMPLE				Well Installation	Remarks
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)		
ft m								
-2								
-6								
-4								
-2								
0		Ground Surface						
2		<i>Sand, some Clay</i> Medium brown, fine grained Sand, some Clay, Saturated, Spoon wet	1	SS	20	52		
4		<i>Sand</i> Coarse grained Sand, some large boulders	2	SS	20	36		
6		<i>Sand, some Silt</i> Coarse grained Sand, some Silt and Gravel	3	SS	20	44		
8		<i>Auger Refusal at 2.44m</i>						
10		End of Borehole						
12								



Well equipped with lockable steel casing.
 Bentonite Hole Plug
 Filter Sand
 Well Screen: 1.52m x 0.05m

Drilled By: George Downing Estate Drilling
Drill Method: CME Hollow Stem
Drill Date: October 13/06

Input By: CMW, snr
Checked By: CMW
Sheet: 1 of 1



Cambium Environmental Inc.
 PO Box 325 • Unit 2 • 2085 Whittington Drive
 Peterborough • Ontario • K9J 6X4

Project No.: 10392-021

Project Name: Mount St. Patrick

Client: Twp of Greater Madawaska

Location: See Figure

Log of Borehole: MW06-3

UTM: 18 T 351263 5021744

Logged By: C. Wolf

Project Manager: C. Wolf

SUBSURFACE PROFILE			SAMPLE				Well Installation	Remarks
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)		
ft m -2 -6 -4 -2 0 2 4 6 8 10 12		Ground Surface						Well equipped with lockable steel casing. Bentonite Hole Plug Native Fill Bentonite Hole Plug Filter Sand Well Screen: 1.52m x 0.05m Driller recommended installing well here, otherwise the hole would jam (no water source near by)
		<i>Sand</i> Medium brown, medium grained Sand, Saturated, Spoon wet	1	SS	20	2		
			2	SS	20	3		
		Very wet Sand						
		End of Borehole						

Drilled By: George Downing Estate Drilling

Drill Method: CME Hollow Stem

Drill Date: October 13/06

Input By: CMW, snr

Checked By: CMW

Sheet: 1 of 1



Cambium Environmental Inc.
 PO Box 325 • Unit 2 • 2085 Whittington Drive
 Peterborough • Ontario • K9J 6X4

Project No.: 10392-021
Project Name: Mount St. Patrick
Client: Twp of Greater Madawaska
Location: See Figure

Log of Borehole: MW06-4
UTM: 18 T 351208 5021681
Logged By: C. Wolf
Project Manager: C. Wolf

SUBSURFACE PROFILE			SAMPLE				Well Installation	Remarks
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)		
0		Ground Surface						
2		<i>Sand</i> Dark brown, fine grained Sand	1	SS	20	5	<p>Well equipped with lockable steel casing. Bentonite Hole Plug Native Fill Bentonite Hole Plug Filter Sand Well Screen: 1.52m x 0.05m (74 blows for 0.25m)</p>	
4		<i>Sand, some Gravel</i> Brown, coarse grained Sand, some Gravel	2	SS	30	11		
6		<i>Sand</i> Medium brown, medium grained Sand, Saturated, Spoon wet	3	SS	30	8		
8			4	SS		8		
10		<i>Sand</i> Medium brown, fine grained Sand, very Saturated	5	SS	30	32		
12		<i>Auger Refusal at 4.21m</i>	6	SS		74		
14		End of Borehole						

Drilled By: George Downing Estate Drilling

Drill Method: CME Hollow Stem

Drill Date: October 13/06

Input By: CMW, snr

Checked By: CMW

Sheet: 1 of 1



Greenview

ENVIRONMENTAL MANAGEMENT

Greenview Environmental Management Limited
 69 Cleak Avenue, P.O. Box 100
 Bancroft, Ontario K0L 1C0
 t: (613) 332-0057
 f: (613) 332-1767
 e: solutions@greenview-environmental.ca

Log of Monitoring Well: MW08-1

Project No.: 102.08.015

Project: Mount St. Patrick Waste Disposal Site

Client: Township of Greater Madawaska

Location: See Site Plan

SUBSURFACE STRATA PROFILE			SAMPLE				Well Completion Details	Comments
Depth	Symbol	Description	No.	Type	% R	SPT N-Value		
						0 15 30 45 60		
-4								Stick-up = 0.77 m
0		Ground Surface						
0	1	Medium Sand Dark brown, medium sand, dry, loosely compacted.	1	AS	50			Silica Sand
2			2	SS	30			
4	3	Fine to Medium Sand Light brown, fine to medium sand, saturated at 3.66 m, compacted.	3	SS	40			Silica Sand
6			4	SS	50			
8			5	SS	50			
10			6	SS	45			
12			7	SS	25			
14			8	SS	30			
16	5	Fine to Medium Sand Light brown, fine to medium sand with small cobble, wet, compacted.						Water level August 18, 2008 = 4.30 m
18								
20		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Drill Method: Hollow Stem Augers

Drill Date: August 18, 2008

Logged By: J. Bailey

Checked By: T. Peters

Sheet: 1 of 1



Greenview Environmental Management Limited
 69 Cleak Avenue, P.O. Box 100
 Bancroft, Ontario K0L 1C0
 t: (613) 332-0057
 f: (613) 332-1767
 e: solutions@greenview-environmental.ca

Borehole Log: MW09-5

Project No.: 102.09.015

Project: Mount St. Patrick Waste Disposal Site

Client: Township of Greater Madawaska

Location: Mount St. Patrick, ON

SUBSURFACE STRATA PROFILE			SAMPLE				Borehole Details	Comments
Depth	Symbol	Description	No.	Type	% R	SPT N-Value		
						0 15 30 45 60		
ft -4 -2 0 2 4 6		Ground Surface Organic Matter / Peat Dark brown-black, organic peat, loosely compacted, wet						Stick Up = 1.13 m Concrete Static Water Level June 23, 2009 = 0.21 m Native Fill Well Screen = 1.07 m x 0.05 m
		Unknown No description available						

Drilled By: Greenview Environmental Management Limited

Drill Method: Drive Point

Drill Date: June 23, 2009

Logged By: Dan Hagan, B.Sc.

Checked By: Tyler Peters, P. Eng.

Sheet: 1 of 1



Greenview Environmental Management Limited
 69 Cleak Avenue, P.O. Box 100
 Bancroft, Ontario K0L 1C0
 t: (613) 332-0057
 f: (613) 332-1767
 e: solutions@greenview-environmental.ca

Borehole Log: MW09-6

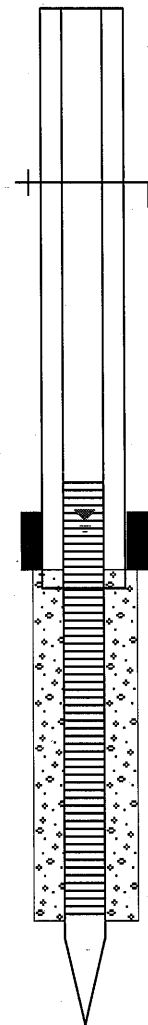
Project No.: 102.09.015

Project: Mount St. Patrick Waste Disposal Site

Client: Township of Greater Madawaska

Location: Mount. St. Patrick, ON

SUBSURFACE STRATA PROFILE			SAMPLE				Borehole Details	Comments
Depth	Symbol	Description	No.	Type	% R	SPT N-Value		
						0 15 30 45 60		
ft m								
-5								
-3								
-1								
		Ground Surface						
		Sand Fine to medium sand, light brown, compact, wet						
1		Unknown No description available						
3								
5		End of Borehole						



Stick Up = 1.32 m

Static Water Level
 June 23, 2009
 = 0.02 m

Concrete

Native Fill

Well Screen =
 1.07 m x 0.05 m

Drilled By: Greenview Environmental Management Limited

Logged By: Dan Hagan, B.Sc.

Drill Method: Drive Point

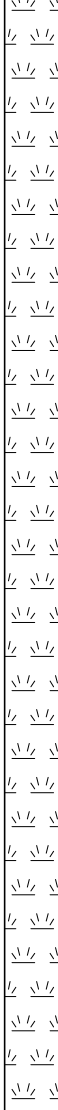

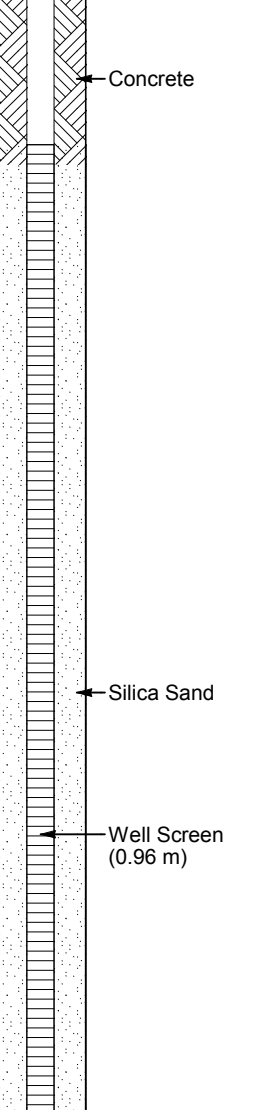

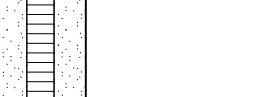


Checked By: Tyler Peters, P. Eng.

Drill Date: June 23, 2009

Sheet: 1 of 1

CLIENT Township of Greater Madawaska
PROJECT NUMBER 102.14.015
DATE STARTED 7/3/14 **COMPLETED** 7/3/14
DRILLING CONTRACTOR GEML
DRILLING METHOD Hand Auger
LOGGED BY DMH **CHECKED BY** THP
NOTES _____

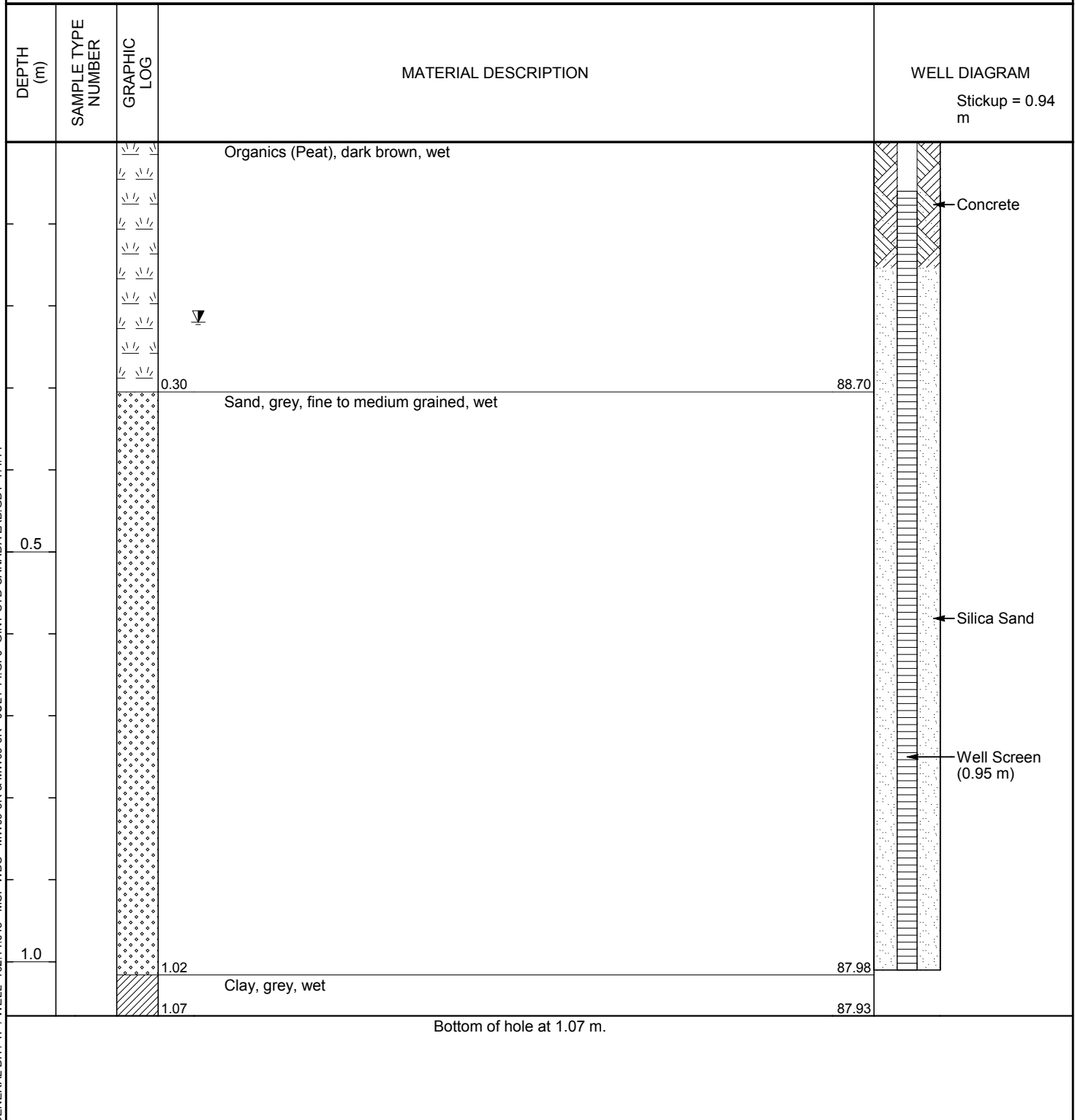
PROJECT NAME Mount St. Patrick Waste Disposal Site
PROJECT LOCATION Mount St. Patrick, Ontario
GROUND ELEVATION 92 m **HOLE SIZE** 0.2 m
GROUND WATER LEVELS:
AT TIME OF DRILLING ---
AT END OF DRILLING ---
1hrs AFTER DRILLING 0.12 m / Elev 91.89 m

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM Stickup = 1.12 m
0.5			Organics (peat), dark brown, wet 	 <p>Concrete</p> <p>Silica Sand</p> <p>Well Screen (0.96 m)</p>
1.0			1.02 Clay, grey, wet 90.98	
		1.10 	90.91 Bottom of hole at 1.10 m.	

GENERAL BH / TP / WELL 102.14.015 - MSP WDS - MW09-5R & MW09-6R - JUL4-14.GPJ GINT STD CANADA LAB.GDT 7/4/14

CLIENT Township of Greater Madawaska
PROJECT NUMBER 102.14.015
DATE STARTED 7/3/14 **COMPLETED** 7/3/14
DRILLING CONTRACTOR GEML
DRILLING METHOD Hand Auger
LOGGED BY DMH **CHECKED BY** THP
NOTES _____

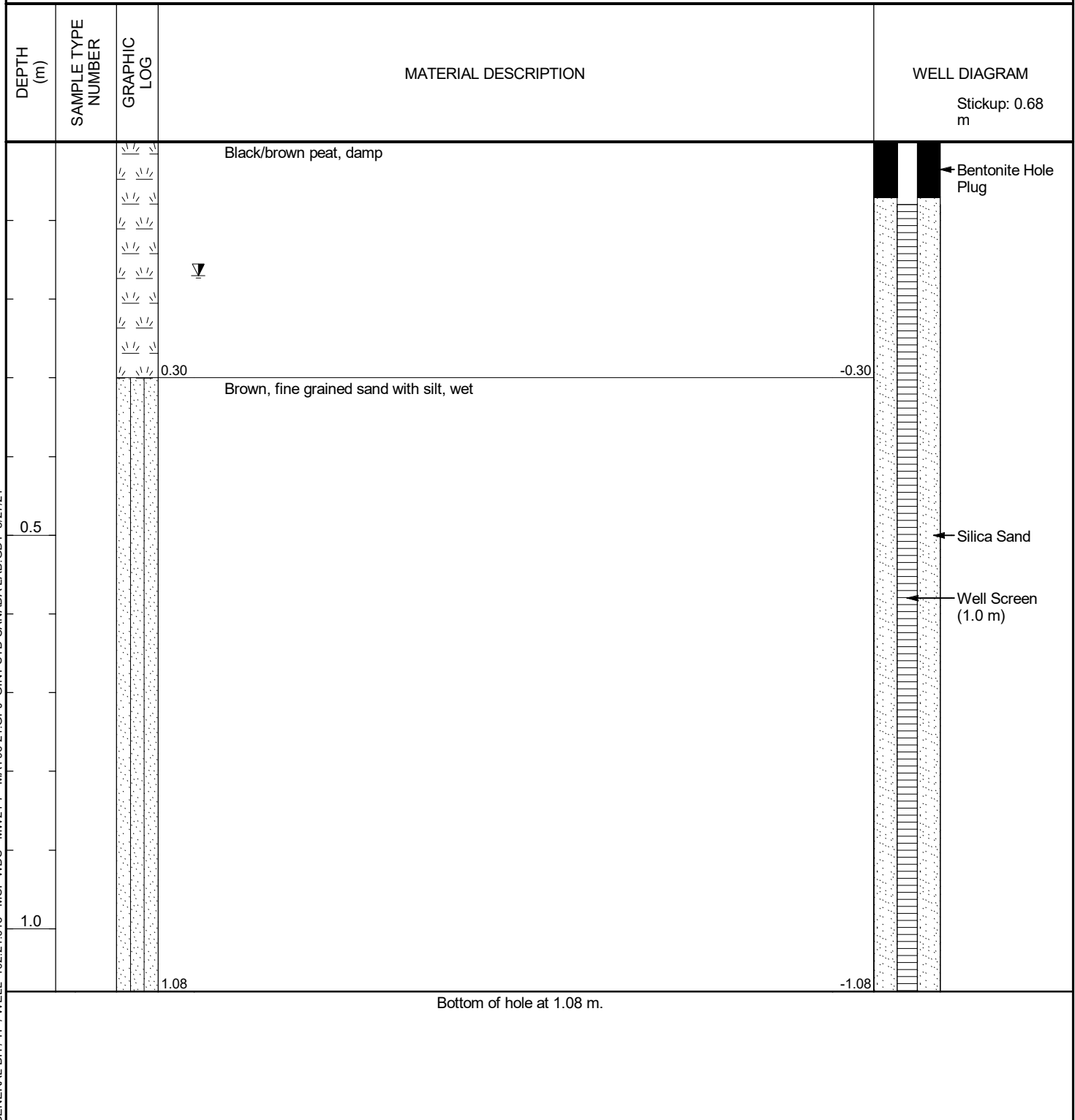
PROJECT NAME Mount St. Patrick Waste Disposal Site
PROJECT LOCATION Mount St. Patrick, Ontario
GROUND ELEVATION 89 m **HOLE SIZE** 0.2 m
GROUND WATER LEVELS:
AT TIME OF DRILLING ---
AT END OF DRILLING ---
1hrs AFTER DRILLING 0.22 m / Elev 88.78 m



GENERAL BH / TP / WELL 102.14.015 - MSP WDS - MW09-5R & MW09-6R - JUL4-14.GPJ GINT STD CANADA LAB.GDT 7/4/14

CLIENT Township of Greater Madawaska
PROJECT NUMBER 102.21.015
DATE STARTED 5/6/21 **COMPLETED** 5/6/21
DRILLING CONTRACTOR GEML
DRILLING METHOD Auger (0.20 m)
LOGGED BY DMH, P.Geo. **CHECKED BY** THP
NOTES New background well

PROJECT NAME Mount St. Patrick Waste Disposal Site
PROJECT LOCATION 134 Flat Road, Mount St. Patrick, Ontario
GROUND ELEVATION 0 m **HOLE SIZE** 50.8mm (PVC)
GROUND WATER LEVELS:
AT TIME OF DRILLING ---
AT END OF DRILLING ---
2hrs AFTER DRILLING 0.17 m / Elev -0.17 m



GENERAL BH / TP / WELL 102.21.015 - MSP WDS - MW21-7 - MAY06-21.GPJ GINT STD CANADA LAB.GDT 8/27/21

Appendix C



Celine Boutin (Greenview)

From: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>
Sent: May 31, 2022 9:45 AM
To: Dan Hagan (Greenview); Tieu, Emily (MECP)
Cc: Leonard Emon (TGM); Tyler Peters (Greenview); Mike Grasby (Greenview); Solutions - Greenview; Quyum, Abdul (MECP)
Subject: RE: Revised Design & Operations Plan for MECP Technical Support Section Pre-Review - Mount St Patrick WDS - TGM (1023.21.015)

Good morning Dan,

I can confirm receipt of the submission and that it has been submitted to technical support for review.

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 | 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

From: Dan Hagan (Greenview) <dan.hagan@greenview-environmental.ca>
Sent: May 31, 2022 9:07 AM
To: Ponalo, Thandeka (MECP) <Thandeka.Ponalo@ontario.ca>; Tieu, Emily (MECP) <Emily.Tieu@ontario.ca>
Cc: Leonard Emon (TGM) <lemon@greatermadawaska.com>; Tyler Peters (Greenview) <tyler.peters@greenview-environmental.ca>; Mike Grasby (Greenview) <mike.grasby@greenview-environmental.ca>; Solutions - Greenview <solutions@greenview-environmental.ca>; Quyum, Abdul (MECP) <Abdul.Quyum@ontario.ca>
Subject: RE: Revised Design & Operations Plan for MECP Technical Support Section Pre-Review - Mount St Patrick WDS - TGM (1023.21.015)
Importance: High

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

Good morning, Ms. Ponalo & Ms. Tieu, Ontario Ministry of the Environment, Conservation and Parks (MECP) Ottawa District Office:

On behalf of the Township of Greater Madawaska (Township), we are following up with you both today to confirm receipt of the submission we provided to you both on May 3, 2022 regarding the *Revised Design & Operations Plan* for the Mount St. Patrick WDS (as below).

We are writing to you today because we have not received a response from you regarding receipt of the submission and confirmation that the submission has been passed along to the MECP Technical Support Section for review.

As this submission is of high importance to the Township, please confirm the Ministry's receipt and that it has been forwarded for review so that we may update the Township and have documentation of the process for our files. If you could please also advise when the Township should expect comments back from the MECP Technical Support, so that we may proceed with formal submission of the package to MECP ECA Submissions in Toronto at our earliest opportunity, it would be very much appreciated.

Sincerely,

Dan Hagan, P. Geo.

Senior Project Manager / Geologist



613.332.0057 x 105

www.greenview-environmental.ca

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From: Dan Hagan (Greenview)

Sent: May 3, 2022 2:06 PM

To: Thandeka Ponalo (MECP) <thandeka.ponalo@ontario.ca>; abdul.quyum@ontario.ca

Cc: Emily Tieu (MOECC) <emily.tieu@ontario.ca>; Leonard Emon (TGM) <lemon@greatermadawaska.com>; Tyler Peters (Greenview) <tyler.peters@greenview-environmental.ca>; Mike Grasby (Greenview) <mike.grasby@greenview-environmental.ca>; Solutions - Greenview <solutions@greenview-environmental.ca>

Subject: Revised Design & Operations Plan for MECP Technical Support Section Pre-Review - Mount St Patrick WDS - TGM (1023.21.015)

Importance: High

Good afternoon, Thandeka and Abdul –

Further to our pre-submission meeting on January 20, 2022 and consistent with the MECP's direction following the meeting, please find the attached *Revised Design and Operations Plan* for the Mount St. Patrick Waste Disposal Site for you to share with the MECP Technical Support Section (TSS) for their review and comment. Once review comments are received from the MECP TSS (regarding their review of the 2021 Annual Report) and any questions/amendments have been addressed, we intend on formally submitting the *Revised Design and Operations Plan* to the MECP as part of the ECA Application process.

As we discussed during the meeting, we had held off on submitting this Plan to you for distribution to MECP TSS until the *2021 Annual Report* for the Mount St. Patrick WDS had been submitted to the MECP Ottawa District Office (late March 2022). Appendix D of the *Revised Design and Operations Plan* has been updated to include the *2021 Annual Report*. As we noted during the pre-submission meeting, the only change to the Annual Environmental Monitoring Program in 2021 (and for future years) was the addition of a new background monitoring well at the site (MW21-7), consistent with recommendations in recent Annual Reports for the site, and given that the existing background monitoring well (MW08-1) had shown groundwater quality consistent with impacts from road salt application to Flat Road and the Transfer Station at the site.

DRAFT versions of adjacent landowner notification letters are included in the attached Plan (in Appendix E), which will be finalized and sent by regular mail to the landowners as part of the formal ECA Application process (immediately following MECP TSS approval to proceed).

I have also attached a copy of the *2021 Annual Report* for the Mount St. Patrick WDS, provided separately from the version included as Appendix D to the *Revised Design and Operations Plan*.

Many thanks in advance for your assistance with this application process, and for distributing it to the MECP TSS at your earliest opportunity.

On a separate matter, and further to MECP direction at the pre-submission meeting on January 20, 2022, we intend on proceeding without delay on the Township's other ECA Application for the Norway Lake Waste Disposal Site, including the related *Revised Design and Operations Plan*. You will be copied on that formal ECA Application submission to the MECP as soon as it is ready.

Have a great day, and please contact me at your earliest opportunity if you have any questions regarding this submission relative to the Mount St. Patrick Waste Disposal Site.

Sincerely,

Dan Hagan, P. Geo.

Senior Project Manager / Geologist



613.332.0057 x 105

www.greenview-environmental.ca

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From: Dan Hagan (Greenview)

Sent: January 20, 2022 3:32 PM

To: Thandeka Ponalo (MECP) <thandeka.ponalo@ontario.ca>; abdul.quyum@ontario.ca

Cc: Emily Tieu (MOECC) <emily.tieu@ontario.ca>; Leonard Emon (TGM) <lemon@greatermadawaska.com>; Tyler Peters (Greenview) <tyler.peters@greenview-environmental.ca>; Solutions - Greenview <solutions@greenview-environmental.ca>

Subject: Thank-you for Pre-Submission Meeting - ECA Applications - Revised Design & Operations Plans - Norway Lake WDS & Mount St Patrick WDS - TGM (1023.21.013/015)

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

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Appendix D





REPORT



Project Property: *Mount St. Patrick WDS
134 Flat Rd
Greater Madawaska ON K0J1N0
Custom-Build Your Own Report*

Report Type:

Order #: *20130227022*

Date: *March 8, 2013*

EcoLog ERIS Ltd.
Environmental Risk
Information Service Ltd. (ERIS)
A division of Glacier Media Inc.
P: 1.866.517.5204
E: info@erisinfo.com

www.erisinfo.com

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Executive Summary

Property Information:

Project Property: *Mount St. Patrick WDS
134 Flat Rd Greater Madawaska ON K0J1N0*

Coordinates:

Latitude: *45.332251*
Longitude: *-76.89866*
UTM Northing: *351,224.17*
UTM Easting: *5,021,613.79*
UTM Zone: *UTM Zone 18T*

Elevation: *627 FT
191.08 M*

Order Information:

Order No.: *20130227022*
Date Requested: *08/03/2013*
Requested by: *Greenview Environmental Management*
Report Type: *Custom-Build Your Own Report*

Additional Products:

Executive Summary: Report Summary

Database	Name	Selected	On Site	Within 0.50KM	Total
AAGR	Abandoned Aggregate Inventory	N	-	-	-
AGR	Aggregate Inventory	N	-	-	-
AMIS	Abandoned Mine Information System	N	-	-	-
ANDR	Anderson's Waste Disposal Sites	N	-	-	-
AUWR	Automobile Wrecking & Supplies	N	-	-	-
BORE	Borehole	N	-	-	-
CA	Certificates of Approval	N	-	-	-
CFOT	Commercial Fuel Oil Tanks	N	-	-	-
CHEM	Chemical Register	N	-	-	-
COAL	Inventory of Coal Gasification Plants and Coal Tar Sites	N	-	-	-
CONV	Compliance and Convictions	N	-	-	-
CPU	Certificates of Property Use	N	-	-	-
DRL	Drill Hole Database	N	-	-	-
EASR	Environmental Activity and Sector Registry	N	-	-	-
EBR	Environmental Registry	N	-	-	-
ECA	Environmental Compliance Approval	N	-	-	-
EEM	Environmental Effects Monitoring	N	-	-	-
EHS	ERIS Historical Searches	N	-	-	-
EIS	Environmental Issues Inventory System	N	-	-	-
EXP	List of TSSA Expired Facilities	N	-	-	-
FCON	Federal Convictions	N	-	-	-
FCS	Contaminated Sites on Federal Land	N	-	-	-
FOFT	Fisheries & Oceans Fuel Tanks	N	-	-	-
FST	Fuel Storage Tank	N	-	-	-
GEN	Ontario Regulation 347 Waste Generators Summary	N	-	-	-
HINC	TSSA Historic Incidents	N	-	-	-
IAFT	Indian & Northern Affairs Fuel Tanks	N	-	-	-
INC	TSSA Incidents	N	-	-	-
LIMO	Landfill Inventory Management Ontario	N	-	-	-
MINE	Canadian Mine Locations	N	-	-	-
MNR	Mineral Occurrences	N	-	-	-
NATE	National Analysis of Trends in Emergencies System (NATES)	N	-	-	-
NCPL	Non-Compliance Reports	N	-	-	-
NDFT	National Defence & Canadian Forces Fuel Tanks	N	-	-	-
NDSP	National Defence & Canadian Forces Spills	N	-	-	-
NDWD	National Defence & Canadian Forces Waste Disposal Sites	N	-	-	-
NEES	National Environmental Emergencies System (NEES)	N	-	-	-
NPCB	National PCB Inventory	N	-	-	-

Database	Name	Selected	On Site	Within 0.50KM	Total
NPRI	National Pollutant Release Inventory	N	-	-	-
OGW	Oil and Gas Wells	N	-	-	-
OOGW	Ontario Oil and Gas Wells	N	-	-	-
OPCB	Inventory of PCB Storage Sites	N	-	-	-
ORD	Orders	N	-	-	-
PAP	Canadian Pulp and Paper	N	-	-	-
PCFT	Parks Canada Fuel Storage Tanks	N	-	-	-
PES	Pesticide Register	N	-	-	-
PINC	TSSA Pipeline Incidents	N	-	-	-
PRT	Private and Retail Fuel Storage Tanks	N	-	-	-
PTTW	Permit to Take Water	N	-	-	-
REC	Ontario Regulation 347 Waste Receivers Summary	N	-	-	-
RSC	Record of Site Condition	N	-	-	-
RST	Retail Fuel Storage Tanks	N	-	-	-
SCT	Scott's Manufacturing Directory	N	-	-	-
SPL	Ontario Spills	N	-	-	-
SRDS	Wastewater Discharger Registration Database	N	-	-	-
TANK	Anderson's Storage Tanks	N	-	-	-
TCFT	Transport Canada Fuel Storage Tanks	N	-	-	-
VAR	TSSA Variances for Abandonment of Underground Storage Tanks	N	-	-	-
WDS	Waste Disposal Sites - MOE CA Inventory	N	-	-	-
WDSH	Waste Disposal Sites - MOE 1991 Historical Approval Inventory	N	-	-	-
WWIS	Water Well Information System	Y	0	6	6
Total:			0	6	6

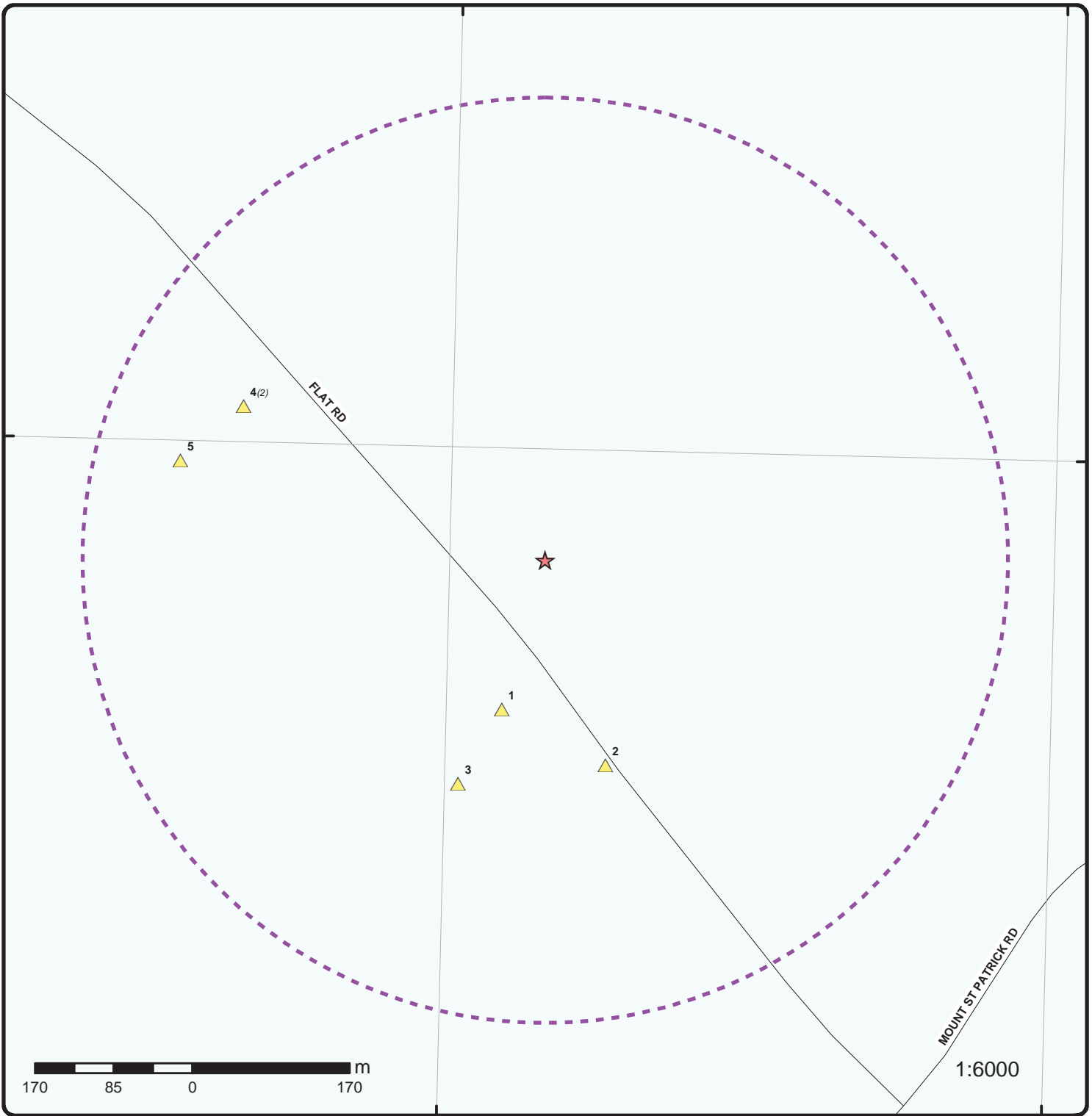
Executive Summary: Site Report Summary – Project Property

<i>Map Key</i>	<i>DB</i>	<i>Company/Site Name</i>	<i>Address</i>	<i>Dis m</i>	<i>Elev diff m</i>	<i>Page Number</i>
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No records found in the selected databases for the project property.

Executive Summary: Site Report Summary – Surrounding Properties

<i>Map Key</i>	<i>DB</i>	<i>Company/Site Name</i>	<i>Address</i>	<i>Dis m</i>	<i>Elev Diff m</i>	<i>Page Number</i>
1	WWIS		lot 4-5 con 14 DACRE ON	168.5	3.92	9
2	WWIS		lot 4 con 14 NEAR DACRE ON	231.1	3.88	9
3	WWIS		lot 5 con 14 ON	259.1	7.66	10
4	WWIS		lot 5 con 14 ON	366.2	3.66	10
4	WWIS		lot 5 con 14 ON	366.2	3.66	11
5	WWIS		lot 5 con 14 ON	408.7	8.56	11



Map

Order No: 20130227022

Address: 134 Flat Rd, Greater Madawaska, ON, K0J1N0

Project Property	Expressway	Industrial and Resource - Regions	National Park
Buffer Outline	Principal Highway	Main Line	Provincial or Territorial Park
Eris Sites with Higher Elevation	Secondary Highway	Sidetrack	Other Park
Eris Sites with Same Elevation	Major Road	Transit Line	Golf Course or Driving Range
Eris Sites with Lower Elevation	Local road	Abandoned Line	Park or Sports Field
Eris Sites with Unknown Elevation	Trail	Pipelines and Transmission	Other Recreation Area
	Proposed Road		
	Ferry Route/Ice Road		

Aerial Not Available

Detail Report

Map Key	Number of Records	Distance m	Elevation m	Site	DB
1	1 of 1	168.5	195.0	lot 4-5 con 14 DACRE ON	WWIS
Well Id:		7152082	Lot:		4-5
Concession:		14	Concession Name:		
County:		RENFREW	Municipality:		BROUGHAM TOWNSHIP
Easting Nad83:		351177	Northing Nad83:		5021452
Zone:		18	Utm Reliability:		margin of error : 10 - 30 m
Primary Water Use:		Public	Construction Date:		9/14/2010
Secondary Water Use:			Well Depth:		
Pump Rate:			Static Water Level:		
Flow Rate:			Clear/Cloudy:		
Specific Capacity:			Final Well Status:		Water Supply
Construction Method:			Flowing (y/n):		
Elevation (m):		195.841476	Elevation Reliability:		
Depth to Bedrock:			Overburden/Bedrock:		
Water Type:		Untested	Casing Material:		
2	1 of 1	231.1	195.0	lot 4 con 14 NEAR DACRE ON	WWIS
Well Id:		7038974	Lot:		004
Concession:		14	Concession Name:		CON
County:		RENFREW	Municipality:		BROUGHAM TOWNSHIP
Easting Nad83:		351289	Northing Nad83:		5021392
Zone:		18	Utm Reliability:		margin of error : 10 - 30 m
Primary Water Use:			Construction Date:		10/6/2006
Secondary Water Use:			Well Depth:		6.1 m
Pump Rate:			Static Water Level:		
Flow Rate:			Clear/Cloudy:		
Specific Capacity:			Final Well Status:		Observation Wells
Construction Method:		Other Method	Flowing (y/n):		
Elevation (m):		195.018371	Elevation Reliability:		
Depth to Bedrock:			Overburden/Bedrock:		Overburden
Water Type:			Casing Material:		PLASTIC
--- Details ---					
Thickness:		3 m	Original Depth:		3 m
Material Colour:		BROWN	Material:		SAND
+			Original Depth:		6.1 m
Thickness:		3.1 m	Original Depth:		6.1 m

Map Key	Number of Records	Distance m	Elevation m	Site	DB
Material Colour:		BROWN		Material:	SAND, GRAVEL
3	1 of 1	259.1	198.7	lot 5 con 14 ON	WWIS
Well Id:	5505964			Lot:	005
Concession:	14			Concession Name:	CON
County:	RENFREW			Municipality:	BROUGHAM TOWNSHIP
Easting Nad83:	351130			Northing Nad83:	5021372
Zone:	18			Utm Reliability:	margin of error : 100 m - 300 m
Primary Water Use:	Domestic			Construction Date:	11/1/1979
Secondary Water Use:				Well Depth:	72 ft
Pump Rate:	60 GPM			Static Water Level:	18 ft
Flow Rate:				Clear/Cloudy:	CLEAR
Specific Capacity:				Final Well Status:	Water Supply
Construction Method:	Cable Tool			Flowing (y/n):	N
Elevation (m):	199.776474			Elevation Reliability:	
Depth to Bedrock:	12			Overburden/Bedrock:	Bedrock
Water Type:	FRESH			Casing Material:	STEEL, OPEN HOLE
--- Details ---					
Thickness:	12 ft			Original Depth:	12 ft
Material Colour:	GREY			Material:	CLAY, PACKED
+					
Thickness:	6 ft			Original Depth:	18 ft
Material Colour:	GREY			Material:	SHALE, SOFT
+					
Thickness:	54 ft			Original Depth:	72 ft
Material Colour:	BLACK			Material:	GRANITE, HARD
4	1 of 2	366.2	194.7	lot 5 con 14 ON	WWIS
Well Id:	5510001			Lot:	005
Concession:	14			Concession Name:	CON
County:	RENFREW			Municipality:	BROUGHAM TOWNSHIP
Easting Nad83:	350898			Northing Nad83:	5021780
Zone:	18			Utm Reliability:	unknown UTM
Primary Water Use:	Domestic			Construction Date:	1/4/1990
Secondary Water Use:				Well Depth:	91 ft
Pump Rate:	10 GPM			Static Water Level:	11 ft
Flow Rate:				Clear/Cloudy:	CLEAR
Specific Capacity:				Final Well Status:	Water Supply
Construction Method:	Cable Tool			Flowing (y/n):	N
Elevation (m):	195.014663			Elevation Reliability:	
Depth to Bedrock:	18			Overburden/Bedrock:	Bedrock
Water Type:	FRESH			Casing Material:	STEEL, OPEN HOLE
--- Details ---					

Map Key	Number of Records	Distance m	Elevation m	Site	DB
Thickness:	18 ft			Original Depth:	18 ft
Material Colour:	BROWN			Material:	SAND, GRAVEL, BOULDERS
+					
Thickness:	57 ft			Original Depth:	75 ft
Material Colour:	GREY			Material:	SANDSTONE, HARD
+					
Thickness:	16 ft			Original Depth:	91 ft
Material Colour:	WHITE			Material:	QUARTZ, UNKNOWN TYPE
4	2 of 2	366.2	194.7	lot 5 con 14 ON	<u>WWIS</u>
Well Id:	5507112			Lot:	005
Concession:	14			Concession Name:	CON
County:	RENFREW			Municipality:	BROUGHAM TOWNSHIP
Easting Nad83:	350898			Northing Nad83:	5021780
Zone:	18			Utm Reliability:	unknown UTM
Primary Water Use:	Domestic			Construction Date:	5/10/1983
Secondary Water Use:				Well Depth:	106 ft
Pump Rate:	50 GPM			Static Water Level:	18 ft
Flow Rate:				Clear/Cloudy:	CLEAR
Specific Capacity:				Final Well Status:	Water Supply
Construction Method:	Cable Tool			Flowing (y/n):	N
Elevation (m):	195.014663			Elevation Reliability:	
Depth to Bedrock:	18			Overburden/Bedrock:	Bedrock
Water Type:	FRESH			Casing Material:	STEEL, OPEN HOLE
--- Details ---					
Thickness:	18 ft			Original Depth:	18 ft
Material Colour:	GREY			Material:	CLAY, PACKED
+					
Thickness:	22 ft			Original Depth:	40 ft
Material Colour:	WHITE			Material:	LIMESTONE, HARD
+					
Thickness:	66 ft			Original Depth:	106 ft
Material Colour:	GREY			Material:	LIMESTONE, HARD
5	1 of 1	408.7	199.6	lot 5 con 14 ON	<u>WWIS</u>
Well Id:	5505951			Lot:	005
Concession:	14			Concession Name:	CON
County:	RENFREW			Municipality:	BROUGHAM TOWNSHIP
Easting Nad83:	350830			Northing Nad83:	5021722
Zone:	18			Utm Reliability:	margin of error : 100 m - 300 m
Primary Water Use:	Domestic			Construction Date:	10/22/1979
Secondary Water Use:				Well Depth:	68 ft
Pump Rate:	40 GPM			Static Water Level:	18 ft
Flow Rate:				Clear/Cloudy:	CLEAR
Specific Capacity:				Final Well Status:	Water Supply
Construction Method:	Cable Tool			Flowing (y/n):	N

<i>Map Key</i>	<i>Number of Records</i>	<i>Distance m</i>	<i>Elevation m</i>	<i>Site</i>	<i>DB</i>
Method:					
Elevation (m):	200.584014			Elevation Reliability:	
Depth to Bedrock:	15			Overburden/Bedrock:	Bedrock
Water Type:	FRESH			Casing Material:	STEEL, OPEN HOLE
--- Details ---					
Thickness:	15 ft			Original Depth:	15 ft
Material Colour:	GREY			Material:	CLAY, PACKED
+					
Thickness:	53 ft			Original Depth:	68 ft
Material Colour:	WHITE			Material:	LIMESTONE

Unplottable Report

Site:	MT ST PATRICK LANDFILL FLAT RD MOUNT ST. PATRICK ON		Database:	WWIS
County:	RENFREW	Municipality:	BROUGHAM TOWNSHIP	
Well Id:	7113405	Lot:		
Concession:		Concession Name:		
Easting Nad83:		Northing Nad83:		
Zone:		Utm	margin of error : 10 - 30 m	
Primary Water Use:	Monitoring	Reliability:		
Secondary Water Use:		Construction Date:		
Pump Rate:		Well Depth:	20 ft	
Flow Rate:		Static Water Level:		
Specific Capacity:		Clear/Cloudy:		
Construction Method:	Auger	Final Well Status:	Test Hole	
Elevation (m):		Flowing (y/n):		
Depth to Bedrock:		Elevation Reliability:		
Water Type:		Overburden/Bedrock:		
---		Casing Material:	PLASTIC, PLASTIC	
Thickness:	20 ft	Original Depth:	20 ft	
Material Colour:	BROWN	Material:	SAND, GRAVEL	

Site:	lot 3 ON		Database:	WWIS
County:	RENFREW	Municipality:	BAGOT & BLITHFIELD TOWNSHIP (BLITHFIELD)	
Well Id:	5514201	Lot:	003	
Concession:		Concession Name:	CON	
Easting Nad83:		Northing Nad83:		
Zone:		Utm	unknown UTM	
Primary Water Use:	Domestic	Reliability:		
Secondary Water Use:		Construction Date:	10/23/2000	
Pump Rate:	6 GPM	Well Depth:	140 ft	
Flow Rate:		Static Water Level:	35 ft	
Specific Capacity:		Clear/Cloudy:	CLEAR	
		Final Well	Water Supply	

Construction Method: Air Percussion
Water Type: FRESH
Elevation (m):
Depth to Bedrock: 3

Status:
Flowing (y/n): N
Casing Material: STEEL
Elevation Reliability:
Overburden/Bedrock: Bedrock

--- Details ---

Thickness: 3 ft
Material Colour: BROWN
+ Thickness: 137 ft
Material Colour: BLACK

Original Depth: 3 ft
Material: SAND
Original Depth: 140 ft
Material: GRANITE

Appendix: Database Descriptions

Ecolog Environmental Risk Information Services Ltd can search the following databases. The extent of Historical information varies with each database and current information is determined by what is publicly available to Ecolog ERIS at the time of update. **Note:** Databases denoted with " * " indicates that the database will no longer be updated. See the individual database description for more information.

Abandoned Aggregate Inventory: Up to Sept 2002 Provincial [AAGR](#)
The MAAP Program maintains a database of all abandoned pits and quarries. Please note that the database is only referenced by lot and concession and city/town location. The database provides information regarding the location, type, size, land use, status and general comments.

Aggregate Inventory: Up to Aug 2012 Provincial [AGR](#)
The Ontario Ministry of Natural Resources maintains a database of all active pits and quarries. Please note that the database is only referenced by lot\concession and city/town location. The database provides information regarding the registered owner/operator, location, status, licence type, and maximum tonnage.

Abandoned Mine Information System: 1800-Jan 2012 Provincial [AMIS](#)
The Abandoned Mines Information System contains data on known abandoned and inactive mines located on both Crown and privately held lands. The information was provided by the Ministry of Northern Development and Mines (MNDM), with the following disclaimer: "the database provided has been compiled from various sources, and the Ministry of Northern Development and Mines makes no representation and takes no responsibility that such information is accurate, current or complete". Reported information includes official mine name, status, background information, mine start/end date, primary commodity, mine features, hazards and remediation.

Anderson's Waste Disposal Sites: 1860s-Present Private [ANDR](#)
The information provided in this database was collected by examining various historical documents which aimed to characterize the likely position of former waste disposal sites from 1860 to present. The research initiative behind the creation of this database was to identify those sites that are missing from the Ontario MOE Waste Disposal Site Inventory, as well as to provide revisions and corrections to the positions and descriptions of sites currently listed in the MOE inventory. In addition to historic waste disposal facilities, the database also identifies certain auto wreckers and scrap yards that have been extrapolated from documentary sources. Please note that the data is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Automobile Wrecking & Supplies: 2001-Jun 2010 Private [AUWR](#)
This database provides an inventory of all known locations that are involved in the scrap metal, automobile wrecking/recycling, and automobile parts & supplies industry. Information is provided on the company name, location and business type.

Borehole: 1875-Aug 2011 Provincial [BORE](#)
A borehole is the generalized term for any narrow shaft drilled in the ground, either vertically or horizontally. The information here includes geotechnical investigations or environmental site assessments, mineral exploration, or as a pilot hole for installing piers or underground utilities. Information is from many sources such as the Ministry of Transportation (MTO) boreholes from engineering reports and projects from the 1950 to 1990's in Southern Ontario. Boreholes from the Ontario Geological Survey (OGS) including The Urban Geology Analysis Information System (UGAIS) and the York Peel Durham Toronto (YPDT) database of the Conservation Authority Moraine Coalition. This database will include fields such as location, stratigraphy, depth, elevation, year drilled, etc. For all water well data or oil and gas well data for Ontario please refer to WWIS and OOGW.

Certificates of Approval:

1985-Oct 30, 2011*

Provincial

[CA](#)

This database contains the following types of approvals: Air & Noise, Industrial Sewage, Municipal & Private Sewage, Waste Management Systems and Renewable Energy Approvals. The MOE in Ontario states that any facility that releases emissions to the atmosphere, discharges contaminants to ground or surface water, provides potable water supplies, or stores, transports or disposes of waste, must have a Certificate of Approval before it can operate lawfully. Fields include approval number, business name, address, approval date, approval type and status. This database will no longer be updated, as CoFA's have been replaced by either Environmental Activity and Sector Registry (EASR) or Environmental Compliance Approval (ECA). Please refer to those individual databases for any information after Oct.31, 2011.

Commercial Fuel Oil Tanks:

1948-Aug 2011

Provincial

[CFOT](#)

Since May 2002, Ontario developed a new act where it became mandatory for fuel oil tanks to be registered with Technical Standards & Safety Authority (TSSA). This data would include all commercial underground fuel oil tanks in Ontario with fields such as location, registration number, tank material, age of tank and tank size.

Chemical Register:

1992, 1999-Jun 2010

Private

[CHEM](#)

This database includes information from both a one time study conducted in 1992 and private source and is a listing of facilities that manufacture or distribute chemicals. The production of these chemical substances may involve one or more chemical reactions and/or chemical separation processes (i.e. fractionation, solvent extraction, crystallization, etc.).

Inventory of Coal Gasification Plants and Coal Tar

Apr 1987 and Nov 1988*

Provincial

[COAL](#)**Sites:**

This inventory includes both the "Inventory of Coal Gasification Plant Waste Sites in Ontario-April 1987" and the Inventory of Industrial Sites Producing or Using Coal Tar and Related Tars in Ontario-November 1988) collected by the MOE. It identifies industrial sites that produced and continue to produce or use coal tar and other related tars. Detailed information is available and includes: facility type, size, land use, information on adjoining properties, soil condition, site operators/occupants, site description, potential environmental impacts and historic maps available. This was a one-time inventory.*

Compliance and Convictions:

1989-2012

Provincial

[CONV](#)

This database summarizes the fines and convictions handed down by the Ontario courts beginning in 1989. Companies and individuals named here have been found guilty of environmental offenses in Ontario courts of law.

Certificates of Property Use:

1994-Jan 2013

Provincial

[CPU](#)

This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all CPU's on the registry such as (EPA s. 168.6) - Certificate of Property Use.

Drill Hole Database:

1886-Oct 2011

Provincial

[DRL](#)

The Ontario Drill Hole Database contains information on more than 113,000 percussion, overburden, sonic and diamond drill holes from assessment files on record with the department of Mines and Minerals. Please note that limited data is available for southern Ontario, as it was the last area to be completed. The database was created when surveys submitted to the Ministry were converted in the Assessment File Research Image Database (AFRI) project. However, the degree of accuracy (coordinates) as to the exact location of drill holes is dependent upon the source document submitted to the MNM. Levels of accuracy used to locate holes are: centering on the mining claim; a sketch of the mining claim; a 1:50,000 map; a detailed company map; or from submitted a "Report of Work".

Environmental Activity and Sector Registry:

Oct 31, 2011-Jan 2013

Provincial

[EASR](#)

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. The EASR allows businesses to register certain activities with the ministry, rather than apply for an approval. The registry is available for common systems and processes, to which preset rules of operation can be applied. The EASR is currently available for: heating systems, standby power systems and automotive refinishing. Businesses whose activities aren't subject to the EASR may apply for an ECA (Environmental Compliance Approval), Please see our ECA database.

Environmental Registry:

1994-Jan 2013

Provincial

[EBR](#)

The Environmental Registry lists proposals, decisions and exceptions regarding policies, Acts, instruments, or regulations that could significantly affect the environment. Through the Registry, thirteen provincial ministries notify the public of upcoming proposals and invite their comments. For example, if a local business is requesting a permit, license, or certificate of approval to release substances into the air or water; these are notified on the registry. Data includes: Approval for discharge into the natural environment other than water (i.e. Air) - EPA s. 9, Approval for sewage works - OWRA s. 53(1), and EPA s. 27 - Approval for a waste disposal site. For information regarding Permit to Take Water (PTTW), Certificate of Property Use (CPU) and (ORD) Orders please refer to those individual databases.

Environmental Compliance Approval:

Oct 31, 2011-Jan 2013

Provincial

[ECA](#)

On October 31, 2011, a smarter, faster environmental approvals system came into effect in Ontario. In the past, a business had to apply for multiple approvals (known as certificates of approval) for individual processes and pieces of equipment. Today, a business either registers itself, or applies for a single approval, depending on the types of activities it conducts. Businesses whose activities aren't subject to the EASR may apply for an ECA. A single ECA addresses all of a business's emissions, discharges and wastes. Separate approvals for air, noise and waste are no longer required. This database will also include Renewable Energy Approvals. For CofA's prior to Nov 1st, 2011, please refer to the CA database. For all Waste Disposal Sites please refer to the WDS database.

Environmental Effects Monitoring:

1992-2007*

Federal

[EEM](#)

The Environmental Effects Monitoring program assesses the effects of effluent from industrial or other sources on fish, fish habitat and human usage of fisheries resources. Since 1992, pulp and paper mills have been required to conduct EEM studies under the Pulp and Paper Effluent Regulations. This database provides information on the mill name, geographical location and sub-lethal toxicity data.

ERIS Historical Searches:

1999-Oct 2012

Private

[EHS](#)

EcoLog ERIS has compiled a database of all environmental risk reports completed since March 1999. Available fields for this database include: site location, date of report, type of report, and search radius. As per all other databases, the ERIS database can be referenced on both the map and "Statistical Profile" page.

Environmental Issues Inventory System:

1992-2001*

Federal

[EIS](#)

The Environmental Issues Inventory System was developed through the implementation of the Environmental Issues and Remediation Plan. This plan was established to determine the location and severity of contaminated sites on inhabited First Nation reserves, and where necessary, to remediate those that posed a risk to health and safety; and to prevent future environmental problems. The EIS provides information on the reserve under investigation, inventory number, name of site, environmental issue, site action (Remediation, Site Assessment), and date investigation completed.

List of TSSA Expired Facilities:

Current to Feb 2012

Provincial

[EXP](#)

This is a list of all expired facilities that fall under the TSSA (TSSA Act & Safety Regulations), including the six regulations that exist under the Fuels Safety Division. It will include facilities such as private fuel outlets, bulk plants, fuel oil tanks, gasoline stations, marinas, propane filling stations, liquid fuel tanks, piping systems, etc. These tanks have been removed and automatically fall under the expired facilities inventory held by TSSA.

Federal Convictions:

1988-Jun 2007

Federal

[FCON](#)

Environment Canada maintains a database referred to as the "Environmental Registry" that details prosecutions under the Canadian Environmental Protection Act (CEPA) and the Fisheries Act (FA). Information is provided on the company name, location, charge date, offence and penalty.

Contaminated Sites on Federal Land:

June 2000-Jan 2013

Federal

[FCS](#)

The Federal Contaminated Sites Inventory includes information on all known federal contaminated sites under the custodianship of departments, agencies and consolidated Crown corporations as well as those that are being or have been investigated to determine whether they have contamination arising from past use that could pose a risk to human health or the environment. The inventory also includes non-federal contaminated sites for which the Government of Canada has accepted some or all financial responsibility. It does not include sites where contamination has been caused by, and which are under the control of, enterprise Crown corporations, private individuals, firms or other levels of government.

Fisheries & Oceans Fuel Tanks:

1964-Sept 2003

Federal

[FOFT](#)

Fisheries & Oceans Canada maintains an inventory of all aboveground & underground fuel storage tanks located on Fisheries & Oceans property or controlled by DFO. Our inventory provides information on the site name, location, tank owner, tank operator, facility type, storage tank location, tank contents & capacity, and date of tank installation.

Fuel Storage Tank:

Current to Jun 2011

Provincial

[FST](#)

The Technical Standards & Safety Authority (TSSA), under the Technical Standards & Safety Act of 2000 maintains a database of registered private and retail fuel storage tanks in Ontario with fields such as location, tank status, license date, tank type, tank capacity, fuel type, installation year and facility type.

Ontario Regulation 347 Waste Generators Summary:

1986-Apr 2012

Provincial

[GEN](#)

Regulation 347 of the Ontario EPA defines a waste generation site as any site, equipment and/or operation involved in the production, collection, handling and/or storage of regulated wastes. A generator of regulated waste is required to register the waste generation site and each waste produced, collected, handled, or stored at the site. This database contains the registration number, company name and address of registered generators including the types of hazardous wastes generated. It includes data on waste generating facilities such as: drycleaners, waste treatment and disposal facilities, machine shops, electric power distribution etc. This information is a summary of all years from 1986 including the most currently available data. Some records may contain, within the company name, the phrase "See & Use..." followed by a series of letters and numbers. This occurs when one company is amalgamated with or taken over by another registered company. The number listed as "See & Use", refers to the new ownership and the other identification number refers to the original ownership. This phrase serves as a link between the 2 companies until operations have been fully transferred.

TSSA Historic Incidents:

2006-June 2009

Provincial

[HINC](#)

This database will cover all incidences recorded by TSSA with their older system, before they moved to their new management system. TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. The TSSA works to protect the public, the environment and property from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from pipelines, diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

Indian & Northern Affairs Fuel Tanks:

1950-Aug 2003

Federal

[IAFT](#)

The Department of Indian & Northern Affairs Canada (INAC) maintains an inventory of all aboveground & underground fuel storage tanks located on both federal and crown land. Our inventory provides information on the reserve name, location, facility type, site/facility name, tank type, material & ID number, tank contents & capacity, and date of tank installation.

TSSA Incidents:

June 2009-Mar 2012

Provincial

[INC](#)

TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. Includes incidents from fuel-related hazards such as spills, fires and explosions. This database will include spills and leaks from diesel, fuel oil, gasoline, natural gas, propane and hydrogen recorded by the TSSA.

Landfill Inventory Management Ontario:

2010

Provincial

[LIMO](#)

The Landfill Inventory Management Ontario (LIMO) database is updated every year, as the ministry compiles new and updated information. The inventory will include small and large landfills. Additionally, each year the ministry will request operators of the larger landfills complete a landfill data collection form that will be used to update LIMO and will include the following information from the previous operating year. This will include additional information such as estimated amount of total waste received, landfill capacity, estimated total remaining landfill capacity, fill rates, engineering designs, reporting and monitoring details, size of location, service area, approved waste types, leachate of site treatment, contaminant attenuation zone and more. The small landfills will include information such as site owner, site location and certificate of approval # and status.

Canadian Mine Locations:

1998-2009

Private

[MINE](#)

This information is collected from the Canadian & American Mines Handbook. The Mines database is a national database that provides over 290 listings on mines (listed as public companies) dealing primarily with precious metals and hard rocks. Listed are mines that are currently in operation, closed, suspended, or are still being developed (advanced projects). Their locations are provided as geographic coordinates (x, y and/or longitude, latitude). As of 2002, data pertaining to Canadian smelters and refineries has been appended to this database.

Mineral Occurrences:

1846-Nov 2011

Provincial

[MNR](#)

In the early 70's, the Ministry of Northern Development and Mines created an inventory of approximately 19,000 mineral occurrences in Ontario, in regard to metallic and industrial minerals, as well as some information on building stones and aggregate deposits. Please note that the "Horizontal Positional Accuracy" is approximately +/- 200 m. Many reference elements for each record were derived from field sketches using pace or chain/tape measurements against claim posts or topographic features in the area. The primary limiting factor for the level of positional accuracy is the scale of the source material. The testing of horizontal accuracy of the source materials was accomplished by comparing the planimetric (X and Y) coordinates of that point with the coordinates of the same point as defined from a source of higher accuracy.

National Analysis of Trends in Emergencies System

1974-1994*

Federal

[NATE](#)**(NATES):**

In 1974 Environment Canada established the National Analysis of Trends in Emergencies System (NATES) database, for the voluntary reporting of significant spill incidents. The data was to be used to assist in directing the work of the emergencies program. NATES ran from 1974 to 1994. Extensive information is available within this database including company names, place where the spill occurred, date of spill, cause, reason and source of spill, damage incurred, and amount, concentration, and volume of materials released.

Non-Compliance Reports:

1992(water only), 1994-2010

Provincial

[NCPL](#)

The Ministry of the Environment provides information about non-compliant discharges of contaminants to air and water that exceed legal allowable limits, from regulated industrial and municipal facilities. A reported non-compliance failure may be in regard to a Control Order, Certificate of Approval, Sectoral Regulation or specific regulation/act.

<u>National Defence & Canadian Forces Fuel Tanks:</u>	Up to May 2001*	Federal	NDFT
The Department of National Defence and the Canadian Forces maintains an inventory of all aboveground & underground fuel storage tanks located on DND lands. Our inventory provides information on the base name, location, tank type & capacity, tank contents, tank class, date of tank installation, date tank last used, and status of tank as of May 2001. This database will no longer be updated due to the new National Security protocols which have prohibited any release of this database.			
<u>National Defence & Canadian Forces Spills:</u>	Mar 1999-Aug 2010	Federal	NDSP
The Department of National Defence and the Canadian Forces maintains an inventory of spills to land and water. All spill sites have been classified under the "Transportation of Dangerous Goods Act - 1992". Our inventory provides information on the facility name, location, spill ID #, spill date, type of spill, as well as the quantity of substance spilled & recovered.			
<u>National Defence & Canadian Forces Waste Disposal Sites:</u>	2001-Apr 2007	Federal	NDWD
The Department of National Defence and the Canadian Forces maintains an inventory of waste disposal sites located on DND lands. Where available, our inventory provides information on the base name, location, type of waste received, area of site, depth of site, year site opened/closed and status.			
<u>National Environmental Emergencies System (NEES):</u>	1974-2003	Federal	NEES
In 2000, the Emergencies program implemented NEES, a reporting system for spills of hazardous substances. For the most part, this system only captured data from the Atlantic Provinces, some from Quebec and Ontario and a portion from British Columbia. Data for Alberta, Saskatchewan, Manitoba and the Territories was not captured. However, NEES is also a repository for all previous Environment Canada spill datasets. NEES is composed of the historic datasets ' or Trends ' which dates from approximately 1974 to present. NEES Trends is a compilation of historic databases, which were merged and includes data from NATES (National Analysis of Trends in Emergencies System), ARTS (Atlantic Regional Trends System), and NEES. In 2001, the Emergencies Program determined that variations in reporting regimes and requirements between federal and provincial agencies made national spill reporting and trend analysis difficult to achieve. As a consequence, the department has focused efforts on capturing data on spills of substances which fall under its legislative authority only (CEPA and FA). As such, the NEES database will be decommissioned in December 2004.			
<u>National PCB Inventory:</u>	1988-2008	Federal	NPCB
Environment Canada's National PCB inventory includes information on in-use PCB containing equipment in Canada including federal, provincial and private facilities. All federal out-of-service PCB containing equipment and all PCB waste owned by the federal government or by federally regulated industries such as airlines, railway companies, broadcasting companies, telephone and telecommunications companies, pipeline companies, etc. are also listed. Although it is not Environment Canada's mandate to collect data on non-federal PCB waste, the National PCB inventory includes some information on provincial and private PCB waste and storage sites.			
<u>National Pollutant Release Inventory:</u>	1993-2010	Federal	NPRI
Environment Canada has defined the National Pollutant Release Inventory ("NPRI") as a federal government initiative designed to collect comprehensive national data regarding releases to air, water, or land, and waste transfers for recycling for more than 300 listed substances.			
<u>Oil and Gas Wells:</u>	1988-2012	Private	OGW
The Nickle's Energy Group (publisher of the Daily Oil Bulletin) collects information on drilling activity including operator and well statistics. The well information database includes name, location, class, status and depth. The main Nickle's database is updated on a daily basis, however, this database is updated on a monthly basis. More information is available at www.nickles.com .			

Ontario Oil and Gas Wells: 1800-Feb 2012 Provincial [OOGW](#)
In 1998, the MNR handed over to the Ontario Oil, Gas and Salt Resources Corporation, the responsibility of maintaining a database of oil and gas wells drilled in Ontario. The OGSR Library has over 20,000+ wells in their database. Information available for all wells in the ERIS database include well owner/operator, location, permit issue date, well cap date, licence no., status, depth and the primary target (rock unit) of the well being drilled. All geology/stratigraphy table information, plus all water table information is also provide for each well record.

Inventory of PCB Storage Sites: 1987-Oct 2004 Provincial [OPCB](#)
The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of PCB storage sites within the province. Ontario Regulation 11/82 (Waste Management - PCB) and Regulation 347 (Generator Waste Management) under the Ontario EPA requires the registration of inactive PCB storage equipment and/or disposal sites of PCB waste with the Ontario Ministry of Environment. This database contains information on: 1) waste quantities; 2) major and minor sites storing liquid or solid waste; and 3) a waste storage inventory.

Orders: 1994-Jan 2013 Provincial [ORD](#)
This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all Orders on the registry such as (EPA s. 17) - Order for remedial work, (EPA s. 18) - Order for preventative measures, (EPA s. 43) - Order for removal of waste and restoration of site, (EPA s. 44) - Order for conformity with Act for waste disposal sites, (EPA s. 136) - Order for performance of environmental measures.

Canadian Pulp and Paper: 1999, 2002, 2004, 2005, Private [PAP](#)
2009
This information is part of the Pulp and Paper Canada Directory. The Directory provides a comprehensive listing of the locations of pulp and paper mills and the products that they produce.

Parks Canada Fuel Storage Tanks: 1920-Jan 2005 Federal [PCFT](#)
Canadian Heritage maintains an inventory of all known fuel storage tanks operated by Parks Canada, in both National Parks and at National Historic Sites. The database details information on site name, location, tank install/removal date, capacity, fuel type, facility type, tank design and owner/operator.

Pesticide Register: 1988-Jun 2012 Provincial [PES](#)
The Ontario Ministry of Environment maintains a database of all manufacturers and vendors of registered pesticides.

TSSA Pipeline Incidents: June 2009-Mar 2012 Provincial [PINC](#)
TSSA's Fuels Safety Program administers the Technical Standards & Safety Act 2000, providing fuel-related safety services associated with the safe transportation, storage, handling and use of fuels such as gasoline, diesel, propane, natural gas and hydrogen. Under this Act, TSSA regulates fuel suppliers, storage facilities, transport trucks, pipelines, contractors and equipment or appliances that use fuels. This database will include spills, strike and leaks from recorded by the TSSA.

Private and Retail Fuel Storage Tanks: 1989-1996* Provincial [PRT](#)
The Fuels Safety Branch of the Ontario Ministry of Consumer and Commercial Relations maintained a database of all registered private fuel storage tanks and licensed retail fuel outlets. This database includes an inventory of locations that have gasoline, oil, waste oil, natural gas and/or propane storage tanks on their property. The MCCR no longer collects this information. This information is now collected by the Technical Standards and Safety Authority (TSSA).

Permit to Take Water: 1994-Jan 2013 Provincial [PTTW](#)
This is a subset taken from Ontario's Environmental Registry (EBR) database. It will include all PTTW's on the registry such as OWRA s. 34 - Permit to take water.

Ontario Regulation 347 Waste Receivers Summary: 1986-2009 Provincial [REC](#)
Part V of the Ontario Environmental Protection Act ("EPA") regulates the disposal of regulated waste through an operating waste management system or a waste disposal site operated or used pursuant to the terms and conditions of a Certificate of Approval or a Provisional Certificate of Approval. Regulation 347 of the Ontario EPA defines a waste receiving site as any site or facility to which waste is transferred by a waste carrier. A receiver of regulated waste is required to register the waste receiving facility. This database represents registered receivers of regulated wastes, identified by registration number, company name and address, and includes receivers of waste such as: landfills, incinerators, transfer stations, PCB storage sites, sludge farms and water pollution control plants. This information is a summary of all years from 1986 including the most currently available data.

Record of Site Condition: 1997-Sept 2001, Oct 2004-2012 Provincial [RSC](#)
The Record of Site Condition (RSC) is part of the Ministry of the Environment's Brownfields Environmental Site Registry. Protection from environmental cleanup orders for property owners is contingent upon documentation known as a record of site condition (RSC) being filed in the Environmental Site Registry. In order to file an RSC, the property must have been properly assessed and shown to meet the soil, sediment and groundwater standards appropriate for the use (such as residential) proposed to take place on the property. The Record of Site Condition Regulation (O. Reg. 153/04) details requirements related to site assessment and clean up. RSCs filed after July 1, 2011 will also be included as part of the new (O.Reg. 511/09).

Retail Fuel Storage Tanks: 1999-Jun 2010 Private [RST](#)
This database includes an inventory of retail fuel outlet locations (including marinas) that have on their property gasoline, oil, waste oil, natural gas and / or propane storage tanks.

Scott's Manufacturing Directory: 1992-Mar 2011 Private [SCT](#)
Scott's Directories is a data bank containing information on over 200,000 manufacturers across Canada. Even though Scott's listings are voluntary, it is the most comprehensive database of Canadian manufacturers available. Information concerning a company's address, plant size, and main products are included in this database.

Ontario Spills: 1988-Aug 2012 Provincial [SPL](#)
This database identifies information such as location (approximate), type and quantity of contaminant, date of spill, environmental impact, cause, nature of impact, etc. Information from 1988-2002 was part of the ORIS (Occurrence Reporting Information System). The SAC (Spills Action Centre) handles all spills reported in Ontario. Regulations for spills in Ontario are part of the MOE's Environmental Protection Act, Part X.

Wastewater Discharger Registration Database: 1990-2011 Provincial [SRDS](#)
Information under this heading is combination of the following 2 programs. The Municipal/Industrial Strategy for Abatement (MISA) division of the Ontario Ministry of Environment maintained a database of all direct dischargers of toxic pollutants within nine sectors including: Electric Power Generation; Mining; Petroleum Refining; Organic Chemicals; Inorganic Chemicals; Pulp & Paper; Metal Casting; Iron & Steel; and Quarries. All sampling information is now collected and stored within the Sample Result Data Store (SRDS).

Anderson's Storage Tanks: 1915-1953* Private [TANK](#)
The information provided in this database was collected by examining various historical documents, which identified the location of former storage tanks, containing substances such as fuel, water, gas, oil, and other various types of miscellaneous products. Information is available in regard to business operating at tank site, tank location, permit year, permit & installation type, no. of tanks installed & configuration and tank capacity. Data contained within this database pertains only to the city of Toronto and is not warranted to be complete, exhaustive or authoritative. The information was collected for research purposes only.

Transport Canada Fuel Storage Tanks: 1970-Mar 2007 Federal [TCFT](#)
With the provinces of BC, MB, NB, NF, ON, PE, and QC; Transport Canada currently owns and operates 90 fuel storage tanks. Our inventory provides information on the site name, location, tank age, capacity and fuel type.

TSSA Variances for Abandonment of Underground

Current to Oct 2011

Provincial

[VAR](#)

Storage Tanks:

The TSSA, Under the Liquid Fuels Handling Code and the Fuel Oil Code, all underground storage tanks must be removed within two years of disuse. If removal of a tank is not feasible, you may apply to seek a variance from this code requirement. This is a list of all variances granted for abandoned tanks.

Waste Disposal Sites - MOE CA Inventory:

1970-Jan 2013

Provincial

[WDS](#)

The Ontario Ministry of Environment, Waste Management Branch, maintains an inventory of known open (active or inactive) and closed disposal sites in the Province of Ontario. Active sites maintain a Certificate of Approval, are approved to receive and are receiving waste. Inactive sites maintain Certificate(s) of Approval but are not receiving waste. Closed sites are not receiving waste. The data contained within this database was compiled from the MOE's Certificate of Approval database. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number. All new Environmental Compliance Approvals handed out after Oct 31, 2011 for Waste Disposal Sites will still be found in this database.

Waste Disposal Sites - MOE 1991 Historical Approval Inventory:

Up to Oct 1990*

Provincial

[WDSH](#)

In June 1991, the Ontario Ministry of Environment, Waste Management Branch, published the "June 1991 Waste Disposal Site Inventory", of all known active and closed waste disposal sites as of October 30st, 1990. For each "active" site as of October 31st 1990, information is provided on site location, site/CA number, waste type, site status and site classification. For each "closed" site as of October 31st 1990, information is provided on site location, site/CA number, closure date and site classification. Locations of these sites may be cross-referenced to the Anderson database described under ERIS's Private Source Database section, by the CA number.

Water Well Information System:

1955-2011

Provincial

[WWIS](#)

This database describes locations and characteristics of water wells found within Ontario in accordance with Regulation 903. It includes such information as coordinates, construction date, well depth, primary and secondary use, pump rate, static water level, well status, etc. Also included are detailed stratigraphy information, approximate depth to bedrock and the approximate depth to the water table.

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries". All values are an approximation.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property, within the report search radius, and the surrounding area outside the search radius.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red upside down triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and were included as reference.

Appendix E



Appendix F



C.O.C.: G108781

REPORT No. B22-14839

Report To:

Greenview Environmental Management

13 Commerce Ct., PO Box 100

Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 18-May-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 08-Jun-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	MW08-1	MW06-2	MW06-3	MW06-4
					Sample I.D.	B22-14839-1	B22-14839-2	B22-14839-3	B22-14839-4
Date Collected					17-May-22	17-May-22	17-May-22	17-May-22	17-May-22
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	26-May-22/O	241	334	214	286	
pH @25°C	pH Units		SM 4500H	26-May-22/O	7.56	7.44	7.25	7.57	
Conductivity @25°C	µmho/cm	1	SM 2510B	26-May-22/O	539	1080	608	1030	
Chloride	mg/L	0.5	SM4110C	25-May-22/O	16.6	119	52.7	144	
Nitrite (N)	mg/L	0.05	SM4110C	25-May-22/O	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	25-May-22/O	1.09	0.49	0.06	0.98	
Sulphate	mg/L	1	SM4110C	25-May-22/O	9	42	18	26	
Phosphorus-Total	mg/L	0.01	E3516.2	24-May-22/K	0.20	0.35	0.11	0.52	
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	24-May-22/K	0.2	0.6	0.5	0.3	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	02-Jun-22/K	0.04	0.02	0.04	0.02	
TDS (Calc. from Cond.)	mg/L	1	Calc.	27-May-22	279	577	315	552	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-May-22/O	1.9	2.2	9.3	1.3	
COD	mg/L	5	SM5220C	02-Jun-22/K	20	47	26	17	
Hardness (as CaCO3)	mg/L	1	SM 3120	20-May-22/O	259	452	212	412	
Aluminum	mg/L	0.01	SM 3120	20-May-22/O	0.05	0.06	0.04	0.06	
Barium	mg/L	0.001	SM 3120	20-May-22/O	0.103	0.293	0.156	0.259	
Boron	mg/L	0.005	SM 3120	20-May-22/O	0.005	0.245	0.030	0.078	
Cadmium	mg/L	0.000015	EPA 200.8	07-Jun-22/O	< 0.000015	< 0.000028	0.000039	< 0.000028	
Calcium	mg/L	0.02	SM 3120	20-May-22/O	79.1	137	64.4	124	
Copper	µg/g	0.0002	EPA 6020	07-Jun-22/O	0.0028	0.0014	0.0065	0.0009	
Iron	mg/L	0.005	SM 3120	20-May-22/O	0.021	0.005	0.016	< 0.005	
Magnesium	mg/L	0.02	SM 3120	20-May-22/O	14.9	26.7	12.5	24.8	
Manganese	mg/L	0.001	SM 3120	20-May-22/O	0.002	0.007	0.342	< 0.001	
Potassium	mg/L	0.1	SM 3120	20-May-22/O	1.5	2.8	0.8	2.8	
Silicon	mg/L	0.01	SM 3120	20-May-22/O	4.69	5.97	4.32	5.13	
Sodium	mg/L	0.2	SM 3120	20-May-22/O	20.4	59.4	53.8	60.8	
Strontium	mg/L	0.001	SM 3120	20-May-22/O	0.153	0.282	0.123	0.238	



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.: G108781

REPORT No. B22-14839

Report To:

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

Attention: Mike Grasby

Caduceon Environmental Laboratories

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

DATE RECEIVED: 18-May-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 08-Jun-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	MW08-1	MW06-2	MW06-3	MW06-4							
					Sample I.D.	Date Collected										
Zinc	mg/L	0.005	SM 3120	20-May-22/O	B22-14839-1	17-May-22	B22-14839-2	17-May-22	B22-14839-3	17-May-22	B22-14839-4	17-May-22	< 0.005	< 0.005	< 0.005	< 0.005



Michelle Dubien
 Lab Manager

R.L. = Reporting Limit

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

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Tel: 613-544-2001

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JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 08-Jun-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	MW09-5R	MW09-6R	MW21-7	GWQA/QC
					Sample I.D.	B22-14839-5	B22-14839-6	B22-14839-7	B22-14839-8
Date Collected					17-May-22	17-May-22	17-May-22	17-May-22	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	26-May-22/O	192	222	200	288	
pH @25°C	pH Units		SM 4500H	26-May-22/O	7.12	7.40	7.28	7.65	
Conductivity @25°C	µmho/cm	1	SM 2510B	26-May-22/O	438	670	496	1030	
Chloride	mg/L	0.5	SM4110C	25-May-22/O	13.4	65.1	8.7	144	
Nitrite (N)	mg/L	0.05	SM4110C	25-May-22/O	< 0.05	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	25-May-22/O	0.17	0.08	0.23	0.99	
Sulphate	mg/L	1	SM4110C	25-May-22/O	5	18	37	26	
Phosphorus-Total	mg/L	0.01	E3516.2	24-May-22/K	0.35	0.08	1.07	0.41	
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	24-May-22/K	4.4	0.9	2.2	0.3	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	02-Jun-22/K	0.16	0.07	0.12	0.02	
TDS (Calc. from Cond.)	mg/L	1	Calc.	27-May-22	226	348	257	553	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	25-May-22/O	18.6	17.2	22.3	1.5	
COD	mg/L	5	SM5220C	02-Jun-22/K	338	64	136	7	
Hardness (as CaCO3)	mg/L	1	SM 3120	20-May-22/O	233	293	101	409	
Aluminum	mg/L	0.01	SM 3120	20-May-22/O	0.05	0.05	0.09	0.06	
Barium	mg/L	0.001	SM 3120	20-May-22/O	0.128	0.145	0.034	0.266	
Boron	mg/L	0.005	SM 3120	20-May-22/O	0.011	0.007	0.052	0.077	
Cadmium	mg/L	0.00015	EPA 200.8	07-Jun-22/O	< 0.000015	< 0.000015	0.000035	< 0.000028	
Calcium	mg/L	0.02	SM 3120	20-May-22/O	69.9	94.0	30.7	123	
Copper	µg/g	0.0002	EPA 6020	07-Jun-22/O	0.0010	0.0097	0.0053	0.0016	
Iron	mg/L	0.005	SM 3120	20-May-22/O	0.432	0.658	0.220	0.007	
Magnesium	mg/L	0.02	SM 3120	20-May-22/O	14.1	14.1	5.83	24.7	
Manganese	mg/L	0.001	SM 3120	20-May-22/O	0.071	0.035	0.078	< 0.001	
Potassium	mg/L	0.1	SM 3120	20-May-22/O	1.2	1.1	1.6	2.8	
Silicon	mg/L	0.01	SM 3120	20-May-22/O	4.37	4.94	5.61	5.17	
Sodium	mg/L	0.2	SM 3120	20-May-22/O	8.0	33.5	87.6	60.9	
Strontium	mg/L	0.001	SM 3120	20-May-22/O	0.152	0.245	0.093	0.237	



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.: G108781

REPORT No. B22-14839

Report To:

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

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

Attention: Mike Grasby

DATE RECEIVED: 18-May-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 08-Jun-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	MW09-5R	MW09-6R	MW21-7	GWQA/QC
					Sample I.D.	B22-14839-5	B22-14839-6	B22-14839-7	B22-14839-8
Zinc	mg/L	0.005	SM 3120	20-May-22/O	Date Collected	17-May-22	17-May-22	17-May-22	17-May-22
						< 0.005	< 0.005	0.007	< 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

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 Lab Manager

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REPORT No. B22-14815

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13 Commerce Crt., PO Box 100

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Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 18-May-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 07-Jun-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	SW 1	SW 2	SW 4	SW QA/QC
					Sample I.D.	B22-14815-1	B22-14815-2	B22-14815-3	B22-14815-4
Date Collected					17-May-22	17-May-22	17-May-22	17-May-22	17-May-22
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	26-May-22/O	151	148	217	151	151
pH @25°C	pH Units		SM 4500H	26-May-22/O	8.14	8.06	8.04	8.05	8.05
Conductivity @25°C	µmho/cm	1	SM 2510B	26-May-22/O	314	306	527	312	312
Chloride	mg/L	0.5	SM4110C	25-May-22/O	8.4	8.3	39.3	8.6	8.6
Nitrite (N)	mg/L	0.05	SM4110C	25-May-22/O	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	25-May-22/O	0.09	< 0.05	0.10	0.11	0.11
Sulphate	mg/L	1	SM4110C	25-May-22/O	6	6	7	6	6
BOD(5 day)	mg/L	3	SM 5210B	23-May-22/K	< 3	< 3	< 3	< 3	< 3
Total Suspended Solids	mg/L	3	SM2540D	28-May-22/K	< 3	< 3	61	4	4
Phosphorus-Total	mg/L	0.01	E3516.2	24-May-22/K	0.02	0.03	0.06	0.02	0.02
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	24-May-22/K	0.4	0.4	1.2	0.4	0.4
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	02-Jun-22/K	0.02	0.03	0.04	0.03	0.03
TDS (Calc. from Cond.)	mg/L	1	Calc.	27-May-22	161	157	273	160	160
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	26-May-22/O	8.5	8.1	28.6	16.1	16.1
Phenolics	mg/L	0.001	MOEE 3179	31-May-22/K	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
COD	mg/L	5	SM5220C	02-Jun-22/K	23	22	67	27	27
Hardness (as CaCO3)	mg/L	1	SM 3120	25-May-22/O	152	156	224	140	140
Arsenic	mg/L	0.0001	EPA 200.8	06-Jun-22/O	0.0001	0.0001	0.0003	0.0001	0.0001
Barium	mg/L	0.001	SM 3120	25-May-22/O	0.071	0.077	0.113	0.066	0.066
Boron	mg/L	0.005	SM 3120	25-May-22/O	0.006	0.006	0.010	0.006	0.006
Cadmium	mg/L	0.000015	EPA 200.8	06-Jun-22/O	< 0.000015	< 0.000015	0.000025	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	25-May-22/O	46.7	47.9	69.0	42.9	42.9
Chromium	mg/L	0.001	EPA 200.8	06-Jun-22/O	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	06-Jun-22/O	0.0006	0.0005	0.0018	0.0004	0.0004
Iron	mg/L	0.005	SM 3120	25-May-22/O	0.097	0.135	0.351	0.091	0.091
Lead	mg/L	0.00002	EPA 200.8	06-Jun-22/O	0.00007	0.00008	0.00029	0.00003	0.00003
Magnesium	mg/L	0.02	SM 3120	25-May-22/O	8.62	8.93	12.5	7.93	7.93

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.: G108781

REPORT No. B22-14815

Report To:

Greenview Environmental Management

13 Commerce Ct., PO Box 100

Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave

Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 18-May-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 07-Jun-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	Client I.D.	SW 1	SW 2	SW 4	SW QA/QC	
					Sample I.D.	Date Collected				
Manganese	mg/L	0.001	SM 3120	25-May-22/O	B22-14815-1	17-May-22	0.078	0.089	0.052	0.071
Mercury	mg/L	0.00002	SM 3112 B	25-May-22/O	B22-14815-2	17-May-22	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Potassium	mg/L	0.1	SM 3120	25-May-22/O	B22-14815-3	17-May-22	1.2	1.3	1.1	1.1
Sodium	mg/L	0.2	SM 3120	25-May-22/O	B22-14815-4	17-May-22	5.7	5.7	35.0	5.3
Strontium	mg/L	0.001	SM 3120	25-May-22/O			0.137	0.145	0.163	0.126
Zinc	mg/L	0.005	SM 3120	25-May-22/O			< 0.005	< 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

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.: G111143

REPORT No. B22-33721

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 04-Nov-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 22-Nov-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW08-1	MW06-2	MW06-3	MW06-4
Sample I.D.	B22-33721-1	B22-33721-2	B22-33721-3	B22-33721-4
Date Collected	02-Nov-22	02-Nov-22	02-Nov-22	02-Nov-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	09-Nov-22/O	307	346	284	320
pH @25°C	pH Units		SM 4500H	09-Nov-22/O	7.68	7.94	7.58	7.74
Conductivity @25°C	µmho/cm	1	SM 2510B	09-Nov-22/O	769	966	925	880
Chloride	mg/L	0.5	SM4110C	16-Nov-22/O	67.3	100	124	83.6
Nitrite (N)	mg/L	0.05	SM4110C	16-Nov-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	16-Nov-22/O	0.33	0.18	0.05	0.35
Sulphate	mg/L	1	SM4110C	16-Nov-22/O	13	35	20	31
Phosphorus-Total	mg/L	0.01	E3516.2	14-Nov-22/K	1.37	0.85	0.07	0.13
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	14-Nov-22/K	0.5	1.1	0.3	0.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	15-Nov-22/K	0.03	0.05	0.03	0.02
Total Dissolved Solids	mg/L	3	SM 2540D	10-Nov-22/O	403	514	491	466
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	09-Nov-22/O	0.3	0.7	1.9	0.4
COD	mg/L	5	SM5220C	08-Nov-22/K	26	64	13	< 5
Hardness (as CaCO3)	mg/L	1	SM 3120	17-Nov-22/O	325	406	314	332
Aluminum	mg/L	0.01	SM 3120	17-Nov-22/O	0.16	0.45	0.03	0.04
Barium	mg/L	0.001	SM 3120	17-Nov-22/O	0.127	0.260	0.231	0.203
Boron	mg/L	0.005	SM 3120	17-Nov-22/O	0.013	0.125	0.032	0.044
Cadmium	mg/L	0.00010	EPA 200.8	17-Nov-22/O	0.000020	0.000033	0.000035	< 0.000010
Calcium	mg/L	0.02	SM 3120	17-Nov-22/O	100	120	93.9	98.6
Copper	mg/L	0.0001	EPA 200.8	17-Nov-22/O	0.0022	0.0041	0.0019	0.0026
Iron	mg/L	0.005	SM 3120	17-Nov-22/O	0.455	1.10	0.009	< 0.005
Magnesium	mg/L	0.02	SM 3120	17-Nov-22/O	18.3	25.5	19.3	20.8
Manganese	mg/L	0.001	SM 3120	17-Nov-22/O	0.021	0.501	0.343	0.002
Potassium	mg/L	0.1	SM 3120	17-Nov-22/O	2.0	3.6	1.3	2.6
Silicon	mg/L	0.01	SM 3120	17-Nov-22/O	5.25	6.81	5.39	5.22
Sodium	mg/L	0.2	SM 3120	17-Nov-22/O	43.6	55.8	72.7	57.4
Strontium	mg/L	0.001	SM 3120	17-Nov-22/O	0.187	0.251	0.182	0.189



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.: G111143

REPORT No. B22-33721

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 04-Nov-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 22-Nov-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW08-1	MW06-2	MW06-3	MW06-4
Sample I.D.	B22-33721-1	B22-33721-2	B22-33721-3	B22-33721-4
Date Collected	02-Nov-22	02-Nov-22	02-Nov-22	02-Nov-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Zinc	mg/L	0.005	SM 3120	17-Nov-22/O	< 0.005	< 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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Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 04-Nov-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 22-Nov-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW09-5R	MW09-6R	GW QA/QC
Sample I.D.	B22-33721-5	B22-33721-6	B22-33721-7
Date Collected	02-Nov-22	02-Nov-22	02-Nov-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	09-Nov-22/O	250	257	288	
pH @25°C	pH Units		SM 4500H	09-Nov-22/O	7.45	7.72	7.52	
Conductivity @25°C	µmho/cm	1	SM 2510B	09-Nov-22/O	511	805	920	
Chloride	mg/L	0.5	SM4110C	16-Nov-22/O	17.3	98.4	121	
Nitrite (N)	mg/L	0.05	SM4110C	16-Nov-22/O	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	16-Nov-22/O	0.06	0.06	< 0.05	
Sulphate	mg/L	1	SM4110C	16-Nov-22/O	3	23	20	
Phosphorus-Total	mg/L	0.01	E3516.2	14-Nov-22/K	0.35	0.06	0.05	
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	14-Nov-22/K	3.7	0.8	0.3	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	15-Nov-22/K	0.09	0.10	0.03	
Total Dissolved Solids	mg/L	3	SM 2540D	10-Nov-22/O	265	423	488	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	09-Nov-22/O	16.9	7.3	1.9	
COD	mg/L	5	SM5220C	08-Nov-22/K	253	40	8	
Hardness (as CaCO3)	mg/L	1	SM 3120	17-Nov-22/O	267	340	315	
Aluminum	mg/L	0.01	SM 3120	17-Nov-22/O	0.03	0.06	0.04	
Barium	mg/L	0.001	SM 3120	17-Nov-22/O	0.136	0.172	0.232	
Boron	mg/L	0.005	SM 3120	17-Nov-22/O	0.008	0.010	0.034	
Cadmium	mg/L	0.00010	EPA 200.8	17-Nov-22/O	< 0.000010	< 0.000010	0.000038	
Calcium	mg/L	0.02	SM 3120	17-Nov-22/O	78.8	107	94.2	
Copper	mg/L	0.0001	EPA 200.8	17-Nov-22/O	0.0009	0.0021	0.0023	
Iron	mg/L	0.005	SM 3120	17-Nov-22/O	0.364	1.04	0.017	
Magnesium	mg/L	0.02	SM 3120	17-Nov-22/O	16.9	17.5	19.3	
Manganese	mg/L	0.001	SM 3120	17-Nov-22/O	0.071	0.052	0.402	
Potassium	mg/L	0.1	SM 3120	17-Nov-22/O	1.2	1.6	1.4	
Silicon	mg/L	0.01	SM 3120	17-Nov-22/O	5.26	6.50	5.43	
Sodium	mg/L	0.2	SM 3120	17-Nov-22/O	9.3	37.6	72.3	
Strontium	mg/L	0.001	SM 3120	17-Nov-22/O	0.174	0.293	0.179	

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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Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 04-Nov-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 22-Nov-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Groundwater

WATERWORKS NO.

Client I.D.	MW09-5R	MW09-6R	GW QA/QC	
Sample I.D.	B22-33721-5	B22-33721-6	B22-33721-7	
Date Collected	02-Nov-22	02-Nov-22	02-Nov-22	

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Zinc	mg/L	0.005	SM 3120	17-Nov-22/O	< 0.005	< 0.005	< 0.005	



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 Lab Manager

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 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 04-Nov-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 07-Dec-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	SW1	SW2	SW4	SW QA/QC
Sample I.D.	B22-33722-1	B22-33722-2	B22-33722-3	B22-33722-4
Date Collected	02-Nov-22	02-Nov-22	02-Nov-22	02-Nov-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed	SW1	SW2	SW4	SW QA/QC
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	09-Nov-22/O	133	146	134	157
pH @25°C	pH Units		SM 4500H	09-Nov-22/O	7.43	7.65	7.62	7.72
Conductivity @25°C	µmho/cm	1	SM 2510B	09-Nov-22/O	276	300	283	326
Chloride	mg/L	0.5	SM4110C	17-Nov-22/O	8.4	7.9	9.3	7.8
Nitrite (N)	mg/L	0.05	SM4110C	17-Nov-22/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-22/O	0.10	0.17	0.13	0.18
Sulphate	mg/L	1	SM4110C	17-Nov-22/O	5	7	6	8
BOD(5 day)	mg/L	3	SM 5210B	10-Nov-22/K	< 3	< 3	< 3	< 3
Total Suspended Solids	mg/L	3	SM2540D	10-Nov-22/K	4	< 3	< 3	7
Phosphorus-Total	mg/L	0.01	E3516.2	23-Nov-22/K	0.04	0.03	0.02	0.02
Total Kjeldahl Nitrogen	mg/L	0.1	E3516.2	23-Nov-22/K	0.4	0.3	0.4	0.4
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	15-Nov-22/K	0.02	0.02	0.02	0.03
Total Dissolved Solids	mg/L	3	SM 2540D	10-Nov-22/O	141	154	145	167
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	09-Nov-22/O	7.6	6.9	7.4	6.3
Phenolics	mg/L	0.001	MOEE 3179	06-Dec-22/K	< 0.001	< 0.001	< 0.001	< 0.001
COD	mg/L	5	SM5220C	15-Nov-22/K	9	8	10	8
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-22/O	133	155	136	150
Arsenic	mg/L	0.0001	EPA 200.8	16-Nov-22/O	0.0001	0.0001	< 0.0001	< 0.0001
Barium	mg/L	0.001	SM 3120	16-Nov-22/O	0.065	0.079	0.067	0.078
Boron	mg/L	0.005	SM 3120	16-Nov-22/O	0.008	0.009	0.007	0.008
Cadmium	mg/L	0.000015	EPA 200.8	16-Nov-22/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	16-Nov-22/O	40.1	46.7	41.2	44.9
Chromium	mg/L	0.001	EPA 200.8	16-Nov-22/O	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	16-Nov-22/O	0.0003	0.0005	0.0003	0.0004
Iron (Total)	mg/L	0.005	SM 3120	16-Nov-22/O	0.046	0.050	0.044	0.044
Lead	mg/L	0.00002	EPA 200.8	16-Nov-22/O	< 0.00002	0.00002	< 0.00002	< 0.00002
Magnesium	mg/L	0.02	SM 3120	16-Nov-22/O	8.04	9.34	8.15	9.19



R.L. = Reporting Limit

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Michelle Dubien
 Lab Manager

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C.O.C.: G111143

REPORT No. B22-33722

Report To:

Greenview Environmental Management

13 Commerce Crt., PO Box 100
 Bancroft Ontario K0L1C0

Attention: Mike Grasby

Caduceon Environmental Laboratories

285 Dalton Ave
 Kingston Ontario K7K 6Z1

Tel: 613-544-2001

Fax: 613-544-2770

DATE RECEIVED: 04-Nov-22

JOB/PROJECT NO.: Mount St. Patrick WDS

DATE REPORTED: 07-Dec-22

P.O. NUMBER: 102.22.015

SAMPLE MATRIX: Surface Water

WATERWORKS NO.

Client I.D.	SW1	SW2	SW4	SW QA/QC
Sample I.D.	B22-33722-1	B22-33722-2	B22-33722-3	B22-33722-4
Date Collected	02-Nov-22	02-Nov-22	02-Nov-22	02-Nov-22

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Manganese (Total)	mg/L	0.001	SM 3120	16-Nov-22/O	0.017	0.025	0.022	0.024
Mercury	mg/L	0.00002	SM 3112 B	10-Nov-22/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Potassium	mg/L	0.1	SM 3120	16-Nov-22/O	1.1	1.2	1.1	1.2
Sodium	mg/L	0.2	SM 3120	16-Nov-22/O	5.2	5.4	5.8	5.1
Strontium	mg/L	0.001	SM 3120	16-Nov-22/O	0.123	0.141	0.125	0.137
Zinc	mg/L	0.005	SM 3120	16-Nov-22/O	< 0.005	< 0.005	< 0.005	< 0.005



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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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Appendix G



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: Mount St. Patrick WDS
Location (e.g. street address, lot, concession): Part of Lot 4, Concession 14, geographic Township of Brougham, Township of Greater Madawaska
GPS Location (taken within the property boundary at front gate/front entry):
North American Datum (NAD83) are 351183.0 metres (m) East, 5021553.0 m North, in Zone 18T
Municipality: Township of Greater Madawaska

Client and/or Site Owner: Township of Greater Madawaska

Monitoring Period (Year): 2022

This Monitoring Report is being submitted under the following:

- Certificate of Approval No.: A411901
- 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: _____

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:

See report

- 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
See report		

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
	New background monitoring well MW21-7 installed in spring 2021.	

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:

- No changes to the site design and operation are recommended
- The following change(s) to the site design and operation is/are recommended:

Name: Tyler H. Peters, P.Eng.

Seal:

Signature: 

Date: Feb17-23



CEP Contact Information:

Company: Greenview Environmental Address:

Telephone No.: 613-332-0057 Fax No. :

E-mail Address: solutions@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) Constant 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

- 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:

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

- 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

- 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.

See report

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.Eng.
 Date: (yyyy/mm/dd): Feb17-23

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: solutions@greenview-environmental.ca

Appendix H



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.