2024 Annual Report

Final

Mount St. Patrick Waste Disposal Site
ECA No. A411901

March 27, 2025

Jp2g Project # 22-6213D

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

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EXECUTIVE SUMMARY

Jp2g Consultants Inc. (Jp2g) was retained by the Township of Greater Madawaska to conduct the 2024 ground and surface water monitoring at the Mount St. Patrick Waste Disposal Site (WDS), 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 (ECA) 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 ECA 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 flow direction at the site in 2024 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 MW06-3, and MW06-4 was not interpreted to be impacted by landfill-related activities, however, naturally occurring conditions within the low-lying area at the site (MW06-3), and winter road maintenance activities (MW06-4), were interpreted to be contributing factors to documented groundwater quality results in the vicinity of the Mount St. Patrick WDS.

Results from monitoring well MW06-2 were interpreted to be most representative of leachate quality at the Site in 2024. New background monitoring well MW21-7 was documented to have insufficient water for sampling in 2024. 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 from this location have also been interpreted to display road salt impacts associated with the transfer station, Flat Road, and the Township's nearby winter sand storage area that is located adjacent to the site.

In 2024, no Reasonable Use Concept (RUC) exceedances were documented in the downgradient monitoring wells. Wells MW09-5R and MW09-6R were last sampled in 2022. Based on the Reasonable Use Concept assessment, the Mount St. Patrick WDS was interpreted to meet the intent of Ministry Guideline B-7 at the downgradient northern CAZ boundary in 2024.

Results from surface water location SW-2 were interpreted to be representative of background surface water quality at the Mount St. Patrick WDS in 2024. Based on a review of the 2024 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. Surface water sampling location SW-3, located near the landfill site and within the low-lying area, was dry in 2024 and historically was not interpreted to be significantly impacted by landfill-related activities.

Based on the calculated 2024 fill rate of 1408 m^3 in comparison to the approved final contours, and with consideration of grading and compaction operations in 2024, the remaining site capacity as of January 2025, was approximately 30,962 m^3. Given the average five (5) year fill rate of 881 m^3 (prior to 2022) the estimated remaining site life for the Mount St. Patrick WDS is approximately thirty-five (35) years.

As processed C&D and bulky wastes are approved as alternative daily cover, no aggregate-based cover material (i.e. sand, etc.) was utilized as part of operations in 2024.

Based on Township records, approximately 3,800 vehicles visited the Mount St. Patrick WDS in 2024 and accepted approximately 11,000 bags, 5 bins, 37 Tri-Axles and 128 trailer-loads of municipal waste for disposal and/or transfer. Based on information supplied by the Township, 62 tonnes of municipal waste were collected at the Mount St. Patrick WDS in 2024 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 20 tonnes of Blue Box recyclables were collected which included 11 tonnes of commingled containers, 6 tonnes of mixed fibres, and 3 tonnes of OCC. Additionally, approximately 450 m^3 of C&D and bulky waste, and 125 m^3 of leaf and yard waste, was accepted at the Mount St. Patrick's WDS in 2024.

According to Township records, 24 tonnes of scrap metal, 10 refrigerant appliances, 68 tires, and 3 tonnes of WEEE were diverted from the depots at the Mount St. Patrick Waste Disposal Site.

Based on the results of the 2024 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.

1 INTRODUCTION

This report was prepared by Jp2g Consultants Inc. (Jp2g) for the purposes of presenting and interpreting the results of the 2024 ground and surface water monitoring completed at Mount St. Patrick Waste Disposal Site (WDS).

The long-term waste management planning in the Township, identified the Mount St. Patrick site for the establishment and operation of a waste transfer station. Accordingly, an application to amend the ECA was submitted on July 25, 2007, to the Ministry. The intent of the 2007 application was to recognize the future 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. Regular municipal waste (i.e. bagged garbage) and Blue Box recycling that are received at the site is transported to GFL Environmental Inc. (GFL) which is located in Moose Creek Ontario for disposal and processing. Construction and demolition (C&D) and bulky wastes received at the Mount St. Patrick site is stockpiled, processed, and landfilled.

Jp2g Consultants Inc. completed the environmental compliance program in 2024. This service was previously offered by Greenview Environmental until 2022 monitoring year. For consistency, many details in this report have been copied in part or in whole from previous reports including Greenview (2023).

1.1 Site Information

A detailed description of the site location is as follows:

- The site is located on part of Lot 4, Concession 14 within the geographic Township of Brougham, in the amalgamated Township of Greater Madawaska (Township) as shown on **Figure 1**.
- The site coordinates are NAD 1983 UTM Zone 18 – 351183E 5021553N.
- The Mount St. Patrick site is located approximately 1.6 kilometers (km) west of the Village of Mount St. Patrick, and access to the site is provided by Flat Road (**Figure 2**).
- 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 site operates as an active waste disposal site and includes a waste and recycling transfer station.
- The site consists of a 1.2hectare (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.
- 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.

1.2 Site Ownership and Key Personnel

Site operations are directed by the Township. Contacts for the municipality and the Competent Environmental Practitioner (CEP) for both groundwater and surface water as defined by the Ministry (2010) are as follows:

Municipal Contact
Township of Greater Madawaska
Leonard Emon
Facilities Manager
Phone: 613.752.2249
Email: lemon@greatermadawaska.com

CEP Contact
Jp2g Consultants Inc.
Andrew Buzza, P.Geo
Sr. Hydrogeologist
Email: andrew.buzza@jp2g.com

1.3 Site Development of the Waste Disposal Site

The following section provides a general description of the site, including operational details:

Environmental Compliance Approval:
The site operates under ECA No. A411901 dated March 28, 1980as amended October 11, 2013 (**Appendix A**).

Site Status:
The site is currently operational.

Site Capacity:
Under Condition 18 of the current ECA the approved total waste disposal volume is 46,785m³.

Projected Site Life:
The remaining lifespan of the site based on a total remaining capacity of approximately 30,962 m³ is approximately 35 years as of December 2024.

Area of current waste cell footprint and approved footprint:
The current ECA recognizes a 1.2 ha landfilling area within a total site area of 38.25 ha.

Dates when the site opened, operated and closed as applicable:
The site was opened in the 1960's and receives municipal solid waste and recyclable wastes.

Information on final cover, slopes and engineering controls:
Details are found in the Design and Operations Plan dated July 23, 2007 (Greenview 2007). Final cover was applied to portions of the landfill site and the side slopes.

Any Permits To Take Water associated with the site:
There are no permits to take water associated with the site.

Other authorizing and/or control instruments associated with the site:
There are no storm water management facilities associated with the site.

Description of any leachate collection systems; and any sewage works, including the C of A number of the works:
The Mount St. Patrick Waste Disposal Site is designed for the natural attenuation of leachate. There are no collection systems or sewage works at the site.

Any site developments which occurred during the year of the monitoring report:
None

Any new developments in the vicinity of the site of relevance from a monitoring perspective:
None.

Historical Site Overview

Environmental Baseline Investigations which were undertaken:
Investigations of the Mount St. Patrick Waste Disposal Site have been carried out since 1999. Reports have been submitted annually to the Ministry.

Design and Construction of the Site:
The site design, development and operational requirements for the current waste disposal site are outlined in Greenview (2007) listed as item 2 in Schedule A of the ECA.

Development of environmental monitoring systems:
Environmental monitoring is conducted annually in accordance with Condition 19 of the ECA and recent TSS review comments.

Conceptual site model:
Infiltrating groundwater at the site will migrate vertically through more porous overburden material until intersected by the shallow groundwater table over bedrock. Groundwater flow is governed by local topography predominantly to be downhill to the south.

Initial placement of waste materials:
Within the 1.2 landfilling area.

Filling, closure and placement of final cover over waste cells:
The C&D waste is ground on site and is applied to the waste mound as needed.

Problems associated with of final cover over waste:
There have been no documented issues with the final cover on the waste disposal site.

Date of site closure, actual or projected, including any closure plans:
There are no closure plans, projected closure 2061

1.4 Ministry Consultation

The Mount St. Patrick WDS was inspected by the Ministry 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 Ministry inspection in electronic correspondence, dated October 11, 2012. Further, the Township submitted a response to the Ministry 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 Ministry 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 Ministry Technical Support Section (TSS) issued groundwater review comments (Greenview, 2013) for the 2011 Annual Report (Greenview, 2012). The Ministry TSS requested that leachate indicator parameters be included in the 2012 Annual Report (Greenview, 2013). Additionally, the Ministry TSS provided direction to compare groundwater samples collected from monitoring well MW09-6 to the Ministry Provincial Water Quality Objectives (PWQO; MINISTRY, 1994b) as the groundwater monitoring location was interpreted to best intercept groundwater which could potentially discharge to Constant Creek (Greenview, 2013).

The Mount St. Patrick WDS was inspected by the Ministry 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 Ministry Ottawa District Office on February 15, 2017 (Greenview, 2017).

On December 24, 2018, the Township received an Ministry TSS surface water review of the 2017 Annual Report (Greenview, 2019). In the review, the Ministry 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. 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 Ministry Ottawa District Office 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 Ministry Ottawa District Office on November 26, 2019 (Greenview, 2020a). The Ministry 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 Ministry Ottawa District Office on December 3, 2019 (Greenview, 2020a). As part of the response, the Township was required to submit photographs to the Ministry in accordance with their request. The Township submitted their response to the Ministry Ottawa District Office on February 14, 2020, and the Ministry 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).

These two (2) documents were completed and submitted to the Ministry Ottawa District for their file on March 31, 2020.

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 representations of the Ministry, the Township, and Greenview to review the proposed Revised DOP and discuss whether the proposed Revised DOP generally met with Ministry expectations for the ECA Application. Based on the Pre-Submission Meeting, it was recommended by the Ministry that the Township wait to submit the ECA Application until the 2021 Annual Report (due for submission to the Ministry 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 Ministry for review and approval on May 03, 2022. Receipt of submission was received on May 30, 2022.

An Inspection Report dated November 21, 2022, was received by the Township. No issues or concerns were identified by the MECP. A copy of the report is provided in **Appendix B**. Copies of the Quarterly Inspection Reports by the Township are also included in **Appendix B**.

1.5 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 RUC (Ministry Guideline B-7) compliance
- Surface water quality assessment
- Site operational overview and capacity assessment.
- Preparation of an annual report that summarises the results of the monitoring program and submitting the report to the Ministry.

2 SITE DESCRIPTION

The following sections present a summary of the physical characteristics for the Mount St. Patrick WDS and is based in part on the descriptions in the Annual Monitoring Reports 2008-2023 prepared by Greenview (2007-2022).

2.1 Topography and Drainage

The vicinity of the Mount St. Patrick site is bounded 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 WDS.

Locally, the topography influences the local drainage which is directed toward 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. In 2007, the low-lying area to the northeast of the site 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 2**).

Constant Creek is located approximately 625 m north of the existing limit of waste at the site (adjacent to monitoring well MW09-6R), and flows west to east towards Calabogie Lake, approximately 11 km southeast of the 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 2**). In 2009, an additional surface water location (SW-4) on Constant Creek was included as part of the environmental monitoring program. Monitoring station SW-4 is located at the approximate mid-point between SW-2 and SW-1.

2.2 Hydrogeological Conditions

As part of the 2006 environmental work program at the site, four (4) monitoring wells were installed at the site. One (1) well was installed upgradient of the site to monitor background groundwater quality (MW06-1), while three (3) wells were installed downgradient of the site (MW06-2, MW06-3, and MW06-4).

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. The subsurface materials in the upland areas in the vicinity of the AWDA of the Mount St. Patrick site 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 to 6 metres below ground surface, at monitoring wells MW06-4 and MW06-1, respectively.

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 (**Figure 2**). The overburden observed during the installation of MW08-1 (background) included fine to medium grained sand with small cobbles.

Further to Ministry TSS comments (November 5, 2007) and the Amended ECA (July 16, 2008), two (2) additional drive-point groundwater monitoring wells were installed in June 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 (**Figure 2**). 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 (**Figure 2**). 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 Ministry 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 locations was compromised as a result of construction materials. In 2014, replacement wells constructed of PVC were installed by the Municipality and labelled as MW09-5R and 6R respectively. Dark brown organic materials (peat) followed by clay were observed during the construction at both locations. The presence of clay may be related to the poorly drained characteristics of the low-lying area north and east of the Mount St. Patrick site.

A new shallow, background monitoring well was installed in May 2021 (MW21-7). The new well 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.

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 2024 was interpreted to be predominantly to the north (**Figures 3a and 3b)**. Borehole logs for all monitoring wells are provided in **Appendix C**.

2.3 Land Use

The land use designation for the Mount St. Patrick WDS is Active Waste Disposal Site on Schedule "A" to the County's Official Plan. The property is bound to the south and north by vacant land. Immediately west of Flat Road, the DACA Centre (community hall and outdoor recreational facility) and a small Township Operations Yard are located. The WDS is zoned Waste Disposal Site (WD) and Extractive Industrial Reserve (EMR) on Schedule "B" to By-Law 22-2003. The properties across Flat Road are zoned 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.

3 ENVIRONMENTAL MONITORING PROGRAM 2024

3.1 Monitoring Locations

Table 1 summarizes the location of monitoring wells and surface water monitoring stations. All monitoring locations including groundwater wells and the surface water monitoring stations are provided in **Figure 2**. Borehole logs are provided in **Appendix C**, and **Appendix D** contains photographs of the wells and surface water monitoring stations in summer 2024.

3.1.1 Groundwater Monitoring Locations

Seven groundwater wells and five mini piezometers are located at and around the Mount St. Patrick WDS. Construction dates vary from 1991 to 2021. Details are as follows:

- **Monitoring Well MW06-2**
  Located approximately 20 m east of the eastern AWDA boundary, in the low-lying area.
- **Monitoring Well MW06-3**
  Located in the low-lying area approximately 25 m northeast of the northeastern corner of the AWDA.

- **Monitoring Well MW06-4**
  Monitoring well MW06-4 is located within the AWDA limits and approximately 10 m northwest of the existing limit of waste.
- **Monitoring Well MW08-1**
  Located approximately 25 m west and upgradient of the of the existing limit of waste.
- **Monitoring Well MW09-5R**
  Located approximately 300 m east of the AWDA.
- **Monitoring well MW09-6R**
  located approximately 560 m northeast of the AWDA.
- **Monitoring Well MW21-7**
  Located approximately 70 m south of the AWDA.
- **Monitoring station MP3R**
  A monitoring piezometer Located approximately 30 m northeast of the existing limit of waste.
- **Monitoring station MP4**
  A monitoring piezometer Located approximately 15 m northwest of the existing limit of waste.
- **Monitoring station MP5**
  A monitoring piezometer Located approximately 150 m northeast of the existing limit of waste.
- **Monitoring station MP6**
  A monitoring piezometer Located approximately 60 m east of the existing limit of waste.
- **Monitoring station MP7**
  A monitoring piezometer Located approximately 100 m northeast of the existing limit of waste.

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 (**Figure 2**). Monitoring well MW21-7 was installed using a hand auger to the total depth of 1.08 m below ground surface (bgs).

3.1.2 Surface Water Monitoring Locations

The four active surface water stations are:

- **Monitoring Location SW1**
  Located on Constant Creek, approximately 700 m northeast and downstream of the existing limit of waste at the Mount St. Patrick site.
- **Monitoring Location SW2**
  Located on Constant Creek, approximately 700 m northwest and upstream of the existing limit of waste at the Mount St. Patrick site.
- **Monitoring Location SW3**
  Located on a low-lying area north of, and in close proximity to, the waste mound.
- **Monitoring Location SW4**
  Downstream surface water quality is located adjacent to the downgradient property boundary and along Constant Creek.

3.2 Monitoring Procedures and Methods

All sampling was completed in general accordance with Jp2g Consultants Inc. standard operating procedures. Sampling methods and quality assurance measures are summarized and provided in **Appendix E**.

3.3 Groundwater Monitoring Program 2024

Two (2) groundwater monitoring events were completed one each in the spring and fall 2024 (July 8 and November 7). The monitoring program included the collection of groundwater levels and water quality samples from selected groundwater stations. **Table 1** summarizes the location of all monitoring wells, and **Table 2** summarizes the sampling activities that were completed during the spring and fall of 2024 monitoring program.

During the 2024 spring and fall sampling events, groundwater elevations were measured at each monitoring well and mini piezometer using an electronic water level tape. Water levels were collected from wells prior to purging and sampling.

During the spring and fall 2024 sampling events the new background monitoring well MW21-7 was dry and samples could not be collected. Wells MW09-5R and MW09-6R were also not sampled in 2024.

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. In 2024, samples were collected from the GLL7 during both sampling events.

Duplicate groundwater samples were collected for Quality Assurance and Quality Control (QA/QC) purposes from well MW08-1 in the fall and from GLL7 during both 2024 sampling events.

Data collected is included as appendices as follows: photo album (**Appendix D**), groundwater elevations (**Appendix G**), and laboratory analytical results (**Appendix H**), groundwater and surface water results (**Appendix I**).

3.4 Surface Water Monitoring Program 2024

Two (2) surface water monitoring events were completed, one each in the spring and fall (July 8 and November 7). The monitoring program included the collection of surface water quality samples as indicated in **Table 2.** Samples were not collected from SW-3 during the spring and fall 2024 monitoring events as this location was dry.

3.5 Analytical Laboratory Accreditation

Collected groundwater and surface water samples were submitted for analysis to the Caduceon Environmental Laboratories (Caduceon), located in Ottawa, 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 Ministry to perform analysis on drinking water in Ontario in accordance with the Safe Drinking Water Act.

3.6 Landfill Gas Monitoring

Landfill gas monitoring although not part of the ECA was completed in 2024. Landfill gas reading were collected from all wells in the spring and fall using LGM gas monitor. There were no detection of sulphide, methane or CO2 in all wells monitored during both sampling events. 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.

3.7 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 WDS on January 27, 2025, to determine the current capacity status for continued disposal operations at the site and to update site features.

Daily waste records (summary forms) were completed at the Mount St. Patrick WDS 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 WDS, to the Resource Productivity and Recovery Authority (RPRA).

4 ENVIRONMENTAL MONITORING RESULTS

4.1 Historical Data

Historical static water level and sampling results are presented in earlier reports completed by Greenview Environmental and are summarized in **Appendix F** of this report.

4.2 Groundwater Flow Monitoring

Static water levels were measured in July and November 2024, and are summarized in **Appendix G**. Ground water flow patterns are provided in **Figures 3a** and **3b.** The water levels were referenced to a local datum. In 2024, and consistent with the historical results, the groundwater flow at the site was interpreted to flow towards the north and northeast, away from the waste mound, and in the general direction of the low-lying areas north of the site.

4.3 Groundwater Quality Assessment

4.3.1 Groundwater Assessment Criteria

Groundwater at landfill sites is generally assessed with regard to the criteria specified in the Ontario Drinking Water Quality Standards (ODWQS). The ODWQS is split into health and non-health related parameters. Non-health related parameters are in turn split into aesthetic objectives and operational guidelines. In 2024, results from MW09-6R were also compared to the Provincial Water Quality Objectives (PWQO).

Typical leachate parameters for the Mount St. Patrick site and that are typical of a rural site of this size have been determined to be: barium, boron, copper, nitrate, and sulphate. Parameters that are excluded would be deemed to be influenced by the natural environment (i.e., influenced by low lying areas) and potential wintertime road maintenance work.

Historically, background groundwater quality was calculated using the median of a minimum of the previous ten (10) sampling events results from background monitoring wells MW08-1 and MW21-7, however, it was recommended that median background groundwater quality at the site be solely calculated based on MW21-7 results once sufficient database of groundwater analytical results is available for the new background well MW21-7. We do note that sampling in recent years has been sporadic at this location. If this location continues to be dry in future years consideration should be given to establishing a new site.

For this report and util such time that an adequate database can be established, background groundwater quality will be calculated using the median of a minimum of the previous ten (10) sampling events results from background monitoring wells MW08-1.

4.3.2 Groundwater Quality 2024

The Laboratory Certificates of Analysis are presented in **Appendix H,** and the results of the 2024 groundwater monitoring program are presented in **Appendix I**. Analytical data were compared to the Ontario Drinking Water Standards (ODWS) and Ministry Guideline B-7 requirements.

Background Monitoring Well MW08-1

In 2024, all parameters met the ODWQS criteria at monitoring well MW08-1. Groundwater results at MW08-1 are not interpreted to be impacted by landfill-related activities. Historically, aluminum, dissolved organic carbon (DOC), hardness, iron, and total dissolved solids (TDS) have been observed to be elevated at times at this location. The recent historical results at this location suggest that this water quality has been compromised by winter time road maintenance activities from the transfer station, Flat Road, and by winter sand storage at the municipal depot located on the west side of Flat Road.

Monitoring Well MW21-7

The new background well MW21-7 was dry during the spring and fall 2024. Based on preliminary results (2021-2022) from this location, background groundwater quality in the vicinity of MW21-7 is interpreted to have naturally high concentrations of aluminum, DOC, iron, and manganese.

Monitoring Well MW06-2

Located approximately 20 m east of the eastern AWDA boundary, in the low-lying area, water quality from this location is used to establish conditions downgradient and northeast of the waste mound (**Figure 2**). In 2024, all parameters met the ODWQS criteria except for TDS and manganese. Historically, manganese was interpreted to be naturally elevated in the background groundwater at the site, while concentrations of TDS were also noted to be elevated in historical background groundwater quality results at MW08-1. In 2024, results from monitoring well MW06-2 were interpreted to be most representative of leachate quality at the site.

Monitoring Well MW06-3

Groundwater quality downgradient and north of the site is characterized by samples collected from monitoring well MW06-3. In 2024, all parameters met the ODWQS criteria except DOC, manganese, and TDS. 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.

Monitoring Well MW06-4

Monitoring well MW06-4 is located within the AWDA limits and approximately 10 m northwest of the existing limit of waste at the site. In 2024, all parameters met the ODWQS criteria except TDS. Groundwater quality at MW06-4 was not interpreted to be impacted by landfill-related activities. 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.

Monitoring Well MW09-5R

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. In 2024, monitoring MW09-5R well was not sampled during either event. This well was last sampled in 2022, where all parameters met the ODWQS criteria except DOC, iron, and manganese. Given that MW09-5R was installed in approximately 1 m of dark brown organic peat material, the historical exceedances of DOC, iron and manganese were interpreted to be result of naturally occurring conditions within the low-lying area.

Monitoring Well MW09-6R

Monitoring well MW09-6R is located approximately 560 m northeast near the location of SW-4. In 2024, monitoring well MW09-6R was not sampled during either event due to dry conditions. This well was last sampled in 2022, where all parameters met the ODWQS criteria except DOC, iron, and manganese (fall only). 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, the high historical concentrations of DOC, iron, and manganese were anticipated and were interpreted to be resultant of naturally occurring conditions within the low-lying area.

Monitoring Well GLL7

In 2024, all parameters met the ODWQS criteria. Based on the interpreted direction of groundwater flow in the vicinity of the Mount St. Patrick site, and 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.

4.3.3 Reasonable Use Concept Assessment

The Reasonable Use Concept was developed by the Ministry to address the levels of off-site contaminants that are considered acceptable. The Reasonable Use Criteria allows for the definition of the level of contamination in the groundwater beyond which mitigative action should be undertaken. The acceptability of the landfill in terms of its impact on groundwater has been assessed in terms of the Reasonable Use Criteria (RUC). The RUC established the acceptability of a change in groundwater quality (C_m) as follows:

Aesthetic Parameters
Degradation of less than 50% of the difference between the background quality and the established objective for the particular health related parameter.

Health Related Parameters
Degradation of less than 25% of the difference between the background quality and the established objective for the particular health related parameter. Acceptable concentrations are based on background levels and water quality guidelines (i.e. drinking water objectives).

The chosen background values are utilized to calculate the RUC allowable concentrations for specific parameters, as per the following formulas:

Health Related: $C_{allow} = P_b + (C_m - P_b) \times 25\%$

Non-Health Related: $C_{allow} = P_b + (C_m - P_b) \times 50\%$

where:

C_{allow} = Maximum allowable concentration of parameter as per the RUC guidelines.

C_m = Maximum acceptable concentration (MAC) of parameter as per the ODWS/OG.

P_b = Chosen background value of parameter

Historically, 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, however, it was recommended that median background groundwater quality at the site be solely calculated based on the new monitoring well MW21-7 results once a sufficient database of groundwater analytical results is available. In 2024, background groundwater quality was calculated using the median of a minimum of the previous ten (10) sampling events results from background monitoring wells MW08-1.

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.

The parameters used in the assessment are listed in **Tables 3** and **4**. Parameters that are not retained for the B-7 assessment are iron, manganese and DOC. The iron and manganese concentrations are variable across the site and are 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. These values are also typical of levels of iron and manganese within Renfrew County. Concentrations of DOC are likely influenced by abundant presence of peat in and around the landfill site area. **Table 3** outlines the median calculation for background concentrations, and **Table 4** outlines the Reasonable Use Criteria.

4.3.4 Reasonable Use Conclusions - 2024

The reasonable use conclusions and the indicator parameters that exceed the RUC for the 2024 sampling events are presented in **Table 5.**

Monitoring Well MW09-5R
This well was not sampled in 2023 and 2024. The results from Previous monitoring year (2022) indicate that all parameters met the RUC criteria during both 2022 sampling events.

Monitoring Well MW09-6R
This well was not sampled in 2023 and 2024. The results from Previous monitoring year (2022) indicate that all parameters met the RUC criteria during both 2022 sampling events.

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 Ministry office should be held to develop an appropriate contingency plan, as necessary and appropriate for the particular site.

Based on the above results, the Mount St. Patrick site was interpreted to be in compliance with RUC and conformance with Ministry Guideline B-7 in 2024.

In 2024, 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 Ministry Guideline B-7.

4.4 Surface Water Quality Assessment

4.4.1 Surface Water Assessment Criteria

Surface water at landfill sites is generally assessed with regard to the criteria specified in the Provincial Water Quality Objectives (PWQO). The PWQOs are a set of ambient surface water quality criteria. In addition to the PWQOs, surface water quality results are, where relevant, compared to select Canadian Water Quality Guidelines (CWQGs).

4.4.2 Surface Water Monitoring 2024

Photos of the monitoring stations are included in **Appendix D,** laboratory results are included in **Appendix H,** and the results of the surface water analysis for 2024 are included in **Appendix I**. **Figure 2** illustrate the locations of all surface water monitoring stations. 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, 2023). Background surface water quality was established as the 75th percentile value of a minimum of the previous ten (10) sampling events results from background surface water monitoring location SW-2.

Surface Water Station SW2 - Background

Surface water location SW-2 is located in Constant Creek, approximately 700 m northwest and upstream of the existing limit of waste site. In 2024, all parameters met the PWQO criteria and other ambient surface water criteria. Results from SW-2 were interpreted to be representative of background surface water quality at the Mount St. Patrick site in 2024.

Surface Water Station SW4

Surface water station SW4 is located downstream of SW2 at the confluence of Constant Creek and the unnamed stream that transects the site. The site was established in 2009. In 2024, all parameters met the PWQO criteria and other ambient surface water criteria. No parameter concentrations were above the 75th percentile background surface water quality except for barium (spring only), COD (spring only), sodium, and TKN (spring only) (see **Table 6**).

Surface Water Station SW1

Surface water quality downstream of SW-4 on Constant Creek is monitored at surface water location SW-1. In spring 2024, all parameters met the PWQO criteria and other ambient surface water criteria. In fall 2024, samples could not be collected. No parameter concentrations were above the 75th percentile background surface water quality except for sodium and chemical oxygen demand (COD) during the spring 2024 sampling event (see **Table 6**).

Surface Water Station SW3

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 which is not hydrologically connected to Constant Creek or sampling stations (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. In 2024, SW3 was dry, and samples could not be collected. 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.

Based on the results of the 2024 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.

4.5 Operations Summary

A summary of 2024 waste management operations at the Mount St. Patrick Waste Disposal Site is presented below.

4.5.1 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 WDS 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 (**Figure 2**). In 2024, C&D and bulky waste materials were processed on-site in fall 2024 and disposed of in the landfill area. A quantity of unprocessed C&D and bulky waste was stockpiled on-site and within the landfilling area at the time of the annual waste capacity survey on January 27, 2025. As part of site operations, the Mount St. Patrick WDS 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 fibers/commingled containers/old corrugated cardboard)	325 m^3
Tires	100 m^3
Leaf and Yard Waste	200 m^3
C&D and Bulky Waste	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 WDS in 2024 were as follows:

Day of the Week	Hours of Operation
Wednesday	8:00 am – 12:00 pm
Saturday	8:00 am – 12:00 pm
Sunday	8:00 am – 12:00 pm
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 from 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 Jp2g in 2024.

4.5.2 Waste Disposal/ Transfer Summary

The Mount St. Patrick WDS currently receives municipal waste and recyclables from the Township of Greater Madawaska which is transferred to GFL Environmental. C&D and bulky waste processing operations were completed in fall 2024. The volume of waste disposed of at the Mount St. Patrick WDS in 2024 was determined by survey and using civil 3D to compare two topographic surfaces to calculate volumetric difference. As well as algebraic calculation to subtract the Jp2g remaining volume from 2024 annual algebraic volume.

To calculate the volume of processed C&D and bulky waste disposed, graded, and compacted at the site in 2024, the Jp2g topographic survey conducted on January 27, 2025, was compared to previous Greenview survey plans. As AutoCAD files were not provided there is some lack of accuracy. Based on the topographic survey calculations for the Mount St. Patrick WDS, the 2024 fill rate was calculated to be approximately 1408 cubic meters (m^3) of waste.

The Jp2g January 2025 survey compared to the approved final contours at closure of the Mount St. Patrick WDS resulted in a remaining site capacity as of January 27, 2025, of approximately 30,962 m^3. Given the average (mean) five (5) year fill rate (2018 to 2022) of 881 m^3, ^{the} estimated remaining site life for the Mount St. Patrick WDS is approximately thirty-five (35) years.

As processed C&D and bulky wastes are approved as alternative daily cover for the Mount St. Patrick WDS, no aggregate-based cover material (i.e. sand, etc.) was utilized as part of operations in 2024.

Based on Township records, approximately 3,801 vehicles visited the Mount St. Patrick WDS in 2024 and accepted approximately 10,849 bags, 5 bin, 37 Tri-Axles and 128 trailer-loads of municipal waste for disposal and/or transfer. Based on information supplied by the Township, 62 tonnes of municipal waste were collected in 2024 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 20 tonnes of Blue Box recyclables were collected which included 11 tonnes of commingled containers, 6tonnes of mixed fibres, and 3 tonnes of OCC. Additionally, approximately 446 m^3 of C&D and bulky waste, and 117 m^3 of leaf and yard waste, was accepted at the Mount St. Patrick WDS in 2024.

According to Township records, 24 tonnes of scrap metal, 10 refrigerant appliances, no tires, and 3 tonne of WEEE were collected from the Mount St. Patrick WDS.

4.5.3 Site Inspections and Maintenance

Site inspections of the AWDA and property at the Mount St. Patrick site were conducted by Jp2g on July 8, 2024 and November 7, 2024 during the spring and fall sampling events, and on January 27, 2025, during the topographic survey of the site. The Township also conducted periodic investigations to verify the compliance status of the site.

4.5.4 Monitoring and Screening Checklist

The monitoring and screening checklist is provided in **Appendix J** and based on the 2024 results no contingency measures are required to be implemented.

5 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the 2024 environmental monitoring program completed for the Mount St. Patrick Waste Disposal Site, the following conclusions are provided:

- The groundwater flow direction at the site in 2024 was interpreted to be similar to historical interpretations with the direction of groundwater flow to the north towards the low-lying area, and in the general direction of Constant Creek.
- Groundwater immediately downgradient of the site at monitoring wells MW06-2, MW06-3, and MW06-4 was not interpreted to be impacted by landfill-related activities, 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 interpreted to be contributing factors to documented groundwater quality results in the vicinity of the Mount St. Patrick WDS.
- In 2024, no Reasonable Use Concept (RUC) exceedances were documented in the results from downgradient monitoring wells MW09-5R and MW09-6R that were attributed to landfill-related factors. Based on the above, the Mount St. Patrick WDS was interpreted to meet the intent of Ministry Guideline B-7 at the downgradient northern CAZ boundary in 2024.
- Results from surface water location SW-2 were interpreted to be representative of background surface water quality at the Mount St. Patrick WDS. Based on a review of 2024 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 of the Mount St. Patrick WDS. Surface water sampling location SW-3, located near the Mount St. Patrick WDS and within the low-lying area, was dry in 2024. Historically, SW-3 was not interpreted to be significantly impacted by landfill-related activities.

5.1 Groundwater Monitoring 2025

No changes to groundwater monitoring are recommended for 2025. Groundwater monitoring should continue to occur twice per year (May/June and October/November) and consist of the following (see **Table 7**):

- Water levels at all locations should be collected.
- Any wells that are found to be damaged should be repaired or replaced.
- Groundwater samples should be collected from all locations in May/June and October /November and include appropriate duplicate samples; and
- Samples should be analyzed for the parameters listed in **Table 7**.

5.2 Surface Water Monitoring 2025

No changes to surface water monitoring are recommended for 2025. Surface water monitoring should continue to occur three times per year (May/June and October/November) and consist of the following (see **Table 7**):

- Collect surface water from SW1, SW2, SW3 and SW4.
- Collect samples in May/June and October/November.
- Samples should be analyzed for the parameters listed in **Table 7.**
- Un-ionized ammonia should be calculated using field results.

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LIMITATIONS AND USE OF THE REPORT

This report was prepared for the exclusive use of the Township of Greater Madawaska. Any use which a third party makes of this report, or and reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Jp2g Consultants Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This landfill impact report involves a limited sampling of locations to assess the probability of contamination on site. The test data, chemical analyses, and conclusions given herein are the results of analyzing the groundwater encountered during the sampling programs. Based upon the total number of test holes performed, these are considered to be fairly representative of the groundwater conditions within each area tested. It should be noted, however, that any assessment regarding the presence of contamination on the property is based on interpretation of conditions determined at specific locations and depths. Chemical results are limited to those parameters tested.

Tables

Table 1: Ground and Surface Water Sampling Locations

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 2: Monitoring Program 2024

Station ID	Monitorign Location	Spring 2024	Fall 2024	Notes
Groundwater				
MW06-2	Approximately 20 m east of the eastern AWDA boundary	√	√	
MW06-3	Approximately 25 m northeast of the northeastern corner of the AWDA	√	√	
MW06-4	Approximately 10 m northwest of the existing limit of waste	√	√	
MW08-1	Approximately 25 m west of the of the existing limit of waste	√	√+ Dup	
MW09-5R	Approximately 300 m east of the AWDA	NS	NS	
MW09-6R	Approximately 560 m northeast of the AWDA.	Dry	Dry	
MW21-7	Approximately 70 m south of the AWDA	Dry	Dry	
GLL7	Residential	√	√	
MP 3R	Approximately 30 m northeast of the existing limit of waste	NM	NM	
MP 4	Approximately 15 m northwest of the existing limit of waste	Destroyed	Destroyed	
MP 5	Approximately 150 m northeast of the existing limit of waste	Dry	Water level only	
MP 6	Approximately 60 m east of the existing limit of waste	Water level only	Water level only	
MP 7	Approximately 100 m northeast of the existing limit of waste	Water level only	Water level only	
Surface Water				
SW1	Approximately 700 m northeast and downstream of the existing limit of waste	√+ Dup	NS	
SW2	Approximately 700 m northwest and upstream of the existing limit of waste	√	√	
SW3	Located on a low-lying area north of the waste mound	Dry	Dry	
SW4	Located adjacent to the downgradient property boundary and along Constant Creek	√	√	

Notes:

1. √ = samplled for the required parameters, field parameters and water level
2. DUP = Duplicate Sample taken
3. NS: Not sampled
3. NM: Not measured

Table 3: Median Background Concentrations (Using MW08-1 Results)

Parameters (mg/L)	Apr 20	Oct 20	May 21	Nov 21	May 22	Nov 22	Jul 23	Nov 23	Jul 24	Nov 24	Median
Alkalinity	236	275	248	299	241	307	267	321	278	316	**277**
Chloride	41.9	63.8	16.1	78.4	16.6	67.3	20.2	40	19.9	39.8	**39.9**
Nitrate	0.84	0.5	0.9	0.5	1.09	0.33	0.66	0.49	0.63	0.53	**0.6**
Sulphate	11	12	9	12	9	13	9	17	11	11	**11**
TDS	316	404	290	440	279	403	300	398	315	408	**357**
DOC	2	1	2.5	1.4	1.9	0.3	1.5	2.6	1.9	4.4	**1.90**
Barium	0.101	0.141	0.088	0.163	0.103	0.127	0.1	0.134	0.095	0.136	**0.12**
Boron	0.006	0.015	0.009	0.013	0.005	0.013	0.012	0.014	0.012	0.016	**0.013**
Iron	0.019	<0.005	0.099	0.447	0.021	0.455	0.028	<0.005	<0.005	0.017	**0.03**
Manganese	0.001	<0.001	0.007	0.038	0.002	0.021	<0.001	<0.001	<0.001	0.002	**0.005**
Sodium	31.4	43.3	20.3	47.2	20.4	43.6	37.3	38.2	22.3	35	**36.2**

Table 4: Reasonable Use Determination 2024 (Using MW08-1 results)

Parameter (mg/L)	Pb	Cm	F	Callow
Alkalinity	277	500	0.5	**389**
Chloride	39.9	250	0.5	**145**
Nitrate	0.6	10	0.25	**3.0**
Sulphate	12	500	0.5	**256**
TDS	457	500	0.5	**479**
DOC	1.9	5	0.5	**3.5**
Barium	0.12	1	0.25	**0.3**
Boron	0.013	5	0.25	**1.26**
Iron	0.03	0.3	0.5	**0.17**
Manganese	0.005	0.05	0.5	**0.03**
Sodium	36.2	200	0.5	**118**

Table 5: Reasonable Use Conclusions 2024

Parameters	ODWS	C_{allow}	MW09-5R		MW09-6R	
			May-22	Nov-22	May-22	Nov-22
Health Related						
Nitrate	**10**	**3.0**	0.17	0.06	0.08	0.06
Barium	**1**	**0.30**	0.128	0.136	0.145	0.172
Boron	**5**	**1.26**	0.011	0.008	0.007	0.01
Aesthetic Parameters						
Alkalinity	**500**	**389**	192	250	222	257
Chloride	**250**	**145**	13.4	17.3	65.1	98.4
Sulphate	**500**	**256**	5	3	18	23
TDS	**500**	**479**	226	265	348	423
Sodium	**200**	**118**	8	9.3	33.5	37.6

NS : Not Sampled

Exceeds Resonable Use Criteria

Table 6: Surface Water Triggers Assessment 2024

Parameters	PWQO (CWQG)	SW2 75th Percentile	SW1		SW4	
			Jul-24	Nov-24	Jul-24	Nov-24
Primary Surface Water Trigger Parameter[1]						
Chloride	**120**	**NA**	10	NS	10.1	9.9
Nitrate	**13**	**NA**	0.05		0.07	<0.05
Phosphorus	**0.03**	**NA**	0.02		0.02	0.02
Boron	**1.5**	**NA**	0.01		0.009	0.009
Iron	**0.3**	**NA**	0.169		0.176	0.061
Zinc	**0.03**	**NA**	<0.005		<0.005	0.005
Secondary Surface Water Trigger Parameter[2]						
Barium	**NV**	**0.074**	0.074		**0.076**	0.073
Chromium	**NV**	**<0.001**	<0.001		<0.001	<0.001
Chemical Oxygen Demand (COD)	**NV**	**22.5**	**25**		**27**	22
Sodium	**NV**	**5.7**	**5.8**		**5.9**	**6.3**
Sulphate	**NV**	**6.0**	4		4	6
Total Kjeldahl Nitrogen (TKN)	**NV**	**0.50**	0.5		**0.7**	0.4

NA : Not Applicable NV: No Value

Exceeds PWQO/CWQO Trigger Criteria

[1] Primary Surface Water Tigger uses the Provincial Water Quality Objective (PWQO)

- Since there is no PWQO for Chloride, the Canadian Water Quality Guideline (CWQG) of 120 mg/L is used
- For Boron, the CWQG of 1.5 mg/L is used since it is based on more up to date literatur

[2] Secondary Surface Water Trigger parameters do not have a PWQO.

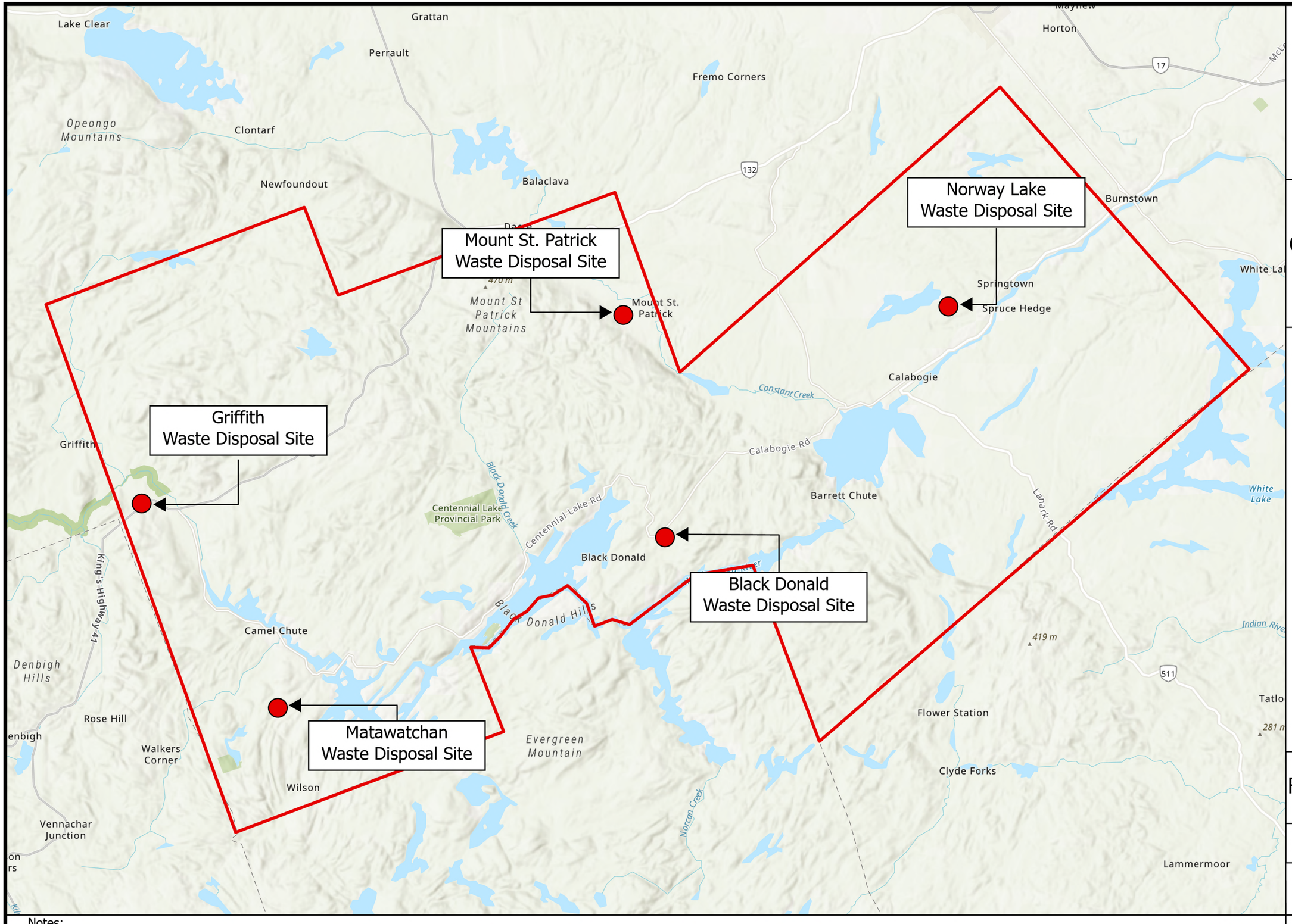
- The running 75th Percentile of the (2019-2023) sampling events of the background (SW2) concentration is used as the trigger

Table 7 : Proposed Monitoring Program 2025

Station ID	Task	Spring 2025	Fall 2025	Analytical Parameters
Groundwater				
MW06-2	Measure water levels / Sample groundwater	√	√	- Major and minor ions (Ca, Na, Cl, SO4, B, K, Mg, Ba) - Trace metals (Fe, Mn, Cu, Sr, Al, Cd, Cr, Co, Si, Zn) - Nitrogen species (NO3, NO2, NH3, TKN) - General parameters (alkalinity, COD, total dissolved solids, phosphorous, hardness, dissolved organic carbon) - Field measurements of pH, conductivity, Dissolved Oxygen, and water tempreture - EPA 624 Volatile Organic Compounds VOC sample collected every Five years from BH1. Next VOCs sampling will be in Spring 2028
MW06-3	Measure water levels / Sample groundwater	√	√	
MW06-4	Measure water levels / Sample groundwater	√	√	
MW08-1	Measure water levels / Sample groundwater	√	√	
MW09-5R	Measure water levels / Sample groundwater	√	√	
MW09-6R	Measure water levels / Sample groundwater	√	√	
MW21-7	Measure water levels / Sample groundwater	√	√	
GLL7	Measure water levels / Sample groundwater	√	√	
MP3R, MP4, MP5, MP6, and MP7	Measure water levels	√	√	
Surface Water				
SW1	Sample Surface water	√	√	- Major and minor ions (Ca, Na, K, Cl, total phosphorous, Ba, B, Mg, SO4) - Trace metals (Fe, Mn, Cu, Cd, Cr, Co, Sr, Zn) with detection limits to PWQO - Nitrogen species (NH3, TKN) - General parameters (alkalinity, COD, Total suspended solids, phenols, total dissolved solids, hardness, biochemical oxygen demand) - Field measurements of dissolved oxygen, pH, conductivity, water temperature, and Un-ionized ammonia (calculation)
SW2	Sample Surface water	√	√	
SW3	Sample Surface water	√	√	
SW4	Sample Surface water	√	√	

Notes:
One Duplicate Sample to be collected during each sampling event.

Figures



N

Township of Greater Madawaska

Waste Disposal Sites

LEGEND

- Waste Disposal Site
- Township Boundary

1:250 0000

0 2,5005,000 10,000 Meters

Regional Location Plan

Project No. 22-6213C Greater Madawaska

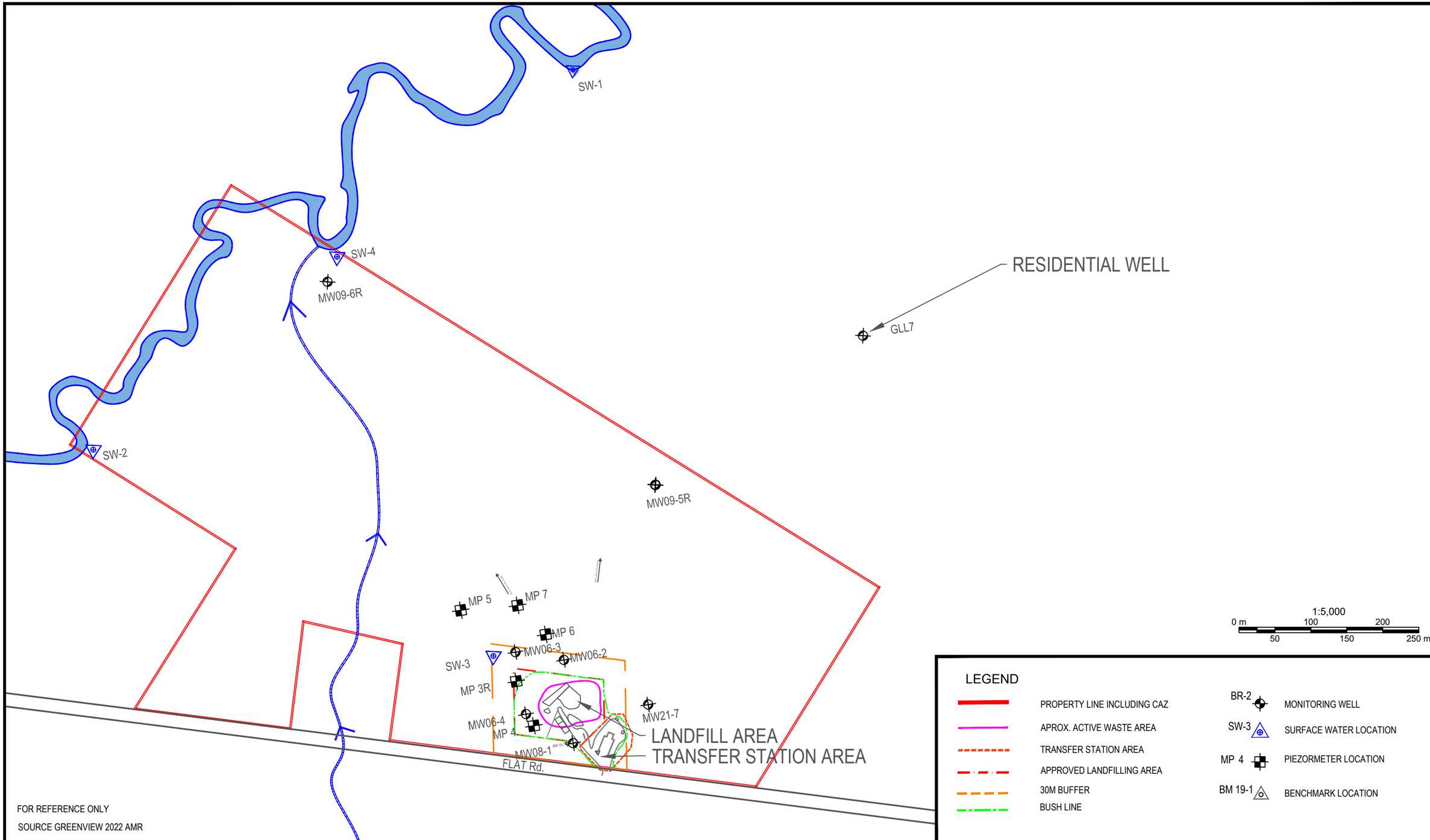
Date:3/12/2024

Drawn By: HV

Checked By: KM

Notes:
Map Layers Obtained from LIO
Waste Disposal Site Locations Sourced from Greenview Environmental Management (2023)

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS



FOR REFERENCE ONLY

SOURCE GREENVIEW 2022 AMR

LEGEND

- PROPERTY LINE INCLUDING CAZ
- APROX. ACTIVE WASTE AREA
- TRANSFER STATION AREA
- APPROVED LANDFILLING AREA
- 30M BUFFER
- BUSH LINE
- BR-2 — MONITORING WELL
- SW-3 — SURFACE WATER LOCATION
- MP 4 — PIEZORMETER LOCATION
- BM 19-1 — BENCHMARK LOCATION

No.	DATE	BY	REVISIONS

NORTH (TRUE NORTH)

Jp2g Consultants Inc.

ENGINEERS · PLANNERS · PROJECT MANAGERS

1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON K2H 8S9

PHONE: 613-828-7800 FAX: 613-828-2600

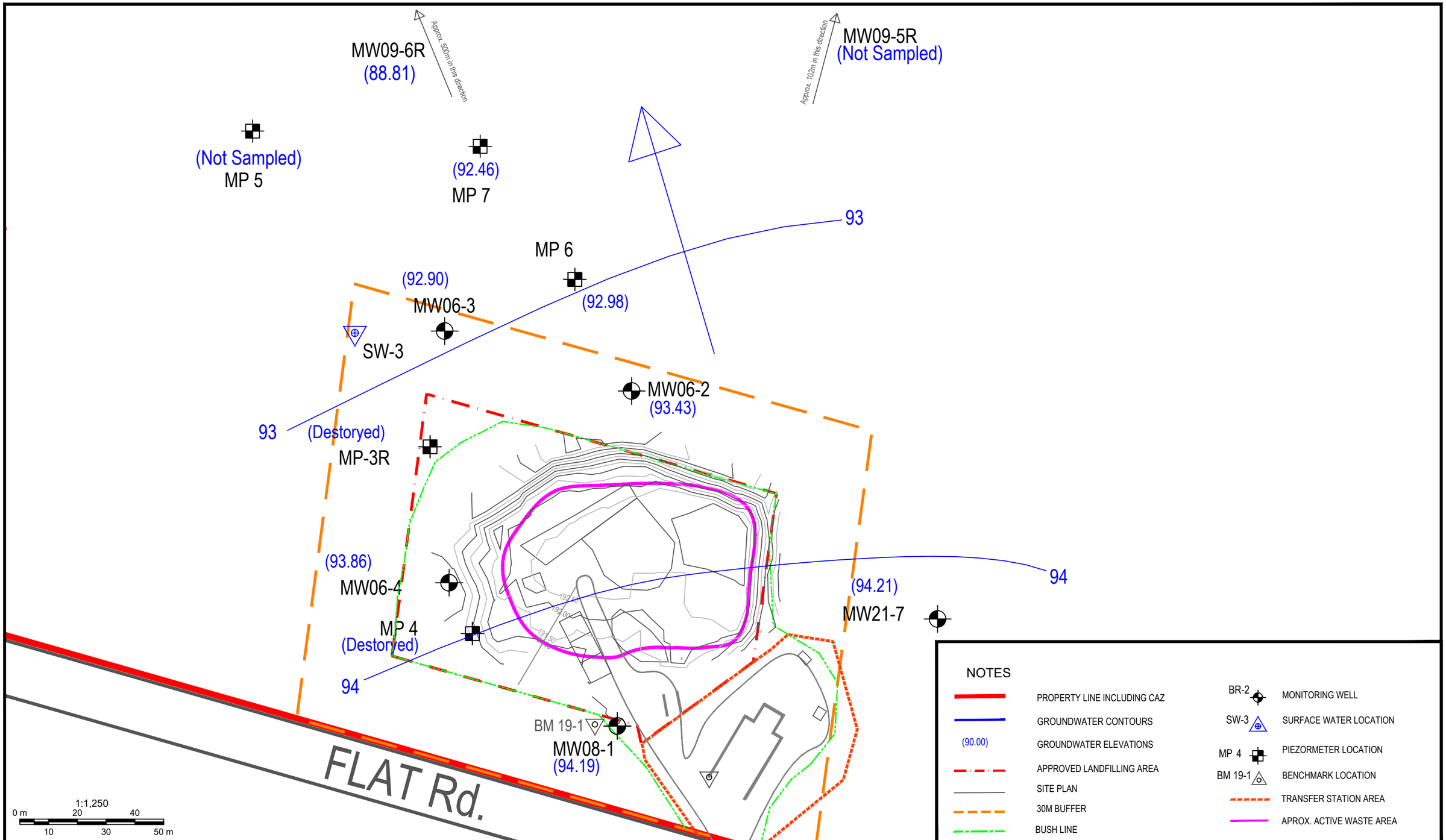
DESIGNED	QS
DRAWN	QS
CHECKED	KM
APPROVED	KM
SCALE	1:5000

TOWNSHIP OF GREATER MADAWASKA

Mt. St. PATRICK WASTE DISPOSAL SITE

SITE PLAN WITH MONITORING LOCATIONS

DATE	15-JAN-2025
PROJECT	22-6213D
PLOTTED	15-JAN-2025
REF	FIG 2



Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON K2H 8S9
PHONE: 613-828-7800 FAX: 613-828-2600

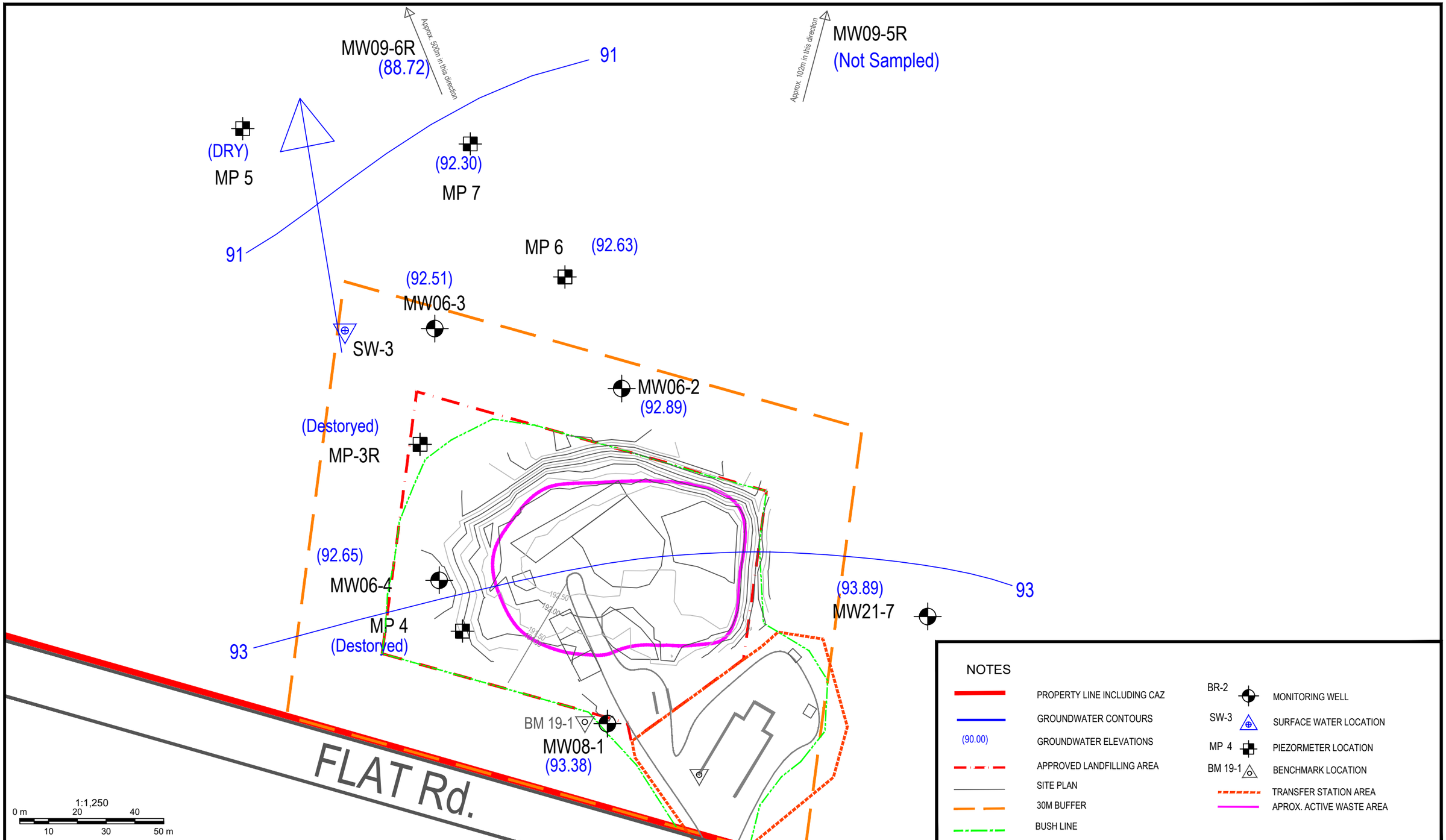
DESIGNED	QS
DRAWN	QS
CHECKED	KM
APPROVED	KM
SCALE	1:1250

TOWNSHIP OF GREATER MADAWASKA

Mt. St PATRICK WASTE DISPOSAL SITE

Spring Flow - JULY 2024

DATE	22-JAN-2024
PROJECT	22-6213C
PLOTTED	22-JAN-2024
REF	FIG 3A


MW09-6R
(88.72)
Approx. 500m in this direction
MW09-5R
(Not Sampled)
Approx. 102m in this direction
91
(DRY)
MP 5
(92.30)
MP 7
91
MP 6
(92.63)
(92.51)
MW06-3
SW-3
MW06-2
(92.89)
(Destoryed)
MP-3R
(92.65)
MW06-4
MP 4
(Destoryed)
93
(93.89)
MW21-7
93
BM 19-1
MW08-1
(93.38)
FLAT Rd.
1:1,250
0 m
20
40
10
30
50 m
NOTES
PROPERTY LINE INCLUDING CAZ
GROUNDWATER CONTOURS
(90.00)
GROUNDWATER ELEVATIONS
APPROVED LANDFILLING AREA
SITE PLAN
30M BUFFER
BUSH LINE
BR-2
MONITORING WELL
SW-3
SURFACE WATER LOCATION
MP 4
PIEZORMETER LOCATION
BM 19-1
BENCHMARK LOCATION
TRANSFER STATION AREA
APROX. ACTIVE WASTE AREA
No.
DATE
BY
REVISIONS
NORTH
TRUE NORTH
Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON K2H 8S9
PHONE: 613-828-7800 FAX: 613-828-2600
DESIGNED QS
DRAWN QS
CHECKED KM
APPROVED KM
SCALE
1:1250
TOWNSHIP OF GREATER MADAWASKA
Mt. St PATRICK WASTE DISPOSAL SITE
Fall Flow - November 2024
DATE 15-JAN-2025
PROJECT 22-6213D
PLOTTED 15-JAN-2025
REF
FIG 3B

Appendix A
Environmental Compliance Approval and Certificate of Requirement

Ontario

Ministry of the Environment
Ministère de l'Environnement

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 exceeded 200 m^3.

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)	*organic waste*	20 m^3
(c)	*waste electrical and electronic equipment*	40 m^3
(d)	*blue box waste*	325 m^3
(e)	tires	100 m^3
(f)	*leaf and yard waste*	200 m^3
(g)	*construction and demolition waste*	200 m^3
(h)	scrap metal	60 m^3
(i)	*white goods that contain refrigerants*	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 Haltzhauer, 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
M5G 1E5

AND

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

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

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

THIS NOTICE WAS MAILED
ON Oct. 21, 2013
DC
(Signed)

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 ✓

Ontario

Ministry of the Environment
Ministère de l'Environnement

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 m^2 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 m^3 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)	*organic waste*	2 m^3
(c)	*waste electrical and electronic equipment*	40 m^3
(d)	*blue box waste*	325 m^3
(e)	tires	100 m^3
(f)	*leaf and yard waste*	50 m^3
(g)	*construction and demolition waste*	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 m^3;
(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 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 property 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 equipment 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 eachportion 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
Ontario

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 39,
The Environmental Protection Act, 1971

MOE 1408 (10/79)

LRO # 49 **Certificate** **Receipted as RE166619** on 2013 05 15 at 15:06

The applicant(s) hereby applies to the Land Registrar. yyyy mm dd

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 Nepean K1V 9K4 acting for Party From(s) Signed 2013 05 06

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 Nepean K1V 9K4 2013 05 15

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
MECP Correspondence

Ontario

MOUNT ST. PATRICK WASTE DISPOSAL SITE

,

Inspection Report

System Number:	A411901
Entity:	THE CORPORATION OF THE TOWNSHIP OF GREATER MADAWASKA
Inspection Start Date:	10/03/2022
Inspection End Date:	11/21/2022
Inspected By:	Thandeka Ponalo
Badge #:	1718

Thandeka Ponalo

_____

(signature)

NON-COMPLIANCE/NON-CONFORMANCE ITEMS

This should not be construed as a confirmation of full compliance with all potential applicable legal requirement and BMPs. These inspection findings are limited to the components and/or activities that were assessed, and the legislative framework(s) that were applied. It remains the responsibility of the owner to ensure compliance with all applicable legislative and regulatory requirements.

If you have any questions related to this inspection, please contact the signed Provincial Officer.

INSPECTION DETAILS

This section includes all questions that were assessed during the inspection.

Ministry Program: WASTE | **Regulated Activity:** Landfills

Question ID	NOL 1	**Question Type**	Legislative
Question: Does the Open landfill site have an Environmental Compliance Approval (ECA)?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes ECA Number A411901 was issued on July 16, 2008 and amended October 11, 2013.			

Question ID	NOL 3	**Question Type**	Legislative
Question: Does the holder of the landfill ECA own the entire site?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 3;		
Observation			
Yes The site is approved for the use and operation of a 1.2 ha landfill within a total site area of 38.25 ha.			

Question ID	NOL 4	**Question Type**	Information
Question: Does the landfill have a Contaminant Attenuation Zone (CAZ)?			
Legislative Requirement	Not Applicable		
Observation			
Yes The site consists of a 1.2 ha landfill within a total site area of 38.25 ha. A significant portion of the site area is located downgradient of the approved waste disposal area, and is currently used for operations, operational buffer and CAZ purposes.			

Question ID	NOL 5	Question Type	Information
Question: Is the CAZ on Crown land?			
Legislative Requirement	Not Applicable		
Observation			
No			

Question ID	NOL 9	Question Type	Legislative
Question: Does the holder of the landfill ECA own the property rights for the CAZ?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 4 | (1);		
Observation			
Yes The 2021 Annual Report states that the operational and CAZ lands were acquired from the Crown and registered on Title.			

Question ID	NOL 13	Question Type	Information
Question: Are access roads and on-site roads provided so that vehicles hauling waste to and on the site may travel readily on any day under all normal weather conditions?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes The 2021 Annual Report states that the site access road has sufficient width at the entrance to allow for unimpeded winter travel and access for emergency and snow removal equipment. During routine site inspections conducted by Greenview Environmental Management (Greenview) staff, they observed the roads to be in good condition. At time of the inspection, roads were observed to be in good condition.			

Question ID	NOL 14	Question Type	Legislative
Question: Is site access limited to times when an attendant is on duty?			
Legislative Requirement	EPA | 27 | (1);		

Observation
Yes As per Condition 13(1) of the ECA, access to the site is controlled through a locked gate at the site entrance. The site is surrounded by forested lands, which provide adequate screening and restricted access for vehicular traffic. Condition 13(2) of the ECA states that access to the landfill shall be restrict to the Owner and Owner authorized commercial vehicles; and access to the transfer station shall be permitted only under the supervision of a competent attendant. During non-operating hours, the site shall be secured to prevent entry by unauthorized persons. At time of the inspection, the site gate was locked to prevent access by unauthorized persons. Staff stated that in accordance with Condition 13(2), access to the site is only permitted to commercial vehicles in the presence of a site attendant.

Question ID	NOL 15	Question Type	Legislative
Question: Does the site only receive waste from within its approved service area?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes In accordance with Condition 11 of the ECA, the site only receives waste generated in the Township of Greater Madawaska.			

Question ID	NOL 16	Question Type	Information
Question: Is the site required to have a ground water monitoring program by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
Yes The groundwater monitoring requirements are outlined in Conditions 19 and 22 and in Schedule "A" of the ECA. It is the responsibility of the Township to ensure the site's groundwater parameters at the property boundary meet those as calculated by Guideline B-7: Reasonable Use Guideline. The 2021 Annual Report states that based on the RUC assessment completed in 2021, it was also interpreted that the 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 was sufficient for operational buffer and CAZ purposes at the site.

The 2021 Annual Report was submitted to Technical Support Section for review.

Question ID	NOL 20	**Question Type**	Information
Question: Is there ongoing abatement to address any concerns the ministry has with the ground water monitoring?			
Legislative Requirement	Not Applicable		
Observation			
No			

Question ID	NOL 21	**Question Type**	Information
Question: Is the site required to manage leachate by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
No There is no leachate control system at this landfill site. The site is a natural attenuating landfill site.			

Question ID	NOL 26	**Question Type**	Information
Question: Is the site required to manage landfill gas by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
No There is no methane gas control system at the site.			

Question ID	NOL 31	**Question Type**	Information
Question: Is the site required to have a surface water monitoring program by the ECA?			

Legislative Requirement	Not Applicable

Observation

Yes
The surface water monitoring requirements are outlined in Conditions 19 and 22 and in Schedule "A" of the ECA. It is the responsibility of the Township to ensure the site's surface water parameters on and off-site meet those as stated in the Provincial Water Quality Objectives (PWQO).

The 2021 Annual Report states that results from surface water location SW-2 were interpreted to be representative of background surface water quality at the site in 2021. Based on a review of 2021 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. The report also stated that surface water sampling location SW-3, located near the site and within the low-lying area was not interpreted to be significantly impacted by landfill-related activities in 2021.

The 2021 Annual Report was submitted to Technical Support Section for review.

Question ID	NOL 36	Question Type	Legislative

Question:

Is proper equipment available for the compaction of waste and applying cover material?

Legislative Requirement	EPA | 27 | (1);

Observation

Yes

Question ID	NOL 37	Question Type	Legislative

Question:

Is the landfill able to accurately determine the amount of waste received?

Legislative Requirement	EPA | 27 | (1);

Observation

Yes
Specialized survey and design technique referred to as digital terrain modelling (DTM) is used to determine waste landfilled and remaining capacity at the site. The DTM method is a computer-based process that compares two (2) topographic surfaces or digital terrain models and calculates the prismoidal volumetric difference. The 2021 Annual Report states that the remaining capacity was estimated to be 35,967 cubic metres or approximately forty-four (44) years.

Question ID	NOL 38	**Question Type**	Legislative
Question: Are all disposal operations at the site adequately and continually supervised?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes In accordance with Condition 13(2) of the ECA, access to the site is permitted only under the supervision of a site attendant.			

Question ID	NOL 39	**Question Type**	Information
Question: Does the landfill operator have a site inspection program as required by the ECA?			
Legislative Requirement	Not Applicable		
Observation			
Yes Inspection and record keeping requirements for the site are outlined in Conditions 14 of the ECA. On each operating day an inspection of the landfill working face, transfer station storage areas, facilities, signage, fencing and gate shall be conducted. On a monthly basis an inspection for erosion of the areas under final cover for erosion, inspection of the landfill for signs of leachate generation, and an assessment of road condition and property litter inspection must be conducted. On an annual basis an inspection of the monitoring wells and a field survey of the limit of fill area must be conducted. At time of the inspection, records for inspections were reviewed. Township staff conduct daily and monthly inspections of the site as outlined in the ECA. Annual inspections of the monitoring wells and a field survey of the limit of fill area were conducted by Greenview staff and documented in the Annual Report.			

Question ID	NOL 40	**Question Type**	Legislative
Question: Does the landfill operator have a procedure in place to address issues identified by staff during the site inspection?			
Legislative Requirement	EPA | 27 | (1);		

Observation
Yes The Township has a system in place to address deficiencies identified during daily and monthly inspections. Township staff shall ensure that corrective actions are always documented in the inspection forms.

Question ID	NOL 41	**Question Type**	Legislative
Question: Is the waste being compacted adequately?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes In accordance with Condition 15(3) of the ECA, waste is deposited in a manner that minimizes the exposure of the working face of the landfilling area and waste is being adequately compacted.			

Question ID	NOL 42	**Question Type**	Legislative
Question: Is Daily cover applied to the waste at the end of each working day or as otherwise specified in the ECA?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 7;		
Observation			
Yes As per Condition 15(11) of the ECA, the site is approved for the following alternative daily cover materials: (a) C&D 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. At time of the inspection, staff stated that they use C&D waste as alternative and have a stockpile of sand.			

Question ID	NOL 43	Question Type	Legislative
Question: Are procedures implemented to control rodents or other animals and insects at the site?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes In accordance with Condition 17 of the ECA, the site is operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.			

Question ID	NOL 44	Question Type	Legislative
Question: Is site access restricted by use of a gate, fence, or physical barrier when the site is not operating?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes The site has a gate which is kept locked when the site attendant is not on site.			

Question ID	NOL 45	Question Type	Legislative
Question: Is the waste disposal area adequately screened from public view?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes The site is treelined which screens the site from public view.			

Question ID	NOL 46	Question Type	Legislative
Question: Are daily records of site operations available at the site for at least the past 2 years or as otherwise required by the ECA?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 21;		
Observation			

Yes
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.

At time of the inspection, daily records were requested and presented.

Question ID	NOL 47	**Question Type**	Legislative
Question: Has the annual operations report been submitted to MECP or available on site as required by the ECA?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes In accordance with Condition 22 of the ECA, an Annual Report was submitted to the District Manager by March 31st.			

Question ID	NOL 48	**Question Type**	Legislative
Question: Is scavenging being prevented?			
Legislative Requirement	EPA | 27 | (1); EPA | O. Reg. 232/98 | 23;		
Observation			
Yes In accordance with Condition 13(3) of the ECA, scavenging and the burning of waste are prohibited at the site.			

Question ID	NOL 51	**Question Type**	Legislative
Question: Is the landfill only accepting the types of waste that they are approved to receive?			
Legislative Requirement	EPA | 27 | (1);		
Observation			

Yes
The site can only accept municipal waste for disposal and recyclables from the Township of Greater Madawaska. In accordance with Conditions 15(5) of the ECA, the landfill is used for the final disposal of C&D and bulky waste. As per Condition 15(7) of the ECA, the stockpile of C&D and bulky waste shall not exceed 200 cubic metres before undergoing size reduction or being landfilled as is, and the size reduction shall take place in the designated staging area.

The site diverts household waste, organic waste, waste electrical and electronic equipment (WEEE), blue box recyclables, old corrugated cardboard, tires, scrap metal, propane cylinders, white goods, and refrigerants.

The 2021 Annual Report states that 73 tonnes of municipal waste was collected at the site and transported to GFL in Moose Creek for final disposal. A total of 25 tonnes of blue box recyclables were collected that consisted of 11 tonnes of commingled containers, 10 tonnes of mixed fibres and 4 tonnes of old corrugated cardboard. Additionally, approximately 410 cubic metres of C&D waste and 110 cubic metres of leaf and yard waste was received at the site. A total of 139 tonnes of scrap metal, 63 refrigerants appliances, 3,078 tires, and 20 tonnes of WEEE were diverted from the Townships three waste disposal sites (Norway Lake WDS, Mount St. Patrick and Griffith WDS). The Township no longer accept organics at their sites.

Question ID	NOL 54	**Question Type**	Legislative
Question: Does the landfill have a procedure in place to address and document spills and fires?			
Legislative Requirement	EPA | 27 | (1);		
Observation			

Yes
In accordance with Condition 18(1) of the ECA, all spills, as defined in the EPA, 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. At time of the inspection, staff stated that there were no emergencies at the site in 2021 and 2022.

In accordance with Condition 18(2) of the ECA, the site has provided a landline telephone for the site to ensure site personnel have access to a reliable means of summoning assistance.

Question ID	NOL 55	**Question Type**	Legislative
Question:			

Does the landfill have emergency contingency plan as required by the ECA?	
Legislative Requirement	EPA | 27 | (1);
Observation	
Yes	

Question ID	NOL 56	**Question Type**	Information
Question: Is there an ECA condition requiring financial assurance?			
Legislative Requirement	Not Applicable		
Observation			
No Financial assurance is not required for municipally operated waste disposal/transfer sites.			

Question ID	NOL 59	**Question Type**	Legislative
Question: Does the landfill have a procedure in place to address complaints?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes The 2021 Annual Report states that there were no reported complaints received by the Township in 2021. At time of the inspection, Township staff stated that no complaints had been received in 2022.			

Question ID	NOL 61	**Question Type**	Information
Question: Has the landfill operator developed a Design and Operations Manual?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes			

Question ID	NOL 62	**Question Type**	Information

Question: Is the Design and Operations Manual up to date?	
Legislative Requirement	Not Applicable
Observation	
Yes	

Question ID	NOL 63	**Question Type**	Legislative
Question: Does the landfill operator have training procedures for site personnel?			
Legislative Requirement	EPA | 27 | (1);		
Observation			
Yes Training requirements are listed in Condition 20 of the ECA. The 2021 Annual Report states that waste operations training was conducted by Greenview on June 12, 2017. At time of the inspection, Township staff stated that training will be conducted by the end of the year and documented in the 2022 Annual Report.			

Question ID	949100	**Question Type**	Legislative
Question: Were the inspection questions sufficient to address other identified non-compliance items?			
Legislative Requirement	Not Applicable		
Observation			
Yes			

THE TOWNSHIP OF
GREATER MADAWASKA

mw Pat

Quarterly Inspection Log
~~Griffith~~ Waste Disposal Site
Township of Greater Madawaska

Waste Mound Final Cover Inspections			
Potential Issues	Deficiencies Noted		Actions Taken
	Y / N	Location of Issue & Description	
Erosion of Final Cover	N		
Vegetation	N		
Settlement Areas	N		
Leachate Seeps	N		
Litter Management	N		

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Emon	11/07/23	9AM

THE TOWNSHIP OF GREATER MADAWASKA

MT ST PAT
Quarterly Inspection Log
~~Griffith~~ Waste Disposal Site
Township of Greater Madawaska

Waste Mound Final Cover Inspections			
Potential Issues	Deficiencies Noted		Actions Taken
	Y / N	Location of Issue & Description	
Erosion of Final Cover	N		
Vegetation	N		
Settlement Areas	N		
Leachate Seeps	N		
Litter Management	N		

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Emm	08/16/23	11 AM

THE TOWNSHIP OF GREATER MADAWASKA

MH ST PART

Quarterly Inspection Log
[redacted] Waste Disposal Site
Township of Greater Madawaska

Waste Mound Final Cover Inspections			
Potential Issues	Deficiencies Noted		Actions Taken
	Y / N	Location of Issue & Description	
Erosion of Final Cover	N		
Vegetation	N		
Settlement Areas	N		
Leachate Seeps	N		
Litter Management	N		

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Emon	05/03/23	8:30 AM

THE TOWNSHIP OF GREATER MADAWASKA

Quarterly Inspection Log
~~Griffith~~ Waste Disposal Site
Township of Greater Madawaska

Waste Mound Final Cover Inspections			
Potential Issues	Deficiencies Noted		Actions Taken
	Y / N	Location of Issue & Description	
Erosion of Final Cover	N		
Vegetation	N		
Settlement Areas	N		
Leachate Seeps	N		
Litter Management	N		

Inspection Completed By:	Name	Date (mm/dd/yyyy)	Time
	L. Emery	02/10/23	6:30 AM

Appendix C
Borehole Logs

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

Log of Borehole: MW06-1

Project No.: 10392-021 *UTM:* 18 T 351249 5021541

Project Name: Mount St. Patrick

Client: Twp of Greater Madawaska *Logged By:* C. Wolf

Location: See Figure *Project Manager:* C. Wolf

SUBSURFACE PROFILE			SAMPLE					
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)	Well Instatllation	Remarks
ft / m		Ground Surface						Well equipped with lockable steel casing.
0 / 0		*Sand* Medium brown, medium grained Sand						Bentonite Hole Plug
			1	SS	30	4		
2			2	SS	5	12		Native Fill
			3	SS	20	44		
10		*Sand and Gravel* Medium brown, medium grained Sand and Gravel	4	SS		19		Bentonite Hole Plug
12 / 4		*Sand and Gravel, Saturated* Medium brown, medium grained Sand and Gravel, Saturated, Spoon wet	5	SS	20	51		
14			6	SS		66		Filter Sand
16								Well Screen: 1.88m x 0.05m
18		*Auger Refusal at 6.10m*						
20 / 6		End of Borehole						
22								
24								
26								

Drilled By: George Downing Estate Drilling *Input By:* CMW, snr

Drill Method: CME Hollow Stem *Checked By:* CMW

Drill Date: October 12/06 *Sheet:* 1 of 1

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

Log of Borehole: MW06-2

Project No.: 10392-021 *UTM:* 18 T 351292 5021678

Project Name: Mount St. Patrick

Client: Twp of Greater Madawaska *Logged By:* C. Wolf

Location: See Figure *Project Manager:* C. Wolf

SUBSURFACE PROFILE			SAMPLE					
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)	Well Instatllation	Remarks
ft / m		Ground Surface						Well equipped with lockable steel casing.
								Bentonite Hole Plug
2		*Sand, some Clay* Medium brown, fine grained Sand, some Clay, Saturated, Spoon wet	1	SS	20	52		Filter Sand
4		*Sand* Coarse grained Sand, some large boulders	2	SS	20	36		Well Screen: 1.52m x 0.05m
6		*Sand, some Silt* Coarse grained Sand, some Silt and Gravel	3	SS	20	44		
8		*Auger Refusal at 2.44m*						
		End of Borehole						
10								
12								

Drilled By: George Downing Estate Drilling *Input By:* CMW, snr

Drill Method: CME Hollow Stem *Checked By:* CMW

Drill Date: October 13/06 *Sheet:* 1 of 1

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

Log of Borehole: MW06-3

Project No.: 10392-021 *UTM:* 18 T 351263 5021744

Project Name: Mount St. Patrick

Client: Twp of Greater Madawaska *Logged By:* C. Wolf

Location: See Figure *Project Manager:* C. Wolf

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

Drilled By: George Downing Estate Drilling *Input By:* CMW, snr

Drill Method: CME Hollow Stem *Checked By:* CMW

Drill Date: October 13/06 *Sheet:* 1 of 1

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

Log of Borehole: MW06-4

Project No.: 10392-021 *UTM:* 18 T 351208 5021681

Project Name: Mount St. Patrick

Client: Twp of Greater Madawaska *Logged By:* C. Wolf

Location: See Figure *Project Manager:* C. Wolf

SUBSURFACE PROFILE			SAMPLE					
Depth	Symbol	Description	Number	Type	% Recovery	SPT (n)	Well Instatllation	Remarks
ft / m		Ground Surface						Well equipped with lockable steel casing.
0 / 0		*Sand* Dark brown, fine grained Sand	1	SS	20	5		Bentonite Hole Plug
2 / 1		*Sand, some Gravel* Brown, coarse grained Sand, some Gravel	2	SS	30	11		Native Fill
6 / 2		*Sand* Medium brown, medium grained Sand, Saturated, Spoon wet	3	SS	30	8		Bentonite Hole Plug
8			4	SS		8		Filter Sand
10 / 3		*Sand* Medium brown, fine grained Sand, very Saturated	5	SS	30	32		Well Screen: 1.52m x 0.05m
12 / 4		*Auger Refusal at 4.21m*	6	SS		74		(74 blows for 0.25m)
14		End of Borehole						
16 / 5								
18								
20 / 6								
22 / 7								
24								
26 / 8								

Drilled By: George Downing Estate Drilling *Input By:* CMW, snr

Drill Method: CME Hollow Stem *Checked By:* CMW

Drill Date: October 13/06 *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)		
ft / m		Ground Surface					Stick-up = 0.77 m	
0		**Medium Sand** Dark brown, medium sand, dry, loosely compacted.	1	AS	50		Silica Sand	
2 – 1 – 4			2	SS	30		Bentonite Chips	
6		**Fine to Medium Sand** Light brown, fine to medium sand, saturated at 3.66 m, compacted.	3	SS	40			
8			4	SS	50			
10 – 3			5	SS	50		Silica Sand	
12			6	SS	45			
14							Water level August 18, 2008 = 4.30 m	
16 – 5			7	SS	25		Well screen = 1.52 m x 0.05 m	
18		**Fine to Medium Sand** Light brown, fine to medium sand with small cobble, wet, compacted.	8	SS	30			
20		End of Borehole						

Drilled By: Lantech Drilling Ltd.

Logged By: J. Bailey

Drill Method: Hollow Stem Augers

Checked By: T. Peters

Drill Date: August 18, 2008

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

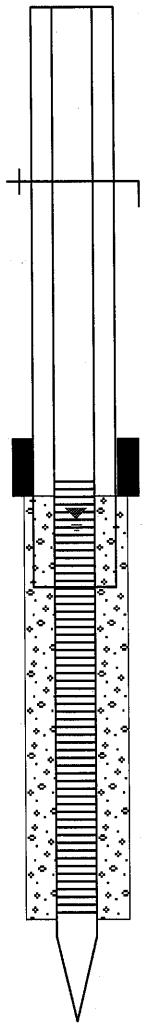
Borehole Log: MW09-5

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

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

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

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 /								Stick Up = 1.32 m
-1 /								
		Ground Surface						Static Water Level June 23, 2009 = 0.02 m
		Sand Fine to medium sand, light brown, compact, wet						Concrete
1 /		**Unknown** No description available						Native Fill
3 / 1								Well Screen = 1.07 m x 0.05 m
		End of Borehole						
5 /								

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

WELL LOG MW09-5R

Greenview ENVIRONMENTAL MANAGEMENT

CLIENT Township of Greater Madawaska
PROJECT NAME Mount St. Patrick Waste Disposal Site
PROJECT NUMBER 102.14.015
PROJECT LOCATION Mount St. Patrick, Ontario
DATE STARTED 7/3/14 **COMPLETED** 7/3/14
GROUND ELEVATION 92 m **HOLE SIZE** 0.2 m
DRILLING CONTRACTOR GEML
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY DMH **CHECKED BY** THP
AT END OF DRILLING ---
NOTES
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)
			Organics (peat), dark brown, wet	Concrete
0.5				Silica Sand
				Well Screen (0.96 m)
1.0			1.02 / 90.98	
			Clay, grey, wet	
			1.10 / 90.91	

Bottom of hole at 1.10 m.

WELL LOG MW09-6R

Greenview ENVIRONMENTAL MANAGEMENT

CLIENT Township of Greater Madawaska
PROJECT NAME Mount St. Patrick Waste Disposal Site
PROJECT NUMBER 102.14.015
PROJECT LOCATION Mount St. Patrick, Ontario
DATE STARTED 7/3/14 **COMPLETED** 7/3/14
GROUND ELEVATION 89 m **HOLE SIZE** 0.2 m
DRILLING CONTRACTOR GEML
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger
AT TIME OF DRILLING ---
LOGGED BY DMH **CHECKED BY** THP
AT END OF DRILLING ---
NOTES
1hrs AFTER DRILLING 0.22 m / Elev 88.78 m

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM (Stickup = 0.94 m)
			Organics (Peat), dark brown, wet	Concrete
			0.30 / 88.70	
			Sand, grey, fine to medium grained, wet	Silica Sand
0.5				
				Well Screen (0.95 m)
1.0			1.02 / 87.98	
			Clay, grey, wet	
			1.07 / 87.93	

Bottom of hole at 1.07 m.

WELL LOG MW21-7

Greenview ENVIRONMENTAL MANAGEMENT

CLIENT Township of Greater Madawaska
PROJECT NAME Mount St. Patrick Waste Disposal Site
PROJECT NUMBER 102.21.015
PROJECT LOCATION 134 Flat Road, Mount St. Patrick, Ontario
DATE STARTED 5/6/21 **COMPLETED** 5/6/21
GROUND ELEVATION 0 m **HOLE SIZE** 50.8mm (PVC)
DRILLING CONTRACTOR GEML
GROUND WATER LEVELS:
DRILLING METHOD Auger (0.20 m)
AT TIME OF DRILLING ---
LOGGED BY DMH, P.Geo. **CHECKED BY** THP
AT END OF DRILLING ---
NOTES New background well
2hrs AFTER DRILLING 0.17 m / Elev -0.17 m

DEPTH (m)	SAMPLE TYPE NUMBER	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM (Stickup: 0.68 m)
			Black/brown peat, damp	Bentonite Hole Plug
0.30				-0.30
			Brown, fine grained sand with silt, wet	Silica Sand
0.5				Well Screen (1.0 m)
1.0				
1.08				-1.08

Bottom of hole at 1.08 m.

Appendix D
Photographs

MW 06-2

MW 06-3

MW 06-4

MW08-1

MW 21-7

MP5

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS

Mt. St. Patrick Waste Disposal Site

Fall 2024 Groundwater Monitoring Locations

DATE	March 2025
PROJECT	22-6213D
FIGURE	1

MP6

MP7

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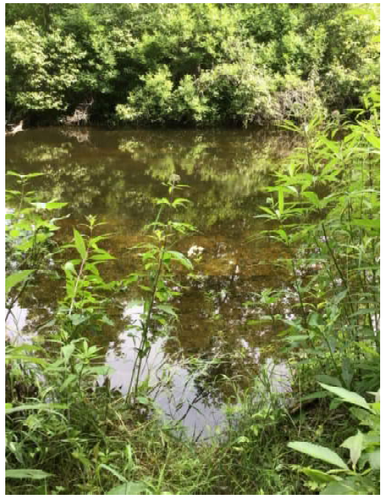
Mt. St. Patrick Waste Disposal Site

Fall 2024 Groundwater Monitoring Locations

DATE	March 2025
PROJECT	22-6213D
FIGURE	1

SW1



SW2

SW3

SW4

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Mt. St. Patrick Waste Disposal Site

Spring 2024 Surface Water Monitoring Locations

DATE	March 2025
PROJECT	22-6213D
FIGURE	1

Appendix E
Sampling Protocol

STANDARD SAMPLING PROTOCOL

The following is a description of the monitoring procedures and protocols used for groundwater and surface water monitoring for landfill sites.

Equipment Cleaning and Calibration

Regardless of matrix, prior to traveling to the site to be sampled, all equipment such as water level indicators and multi-parameter meters must be cleaned and calibrated as specified by the equipment manufacturer. Details of the cleaning and calibration should be recorded in the field notes.

GROUNDWATER
Monitoring Well Assessment

Provide an assessment of the status of all monitoring wells at the site.

Note any changes to the well and/or protective casing and record the physical condition of the well; and

Label all observation wells clearly and accurately on both the protective casing and well pipe.

Groundwater Monitoring

Maintain and use an accurate, up-to-date list of all observation wells to be monitored.

Check all field equipment for cleanliness; and

Wear personnel protective equipment as required (i.e., gloves, protective glasses, splash guards) during all phases of work, and follow any appropriate health and safety plan procedures.

Gas Detection in Wells (Prior to Measuring Water Levels)

Turn on gas meter and prepare for sampling atmospheric condition inside monitoring well.

Remove protective casing cover and well cap avoiding introduction of foreign materials into the well.

Immediately insert the probe attached to the gas meter into the well and wait for readings to stabilize.

Record the measurement in the appropriate column on the field data sheet or field book.

Water Level Measurements (Prior to Purging)

Record water level measurements prior to purging or sampling when required.

Do not move dedicated sampling devices such as the "Waterra" inertial pump prior to measuring the water level unless the well diameter dictates removal; reference the measurement from the same location each time (marked location or lowest point on pipe).

Lower the tape/probe into the wells - record the depth to water when the indicator (audible/visual) shows the water level has been reached.

Measure the water level twice by raising and lowering the tape/probe; and

Record the measurement to the nearest cm (0.5 cm) in the appropriate column on the field data sheet or field book.

Well Purging (Prior to Sampling)

The purpose of purging is to remove the stagnant water from within a monitor (removal of all stagnant water) so that a representative water sample may be collected. The procedures for purging are as follows.

Purge the well only after water levels have been confirmed.

Lift the tubing off the bottom of the well and "pump" at a minimum all stagnant water from the well into a graduated container such as a bucket, pail or cylinder so that the purged volume can be measured and recorded.

For low-yield wells, it is expected that either “no purge sampling techniques or low flow purging will be utilized (avoid purging well dry).

Under normal circumstances purged water may be discarded on the ground, away from the well to avoid the potential of water seeping back into the well; and

Allow a sufficient recovery period before sampling (not more than 48 hours).

Field Measurements

Field measurements are to be collected and recorded as outlined in the Environmental Compliance Approval or the approved monitoring program. Typically, these include at a minimum: temperature, pH and conductivity.

Well Sampling

Collect the water sample as soon as practical (not more than 48 hours) after purging starting at the least contaminated location and proceeding to the most contaminated.

Lift tubing and check valve off bottom of well to avoid introducing unnecessary sediment into the sample and transfer some representative sample water into a clean, well rinsed container to conduct measurements of field parameters.

Lift the tubing and gently transfer a sample into a clean container and thoroughly mix to form a single representative sample.

Transfer the sample into a pre-labelled sample bottle; labelling to consist of at a minimum, the project number, well ID and the date.

For samples that require filtering, attach the disposable filter onto the end of the tubing (typically a 0.45-micron membrane filter or as otherwise specified should be used).

Attempt to keep sample agitation to a minimum during sample transfer.

Store samples in a cooler, with ice packs to keep cool.

Transport samples to laboratory within the maximum hold time established by the laboratory (typically within a 48-hour period).

Volatile Organic Compound (VOC) Sampling

Volatile Organic Compounds (VOC) can be easily lost during sample collection, storage, and transportation. The following sampling and handling protocols are adhered to.

VOC samples are to be collected in special containers provided by the laboratory. These typically include glass vials, preferably amber, with a minimum capacity of 20 ml and sealed with Septum tops.

Vials must be filled just to overflowing in such a manner that no air bubbles pass through the vial as it is being filled (this is easier to accomplish by inserting a 4' length of ¼ " poly tubing into the existing Wattera tubing and filling the vial from the ¼" tubing).

Vials must then be sealed with the cap so that no air bubbles are entrapped within it; the septum is placed with the Teflon side face down toward the inside of the bottle.

Check for the presence of air bubbles by inverting the vial and tapping on hard surface; if air bubbles are present, discard the sample and re-sample.

All VOC samples must be preserved as specified by the laboratory (typically with 1 to 2 drops of Hydrochloric Acid (HCI)) and refrigerated or stored on ice until analysed; and

VOC samples should be submitted in duplicate at a ratio specified in the approved monitoring program (typically 1:10)

Surface Water Sampling (General)

Surface water samples should be collected at the same designated location during each sample event (do not collect samples from any station which is frozen, stagnant or otherwise not representative of normal conditions).

If you must stand in the stream, position yourself downstream of the sample location to avoid contaminating the sample with sediment, debris, and other floating materials.

All equipment must be thoroughly rinsed with distilled water at the beginning of each station to avoid cross-contamination.

Wear gloves as required to handle the sample bottles.

Fill all bottles using an unpreserved transfer bottle (to avoid overflowing pre-preserved bottles).

When sampling for dissolved metals, the sample must be filtered and placed in a separate metals bottle, while sampling for total metals, the sample is placed in a common bottle for metals that is provided by the laboratory.

Label and store all samples in the same manner as for groundwater samples; and

Conduct field measurements (these typically include temperature, pH, conductivity, Dissolved Oxygen and Flow).

Flow Measurements (General)

Discharge flow measurements must be taken at designated stations.

QA/QC Water Samples

A field quality assurance and quality control program for all monitoring events will be established as follows and or as dictated in the approved monitoring program.

Where groundwater or surface water samples are collected, and if stipulated in the approved monitoring program, a field blank in which a set of sample bottles is filled with distilled water at a known site or monitoring station is submitted to the laboratory for analysis along with the samples

Where VOC samples are taken, a trip blank, in which 1 set of VOC vials are filled with distilled water (at the laboratory or office) prior to going to the field and accompanies the sample bottles until they are returned to the lab; and

Duplicate of as outlined in the approved monitoring program or 1 duplicate for every 10 samples (do not identify the sample ID number to the laboratory, but have it recorded in the field notes) use the sampling technique as for observation wells.

SAMPLING

Station Sampling Order

The stations will be sampled beginning with those wells exhibiting the lowest chemical concentrations and then moving on to wells with greater chemical concentrations.

Monitoring Periods

The monitoring periods are as recommended in either the approved monitoring program or the Environmental Compliance Approval.

Analytical Parameters

Analysis will be as recommended in either the approved monitoring program and or the Environmental Compliance Approval.

Gas Detection of On-site Buildings

Gas detection in on-site buildings is to be included as part of regular monitoring.

Appendix F

Historic Static Levels, Ground and Surface Water Analysis

THE TOWNSHIP OF GREATER MADAWASKA

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.

THE TOWNSHIP OF GREATER MADAWASKA

Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	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 $CaCO_3$)	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.

THE TOWNSHIP OF GREATER MADAWASKA

Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW06-2													5-year Trends
				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	(sparkline)
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.
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3. Results obtained from laboratory analysis.
4. Results obtained from field analysis.

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THE TOWNSHIP OF GREATER MADAWASKA

Groundwater Quality
Mount St. Patrick Waste Disposal Site

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				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 $CaCO_3$)	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.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW06-4														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 $CaCO_3$)	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.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	MW09-5R														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 $CaCO_3$)	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.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	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 $CaCO_3$)	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.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

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.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

Groundwater Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background (median)	RUC [1]	ODWS [2]	GLL7 (Residential)												5-year Trends
				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	(sparkline)
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.

Greenview ENVIRONMENTAL MANAGEMENT

THE TOWNSHIP OF GREATER MADAWASKA

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.

THE TOWNSHIP OF GREATER MADAWASKA

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.

THE TOWNSHIP OF GREATER MADAWASKA

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.

Greenview ENVIRONMENTAL MANAGEMENT

THE MUNICIPALITY OF GREATER MADAWASKA

Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background	PWQO [1]	SW-1														5-year Trends
	(75th Percentile)		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	(sparkline)
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	0.00087	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.
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Greenview
ENVIRONMENTAL MANAGEMENT

THE MUNICIPALITY OF GREATER MADAWASKA

Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background	PWQO [1]	SW-2 (Background)														5-year Trends
	(75th Percentile)		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	(sparkline)
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	0.117	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.
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ENVIRONMENTAL MANAGEMENT

THE MUNICIPALITY OF GREATER MADAWASKA

Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background	PWQO [1]	SW-3						5-year Trends
	(75th Percentile)		25-May-16	09-May-17	07-May-18	16-May-19	28-Apr-20	06-May-21	(sparkline)
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.

Greenview ENVIRONMENTAL MANAGEMENT

THE MUNICIPALITY OF GREATER MADAWASKA

Surface Water Quality
Mount St. Patrick Waste Disposal Site

Parameter	Background	PWQO [1]	SW-4													5-year Trends
	(75th Percentile)		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	(sparkline)
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.

Greenview
ENVIRONMENTAL MANAGEMENT

Appendix G
Groundwater Elevations 2024

Groundwater Elevations: Mt. St. Patrick WDS (Closed)

Monitor	Top of Pipe Elevation (Assumed Datum)	Ground Elevation (Assumed Datum)	Well of Bottom Depth (M)	Jul-23		Nov-23		Jul-24		Nov-24	
				Water Level	Elevation	Water Level	Elevation	Water Level	Elevation	Water Level	Elevation
MW 08-1	98.58	97.69	6.51	4.27	94.31	5.37	93.21	4.39	94.19	5.20	93.38
MW 06-2	94.86	93.93	3.19	1.37	93.49	2.07	92.79	1.43	93.43	1.97	92.89
MW 06-3	94.26	93.29	3.85	1.34	92.92	1.82	92.44	1.36	92.90	1.75	92.51
MW 06-4	96.57	95.66	4.92	2.60	93.97	3.64	92.93	2.71	93.86	3.92	92.65
MW 09-5R	93.28	92.08	--	NF	--	NF	--	NF	--	NF	--
MW 09-6R	90.53	89.30	2.02	Not Found	--	1.73	88.80	1.72	88.81	1.81	88.72
MW 21-7	95.52	94.97	1.73	1.15	94.37	1.72	93.80	1.31	94.21	1.63	93.89
MP 3R	94.45	93.51	--	NF	--	NF	--	NF	--	NF	--
MP 4	96.71	95.93	--	NF	--	NF	--	NF	--	NF	--
MP 5	93.65	92.86	0.92	NF	--	DRY	--	DRY	--	1.21	92.44
MP 6	93.67	93.02	1.82	0.67	93.00	1.08	92.59	0.69	92.98	1.04	92.63
MP 7	93.47	92.81	1.83	0.99	92.48	1.21	92.26	1.01	92.46	1.17	92.30

Note:
1. Well depths based on Jp2g measurements in 2023
2. MW 95-3B was repaired by Greenview 2021 surveyed Nov 16, 2021
3. Elevations based on Greenview 2011 Survey
4. Elevations are assumed
5- NF: Not Found - Likely Destoryed

Appendix H
Laboratory Certificates of Analysis 2024

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 111308

REPORT No: 24-020699 - Rev. 0

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2024-Jul-09
DATE REPORTED: 2024-Jul-17
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Mount St Patrick 22-621313
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	5	OTTAWA	PCURIEL	2024-Jul-10	A-IC-01	SM 4110B
COD (Liquid)	5	KINGSTON	EHINCH	2024-Jul-15	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	5	OTTAWA	SBOUDREAU	2024-Jul-10	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	5	OTTAWA	VKASYAN	2024-Jul-11	C-OC-01	EPA 415.2
Ion Balance (Calc.)	5	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/MS (Liquid)	5	OTTAWA	TPRICE	2024-Jul-15	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	5	OTTAWA	APRUDYVUS	2024-Jul-11	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	5	KINGSTON	JYEARWOOD	2024-Jul-15	NH3-001	SM 4500NH3
Phenols (Liquid)	5	KINGSTON	JMACINNES	2024-Jul-17	PHEN-01	MECP E3179
TP & TKN (Liquid)	5	KINGSTON	KDIBBITS	2024-Jul-15	TPTKN-001	MECP E3516.2

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

Parameter	Units	R.L.	Client I.D.	GLL7	MW06-3	MW06-2	MW06-4	MW08-1
			Sample I.D.	24-020699-1	24-020699-2	24-020699-3	24-020699-4	24-020699-5
			Date Collected	2024-07-08	2024-07-08	2024-07-08	2024-07-08	2024-07-08
				-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		209	348	346	295	278
Conductivity @25°C	uS/cm	1		405	1010	984	1020	587
pH @25°C	pH units	-		7.44	7.25	7.39	7.47	7.43
Chloride	mg/L	0.5		0.9	122	94.7	144	19.9
Nitrate (N)	mg/L	0.05		<0.05	<0.05	0.53	0.85	0.63
Nitrite (N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1		10	5	31	18	11
Phosphorus (Total)	mg/L	0.01		0.01	0.31	0.78	1.01	3.11
Total Kjeldahl Nitrogen	mg/L	0.1		0.1	0.5	0.6	0.3	1.4
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		<0.05	0.06	0.15	<0.05	<0.05
Dissolved Organic Carbon	mg/L	0.2		2.4	10.1	4.3	1.9	4.3
Phenolics	mg/L	0.001		<0.001	<0.001	<0.001	0.001	<0.001
COD	mg/L	5		<5	51	40	47	81
Hardness (as CaCO3)	mg/L	0.02		199	358	349	329	251
Aluminum	mg/L	0.01		0.02	0.05	0.04	0.03	0.03
Barium	mg/L	0.001		0.185	0.260	0.236	0.225	0.095
Boron	mg/L	0.005		0.012	0.059	0.167	0.061	0.012
Calcium	mg/L	0.02		60.9	108	105	97.9	76.4
Iron	mg/L	0.005		0.068	0.021	0.049	<0.005	<0.005
Magnesium	mg/L	0.02		11.4	21.6	21.4	20.5	14.6
Manganese	mg/L	0.001		0.004	1.02	0.193	<0.001	<0.001

Michelle Dubien
Data Specialist

	Client I.D.	GLL7	MW06-3	MW06-2	MW06-4	MW08-1
	Sample I.D.	24-020699-1	24-020699-2	24-020699-3	24-020699-4	24-020699-5
	Date Collected	2024-07-08	2024-07-08	2024-07-08	2024-07-08	2024-07-08
Parameter	**Units** **R.L.**	-	-	-	-	-
Potassium	mg/L 0.1	2.3	1.1	3.5	2.9	1.7
Silicon	mg/L 0.01	4.30	5.26	5.84	4.97	4.42
Sodium	mg/L 0.2	1.9	64.2	58.2	72.6	22.3
Strontium	mg/L 0.001	0.189	0.218	0.229	0.199	0.153
Zinc	mg/L 0.005	0.022	0.006	<0.005	<0.005	<0.005
Cadmium	mg/L 0.000015	<0.000015	0.000084	<0.000015	<0.000015	<0.000015
Copper	mg/L 0.0001	0.0923	0.0013	0.0010	0.0009	0.0008
Anion Sum	meq/L -	4.42	10.5	10.3	10.4	6.39
Cation Sum	meq/L -	4.12	10.0	9.61	9.81	6.03
% Difference	% -	3.45	2.33	3.21	2.89	2.89
Ion Ratio	- -	1.07	1.05	1.07	1.06	1.06
Sodium Adsorption Ratio	- -	0.0592	1.48	1.36	1.74	0.612
TDS (Ion Sum Calc)	mg/L 1	213	532	523	537	315
TDS(calc.)/EC(actual)	- -	0.526	0.526	0.531	0.525	0.537
Conductivity Calc	µmho/cm -	395	976	936	988	573
Conductivity Calc / Conductivity	- -	0.975	0.965	0.951	0.967	0.975
Langelier Index(25°C)	- -	0.112	0.362	0.486	0.458	0.315
Saturation pH (25°C)	- -	7.33	6.89	6.90	7.01	7.11
pH (Client Data)	pH units -	6.0	6.2	6.5	6.7	6.4
Temperature (Client Data)	°C -	15.0	13.6	14.8	11.5	10.7

Michelle Dubien
Data Specialist

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured. Canadian owned.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 111437

REPORT No: 24-035147 - Rev. 0

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2024-Nov-08
DATE REPORTED: 2024-Nov-22
SAMPLE MATRIX: Ground Water

CUSTOMER PROJECT: Mt St Patrick 22-6213C
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	6	OTTAWA	PCURIEL	2024-Nov-12	A-IC-01	SM 4110B
COD (Liquid)	6	KINGSTON	DCASSIDY	2024-Nov-13	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	6	OTTAWA	SBOUDREAU	2024-Nov-11	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	6	OTTAWA	TPRICE	2024-Nov-18	C-OC-01	EPA 415.2
Ion Balance (Calc.)	6	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/MS (Liquid)	6	OTTAWA	AOZKAYMAK	2024-Nov-13	D-ICPMS-01	EPA 200.8
ICP/OES (Liquid)	6	OTTAWA	APRUDYVUS	2024-Nov-14	D-ICP-01	SM 3120B
Ammonia & o-Phosphate (Liquid)	6	KINGSTON	JYEARWOOD	2024-Nov-13	NH3-001	SM 4500NH3
Phenols (Liquid)	6	KINGSTON	EHINCH	2024-Nov-12	PHEN-01	MECP E3179
TP & TKN (Liquid)	6	KINGSTON	YLIEN	2024-Nov-19	TPTKN-001	MECP E3516.2

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

Michelle Dubien
Data Specialist

	Client I.D.	GLL7	MW08-1	MW06-4	MW06-3	MW06-2
	Sample I.D.	24-035147-1	24-035147-2	24-035147-3	24-035147-4	24-035147-5
	Date Collected	2024-11-07	2024-11-07	2024-11-07	2024-11-07	2024-11-07
Parameter	**Units** / **R.L.**	-	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L / 5	205	316	336	296	358
Conductivity @25°C	uS/cm / 1	393	722	867	989	928
pH @25°C	pH units / -	8.09	7.89	8.00	7.84	7.89
Chloride	mg/L / 0.5	1.2	39.8	63.9	131	75.4
Nitrate (N)	mg/L / 0.05	<0.05	0.53	1.00	0.07	0.25
Nitrite (N)	mg/L / 0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L / 1	9	11	33	18	33
Phosphorus (Total)	mg/L / 0.01	<0.01	2.21	1.01	2.38	1.09
Total Kjeldahl Nitrogen	mg/L / 0.1	<0.1	0.7	0.2	0.3	1.4
Ammonia (N)-Total (NH3+NH4)	mg/L / 0.05	<0.05	<0.05	<0.05	0.06	0.06
Dissolved Organic Carbon	mg/L / 0.8	1.5	4.4	3.6	8.1	4.2
Phenolics	mg/L / 0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L / 5	7	183	41	62	111
Hardness (as CaCO3)	mg/L / 0.02	231	350	354	385	403
Aluminum	mg/L / 0.01	0.02	0.04	0.03	0.04	0.04
Barium	mg/L / 0.001	0.213	0.136	0.224	0.266	0.261
Boron	mg/L / 0.005	0.011	0.016	0.082	0.040	0.157
Calcium	mg/L / 0.02	71.6	108	106	116	121
Iron	mg/L / 0.005	0.043	0.017	<0.005	0.012	0.021
Magnesium	mg/L / 0.02	12.7	19.8	21.6	22.9	24.2
Manganese	mg/L / 0.001	0.001	0.002	<0.001	0.450	0.114

Michelle Dubien
Data Specialist

			Client I.D.	GLL7	MW08-1	MW06-4	MW06-3	MW06-2
			Sample I.D.	24-035147-1	24-035147-2	24-035147-3	24-035147-4	24-035147-5
			Date Collected	2024-11-07	2024-11-07	2024-11-07	2024-11-07	2024-11-07
Parameter	**Units**	**R.L.**		-	-	-	-	-
Potassium	mg/L	0.1		2.3	2.3	2.9	1.5	3.6
Silicon	mg/L	0.01		4.27	4.95	5.03	5.20	5.82
Sodium	mg/L	0.2		2.0	35.0	69.0	75.5	59.6
Strontium	mg/L	0.001		0.205	0.201	0.199	0.220	0.246
Zinc	mg/L	0.005		<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	mg/L	0.000015		<0.000015	<0.000015	<0.000015	0.000030	<0.000015
Copper	mg/L	0.0001		0.0108	0.0015	0.0015	0.0015	0.0017
Anion Sum	meq/L	-		4.32	7.70	9.27	10.0	10.0
Cation Sum	meq/L	-		4.77	8.59	10.1	11.0	10.7
% Difference	%	-		4.96	5.44	4.55	4.94	3.59
Ion Ratio	-	-		0.905	0.897	0.913	0.906	0.931
Sodium Adsorption Ratio	-	-		0.0569	0.815	1.60	1.67	1.29
TDS (Ion Sum Calc)	mg/L	1		222	408	502	544	534
TDS(calc.)/EC(actual)	-	-		0.564	0.565	0.579	0.550	0.575
Conductivity Calc	µmho/cm	-		423	754	900	1020	960
Conductivity Calc / Conductivity	-	-		1.08	1.04	1.04	1.03	1.03
Langelier Index(25°C)	-	-		0.823	0.958	1.09	0.905	1.07
Saturation pH (25°C)	-	-		7.27	6.93	6.91	6.93	6.82
pH (Client Data)	pH units	-		6.2	7.4	7.5	7.2	7.3
Temperature (Client Data)	°C	-		13.2	11.3	10.4	12.1	11.7

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		Client I.D.	Dup#1
		Sample I.D.	24-035147-6
		Date Collected	2024-11-07
Parameter	**Units**	**R.L.**	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	320
Conductivity @25°C	uS/cm	1	719
pH @25°C	pH units	-	7.97
Chloride	mg/L	0.5	39.8
Nitrate (N)	mg/L	0.05	0.54
Nitrite (N)	mg/L	0.05	<0.05
Sulphate	mg/L	1	11
Phosphorus (Total)	mg/L	0.01	1.49
Total Kjeldahl Nitrogen	mg/L	0.1	0.5
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	<0.05
Dissolved Organic Carbon	mg/L	0.8	3.6
Phenolics	mg/L	0.001	<0.001
COD	mg/L	5	112
Hardness (as CaCO3)	mg/L	0.02	356
Aluminum	mg/L	0.01	0.04
Barium	mg/L	0.001	0.138
Boron	mg/L	0.005	0.018
Calcium	mg/L	0.02	109
Iron	mg/L	0.005	<0.005
Magnesium	mg/L	0.02	20.0
Manganese	mg/L	0.001	0.001

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Parameter	Units	R.L.	Client I.D.: Dup#1 Sample I.D.: 24-035147-6 Date Collected: 2024-11-07 -
Potassium	mg/L	0.1	2.3
Silicon	mg/L	0.01	4.94
Sodium	mg/L	0.2	35.2
Strontium	mg/L	0.001	0.203
Zinc	mg/L	0.005	<0.005
Cadmium	mg/L	0.000015	<0.000015
Copper	mg/L	0.0001	0.0007
Anion Sum	meq/L	-	7.78
Cation Sum	meq/L	-	8.70
% Difference	%	-	5.55
Ion Ratio	-	-	0.895
Sodium Adsorption Ratio	-	-	0.812
TDS (Ion Sum Calc)	mg/L	1	412
TDS(calc.)/EC(actual)	-	-	0.573
Conductivity Calc	µmho/cm	-	762
Conductivity Calc / Conductivity	-	-	1.06
Langelier Index(25°C)	-	-	1.05
Saturation pH (25°C)	-	-	6.92

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 111307

REPORT No: 24-020697 - Rev. 0

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2024-Jul-09
DATE REPORTED: 2024-Jul-17
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: Mount St Patrick 22-621313
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	4	OTTAWA	PCURIEL	2024-Jul-10	A-IC-01	SM 4110B
BOD5 (Liquid)	4	KINGSTON	JWOLFE2	2024-Jul-11	BOD-001	SM 5210B
COD (Liquid)	4	KINGSTON	EHINCH	2024-Jul-15	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	4	OTTAWA	SBOUDREAU	2024-Jul-10	COND-02/PH-02/ALK-02	SM 2510B/4500H/2320B
DOC/DIC (Liquid)	4	OTTAWA	VKASYAN	2024-Jul-10	C-OC-01	EPA 415.2
Ion Balance (Calc.)	4	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/MS Total (Liquid)	4	OTTAWA	TPRICE	2024-Jul-12	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	4	OTTAWA	APRUDYVUS	2024-Jul-11	D-ICP-01	SM 3120B
Mercury (Liquid)	4	OTTAWA	TBENNETT	2024-Jul-11	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	4	KINGSTON	JYEARWOOD	2024-Jul-15	NH3-001	SM 4500NH3
Phenols (Liquid)	4	KINGSTON	JMACINNES	2024-Jul-17	PHEN-01	MECP E3179
TP & TKN (Liquid)	4	KINGSTON	KDIBBITS	2024-Jul-15	TPTKN-001	MECP E3516.2
TSS (Liquid)	4	KINGSTON	DCASSIDY	2024-Jul-11	TSS-001	SM 2540D

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

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		Client I.D.	SW4	SW2	SW1	Dup#1
		Sample I.D.	24-020697-1	24-020697-2	24-020697-3	24-020697-4
		Date Collected	2024-07-08	2024-07-08	2024-07-08	2024-07-08
Parameter	**Units**	**R.L.**	-	-	-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5	126	129	136	140
Conductivity @25°C	uS/cm	1	274	276	278	276
pH @25°C	pH units	-	6.93	7.01	7.10	7.11
Chloride	mg/L	0.5	10.1	9.9	10.0	9.9
Nitrate (N)	mg/L	0.05	0.07	0.05	0.05	0.05
Nitrite (N)	mg/L	0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	1	4	4	4	4
BOD5	mg/L	3	<3	<3	<3	<3
Total Suspended Solids	mg/L	3	4	3	<3	3
Phosphorus (Total)	mg/L	0.01	0.02	0.02	0.02	0.02
Total Kjeldahl Nitrogen	mg/L	0.1	0.7	0.5	0.5	0.5
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Organic Carbon	mg/L	0.2	12.6	10.5	11.3	12.7
Phenolics	mg/L	0.001	<0.001	<0.001	<0.001	<0.001
COD	mg/L	5	27	18	25	18
Hardness (as CaCO3)	mg/L	0.02	134	135	134	138
Barium (Total)	mg/L	0.001	0.076	0.075	0.074	0.076
Boron (Total)	mg/L	0.005	0.009	0.010	0.010	0.008
Calcium (Total)	mg/L	0.02	40.8	40.8	40.8	42.0
Iron (Total)	mg/L	0.005	0.176	0.128	0.169	0.161
Magnesium (Total)	mg/L	0.02	7.91	7.92	7.78	8.02

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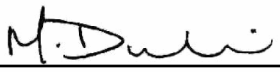
			Client I.D.	SW4	SW2	SW1	Dup#1
			Sample I.D.	24-020697-1	24-020697-2	24-020697-3	24-020697-4
			Date Collected	2024-07-08	2024-07-08	2024-07-08	2024-07-08
Parameter	**Units**	**R.L.**		-	-	-	-
Manganese (Total)	mg/L	0.001		0.063	0.046	0.046	0.047
Potassium (Total)	mg/L	0.1		1.1	1.1	1.0	1.1
Sodium (Total)	mg/L	0.2		5.9	5.8	5.8	5.9
Strontium (Total)	mg/L	0.001		0.133	0.133	0.131	0.135
Zinc (Total)	mg/L	0.005		<0.005	<0.005	<0.005	0.005
Arsenic (Total)	mg/L	0.0001		0.0001	0.0001	0.0001	0.0001
Cadmium (Total)	mg/L	0.000015		<0.000015	<0.000015	<0.000015	<0.000015
Chromium (Total)	mg/L	0.001		<0.001	<0.001	<0.001	<0.001
Copper (Total)	mg/L	0.0001		0.0005	0.0007	0.0005	0.0005
Lead (Total)	mg/L	0.00002		0.00004	0.00003	0.00003	0.00004
Mercury	mg/L	0.00002		<0.00002	<0.00002	<0.00002	<0.00002
Anion Sum	meq/L	-		2.89	2.94	3.08	3.16
Cation Sum	meq/L	-		2.98	2.98	2.96	3.06
% Difference	%	-		1.55	0.652	1.85	1.69
Ion Ratio	-	-		0.969	0.987	1.04	1.03
Sodium Adsorption Ratio	-	-		0.221	0.219	0.217	0.220
TDS (Ion Sum Calc)	mg/L	1		146	147	151	155
TDS(calc.)/EC(actual)	-	-		0.533	0.534	0.543	0.563
Conductivity Calc	µmho/cm	-		285	286	291	298
Conductivity Calc / Conductivity	-	-		1.04	1.04	1.05	1.08
Langelier Index(25°C)	-	-		-0.753	-0.662	-0.550	-0.523



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			Client I.D.	SW4	SW2	SW1	Dup#1
			Sample I.D.	24-020697-1	24-020697-2	24-020697-3	24-020697-4
			Date Collected	2024-07-08	2024-07-08	2024-07-08	2024-07-08
Parameter	**Units**	**R.L.**		-	-	-	-
Saturation pH (25°C)	-	-		7.68	7.67	7.65	7.63
pH (Client Data)	pH units	-		6.0	5.6	6.0	
Temperature (Client Data)	°C	-		24.1	23.4	24.6	

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G 111436

REPORT No: 24-035146 - Rev. 0

Report To:
Jp2g Consultants Inc
1150 Morrison Dr.
Ottawa, ON K2H 8S9

CADUCEON Environmental Laboratories
2378 Holly Lane
Ottawa, ON K1V 7P1

Attention: Nick Weston

DATE RECEIVED: 2024-Nov-08
DATE REPORTED: 2024-Nov-21
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT: Mt St Patrick 22-6213C
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	2	OTTAWA	PCURIEL	2024-Nov-12	A-IC-01	SM 4110B
BOD5 (Liquid)	2	KINGSTON	DCASSIDY	2024-Nov-13	BOD-001	SM 5210B
COD (Liquid)	2	KINGSTON	DCASSIDY	2024-Nov-13	COD-001	SM 5220D
Cond/pH/Alk Auto (Liquid)	2	OTTAWA	SBOUDREAU	2024-Nov-11	COND-02/PH-02/A LK-02	SM 2510B/4500H/ 2320B
DOC/DIC (Liquid)	2	OTTAWA	TPRICE	2024-Nov-19	C-OC-01	EPA 415.2
Ion Balance (Calc.)	2	OTTAWA	ASCHNEIDER		CP-028	MECP E3196
ICP/MS Total (Liquid)	2	OTTAWA	AOZKAYMAK	2024-Nov-11	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	2	OTTAWA	APRUDYVUS	2024-Nov-11	D-ICP-01	SM 3120B
Mercury (Liquid)	2	OTTAWA	TBENNETT	2024-Nov-12	D-HG-02	SM 3112B
Ammonia & o-Phosphate (Liquid)	2	KINGSTON	JYEARWOOD	2024-Nov-13	NH3-001	SM 4500NH3
Phenols (Liquid)	2	KINGSTON	EHINCH	2024-Nov-12	PHEN-01	MECP E3179
TP & TKN (Liquid)	2	KINGSTON	YLIEN	2024-Nov-19	TPTKN-001	MECP E3516.2
TSS (Liquid)	2	KINGSTON	MWILSON	2024-Nov-13	TSS-001	SM 2540D

R.L. = Reporting Limit
NC = Not Calculated
Test methods may be modified from specified reference method unless indicated by an *

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			Client I.D.	SW2	SW4
			Sample I.D.	24-035146-1	24-035146-2
			Date Collected	2024-11-07	2024-11-07
Parameter	**Units**	**R.L.**		-	-
Alkalinity(CaCO3) to pH4.5	mg/L	5		130	131
Conductivity @25°C	uS/cm	1		286	284
pH @25°C	pH units	-		7.77	7.93
Chloride	mg/L	0.5		10.5	9.9
Nitrate (N)	mg/L	0.05		<0.05	<0.05
Nitrite (N)	mg/L	0.05		<0.05	<0.05
Sulphate	mg/L	1		6	6
BOD5	mg/L	3		<3	<3
Total Suspended Solids	mg/L	3		<3	<3
Phosphorus (Total)	mg/L	0.01		0.02	0.02
Total Kjeldahl Nitrogen	mg/L	0.1		0.4	0.4
Ammonia (N)-Total (NH3+NH4)	mg/L	0.05		<0.05	0.05
Dissolved Organic Carbon	mg/L	0.8		10.1	9.7
Phenolics	mg/L	0.001		<0.001	<0.001
COD	mg/L	5		21	22
Hardness (as CaCO3)	mg/L	0.02		143	140
Barium (Total)	mg/L	0.001		0.074	0.073
Boron (Total)	mg/L	0.005		0.010	0.009
Calcium (Total)	mg/L	0.02		42.7	42.0
Iron (Total)	mg/L	0.005		0.078	0.061
Magnesium (Total)	mg/L	0.02		8.75	8.55

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			Client I.D.	SW2	SW4
			Sample I.D.	24-035146-1	24-035146-2
			Date Collected	2024-11-07	2024-11-07
Parameter	Units	R.L.		-	-
Manganese (Total)	mg/L	0.001		0.034	0.030
Potassium (Total)	mg/L	0.1		1.4	1.4
Sodium (Total)	mg/L	0.2		6.4	6.3
Strontium (Total)	mg/L	0.001		0.138	0.136
Zinc (Total)	mg/L	0.005		<0.005	0.005
Arsenic (Total)	mg/L	0.0001		0.0001	0.0001
Cadmium (Total)	mg/L	0.000015		<0.000015	<0.000015
Chromium (Total)	mg/L	0.001		<0.001	<0.001
Copper (Total)	mg/L	0.0001		0.0002	0.0002
Lead (Total)	mg/L	0.00002		0.00002	<0.00002
Mercury	mg/L	0.00002		<0.00002	<0.00002
Anion Sum	meq/L	-		3.01	3.02
Cation Sum	meq/L	-		3.17	3.12
% Difference	%	-		2.73	1.58
Ion Ratio	-	-		0.947	0.969
Sodium Adsorption Ratio	-	-		0.233	0.231
TDS (Ion Sum Calc)	mg/L	1		153	153
TDS(calc.)/EC(actual)	-	-		0.536	0.538
Conductivity Calc	µmho/cm	-		300	297
Conductivity Calc / Conductivity	-	-		1.05	1.05
Langelier Index(25°C)	-	-		0.111	0.269

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			Client I.D.	SW2	SW4
			Sample I.D.	24-035146-1	24-035146-2
			Date Collected	2024-11-07	2024-11-07
Parameter	**Units**	**R.L.**		-	-
Saturation pH (25°C)	-	-		7.66	7.66
pH (Client Data)	pH units	-		7.5	7.6
Temperature (Client Data)	°C	-		10.5	10.4

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Appendix I
Chemistry Analyses 2024

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 08-1					
		Jul-23	Jul-23	Nov-23	Nov-23	Jul-24	Nov-24
Parameters mg/L			Dup #1		Dup #1		
Alkalinity(CaCO3) to pH4.5	30-500	267	266	321	321	278	316
pH @25°C	6.5 - 8.5	7.9	7.87	7.82	7.79	7.43	7.89
Conductivity @25°C		578	573	760	759	587	722
TDS (Calc. from Cond.)		300	297	398	397		
Chloride	250	20.2	19.5	40	39.1	19.9	39.8
Nitrate (N)	10	0.66	0.65	0.49	0.55	0.63	0.53
Nitrite (N)	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	500	9	9	17	17	11	11
Phosphorus (Total)		0.48	0.32	2.45	2.65	3.11	2.21
Total Kjeldahl Nitrogen		0.2	0.2	1.1	0.6	1.4	0.7
Ammonia (N)-Total (NH3+NH4)		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dissolved Organic Carbon	5	1.5	2.3	2.6	3	4.3	4.4
Phenolics				<0.001	<0.001	<0.001	<0.001
COD		<5	<5	76	75	81	183
Hardness (as CaCO3)	500	213	215	297	299	251	350
Aluminum		0.04	0.04	0.03	0.03	0.03	0.04
Barium	1	0.1	0.089	0.134	0.134	0.095	0.136
Boron	5	0.012	0.011	0.014	0.013	0.012	0.016
Calcium		64.2	64.7	87.2	87.8	76.4	108
Iron	0.3	0.028	0.027	<0.005	<0.005	<0.005	0.017
Magnesium		12.8	12.9	19.1	19.3	14.6	19.8
Manganese	0.05	<0.001	0.001	<0.001	<0.001	<0.001	0.002
Potassium		1.4	1.4	2	2	1.7	2.3
Silicon		3.83	3.8	5.14	5.15	4.42	4.95
Sodium	200	37.3	37.4	38.2	38.4	22.3	35
Strontium		0.127	0.127	0.187	0.189	0.153	0.201
Zinc	5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic	0.01						
Cadmium	0.005	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015
Chromium	0.05						
Cobalt							
Copper	1	0.0029	0.0029	0.0015	0.0008	0.0008	0.0015
Lead	0.01						
Mercury	0.001						
Anion Sum		6.15	6.11	7.93	7.9	6.39	7.7
Cation Sum		5.92	5.96	7.64	7.69	6.03	8.59
% Difference		1.96	1.31	1.84	1.4	2.89	5.44
Ion Ratio		1.04	1.03	1.04	1.03	1.06	0.897
Sodium Adsorption Ratio		1.11	1.11	0.965	0.966	0.612	0.815
TDS (Ion Sum Calc)	500	309	308	398	398	315	408
TDS(calc.)/EC(actual)		0.534	0.537	0.524	0.525	0.537	0.565
Conductivity Calc		557	556	718	719	573	754
Conductivity Calc / Conductivity		0.963	0.971	0.945	0.947	0.975	1.04
Langelier Index(25°C)		0.692	0.664	0.814	0.787	0.315	0.958
Saturation pH (25°C)		7.21	7.21	7.01	7	7.11	6.93
Field Measured							
Water Temp. (°C)		10.8		10.5		10.7	11.3
Conductivity (microS/cm)		660		860		520	810
pH (pH units)		7.6		7.3		6.9	7.4

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 08-1					
		Nov-24					
Parameters mg/L		Dup #1					
Alkalinity(CaCO3) to pH4.5	30-500	320					
pH @25°C	6.5 - 8.5	7.97					
Conductivity @25°C		719					
TDS (Calc. from Cond.)							
Chloride	250	39.8					
Nitrate (N)	10	0.54					
Nitrite (N)	1	<0.05					
Sulphate	500	11					
Phosphorus (Total)		1.49					
Total Kjeldahl Nitrogen		0.5					
Ammonia (N)-Total (NH3+NH4)		<0.05					
Dissolved Organic Carbon	5	3.6					
Phenolics		<0.001					
COD		112					
Hardness (as CaCO3)	500	356					
Aluminum		0.04					
Barium	1	0.138					
Boron	5	0.018					
Calcium		109					
Iron	0.3	<0.005					
Magnesium		20					
Manganese	0.05	0.001					
Potassium		2.3					
Silicon		4.94					
Sodium	200	35.2					
Strontium		0.203					
Zinc	5	<0.005					
Arsenic	0.01						
Cadmium	0.005	<0.000015					
Chromium	0.05						
Cobalt							
Copper	1	0.0007					
Lead	0.01						
Mercury	0.001						
Anion Sum		7.78					
Cation Sum		8.7					
% Difference		5.55					
Ion Ratio		0.895					
Sodium Adsorption Ratio		0.812					
TDS (Ion Sum Calc)	500	412					
TDS(calc.)/EC(actual)		0.573					
Conductivity Calc		762					
Conductivity Calc / Conductivity		1.06					
Langelier Index(25°C)		1.05					
Saturation pH (25°C)		6.92					
Field Measured							
Water Temp. (°C)							
Conductivity (microS/cm)							
pH (pH units)							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 06-2					
		Jul-23	Nov-23	Jul-24	Nov-24		
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	333	348	346	358		
pH @25°C	6.5 - 8.5	7.7	7.78	7.39	7.89		
Conductivity @25°C		1110	1020	984	928		
TDS (Calc. from Cond.)		595	547				
Chloride	250	142	107	94.7	75.4		
Nitrate (N)	10	0.64	0.34	0.53	0.25		
Nitrite (N)	1	<0.05	<0.05	<0.05	<0.05		
Sulphate	500	29	25	31	33		
Phosphorus (Total)		0.86	1.49	0.78	1.09		
Total Kjeldahl Nitrogen		0.9	4.7	0.6	1.4		
Ammonia (N)-Total (NH3+NH4)		0.24	0.34	0.15	0.06		
Dissolved Organic Carbon	5	<0.2	2.8	4.3	4.2		
Phenolics			<0.001	<0.001	<0.001		
COD		15	138	40	111		
Hardness (as CaCO3)	500	396	379	349	403		
Aluminum		0.06	0.03	0.04	0.04		
Barium	1	0.276	0.337	0.236	0.261		
Boron	5	0.135	0.138	0.167	0.157		
Calcium		119	111	105	121		
Iron	0.3	0.036	0.514	0.049	0.021		
Magnesium		24	24.6	21.4	24.2		
Manganese	0.05	0.278	2.24	0.193	0.114		
Potassium		3.5	3.8	3.5	3.6		
Silicon		5.14	7.2	5.84	5.82		
Sodium	200	57.5	60.6	58.2	59.6		
Strontium		0.256	0.258	0.229	0.246		
Zinc	5	<0.005	<0.005	<0.005	<0.005		
Arsenic	0.01						
Cadmium	0.005	0.000022	<0.000015	<0.000015	<0.000015		
Chromium	0.05						
Cobalt							
Copper	1	0.0032	0.0007	0.001	0.0017		
Lead	0.01						
Mercury	0.001						
Anion Sum		11.3	10.5	10.3	10		
Cation Sum		10.5	10.4	9.61	10.7		
% Difference		3.68	0.623	3.21	3.59		
Ion Ratio		1.08	1.01	1.07	0.931		
Sodium Adsorption Ratio		1.26	1.36	1.36	1.29		
TDS (Ion Sum Calc)	500	578	545	523	534		
TDS(calc.)/EC(actual)		0.522	0.533	0.531	0.575		
Conductivity Calc		1050	982	936	960		
Conductivity Calc / Conductivity		0.949	0.96	0.951	1.03		
Langelier Index(25°C)		0.826	0.893	0.486	1.07		
Saturation pH (25°C)		6.87	6.89	6.9	6.82		
Field Measured							
Water Temp. (°C)		14.8	11.1	14.8	11.7		
Conductivity (microS/cm)		1200	1070	820	1130		
pH (pH units)		7.2	6.8	6.5	7.3		

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 06-3					
		Jul-23	Nov-23	Jul-24	Nov-24		
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	327	289	348	296		
pH @25°C	6.5 - 8.5	7.54	7.71	7.25	7.84		
Conductivity @25°C		885	1050	1010	989		
TDS (Calc. from Cond.)		468	562				
Chloride	250	89.3	146	122	131		
Nitrate (N)	10	0.07	<0.05	<0.05	0.07		
Nitrite (N)	1	<0.05	<0.05	<0.05	<0.05		
Sulphate	500	10	22	5	18		
Phosphorus (Total)		0.09	0.39	0.31	2.38		
Total Kjeldahl Nitrogen		0.5	0.4	0.5	0.3		
Ammonia (N)-Total (NH3+NH4)		0.05	0.08	0.06	0.06		
Dissolved Organic Carbon	5	5.5	5.4	10.1	8.1		
Phenolics			<0.001	<0.001	<0.001		
COD		20	19	51	62		
Hardness (as CaCO3)	500	337	335	358	385		
Aluminum		0.06	0.04	0.05	0.04		
Barium	1	0.258	0.279	0.26	0.266		
Boron	5	0.05	0.045	0.059	0.04		
Calcium		102	97.9	108	116		
Iron	0.3	0.103	0.063	0.021	0.012		
Magnesium		20	22	21.6	22.9		
Manganese	0.05	0.987	1.66	1.02	0.45		
Potassium		0.8	1.1	1.1	1.5		
Silicon		4.49	5.45	5.26	5.2		
Sodium	200	62.6	74	64	76		
Strontium		0.20	0.21	0.22	0.22		
Zinc	5	<0.005	<0.005	0.006	<0.005		
Arsenic	0.01						
Cadmium	0.005	0.000057	0.000054	0.000084	0.00003		
Chromium	0.05						
Cobalt							
Copper	1	0.0024	0.0017	0.0013	0.0015		
Lead	0.01						
Mercury	0.001						
Anion Sum		9.25	10.4	10.5	10		
Cation Sum		9.52	10	10	11		
% Difference		1.47	1.76	2.33	4.94		
Ion Ratio		0.971	1.04	1.05	0.906		
Sodium Adsorption Ratio		1.48	1.76	1.48	1.67		
TDS (Ion Sum Calc)	500	482	539	532	544		
TDS(calc.)/EC(actual)		0.544	0.513	0.526	0.55		
Conductivity Calc		884	992	976	1020		
Conductivity Calc / Conductivity		0.999	0.945	0.965	1.03		
Langelier Index(25°C)		0.6	0.689	0.362	0.905		
Saturation pH (25°C)		6.94	7.02	6.89	6.93		
Field Measured							
Water Temp. (°C)		13.1	12.1	13.6	12.1		
Conductivity (microS/cm)		980	1140	840	1100		
pH (pH units)		7.3	7	6.2	7.2		

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 06-4					
		Jul-23	Nov-23	Jul-24	Nov-24		
Parameters mg/L							
Alkalinity(CaCO3) to pH4.5	30-500	281	320	295	336		
pH @25°C	6.5 - 8.5	7.7	7.87	7.47	8		
Conductivity @25°C		1450	1050	1020	867		
TDS (Calc. from Cond.)		789	564				
Chloride	250	280	122	144	63.9		
Nitrate (N)	10	1.08	1.07	0.85	1		
Nitrite (N)	1	<0.40	<0.05	<0.05	<0.05		
Sulphate	500	29	38	18	33		
Phosphorus (Total)		0.83	4.22	1.01	1.01		
Total Kjeldahl Nitrogen		0.3	1.7	0.3	0.2		
Ammonia (N)-Total (NH3+NH4)		<0.05	0.05	<0.05	<0.05		
Dissolved Organic Carbon	5	<0.2	2.5	1.9	3.6		
Phenolics			<0.001	0.001	<0.001		
COD		<5	96	47	41		
Hardness (as CaCO3)	500	504	373	329	354		
Aluminum		0.06	0.07	0.03	0.03		
Barium	1	0.342	0.262	0.225	0.224		
Boron	5	0.041	0.071	0.061	0.082		
Calcium		151	108	97.9	106		
Iron	0.3	<0.005	0.127	<0.005	<0.005		
Magnesium		30.8	25.1	20.5	21.6		
Manganese	0.05	<0.001	0.018	<0.001	<0.001		
Potassium		2.9	3	2.9	2.9		
Silicon		4.42	5.32	4.97	5.03		
Sodium	200	72.4	72.60	72.60	69		
Strontium		0.295	0.226	0.199	0.199		
Zinc	5	<0.005	<0.005	<0.005	<0.005		
Arsenic	0.01						
Cadmium	0.005	0.000032	<0.000015	<0.000015	<0.000015		
Chromium	0.05						
Cobalt							
Copper	1	0.0026	0.0021	0.0009	0.0015		
Lead	0.01						
Mercury	0.001						
Anion Sum		14.2	10.7	10.4	9.27		
Cation Sum		13.3	10.7	9.81	10.1		
% Difference		3.28	0.08	2.89	4.55		
Ion Ratio		1.07	1	1.06	0.913		
Sodium Adsorption Ratio		1.4	1.64	1.74	1.6		
TDS (Ion Sum Calc)	500	740	565	537	502		
TDS(calc.)/EC(actual)		0.51	0.536	0.525	0.579		
Conductivity Calc		1380	1020	988	900		
Conductivity Calc / Conductivity		0.953	0.969	0.967	1.04		
Langelier Index(25°C)		0.846	0.935	0.458	1.09		
Saturation pH (25°C)		6.85	6.93	7.01	6.91		
Field Measured							
Water Temp. (°C)		14.6	9.4	11.5	10.4		
Conductivity (microS/cm)		1460	1230	840	960		
pH (pH units)		7.2	6.5	6.7	7.5		

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 09-5R					
		Jul-23	Nov-23	Jul-24	Nov-24		
Parameters mg/L		NS	NS	NS	NS		
Alkalinity(CaCO3) to pH4.5	30-500						
pH @25°C	6.5 - 8.5						
Conductivity @25°C							
TDS (Calc. from Cond.)							
Chloride	250						
Nitrate (N)	10						
Nitrite (N)	1						
Sulphate	500						
Phosphorus (Total)							
Total Kjeldahl Nitrogen							
Ammonia (N)-Total (NH3+NH4)							
Dissolved Organic Carbon	5						
Phenolics							
COD							
Hardness (as CaCO3)	500						
Aluminum							
Barium	1						
Boron	5						
Calcium							
Iron	0.3						
Magnesium							
Manganese	0.05						
Potassium							
Silicon							
Sodium	200						
Strontium							
Zinc	5						
Arsenic	0.01						
Cadmium	0.005						
Chromium	0.05						
Cobalt							
Copper	1						
Lead	0.01						
Mercury	0.001						
Anion Sum							
Cation Sum							
% Difference							
Ion Ratio							
Sodium Adsorption Ratio							
TDS (Ion Sum Calc)	500						
TDS(calc.)/EC(actual)							
Conductivity Calc							
Conductivity Calc / Conductivity							
Langelier Index(25°C)							
Saturation pH (25°C)							
Field Measured							
Water Temp. (^{o}C)							
Conductivity (microS/cm)							
pH (pH units)							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 09-6R					
		Jul-23	Nov-23	Jul-24	Nov-24		
Parameters mg/L		NS	NS	NS	NS		
Alkalinity(CaCO3) to pH4.5	30-500						
pH @25°C	6.5 - 8.5						
Conductivity @25°C							
TDS (Calc. from Cond.)							
Chloride	250						
Nitrate (N)	10						
Nitrite (N)	1						
Sulphate	500						
Phosphorus (Total)							
Total Kjeldahl Nitrogen							
Ammonia (N)-Total (NH3+NH4)							
Dissolved Organic Carbon	5						
Phenolics							
COD							
Hardness (as CaCO3)	500						
Aluminum							
Barium	1						
Boron	5						
Calcium							
Iron	0.3						
Magnesium							
Manganese	0.05						
Potassium							
Silicon							
Sodium	200						
Strontium							
Zinc	5						
Arsenic	0.01						
Cadmium	0.005						
Chromium	0.05						
Cobalt							
Copper	1						
Lead	0.01						
Mercury	0.001						
Anion Sum							
Cation Sum							
% Difference							
Ion Ratio							
Sodium Adsorption Ratio							
TDS (Ion Sum Calc)	500						
TDS(calc.)/EC(actual)							
Conductivity Calc							
Conductivity Calc / Conductivity							
Langelier Index(25°C)							
Saturation pH (25°C)							
Field Measured							
Water Temp. (°C)							
Conductivity (microS/cm)							
pH (pH units)							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

Monitor Number->	ODWS	MW 21-7					
		Jul-23	Nov-23	Jul-24	Nov-24		
Parameters mg/L		NS	NS	NS	NS		
Alkalinity(CaCO3) to pH4.5	30-500						
pH @25°C	6.5 - 8.5						
Conductivity @25°C							
TDS (Calc. from Cond.)							
Chloride	250						
Nitrate (N)	10						
Nitrite (N)	1						
Sulphate	500						
Phosphorus (Total)							
Total Kjeldahl Nitrogen							
Ammonia (N)-Total (NH3+NH4)							
Dissolved Organic Carbon	5						
Phenolics							
COD							
Hardness (as CaCO3)	500						
Aluminum							
Barium	1						
Boron	5						
Calcium							
Iron	0.3						
Magnesium							
Manganese	0.05						
Potassium							
Silicon							
Sodium	200						
Strontium							
Zinc	5						
Arsenic	0.01						
Cadmium	0.005						
Chromium	0.05						
Cobalt							
Copper	1						
Lead	0.01						
Mercury	0.001						
Anion Sum							
Cation Sum							
% Difference							
Ion Ratio							
Sodium Adsorption Ratio							
TDS (Ion Sum Calc)	500						
TDS(calc.)/EC(actual)							
Conductivity Calc							
Conductivity Calc / Conductivity							
Langelier Index(25°C)							
Saturation pH (25°C)							
Field Measured							
Water Temp. (^{o}C)							
Conductivity (microS/cm)							
pH (pH units)							

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Groundwater Quality
Project Name: Mt. St. Patrick

RESIDENTIAL WELL

Monitor Number->	ODWS	GLL7					
		Jul-23	Nov-23	Jul-24	Nov-24		
Parameters mg/L		NS					
Alkalinity(CaCO3) to pH4.5	30-500		206	209	205		
pH @25°C	6.5 - 8.5		8.16	7.44	8.09		
Conductivity @25°C			413	405	393		
TDS (Calc. from Cond.)			213				
Chloride	250		1.3	0.9	1.2		
Nitrate (N)	10		<0.05	<0.05	<0.05		
Nitrite (N)	1		<0.05	<0.05	<0.05		
Sulphate	500		10	10	9		
Phosphorus (Total)			0.01	0.01	<0.01		
Total Kjeldahl Nitrogen			0.2	0.1	<0.1		
Ammonia (N)-Total (NH3+NH4)			<0.05	<0.05	<0.05		
Dissolved Organic Carbon	5		2.1	2.4	1.5		
Phenolics			<0.001	<0.001	<0.001		
COD			<5	<5	7		
Hardness (as CaCO3)	500		0.47	199	231		
Aluminum			<0.01	0.02	0.02		
Barium	1		<0.001	0.185	0.213		
Boron	5		0.008	0.012	0.011		
Calcium			0.14	60.9	71.6		
Iron	0.3		0.006	0.068	0.043		
Magnesium			0.03	11.4	12.7		
Manganese	0.05		0.002	0.004	0.001		
Potassium			0.2	2.3	2.3		
Silicon			4.24	4.3	4.27		
Sodium	200		104	1.9	2		
Strontium			<0.001	0.189	0.205		
Zinc	5		<0.005	0.022	<0.005		
Arsenic	0.01						
Cadmium	0.005		<0.000015	<0.000015	<0.000015		
Chromium	0.05						
Cobalt							
Copper	1		0.0077	0.0923	0.0108		
Lead	0.01						
Mercury	0.001						
Anion Sum			4.37	4.42	4.32		
Cation Sum			4.52	4.12	4.77		
% Difference			1.7	3.45	4.96		
Ion Ratio			0.967	1.07	0.905		
Sodium Adsorption Ratio			65	0.0592	0.0569		
TDS (Ion Sum Calc)	500		239	213	222		
TDS(calc.)/EC(actual)			0.579	0.526	0.564		
Conductivity Calc			403	395	423		
Conductivity Calc / Conductivity			0.976	0.975	1.08		
Langelier Index(25°C)			-1.8	0.112	0.823		
Saturation pH (25°C)			9.96	7.33	7.27		
Field Measured							
Water Temp. (°C)			11.5	15.0	13.2		
Conductivity (microS/cm)			490	370	320		
pH (pH units)			7.9	6	6.2		

Notes:

All values reported in mg/L unless otherwise noted

ODWS = Ontario Drinking Water Standards

Shaded values exceed ODWS

Surface Water Quality
Project Name: Mt. St. Patrick

Monitor Number ->				SW 1					
Parameters	**Limit**	**PWQO**	**CWQG**	**23-Jul-23**	**23-Nov-23**	**8-Jul-24**	**DUP #1**	**7-Nov-24**	
Alkalinity(CaCO3) to pH4.5	IPWQO	a		NS	147	136	140	NS	
pH @25°C					7.95	7.1	7.11		
Conductivity @25°C					301	278	276		
TDS (Calc. from Cond.)					154				
Chloride			120		9.3	10	9.9		
Nitrate (N)			3		0.07	0.05	0.05		
Nitrite (N)			0.6		<0.05	<0.05	<0.05		
Sulphate					6	4	4		
BOD5					<3	<3	<3		
Total Suspended Solids					48	<3	3		
Phosphorus (Total)	IPWQO	0.03			0.03	0.02	0.02		
Total Kjeldahl Nitrogen					0.4	0.5	0.5		
Ammonia (N)-Total (NH3+NH4)					<0.05	<0.05	<0.05		
Dissolved Organic Carbon					8.6	11.3	12.7		
Phenolics					<0.001	<0.001	<0.001		
COD					17	25	18		
Hardness (as CaCO3)					154	134	138		
Barium (Total)					0.082	0.074	0.076		
Boron (Total)	IPWQO	0.2	1.5		0.006	0.01	0.008		
Calcium (Total)					46.5	40.8	42		
Iron (Total)	PWQO	0.3	0.3		0.126	0.169	0.161		
Magnesium (Total)					9.29	7.78	8.02		
Manganese (Total)					0.027	0.046	0.047		
Potassium (Total)					1.5	1	1.1		
Sodium (Total)					6.1	5.8	5.9		
Strontium (Total)					0.149	0.131	0.135		
Zinc (Total)	PWQO IPWQO	0.03 0.02	0.007		0.014	<0.005	0.005		
Arsenic (Total)					0.0001	0.0001	0.0001		
Cadmium (Total)	PWQO	0.0002	0.00009		<0.000015	<0.000015	<0.000015		
Chromium (Total)	PWQO	0.001	0.001		<0.001	<0.001	<0.001		
Copper (Total)	PWQO IPWQO	0.005 d	Max 0.004 min 0.002 (based on hardness)		0.0005	0.0005	0.0005		
Lead (Total)	PWQO	0.005	0.001		0.00003	0.00003	0.00004		
Mercury	PWQO	0.0002	0.000026		<0.00002	<0.00002	<0.00002		
Anion Sum					3.32	3.08	3.16		
Cation Sum					3.4	2.96	3.06		
% Difference					1.13	1.85	1.69		
Ion Ratio					0.978	1.04	1.03		
Sodium Adsorption Ratio					0.214	0.217	0.22		
TDS (Ion Sum Calc)					167	151	155		
TDS(calc.)/EC(actual)					0.555	0.543	0.563		
Conductivity Calc					322	291	298		
Conductivity Calc / Conductivity					1.07	1.05	1.08		
Langelier Index(25°C)					0.381	-0.55	-0.523		
Saturation pH (25°C)					7.57	7.65	7.63		
Field Measured									
Water Temp. (^{o}C)					5.7	24.6			
Conductivity (microS/cm)					370	270			
pH (pH units)		6.5 - 8.5	6.5 - 9		7.8	6			
DO					10.6	6.1			
FLOW L/S					NM	NM			

Notes:
All values reported in mg/L unless otherwise noted
PWQO- Provincial Water Quality Objectives
CWQG - Canadian Water Quality Guidelines
NS - No Sample Taken
NM - Not Measured

Surface Water Quality
Project Name: Mt. St. Patrick

Monitor Number ->			SW 2					
Parameters	**Limit**	**PWQO**	**23-Jul-23**	**23-Nov-23**	**8-Jul-24**	**7-Nov-24**		
Alkalinity(CaCO3) to pH4.5	IPWQO	a	134	145	129	130		
pH @25°C			7.25	7.99	7.01	7.77		
Conductivity @25°C			281	296	276	286		
TDS (Calc. from Cond.)			144	152				
Chloride			8.4	9.2	9.9	10.5		
Nitrate (N)			0.08	0.05	0.05	<0.05		
Nitrite (N)			<0.05	<0.05	<0.05	<0.05		
Sulphate			5	6	4	6		
BOD5			<3	<3	<3	<3		
Total Suspended Solids			3	4	3	<3		
Phosphorus (Total)	IPWQO	0.03	0.02	0.03	0.02	0.02		
Total Kjeldahl Nitrogen			0.4	0.5	0.5	0.4		
Ammonia (N)-Total (NH3+NH4)			<0.05	<0.05	<0.05	<0.05		
Dissolved Organic Carbon			10.1	8	10.5	10.1		
Phenolics			<0.001	<0.001	<0.001	<0.001		
COD			21	14	18	21		
Hardness (as CaCO3)			134	146	135	143		
Barium (Total)			0.074	0.079	0.075	0.074		
Boron (Total)	IPWQO	0.2	0.011	0.006	0.01	0.01		
Calcium (Total)			40.6	43.9	40.8	42.7		
Iron (Total)	PWQO	0.3	0.079	0.06	0.128	0.078		
Magnesium (Total)			7.9	8.8	7.92	8.75		
Manganese (Total)			0.039	0.035	0.046	0.034		
Potassium (Total)			0.7	1.4	1.1	1.4		
Sodium (Total)			5.1	5.5	5.8	6.4		
Strontium (Total)			0.131	0.141	0.133	0.138		
Zinc (Total)	PWQO IPWQO	0.03 0.02	<0.005	<0.005	<0.005	<0.005		
Arsenic (Total)			0.0001	0.0001	0.0001	0.0001		
Cadmium (Total)	PWQO	0.0002	<0.000015	<0.000015	<0.000015	<0.000015		
Chromium (Total)	PWQO	0.001	<0.001	<0.001	<0.001	<0.001		
Copper (Total)	PWQO IPWQO	0.005 d	0.0005	0.0002	0.0007	0.0002		
Lead (Total)	PWQO	0.005	0.00003	<0.00002	0.00003	0.00002		
Mercury	PWQO	0.0002	<0.00002	<0.00002	<0.00002	<0.00002		
Anion Sum			3.02	3.28	2.94	3.01		
Cation Sum			2.92	3.2	2.98	3.17		
% Difference			1.72	1.27	0.652	2.73		
Ion Ratio			1.03	1.03	0.987	0.947		
Sodium Adsorption Ratio			0.191	0.198	0.219	0.233		
TDS (Ion Sum Calc)			148	162	147	153		
TDS(calc.)/EC(actual)			0.528	0.547	0.534	0.536		
Conductivity Calc			286	310	286	300		
Conductivity Calc / Conductivity			1.02	1.05	1.04	1.05		
Langelier Index(25°C)			-0.406	0.391	-0.662	0.111		
Saturation pH (25°C)			7.66	7.6	7.67	7.66		
Field Measured								
Water Temp. (^{o}C)			22.9	7.1	23.9	10.5		
Conductivity (microS/cm)			340	370	270	330		
pH (pH units)		6.5 - 8.5	6.5	7.6	5.6	7.5		
DO			13.1	10.9	6.6	8.2		
FLOW L/S			NM	NM	NM	NM		

Notes:
All values reported in mg/L unless otherwise noted
PWQO- Provincial Water Quality Objectives
CWQG - Canadian Water Quality Guidelines
NS - No Sample Taken
NM - Not Measured

Surface Water Quality
Project Name: Mt. St. Patrick

Monitor Number ->			**SW 3**					
Parameters	**Limit**	**PWQO**	**23-Jul-23**	**23-Nov-23**	**8-Jul-24**	**7-Nov-24**		
Alkalinity(CaCO3) to pH4.5	IPWQO	a	DRY	DRY	DRY	DRY		
pH @25°C								
Conductivity @25°C								
TDS (Calc. from Cond.)								
Chloride								
Nitrate (N)								
Nitrite (N)								
Sulphate								
BOD5								
Total Suspended Solids								
Phosphorus (Total)	IPWQO	0.03						
Total Kjeldahl Nitrogen								
Ammonia (N)-Total (NH3+NH4)								
Dissolved Organic Carbon								
Phenolics								
COD								
Hardness (as CaCO3)								
Barium (Total)								
Boron (Total)	IPWQO	0.2						
Calcium (Total)								
Iron (Total)	PWQO	0.3						
Magnesium (Total)								
Manganese (Total)								
Potassium (Total)								
Sodium (Total)								
Strontium (Total)								
Zinc (Total)	PWQO IPWQO	0.03 0.02						
Arsenic (Total)								
Cadmium (Total)	PWQO	0.0002						
Chromium (Total)	PWQO	0.001						
Copper (Total)	PWQO IPWQO	0.005 d						
Lead (Total)	PWQO	0.005						
Mercury	PWQO	0.0002						
Anion Sum								
Cation Sum								
% Difference								
Ion Ratio								
Sodium Adsorption Ratio								
TDS (Ion Sum Calc)								
TDS(calc.)/EC(actual)								
Conductivity Calc								
Conductivity Calc / Conductivity								
Langelier Index(25°C)								
Saturation pH (25°C)								
Field Measured								
Water Temp. (^{o}C)								
Conductivity (microS/cm)								
pH (pH units)		6.5 - 8.5						
DO								
FLOW L/S								

Notes:
All values reported in mg/L unless otherwise noted
PWQO- Provincial Water Quality Objectives
CWQG - Canadian Water Quality Guidelines
NS - No Sample Taken
NM - Not Measured

Surface Water Quality
Project Name: Mt. St. Patrick

Monitor Number ->			SW 4					
Parameters	**Limit**	**PWQO**	**23-Jul-23**	**24-Nov-23**	**8-Jul-24**	**7-Nov-24**		
Alkalinity(CaCO3) to pH4.5	IPWQO	a	132	142	126	131		
pH @25°C			7.32	7.99	6.93	7.93		
Conductivity @25°C			287	298	274	284		
TDS (Calc. from Cond.)			147	153				
Chloride			9.4	9.4	10.1	9.9		
Nitrate (N)			0.1	0.08	0.07	<0.05		
Nitrite (N)			<0.05	<0.05	<0.05	<0.05		
Sulphate			5	6	4	6		
BOD5			<3	<3	<3	<3		
Total Suspended Solids			4	9	4	<3		
Phosphorus (Total)	IPWQO	0.03	0.02	0.02	0.02	0.02		
Total Kjeldahl Nitrogen			0.4	0.5	0.7	0.4		
Ammonia (N)-Total (NH3+NH4)			<0.05	<0.05	<0.05	0.05		
Dissolved Organic Carbon			10	8.5	12.6	9.7		
Phenolics			<0.001	<0.001	<0.001	<0.001		
COD			22	19	27	22		
Hardness (as CaCO3)			140	153	134	140		
Barium (Total)			0.077	0.081	0.076	0.073		
Boron (Total)	IPWQO	0.2	0.01	0.006	0.009	0.009		
Calcium (Total)			42.6	46	40.8	42		
Iron (Total)	PWQO	0.3	0.101	0.073	0.176	0.061		
Magnesium (Total)			8.24	9.15	7.91	8.55		
Manganese (Total)			0.04	0.032	0.063	0.03		
Potassium (Total)			0.8	1.5	1.1	1.4		
Sodium (Total)			5.4	6	5.9	6.3		
Strontium (Total)			0.138	0.148	0.133	0.136		
Zinc (Total)	PWQO IPWQO	0.03 0.02	<0.005	0.022	<0.005	0.005		
Arsenic (Total)			0.0001	0.0001	0.0001	0.0001		
Cadmium (Total)	PWQO	0.0002	<0.000015	<0.000015	<0.000015	<0.000015		
Chromium (Total)	PWQO	0.001	<0.001	<0.001	<0.001	<0.001		
Copper (Total)	PWQO IPWQO	0.005 d	0.0005	0.0002	0.0005	0.0002		
Lead (Total)	PWQO	0.005	0.00002	0.00002	0.00004	<0.00002		
Mercury	PWQO	0.0002	<0.00002	<0.00002	<0.00002	<0.00002		
Anion Sum			3.02	3.23	2.89	3.02		
Cation Sum			3.07	3.35	2.98	3.12		
% Difference			0.801	1.83	1.55	1.58		
Ion Ratio			0.984	0.964	0.969	0.969		
Sodium Adsorption Ratio			0.198	0.21	0.221	0.231		
TDS (Ion Sum Calc)			151	164	146	153		
TDS(calc.)/EC(actual)			0.528	0.549	0.533	0.538		
Conductivity Calc			294	317	285	297		
Conductivity Calc / Conductivity			1.02	1.06	1.04	1.05		
Langelier Index(25°C)			-0.323	0.402	-0.753	0.269		
Saturation pH (25°C)			7.64	7.59	7.68	7.66		
Field Measured								
Water Temp. (^{o}C)			22.3	6.2	24.1	10.4		
Conductivity (microS/cm)			340	370	260	330		
pH (pH units)		6.5 - 8.5	6.7	8.1	6	7.6		
DO			12.9	10.8	5.8	8.1		
FLOW L/S			NM	NM	NM	NM		

Notes:
All values reported in mg/L unless otherwise noted
PWQO- Provincial Water Quality Objectives
CWQG - Canadian Water Quality Guidelines
NS - No Sample Taken
NM - Not Measured

Appendix J
Monitoring and Screening Checklist

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
GPS Location (taken within the property boundary at front gate/ front entry)	NAD 83, UTM Zone 18, 351183E 5021553N
Municipality	Township of Greater Madawaska
Client and/or Site Owner	Township of Greater Madawaska
Monitoring Period (Year)	2024
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval Number:	A411901
Director's Order No.:	NA
Provincial Officer's Order No.:	NA
Other:	NA

Report Submission Frequency	◉ **Annual** ○ **Other**		
The site is: **(Operation Status)**	◉ **Open** ○ **Inactive** ○ **Closed**		
Does your Site have a Total Approved Capacity?	◉ **Yes** ○ **No**		
If yes, please specify Total Approved Capacity	46785	*Units*	Cubic Metres
Does your Site have a Maximum Approved Fill Rate?	○ **Yes** ◉ **No**		
If yes, please specify Maximum Approved Fill Rate		*Units*	
Total Waste Received within Monitoring Period (Year)	1,408	*Units*	Cubic Metres
Total Waste Received within Monitoring Period (Year) *Methodology*			
Estimated Remaining Capacity	30,962	*Units*	Cubic Metres
Estimated Remaining Capacity *Methodology*	Estimation based on Calculation and Site Capacity Design		
Estimated Remaining Capacity *Date Last Determined*	January 25, 2025		
Non-Hazardous Approved Waste Types	☒ Domestic ☐ Industrial, Commercial & Institutional (IC&I) ☐ Source Separated Organics (Green Bin) ☐ Tires	☐ Contaminated Soil ☐ Wood Waste ☒ Blue Box Material ☐ Processed Organics ☐ Leaf and Yard Waste	☐ Food Processing/Preparation Operations Waste ☐ Hauled Sewage Other:
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial *(separate waste classes by comma)*			
Year Site Opened *(enter the Calendar Year only)*	1960	**Current ECA Issue Date**	Mar. 1980 last amended Oct. 2013
Is your Site required to submit Financial Assurance?		○ **Yes** ◉ **No**	
Describe how your Landfill is designed.		◉ Natural Attenuation only ○ Fully engineered Facility ○ Partially engineered Facility	
Does your Site have an approved Contaminant Attenuation Zone?		◉ **Yes** ○ **No**	

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:	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)	○ Yes ◉ No

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**	
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**
MW09-5R	Not sampled	July & November 2024
MW09-6R	Dry	July & November 2024
MW21-7	Dry	July & November 2024

3) a) Is landfill gas being monitored or controlled at the site?	○ **Yes** ◉ **No**	
If yes to 3(a), please answer the next two questions below.		
b) Have any measurements been taken since the last reporting period that indicate landfill gas is present in the subsurface at levels exceeding criteria established for the site?	○ **Yes** ◉ **No**	
c) Has 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 below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
All sampling completed in general accordance with Jp2g sampling protocols		

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**	All sampling completed in general accordance with Jp2g sampling protocols

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		
6) The site meets compliance and assessment criteria.	(●) Yes ( ) No		
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		
1) 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 ( ) No	Note which practice(s):	☐ (a) ☐ (b) ☒ (c)
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	( ) Yes (●) No ( ) Not Applicable		

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**	Continue to monitor with no changes from 2024 monitoring program
○ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No Changes to site design and operation are recommended**	
○ **The following change(s) to the site design and operation is/ are recommended:**	

Name:	Andrew Buzza, P.Geo Note: Report signed and stamped.		
Seal:	Add Image		
Signature:		**Date:**	March 2025
CEP Contact Information:	Andrew Buzza, p.Geo		
Company:	Jp2g Consultants Inc.		
Address:	1150 Morrison Drive Suite 410 Ottawa ON K2H 8S9		
Telephone No.:	613 828-7800	Fax No. :	613 828-2600
E-mail Address:	andrew.buzza@jp2g.com		
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)	Approximately 630m north of the site

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	
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
SW1	NS	November 2024
SW3	Dry	July & November 2024

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**
All surface water sampling completed in general accordance with Jp2g sampling procedures.		

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**	All surface water sampling completed in general accordance with Jp2g sampling procedures.

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
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**	

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**	
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	Overall the results of the surface and groundwater sampling do not indicate that the landfill activities at this location is having a negative effect on the surface water around the Landfill site.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	◯ **Yes** ◉ **No** ◯ **Not Applicable**	

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**	Continue to monitor with no changes from 2024 monitoring program
○ **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	Education with 30 years experience
Date:	March 2025
CEP Contact Information:	Andrew Buzza, P.Geo
Company:	Jp2g Consultants Inc.
Address:	1150 Morrison Drive Suite 410 Ottawa ON K2H 8S9
Telephone No.:	613 828-7800
Fax No. :	613 828-2600
E-mail Address:	andrew.buzza@jp2g.com

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