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2024 Annual Monitoring Report

McGarry Waste Disposal Site
Township of McGarry, Ontario

Prepared for:

Corporation of the Township of McGarry
27 Webster Street, P.O. Box 99
Virginiatown, Ontario P0K 1X0

February 4, 2025

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by the Corporation of the Township of McGarry (Client) to conduct the 2024 Annual Monitoring Program for the McGarry Waste Disposal Site property (Site) located east of Virginiatown, Ontario on the south side of Highway 66 in the Township of McGarry, District of Timiskaming, Ontario.

The purpose of completing the 2024 Annual Monitoring Program was to assess the hydraulic media for contaminants of concern as a compliance requirement under the Ministry of the Environment, Conservation and Parks (MECP) site-specific Certificate of Approval (CofA) Number **A572402** and the applicable regulatory requirements during 2024. To achieve the reporting objectives of this Site monitoring program, Pinchin carried out groundwater and surface water sampling at the Site in general accordance with the documents referenced within this report.

1.1 Location

The Site is located at Universal Transverse Mercator (UTM) coordinates Zone 17U, 609,800 metres (m) Easting and 5,332,529 m Northing (North American Datum (NAD) 1983). Landfill coordinates were obtained from Google Earth.

The Site is located approximately 4 kilometres (km) east of Virginiatown, Ontario along the border between Québec and Ontario. The Site is accessed via a gravel road that extends off Raven Mountain Road, south of Highway 66. The Site location is indicated on Figure 1 (All Figures are provided in Appendix I).

1.1.1 Site Survey and Aerial Photography

At the time of preparation of this report, a cadastral or geodetic survey or aerial photography of the Site was not available for Pinchin to review. Pinchin completed an elevation survey of the existing monitoring well network on May 20, 2017. All elevations referenced within this report are based on local benchmarks established by Pinchin.

1.2 Ownership and Key Personnel

The Site is owned and operated by the Corporation of the Township of McGarry. The 2024 Monitoring Program was completed for the following Representative on behalf of the Township:

Ms. Karine Pelletier
Township of McGarry
27 Webster Street, PO Box 99
Virginiatown, Ontario P0K 1X0

The Competent Environmental Practitioner (CEP) for the Site groundwater and surface water monitoring program was Mr. Tim McBride of Pinchin Ltd. Mr. McBride's contact information is provided below:

Mr. Tim McBride, B.Sc., P.Geo., QP_{ESA}

Pinchin Ltd.

662 Falconbridge Road, Unit 3

Sudbury, Ontario P3A 4S4

1.3 Description and Development of the Site

This Site was originally approved in 1973 for the use and operation of a 35.0-hectare (ha) landfilling site for the disposal of solid, non-hazardous domestic and commercial wastes. The original Site Design and Operations Plan (D&O Plan) was prepared by Heathwood Engineering Associated Limited. The Site is operated under Provisional CofA Number **A572402,** issued August 20, 1980. A copy of the most recent CofA is provided in Appendix II.

The CofA indicates that the Site is to be operated in accordance with a Site Plan dated February 8, 1977, and a Surveyor's Certificate prepared by Pit, Blackburn, Ontario Land Surveyors dated July 2, 1974. Neither of these documents have been provided to Pinchin for review at the time of preparation of this report.

On October 29, 1998, the MECP issued an Inspection Report that included a request that the Township update their Site Plan and their Operational and Maintenance Plan as an action item as had also been requested during previous inspections. The Township subsequently retained Hatch Ltd. (Hatch) to update their D&O Plan which was issued on August 12, 1999. It is Pinchin's understanding that the Hatch D&O Plan is the current approved D&O Plan for the Site.

In 2014, the MECP conducted a groundwater-related review of the 2013 annual monitoring report prepared by A&A Environmental Consultants Inc. (A&A) for the Site to evaluate on and off-Site groundwater impacts, as well as compliance with provincial regulations. The review was summarized in the 2014 Thomas Guo Memo. Mr. Guo indicated that contaminated leachate was migrating off the established attenuation zone (CAZ) for the Site. Based on this conclusion, it was recommended that the Township investigate mitigation measures, including expanding the CAZ with additional downgradient land and replacing the assumed background monitoring well (MW1) with a new background monitoring well.

In 2014, a new monitoring well (MW8) was installed and monitored. The recommendations in the 2014 A&A Annual Monitoring Report were to replace MW1 with MW8 as the background well and to continue annual groundwater monitoring.

Pinchin was retained in 2015 to complete the 2015 Annual Monitoring Report and recommended the following:

- The landfill cover material be inspected and maintained as part of the ongoing monitoring program;
- Consideration should be given to installing an additional monitoring well northwest of MW7 to confirm or refute the presence of leachate impacts migrating off-Site;
- An elevation survey should be completed for the Site to confirm the groundwater flow direction and help identify the direction of the leachate plume; and
- Monitoring frequency should be reduced to twice annually in the early spring and late fall.

On January 21, 2016, a Voluntary Abatement Plan was submitted to the Township by Pinchin. This document provided a detailed outline of a three-year plan that was intended to help facilitate the long-term disposal needs of the Township, address MECP concerns and be economically viable. The work completed as part of this plan has included:

- Completion of an Environmental Peer Review and Operations Evaluation in which historical documents were reviewed to identify the Site's groundwater impacts and evaluate compliance with respect to the provincial regulations;
- Completion of the Annual Monitoring Programs and Reports for the years 2016 through 2020;
- Completion of a monitoring well elevation survey;
- Completion of a D&O Plan and Waste Capacity Assessment; and
- Completion of an updated Voluntary Abatement Plan.

1.4 Site Document Review

Pinchin reviewed the following documents for the Site and are referenced within this document:

- Report entitled "The Corporation of the Township of McGarry, Virginiatown, Ontario, Operation and Maintenance Manual for McGarry Sanitary Landfill" prepared for The Corporation of the Township of McGarry by Hatch Ltd., dated January 4, 1999 (the 1999 Hatch Operation and Maintenance Manual);
- Report entitled "The Corporation of the Township of McGarry, Virginiatown, Ontario, Groundwater Well Installation and Groundwater Testing for McGarry Sanitary Landfill" prepared for The Corporation of the Township of McGarry by Hatch Ltd. dated August 12, 1999 (the 1999 Hatch Groundwater Well Installation and Groundwater Testing Report);

- Report entitled "The Corporation of the Township of McGarry, Virginiatown, Ontario, Site Design and Operations Plan for McGarry Sanitary Landfill" prepared for The Corporation of the Township of McGarry by Hatch Ltd. dated August 12, 1999 (the 1999 Hatch D&O Plan);
- Memorandum entitled *"The Township of McGarry – McGarry Township Landfill Site, 2013 Annual Monitoring Report, ECA Number: A572402"* issued by Thomas Guo, Regional Hydrogeologist (in-training), Technical Support Section, Northern Region of the MECP to Steven Momy, Senior Environmental Officer, Timmins District Office of the MECP (the 2014 Thomas Guo Memo);
- Report entitled "*2014 Annual Monitoring Report – McGarry Township Landfill"* prepared for the Township of McGarry by A&A Environmental Consultants Inc. dated March 12, 2015 (the 2014 A&A Monitoring Report);
- Report entitled "*2015 Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario"* prepared for the Township of McGarry by Pinchin Ltd. dated March 31, 2016 (the 2015 Pinchin Monitoring Report);
- Report entitled "*2016 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario"* prepared for the Township of McGarry by Pinchin Ltd., dated February 1, 2017 (the 2016 Pinchin Monitoring Report);
- Report entitled *"Design & Operations Plan, McGarry Waste Disposal Site, Township of McGarry, Ontario"* prepared for the Township of McGarry by Pinchin Ltd. dated September 29, 2017 (the 2017 Pinchin D&O Plan);
- Report entitled "*2017 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario"* prepared for the Township of McGarry by Pinchin Ltd. dated December 14, 2018 (the 2017 Pinchin Monitoring Report);
- Memorandum entitled *"2016 Annual Monitoring Report – McGarry Waste Disposal Site, Township of McGarry, District of Timiskaming"* issued by Melissa Lefrançois, Hydrogeologist, Technical Support of the MECP to Steve Momy, Senior Environmental Officer, Timmins Office of the MECP dated January 11, 2018 (the 2018 MECP Memo);
- Report entitled "*2018 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario"* prepared for the Township of McGarry by Pinchin Ltd. dated February 14, 2019 (the 2018 Pinchin Monitoring Report);
- Report entitled "*2019 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario"* prepared for the Township of McGarry by Pinchin Ltd. dated January 23, 2020 (the 2019 Pinchin Monitoring Report);

- Report entitled "*2020 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario*" prepared for the Township of McGarry by Pinchin Ltd. dated February 10, 2021 (the 2020 Pinchin Monitoring Report);
- Report entitled "*2021 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario*" prepared for the Township of McGarry by Pinchin Ltd. dated March 22, 2022 (the 2021 Pinchin Monitoring Report);
- Report entitled "*2022 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario*" prepared for the Township of McGarry by Pinchin Ltd. dated February 27, 2023 (the 2022 Pinchin Monitoring Report); and
- Report entitled "*2023 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario*" prepared for the Corporation of the Township of McGarry by Pinchin Ltd. dated March 11, 2024.

A copy of these documents can be obtained from the Client. Pinchin has relied on the information available in the previous environmental reports reviewed for the Site as part of this assessment. Information reviewed within these reports is referenced in pertinent sections throughout this document.

1.5 Monitoring and Reporting Program Objectives and Requirements

The CofA does not outline monitoring and reporting requirements for the Site. The reporting completed by Pinchin has been generally developed based on the Ontario MECP document entitled "*Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document*" dated November 2010.

1.6 Assumptions and Limitations

Pinchin has assumed that the information generated from historical investigations is accurate and has been completed in accordance with standard engineering practices and regulations. It should be noted that the historical background information made available to Pinchin by the Client was limited to the information provided in the 2014 A&A Monitoring Report and the 1999 Hatch Groundwater Well Installation and Groundwater Testing Report, as well as MECP correspondence.

The scope of the monitoring activities was limited to the parameters listed in the Column 1 (spring groundwater samples), Column 2 (summer and fall groundwater samples), Column 3 (spring surface water samples) and Column 4 (summer and fall surface water samples) of Schedule 5 in the MECP document entitled "*Landfill Standards: A Guideline on the Regulatory and Approval Requirements for New or Expanding Landfilling Sites*" dated January 2012 (MECP Landfill Standards). The investigations were limited solely to the groundwater within the monitoring well installations on-Site and the surface water surrounding the Site. The investigation does not constitute an exhaustive investigation of the Site

property or adjacent properties for potentially unknown contaminants and/or other unknown sources of environmental impact.

Pinchin's limitation of liability and scope of work is as follows:

- The work performed in this report was carried out in accordance with the Terms and Conditions made part of the contract. The conclusions presented herein are based solely upon the scope of services described in the contract;
- The report has been prepared in accordance with generally accepted environmental study and/or engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of the contract and included in this report;
- The services performed and outlined in this report were based in part upon a previously installed monitoring network established by others and approved by the applicable regulatory agencies. Pinchin's opinion cannot be extended to portions of the Site which were unavailable for direct observations reasonably beyond the control of Pinchin;
- The objective of this report was to assess the water quality conditions at the Site given the context of the contract with respect to existing environmental regulations within the applicable jurisdiction;
- The Site history interpreted herein relies on information supplied by others such as local, provincial and federal agencies, as well as Site personnel. No attempt has been made to independently verify the accuracy of such information unless specifically noted in this report;
- Pinchin's interpretations relating to the landfill-derived leachate plume at the Site are described in this report. Where testing was performed, it was executed in accordance with the contract for these services. It should be noted that other compounds or materials not tested for may be present in the Site environment. The conclusions of this report are based in part on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the Site in locations not specifically investigated. Should such an event occur, Pinchin must be notified in order that we may determine if modifications to our conclusions are necessary;
- The utilization of Pinchin's services during future monitoring at the Site will allow Pinchin to observe compliance with the conclusions and recommendations contained herein. It will also provide for changes as necessary to suit field conditions as they are encountered; and

- Any use which a third party makes of this report, or any reliance on or decisions to be made based on it is the responsibility of such third parties. Pinchin accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

2.0 PHYSICAL SETTING

2.1 Geology and Hydrogeology

It was reported in the 1999 Hatch Groundwater Well Installation and Groundwater Testing Report that the Site is located in a sand and gravel pit. The subsurface materials at the base of the landfill reportedly consisted of silty sand.

Based on Pinchin's review of the 2014 A&A Monitoring Report, the Site is located on the boundary of an esker which consists of sand and gravel deposits approximately 100 m thick deposited by glacial meltwater that was flowing beneath or within a historic glacier. Mapping by the Ontario Geological Survey indicates that the quaternary geology of the Site is Cenozoic glaciolacustrine shallow water deposits of sand with minor gravel. This sand is typically fine to medium-grained although silty and/or coarse layers are commonly encountered.

The landfill area is located in the drainage area of a tributary to Milky Creek. The topography of the Site gently slopes toward the middle of the Site and westward toward the Milky Creek drainage area. Milky Creek is located approximately 500 m west of the Site. Pit development and sand extraction has resulted in a generally flat, level area for fill placement surrounded by a sand bluff.

Based on Pinchin's review of the boreholes advanced at the Site, the soil consists of medium-grained and silty sand. Borehole logs depicting the subsurface stratigraphy and construction details for each of the groundwater monitoring wells for the Site are provided in Appendix III.

2.2 Surface Water Features

Milky Creek is located approximately 500 m west of the Site. Surface water drainage from the landfill is inferred to flow to the west and dissipate to ground and is reported to be intermittent with seasonal fluctuations consistent with precipitation events. There are no Provincially Significant Wetlands identified in the surrounding watershed system.

Based on the 1999 Hatch Operation and Maintenance Manual, surface water run-off at the Site generally flows into the low-lying area in the southwest portion of the Site. Based on field observations recorded in 1998, direct off-Site surface water drainage into the Milky Creek drainage area was not observed. The surface waters that collect in the low-lying area likely infiltrate into the groundwater at the Site. The 1999

Hatch D&O Plan indicates that a surface water ditch was excavated in the spring of 1999 to drain standing water from the western toe of the landfill to the west of the Site.

Previous investigations included a surface water sampling location within a ditch in the vicinity of MW3. Surface water quality at this location has regularly exceeded the Provincial Water Quality Objectives (PWQO) for various parameters. The 2014 Thomas Guo Memo recommended that a surface water review be completed to assess the source of the elevated contaminants in the surface water.

During the 2016 Monitoring Program, Pinchin completed a surface water evaluation for the Site which included the collection of surface water samples at various locations. Details regarding the 2016 surface water evaluation activities are provided in the 2016 Pinchin Monitoring Report. Pinchin established a surface water monitoring program in 2017 which included upstream and downstream locations within Milky Creek located west of the Site. These sampling locations were included in future sampling events up to and including the 2024 monitoring program.

3.0 HISTORICAL DOCUMENT REVIEW

Pinchin reviewed the 1999 Hatch Operation and Maintenance Manual, the 1999 Hatch Groundwater Well Installation and Groundwater Testing Report, the 1999 Hatch D&O Plan, the 2014 Thomas Guo Memo, the 2014 A&A Monitoring Report, the 2015 and 2016 Pinchin Monitoring Reports, the 2017 Pinchin D&O Plan, the 2018 MECP Memo and the 2019 to 2023 Pinchin Annual Monitoring Reports. The following section provides a brief summary of these documents.

The 1999 Hatch Operation and Maintenance Manual

The 1999 Hatch Operation and Maintenance Manual was completed to update the D&O Plan for the Site. Based on the population estimates at the time, it was concluded that the Site would be capable of accepting waste for approximately 30 to 35 years. The 1999 Hatch Operation and Maintenance Manual provided background information regarding topography, geology, soil conditions and climatology. It also provided operation and maintenance procedures to be implemented at the Site.

The 1999 Hatch Groundwater Well Installation and Groundwater Testing Report

The 1999 Hatch Groundwater Well Installation and Groundwater Testing Report was completed in response to the action requirements provided by the MECP in their Inspection Report dated October 26, 1998. The groundwater well installations were intended to support a groundwater monitoring program for the Site as included in the Operation and Maintenance Manual.

The 1999 Hatch Groundwater Well Installation and Groundwater Testing Report consisted of the following:

- The installation of four groundwater monitoring wells (MW1 through MW4);
- Measurement of groundwater levels to determine groundwater flow directions;
- Collection and submission of groundwater samples for laboratory analysis of metals, anions and general chemistry parameters, as well as submission of a sample of leachate impacted groundwater for volatile organic compounds (VOC) analysis;
- Collection and submission of a surface water sample from runoff at the Site for laboratory analysis of metals, anions and general chemistry parameters; and
- Preparation of a factual report detailing the well installation program and providing sampling methodologies for future samples.

The 1999 Hatch Groundwater Well Installation and Groundwater Testing Report indicated that the Site overburden soils consist of sand with some silty and gravelly zones. Groundwater level measurements indicated that the groundwater flowed toward the middle of the Site from the north and south and was inferred to flow westward from there towards Milky Creek.

The groundwater quality results indicated that groundwater at the perimeter monitoring wells had not been adversely impacted by the leachate at levels of concern. Based on topography and a review of the groundwater level measurements collected at the Site, it was reported that leachate was migrating generally towards the west as it crossed the property boundary. However, no adverse impacts or concerns were identified at downgradient monitoring well MW3.

The 1999 Hatch D&O Plan

The 1999 Hatch D&O Plan was completed to update the existing Site D&O Plan and was published on January 4, 1999. In particular, the report provided a revised Site capacity estimate which indicated that the Site would be capable of accepting waste a further 19 years. The 1999 Hatch D&O Plan noted a waste fill area located east of the entrance to the Site which was reportedly used for the disposal of solid waste from the demolition of buildings, as well as residential wastes. In addition, it was noted that a surface water drainage ditch was excavated in the spring of 1999 to drain standing water from the western toe of the landfill.

The 2014 Thomas Guo Memo

The 2014 Thomas Guo Memo consisted of a review of the groundwater related portions of the report prepared by A&A Environmental Consultants Inc. entitled "*2013 Annual Monitoring Report, McGarry Township Landfill, Report #2379 – McGarry*" dated March 20, 2014. The purpose of the 2014 Thomas

Guo Memo was to review and evaluate on and off-Site groundwater impacts and compliance with provincial regulations.

Based on this review, it was noted that wells MW2 and MW7 located immediately adjacent to the Site boundary were impacted by leachate. Based on the proximity of these wells to the Site boundary, it was determined that leachate was migrating beyond the established attenuation zone area of the landfill.

The following is a summary of the recommendations provided in the 2014 Thomas Guo Memo:

- Replace MW1 with a new background well in 2014 located along the south boundary of the property;
- Investigate mitigation options to address off-Site leachate impacts. As previously suggested by an MECP hydrogeologist, this could include the acquisition of additional lands downgradient of the current property to bring this Site into compliance with the "reasonable use concept" (RUC) Guideline B-7. It was recommended that the proponent include a plan for achieving compliance in the next annual monitoring report;
- The consultant should further investigate the elevated contaminant levels found in surface water samples from the Site ditch. This could include sediment analysis to investigate the causes of impacts in surface water;
- The monitoring program should be continued in 2014 with monitoring events to be conducted in the spring, summer and fall. The monitoring report shall be prepared by a qualified person and submitted to the MECP by March 31, 2015; and
- The monitoring report should include a copy of the active CofA issued by the MECP.

The 2014 A&A Monitoring Report

The 2014 A&A Monitoring Report includes the monitoring results from June 1999 to October 2014 and specifically documents the 2014 monitoring program which included measuring and sampling groundwater from seven previously installed monitoring wells on Site. Groundwater samples were submitted for laboratory analysis of metals, anions and general chemistry parameters. The 2014 sampling events were conducted in May, August and October.

The following provides a summary of the 2014 A&A Monitoring Report:

- There was significant fluctuation throughout the monitoring events for the majority of the parameters which was correlated to the amount of rainfall received at the Site prior to each sampling event;
- High concentrations for most parameters were observed at the leachate well (MW4), but such parameters showed a general declining trend in most of the tested parameters in

recent years. In addition, the concentrations of these parameters in the boundary wells were much lower and fairly stable indicating that attenuation was taking place within the landfill boundaries;

- In 2014, groundwater quality at all inferred downgradient and boundary monitoring wells met the RUC for all health-related parameters. Concentrations of arsenic and boron exceeded the RUC at the leachate well (MW4); however, natural attenuation between MW4 and the north and west Site boundaries ensured that these concentrations were reduced to acceptable levels as groundwater exited the property;
- Background groundwater quality at MW1 indicated stable trends with generally low parameter concentrations, but concentrations of pH, alkalinity and hardness continue to fall below the range specified by Ontario Drinking Water Quality Standards (ODWQS). This was correlated to naturally occurring upgradient sources of organic nitrogen, decaying organic matter and a lack of naturally occurring carbonate minerals;
- Most of the monitoring wells, with the exception of leachate well MW4, had concentrations of organic nitrogen slightly higher than the RUC allowable limits and a pH below the acceptable range of values for the Site. This was noted to be a reflection of groundwater quality entering the Site which does not meet the ODWQS for these parameters;
- Monitoring well MW8 was installed on August 5, 2014, to replace monitoring well MW6 which was observed to be dry during multiple sampling events. Several RUC exceedances were reported at MW8, including organic nitrogen, pH, dissolved organic carbon (DOC), aluminum, iron and manganese;
- Lead, iron, aluminum and manganese naturally occur in the soil and may be carried over in the sample if the filtering procedure is unsuccessful and if the wells are not sampled at a slow enough rate. Groundwater free of dissolved oxygen tends to dissolve iron and manganese from the geological strata of the aquifer material; however, high levels of iron and manganese observed at the leachate well were more likely due to the influence of landfill leachate. In addition, exceedances of the RUC allowable limit for organic nitrogen were likely the result of impacts from leachate, as well as the presence of local influences;
- The leachate impacted wells were within the property boundary of the landfill, and results did not suggest the Site is operating outside the originally proposed design objectives as a natural attenuation site; and

- Two surface water samples were collected from the ditch located near well MW3. Previous investigations noted PWQO exceedances at this location for various metals. It was noted that surface water samples were unfiltered, and the acid preservative used for metals analysis would digest any fine sediment particles present in the sample which likely accounts for the high metal concentrations.

The following provides a summary of the recommendations made in the 2014 A&A Monitoring Report:

- Previous investigations used monitoring well MW1 as a background well based on the belief that groundwater was flowing to the west. Although MW1 shows low levels for most of the tested parameters, it has also exceeded the ODWQS on several sampling occasions. Since groundwater had been established to flow north-northwest and MW1 is located close to the northeast Site boundary, replacing this well with a new well (MW8) located along the south property boundary was recommended; and
- It was recommended that the monitoring and sampling program continue to be conducted annually in spring, summer and fall.

In summary, the 2014 A&A Monitoring Report noted that Site-related impacts on downgradient water quality were minor. Although groundwater impairment was evident at the leachate source well MW4 which had elevated conductivity, total dissolved solids (TDS) and dissolved constituents, the natural attenuation and buffering capacity of the soil had been sufficient to restore the groundwater quality to near background levels at the downgradient boundary. While the 2014 A&A Report indicated that the results of the 2014 annual monitoring program suggest that the Site was still operating within the originally proposed design objectives as a natural attenuation site, it was recommended that additional lands be acquired in order to ensure adequate contaminant attenuation.

The 2015 Pinchin Monitoring Report

The 2015 Pinchin Monitoring Report includes the monitoring results from May, July, and September 2015 and specifically documents the 2015 monitoring program which consisted of monitoring and sampling groundwater from seven previously installed monitoring wells on the Site, as well as the collection of surface water samples from the on-Site ditch.

Based on the results of the 2015 monitoring program, Pinchin did not identify any significant landfill related impacts at the Site. Low pH, alkalinity and total hardness observed at downgradient monitoring locations MW2 and MW7 were reported to be likely a result of naturally occurring conditions within the shallow unconfined aquifer on-Site. All exceedances of the RUC Guideline B-7 in 2015 were related to operational guidelines associated with drinking water systems set by the ODWQS and were not considered to be a significant environmental concern originating from the Site.

In 2015, elevated concentrations of DOC, iron and manganese were observed at the leachate monitoring well MW4 and the newly installed background well MW8 (located southeast of the Site). These elevated concentrations appeared to be attenuating with distance from the active fill zone as concentrations of these parameters were observed to be below the ODWQS at wells MW1, MW2, MW3, MW5 and MW7.

In 2015, elevated concentrations of DOC, aluminum and lead were observed within surface water samples collected from the on-Site ditch during the spring 2015 sampling event. This surface water sampling location is located within the landfill confines. As there was no downgradient surface water location established at the time of the 2015 Pinchin Monitoring Report, it was Pinchin's opinion that there was insufficient evidence to suggest significant concentrations of landfill related contaminants were migrating to downgradient surface water receptors.

The following provides a summary of the recommendations made in the 2015 Pinchin Monitoring Report:

- The Client should continue to ensure that the current landfill cover material is inspected and maintained as part of the ongoing monitoring program. In the future, any damage to the cover due to weathering or other causes should be rectified;
- Consideration should be given during future monitoring events to installing a monitoring well northwest of MW7 to confirm or refute the presence of leachate impacts migrating off-Site and beyond MW7;
- Based on the soil characteristics of the Site, consideration should be given to installing a deeper monitoring well nested with MW7 in order to assess groundwater quality beneath the shallow aquifer and to determine if a confined aquifer is present at the Site;
- An elevation survey should be completed at the Site to confirm groundwater flow direction. An elevation survey would accurately determine the groundwater flow direction and help identify the direction of the leachate plume;
- As per the 2014 Thomas Guo Memo, further investigation is required regarding the elevated concentrations of metals observed within surface water samples collected from the on-Site ditch. Pinchin recommends establishing upgradient and downgradient surface water sampling locations in order to identify potential downgradient surface water impacts; and
- It was Pinchin's opinion that the monitoring frequency should be reduced to twice annually (early spring and late fall).

The 2016 Pinchin Monitoring Report

The 2016 Pinchin Monitoring Report specifically documents the 2016 monitoring program which consisted of monitoring and sampling groundwater from seven previously installed monitoring wells on the Site, as

well as the collection of surface water samples from the on-Site ditch (Ditch) and two off-Site surface water locations (SW1 and SW2). Pinchin noted that leachate impacts had previously been identified at well MW8 likely due to its proximity to the waste area or a potential radial groundwater flow pattern at the Site. However, monitoring well MW8 could not be located during the 2016 monitoring program; therefore, groundwater quality south of the Site was not assessed. Pinchin recommended monitoring well MW8 be located and incorporated into future monitoring programs, or that a new monitoring location be established south of the Site to help delineate potential impacts in this area.

Based on Pinchin's review of the analytical data collected in 2016, the observed topography of the area and the proximity of Milky Creek, it was Pinchin's opinion that the leachate plume was likely situated southwest of the Site. Based on the groundwater quality observed at monitoring well MW3, it was Pinchin's opinion that this plume was naturally attenuating with distance from waste area. However, Pinchin recommended that future groundwater elevation measurements are collected to accurately determine the groundwater flow direction and confirm the direction of the leachate plume.

Based on the 2016 results obtained from the existing groundwater monitoring wells, Pinchin did not identify any significant human health or ecological landfill related impacts northwest of the Site. All exceedances of the RUC Guideline B-7 were related to operational guidelines associated with drinking water systems set by the ODWQS.

Based on Pinchin's review of the existing dataset and regulatory requirements as of the 2016 Pinchin Monitoring Report, Pinchin recommended the following:

- The Client should continue to ensure that the current landfill cover material is inspected and maintained as part of the ongoing monitoring program. In the future, any damage to the cover due to weathering or other cause should be rectified;
- As per the 2014 Thomas Guo Memo, further investigation was required regarding the elevated concentrations of metals observed at the surface water sampling location. Pinchin recommended continuing to sample surface water sampling locations SW1, SW2 and Ditch to identify potential downgradient surface water impacts;
- A monitoring well elevation survey should be completed in the spring of 2017 to confirm the groundwater flow direction at the Site ensuring the inclusion of monitoring well MW8; and
- The monitoring frequency should remain twice annually (early spring and late fall).

The 2017 Pinchin D&O Plan

The 2017 Pinchin D&O Plan was written to satisfy the requirements of the Voluntary Abatement Plan issued to the Township on January 21, 2016, to reflect current on-Site operations and to provide direction to guide the future development and operations of the Site. The scope of work included reviewing and

updating the 1999 Hatch D&O Plan to meet current regulatory and approval requirements for the design, operation, closure and post-closure care of the Site.

The 2017 Pinchin D&O Plan also provided an update on the remaining waste capacity of the Site. The capacity is dependent upon the limitations of the Site placed by the CofA and applicable provincial statutes and regulations. The primary constraint is the 35.0-ha area for landfilling approved in CofA Number **A572402**. The conceptual final contour plan for the Site upon closure will include a maximum slope of 4 horizontal to 1 vertical (4:1) and minimum slope of 20 horizontal to 1 vertical (20:1). The volume between the existing contours and the proposed final contours equates to the remaining capacity of the Site. Based on the approved 35.0-ha Site and the annual disposal rate, it was Pinchin's opinion that the Site will not reach capacity for over 75 years; however, it was recommended that an updated D&O Plan be completed every 20 years to re-evaluate the operations, environmental impact and life expectancy of the Site.

The 2018 MECP Memo

Based on the information provided in the Environmental Peer Review and Operations Evaluation Report and the 2015 and 2016 Pinchin Monitoring Reports, the following recommendations were provided in the 2018 MECP Memo:

- Continue to ensure that current landfill cover material is inspected and maintained as part of the ongoing monitoring program. Any damage to the cover due to weathering or other causes should be rectified;
- Complete an elevation survey for all sampling events in 2017 to confirm the groundwater flow direction at the Site ensuring the inclusion of monitoring well MW8. The groundwater elevations and contours should be illustrated in future monitoring reports; and
- Update the current regulatory and approval requirements for the design, operation, closure and post-closure care of the Site. Consideration should be given to revising the waste capacity of the site. Consideration should also be given to conducting an updated waste capacity assessment at the Site.

Further, it was recommended that the 2018 annual monitoring program should consist of tri-annual sampling in the spring, summer and fall at all groundwater monitoring locations on Site. Tri-annual monitoring was recommended to continue until an appropriate background well, groundwater contour (flow direction) and confirmation of achievable RUC at the property line could be established.

It was also recommended that the Site be reviewed by an MECP surface water specialist to conduct further investigation into the previously identified elevated metal concentrations in surface water.

The Previous Pinchin Monitoring Reports (2017, 2018, 2019, 2020, 2021, 2022 and 2023)

Based on a review of the analytical data set collected from 2017 until 2023, Pinchin did not identify landfill related impacts at monitoring wells MW1, MW2, MW3, MW5 and MW7. Pinchin notes that historical groundwater flow was reportedly in a north-northwest direction towards the lowlands of Milky Creek, and as such the leachate plume originating from the waste area has historically been interpreted to migrate towards monitoring wells MW2 and MW7. However, based on groundwater elevation contours completed as part of Pinchin's annual monitoring programs from 2018 until 2023, the groundwater flow has been interpreted to be a radial pattern converging towards the low-lying area in the vicinity of monitoring well MW5.

Landfill leachate (MW4) appeared to be naturally attenuating within proximity of the waste area and was not influencing the shallow unconfined groundwater unit in the vicinity of monitoring wells MW1, MW2, MW3, MW5 and MW7. All exceedances of the RUC Guideline B-7 were related to operational guidelines associated with drinking water systems set by the ODWQS and did not suggest human health or ecological concerns related to landfill impacts. Similarly, based on Pinchin's review of the surface water analytical data set, it appeared that landfill derived surface water impacts were not occurring at the downstream surface water receptors.

Monitoring well MW8 was located and repaired in accordance with O. Reg. 903 during the spring 2018 monitoring event. Historical groundwater quality south of the waste area represented by available analytical data collected from monitoring well MW8 was initially interpreted to be indicative of anthropogenic impacts. However, based on more recent groundwater elevations contours and groundwater quality for MW8, groundwater at this location was not interpreted to be impacted by landfilling activities.

As part of the previous monitoring reports, Pinchin recommended the following:

- The Client should continue to ensure that the current landfill cover material is inspected and maintained as part of the ongoing monitoring program. In the future, any damage to the cover due to weathering or other causes should be rectified;
- Surface water sampling locations SW1, SW2, Ditch and Pond should continue to be sampled on a tri-annual basis to identify potential downgradient surface water impacts; and
- Tri-annual sampling in the spring (May-June), mid-summer (August-September) and late fall (October-November) should continue at all groundwater monitoring locations on Site. This should continue until the appropriate background well, groundwater contour (flow direction) and confirmation of achievable RUC at the property line can be established.

4.0 METHODOLOGY

4.1 Scope of Work

The objectives of the monitoring program as requested by the client were provided in Pinchin's proposal entitled "*2022-2024 Annual Monitoring and Reporting – McGarry Landfill*" dated January 7, 2022 (the Proposal).

The 2024 Annual Monitoring Report has been developed based on an assessment of the ODWQS, MECP Guideline B-7, PWQO, Aquatic Protection Values (APV) and CWQG and will meet the minimum reporting requirements specified in the Site-specific CofA and MECP Landfill Standards.

The objectives of the current monitoring program as requested by the Client included the following scope of work:

- Mobilization to the Site during the spring, summer and fall of 2024 and collection of groundwater and surface water samples from the existing well network and surface water monitoring locations;
- Submission of representative spring groundwater samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in Column 1 of Schedule 5 of the MECP Landfill Standards, as well as submission of spring surface water samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in Column 3 of Schedule 5;
- Submission of representative summer and fall groundwater samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in Column 2 of Schedule 5 of the MECP Landfill Standards, as well as submission of summer and fall surface water samples to an accredited analytical laboratory for analysis of the chemical parameters outlined in Column 4 of Schedule 5; and
- Preparation of a report outlining the 2024 field work completed and the analytical results, an evaluation of the results and any subsequent recommendations.

The investigation methodology was also conducted in general accordance with, and reference is made to the following regulatory and guidance documents:

- MECP document entitled "Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario" dated December 1996 (MECP Sampling Guideline);
- MECP document entitled "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" dated March 9, 2004, amended July 1, 2011 (Analytical Methods);

- Ontario Regulation 169/03 "*Ontario Drinking Water Quality Standards*" under the Safe Drinking Water Act dated 2002 (ODWQS);
- MECP document entitled "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines" dated June 2003 (ODWQS Guideline);
- MECP document entitled "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities, Guideline B-7 (formerly 15-08)" (Guideline B-7) dated April 1994;
- MECP document entitled "*Determination of Contaminant Limits and Attenuation Zones, Procedure B-7-1*" (formerly referenced by 15-08) dated 2018 and updated in 2021;
- Ontario Regulation 903 R.R.O. 1990 "*Wells*" under the Ontario Water Resources Act, as amended in 2019;
- MECP document entitled "*Water Management Policies Guidelines Provincial Water Quality Objectives*" (PWQO) dated July 1994, revised February 1999;
- MECP document entitled "Rationale for the Development of Soil and Groundwater Standards for Use at Contaminated Sites in Ontario" (Table 3.1 - Aquatic Protection Values) dated April 15, 2011 (APV); and
- Canadian Council of Ministers of the Environment (CCME) document entitled "*Canadian Environmental Quality Guidelines*" (Water Quality Guidelines for the Protection of Freshwater Aquatic Life) dated 1999 (CWQG).

4.2 Groundwater Monitoring Well Locations

The original groundwater monitoring well network for the Site was established in June 1999 and consisted of four shallow overburden wells (MW1 through MW4). Supplemental monitoring wells (MW5, MW6 and MW7) were installed on May 22, 2004, in order to improve delineation of leachate impacts at the Site. Monitoring well MW8 was installed on August 5, 2014, and was intended to replace MW6 (which had consistently been observed to be dry prior to its loss) and serve as a background monitoring location; however, Pinchin notes that exceedances of the ODWQS and Guideline B-7 criteria have historically been quantified at this location. Based on the updated groundwater flow interpretation, as well as the results of historical sampling events Pinchin has continued to utilize well MW1 as the "best case" background monitoring location for the 2024 annual monitoring program. Monitoring well MW6 has not been located since the fall of 2015 and is presumed to have been destroyed.

The current groundwater monitoring network at the Site consists of eight overburden groundwater monitoring wells (MW1 through MW8). These wells serve as reference points for retrieving water quality across the landfill.

The following table summarizes the location of each of the monitoring wells, as well as the rationale for their inclusion in the annual monitoring program:

Monitoring Well ID	Location	Rationale
MW1	Along northeast Site boundary	Background
MW2	Along north Site boundary	Upgradient
MW3	West portion of Site	Cross-gradient
MW4	Central within the waste fill area of the Site	Leachate
MW5	Central-east portion of the Site	Downgradient
MW6	Along south Site boundary	Cross-gradient
MW7	Along northwest Site boundary	Cross-gradient
MW8	Along south Site boundary	Cross-gradient

Groundwater monitoring well locations are identified on Figure 2. Details regarding the groundwater monitoring well locations are provided in Table 1 (all Tables are provided in Appendix IV).

Pinchin was successful in obtaining representative groundwater samples at all groundwater monitoring locations during the 2024 monitoring period with the exception of MW6 which could not be located and is presumed destroyed. The condition of each of the groundwater monitoring well locations was inspected at the time of each of the 2024 sampling events. All wells were observed to be in compliance with O. Reg. 903 with the exception of MW3; the casing of which was observed to be missing a lid and sinking into the ground and MW4 which was found to have its riser sticking up to a height that prevents the casing lid from closing. In addition, the surficial concrete seal at the base of MW8 appeared to be compromised; however, the underlying bentonite seal remains intact and serves as an effect barrier against vertical migration or preferential water infiltration around the base of the well. A photographic log of the monitoring locations is provided in Appendix V.

4.3 Surface Water Monitoring Locations

Milky Creek is located approximately 500 m west of the Site and flows in a southwesterly direction towards Larder River. Based on field observations collected during the 2016 through 2024 monitoring programs, surface water drainage from the Site is expected to flow in a westerly direction towards Milky Creek. It is expected that surface water drainage, in particular the ponded water observed on the south of the Site and the ditch area, is intermittent with seasonal fluctuations consistent with precipitation events. Routine monitoring of this ponded surface water and ditch system is required during future monitoring events to confirm this observation. However, monitoring stagnant water conditions presents challenges with respect to the interpretation of trends as stagnant water is often not representative of the conditions within a flow system.

The Site has one historical point for surface water monitoring: Ditch, located along the west portion of the Site in the vicinity of MW3. Pinchin established additional surface water sampling locations upstream (SW1) and downstream (SW2) of the Site in 2016, as well as an additional on-Site surface water sampling location (Pond).

The following table provides a summary of the surface water sampling locations included in the 2024 monitoring program with coordinates provided in UTM NAD83. The locations of the surface water sampling locations are provided in Figure 2. A photographic log of the monitoring locations is provided in Appendix V.

Location ID	Easting Zone 17U	Northing Zone 17U	Description
Ditch	609,750	5,332,109	Ditch located immediately west of Site
Pond	610,083	5,332,341	Pond located on central portion of landfill
SW1	609,654	5,332,801	Milky Creek approximately 400 m north of Site upstream
SW2	609,850	5,332,369	Milky Creek approximately 700 m southwest of Site downstream

Pinchin was successful in obtaining representative groundwater samples at all surface water sampling locations during the 2024 monitoring period with the exception of Ditch which was observed to be dry during the fall sampling event and Pond which was observed to be dry during all 2024 sampling events.

4.4 Monitoring Frequency

Groundwater and surface water quality monitoring at the Site was completed three times annually by Pinchin during 2024. Groundwater and surface water sampling events occurred on the following dates:

- Spring – May 15, 2024;
- Summer – July 23, 2024; and
- Fall – October 16, 2024.

4.5 Monitoring Parameters

4.5.1 Groundwater Monitoring Parameters

During the spring 2024 monitoring event, groundwater samples were submitted for laboratory analysis of the parameters listed in Column 1 of Schedule 5 of the MECP Landfill Standards. During the summer and fall 2024 monitoring events, groundwater samples were submitted for laboratory analysis of the parameters listed in Column 2 of Schedule 5 of the MECP Landfill Standards. At the time of sample

collection, field readings for the following parameters were measured; temperature, pH, conductivity, oxidation reduction potential (ORP) and dissolved oxygen (DO).

4.5.2 Surface Water Monitoring Parameters

During the spring 2024 monitoring event, surface water samples were submitted for laboratory analysis of the parameters listed in Column 3 of Schedule 5 of the MECP Landfill Standards. During the summer and fall 2024 monitoring events, surface water samples were submitted for laboratory analysis of the parameters listed in Column 4 of Schedule 5 of the MECP Landfill Standards. At the time of sample collection, field readings for the following parameters were measured: temperature, pH, conductivity, ORP and DO.

4.6 Monitoring Procedures and Methods

4.6.1 Standard Operating Procedures

The following Pinchin Standard Operating Procedures (SOPs) were followed by Pinchin field personnel for each portion of this project:

- Groundwater Sampling SOP; and
- Surface Water Sampling SOP.

All Pinchin monitoring SOPs have been developed in accordance with the MECP Sampling Document and are consistent with standard engineering practices.

4.6.2 Groundwater Monitoring Activities

To perform the groundwater monitoring activities, the following tasks were conducted:

- Pinchin notified the Client prior to field activities and subsequently mobilized staff from the Sudbury office to the Site;
- Static groundwater levels were collected using a Solinst™ water level tape. Measurements were collected from the top of riser pipe. The meter tape is calibrated in 1.0-millimetre (mm) increments. Reproducibility of the depth measurements is generally within 2.0 mm or less;
- During the monitoring events, groundwater from each monitoring well was purged prior to the collection of the sample using a moderate-flow sample methodology via high-density polyethylene or low-density polyethylene 3/8" tubing and a Waterra™ inertial foot valve system. The inertial pump system was chosen as an approved method to minimize sediment/particulate within each sample and to minimize sample agitation and well trauma in accordance with the MECP Sampling Document. Pinchin purged a minimum of

three well volumes to a maximum of six well volumes, or until dry using the inertial pump system until the well volume column was representative of the surrounding formation. During purging activities, additional groundwater monitoring parameters were collected from each monitoring well using a YSI-556 water quality meter for measurement of field parameters. Sample residual was disposed of onto the ground surface, on-site and upgradient within the landfill confines;

- Groundwater samples were collected using the inertial pump system in accordance with the MECP Sampling Document. Dissolved metals were field-filtered using a dedicated in-line 0.45-micron disposable filter. Upon completion of field sampling and monitoring activities, all samples collected were submitted to the project laboratory SGS Canada Inc. (SGS) in Lakefield, Ontario. All parameters were analyzed by the project laboratory using MECP approved procedures and are consistent with the analytical methods prescribed in the Analytical Methods document; and
- The groundwater samples collected were analyzed at the project laboratory for the parameters listed in Column 1 of Schedule 5 of the MECP Landfill Standards (spring) and Column 2 of Schedule 5 of the MECP Landfill Standards (summer and fall). Groundwater sample results were compared to the applicable ODWQS as applied in accordance with the ODWQS Guideline document. Groundwater sample results were also compared to the reasonable usage parameters and were assessed using Guideline B-7 to establish and determine levels of contaminant discharges to the groundwater formation which would be considered acceptable by the MECP from naturally attenuating landfill sites with respect to human consumption and potable considerations.

4.6.3 Surface Water Monitoring Activities

To perform the surface water monitoring activities, the following tasks were conducted:

- Pinchin notified the Client prior to field activities and subsequently mobilized staff from the Sudbury office to the Site. The spring, summer and fall surface water sampling events coincided with the groundwater monitoring events;
- Care was taken during collection of surface water samples to ensure that a representative sample was collected, and that underlying sediments were not disturbed. For the surface water samples only, no filtration was done (in accordance with MECP surface water sampling protocols);
- All field activities at each monitoring location were initiated at downstream locations working upstream to avoid sediment disturbance and influencing sample integrity;

- Surface water samples were collected during each sampling event using a direct grab sampling methodology in accordance with the MECP Sampling Document. Upon completion of field sampling and monitoring activities, all samples collected were submitted to SGS. All parameters were analyzed by the project laboratory using MECP approved procedures and are consistent with the analytical methods prescribed in the Analytical Methods document;
- During sampling activities, surface water monitoring field parameters were collected at each surface water monitoring location using a YSI-556 water quality meter; and
- Surface water samples were analyzed during the monitoring events for parameters listed in the Column 3 (spring) of Schedule 5 in the MECP Landfill Standards document and Column 4 (summer and fall) of Schedule 5 in the MECP Landfill Standards document. Sample results were compared to the applicable PWQO, APV and CWQG criteria.

4.6.4 Groundwater and Surface Water Field Measurements

Subsequent to groundwater depth measurement and during purging activities, additional groundwater monitoring parameters were collected from each monitoring well using a YSI-556 water quality meter for measurement of field parameters. Field parameters at each surface water monitoring location were also collected using the YSI-556. The following field parameters were measured during the 2023 monitoring program:

- *Dissolved Oxygen (DO)* refers to the relative quantity of oxygen molecules which are dissolved or carried within a quantity of water. Oxygen enters water as rooted aquatic plants and algae undergo photosynthesis and as oxygen is transferred across an air and water interface. Oxygen's solubility in water is indirectly correlated with water's temperature, salinity and pressure. DO concentrations have a significant effect on groundwater quality by regulating the valence state of trace of metals and constraining the bacterial metabolism of dissolved organic species;
- *Conductivity* is the measurement of water's capacity to pass an electrical current. It is considered to be a reasonable indicator of ionic activity and dissolved solids concentration levels. It is affected by the presence of inorganic dissolved solids which carry a negative charge such as chloride, nitrate, sulphate and phosphate anions, or a positive charge such as sodium, magnesium, calcium, iron and aluminum cations. Organic compounds such as oil and phenol do not conduct an electrical current very well, and would therefore have low conductivity in water. Conductivity is also directly

correlated to the water temperature. Specific conductivity is a measurement of conductivity values which have been compensated to 25°C;

- *pH* is a measure of water's acidic/basic properties on a logarithmic scale from 1 (strongly acidic) to 14 (strongly alkaline or basic). It determines the solubility and biological availability of chemical constituents such as nutrients and heavy metals. For example, in addition to affecting how much and what form of phosphorus is most abundant in the water, pH also determines whether aquatic life and use it. The degree to which heavy metals are soluble determines their toxicity. Metals tend to be more toxic at lower pH values because they are more soluble. Excessively high and low pHs can have serious environmental and health effects. A high pH may cause the release of iron, copper, or lead into potable water, corrosion on water pipes and water using appliances and reduces the effectiveness of water disinfection with chlorine. Low pH values corrode substances such as metals and plastics. Fluctuations in groundwater pH values may be indicative of groundwater contamination;
- *Temperature* has a dramatic influence on water quality. The rate of chemical reactions is generally correlated to temperature which in turn affects the biological availability of nutrients within the water. As previously mentioned, oxygen's solubility in water is indirectly correlated with its temperature. Declining concentrations of oxygen within warming water is magnified by aquatic plants increasing metabolism as water temperature increases. Low concentrations of DO weaken aquatic plants resistance to disease, parasites, and other pollutants; and
- *Oxidation-reduction potential (ORP)* characterizes the oxidation-reduction state of the water on a scale from approximately -300mV (strongly reducing) up to +500mV (strongly oxidizing). The primary application of ORP is recording significant changes in the redox potential which is observed when purging a stagnant water column in piezometer and replacing it with "fresh" groundwater.

4.6.5 Record Keeping and Field Notes

Field notes were collected during the spring, summer and fall water quality monitoring events and recorded relevant observations, including, but not limited to:

- Dates and time of work being completed;
- Instrumentation and instrument condition;
- Calibration methods and results;
- Field parameter measurements;

- Field personnel conducting the investigations;
- Field methods used;
- Sampling location identifications;
- Sampling equipment and condition;
- Sample identification (i.e. type, media, number of containers, etc.);
- Sample preparation methods (i.e. preservatives, filtration, etc.);
- Field quality assurance/quality control (QA/QC) measurements;
- Field and sample identifiers;
- Anomalous conditions (i.e. damage to monitoring wells);
- Photographs of monitoring wells and monitoring stations;
- Weather conditions at the time of the monitoring events; and
- Field conditions.

All raw data and field notes are preserved and retained in Pinchin's custody.

4.7 Quality Assurance for Sampling and Analysis

Pinchin uses recognized industry standards, including the Canadian Council of Ministers of the Environment (CCME) *Subsurface Assessment Handbook for Contaminated Sites* and MECP's manual *Guidance on Sampling and Analytical Methods for Use at Contaminated Sites in Ontario* for conducting environmental assessments.

For quality assurance, all work is supervised and internally reviewed by senior staff members. As such, various QA/QC protocols were followed during the water quality sampling events to ensure that representative samples were obtained, and that representative analytical data were reported by the laboratory.

Field QA/QC protocols that were employed by Pinchin included the following:

- Clean, labelled and pre-preserved (when applicable) sample containers were provided by the laboratory;
- Water quality samples were placed in laboratory supplied sample jars;
- The monitoring wells were purged to remove stagnant water prior to sample collection, so that representative groundwater samples could be obtained. Dedicated purging and sampling equipment was used for monitoring well development, purging and sampling to minimize the potential for cross-contamination;

- All water quality samples were placed in coolers on ice immediately upon collection with appropriate sample temperatures maintained prior submission to the laboratory;
- Dedicated and disposable Nitrile™ gloves were used for all sample handling;
- All non-dedicated monitoring and sampling equipment (i.e. water level meter and YSI-556) was cleaned before initial use and between uses to minimize the potential for cross-contamination by washing with an Alconox™/potable water mixture followed by a deionized water rinse;
- Field duplicate groundwater samples were collected during the spring, summer and fall sampling event (1 in 10); and
- Sample collection and handling procedures were performed in general accordance with the MECP Sampling Guideline.

The SGS laboratory has an established QA/QC program and is a member of the Canadian Association for Laboratory Accreditation and is accredited by the Standards Council of Canada for specified environmental analysis. SGS's internal laboratory QA/QC consisted of the analysis of laboratory duplicate, method blank, matrix spike and spiked blank samples, an evaluation of relative percent difference calculations for laboratory duplicate samples and an evaluation of surrogate recoveries for the method blank, matrix spike and spiked blank samples.

4.8 Data Quality Evaluation

In order to provide confidence in the data obtained, a comprehensive QA/QC component was included in the monitoring program. The QA/QC procedures developed for this monitoring program are prepared in accordance with MECP Sampling Document and in most cases, exceed the minimum requirements.

Relative per cent difference (RPD) values (the absolute difference between two values divided by the average value and expressed as a per cent) were calculated between the parent sample and the field duplicate as part of the QA/QC program. RPD results of sample and duplicate analyses that are less than 50 percent indicate an acceptable level of analytical uncertainty. RPD values calculated for measured analyte concentrations for sample and duplicate pairs that exceed 50 per cent generally warrant discussion because they may indicate the presence of elevated analytical uncertainty and a potential for making interpretive errors based on the analysis results. Use of calculated RPD values to assess analytical uncertainty when using measured analyte concentrations for sample and sample duplicate pairs is not appropriate when either measured analyte concentration is within a multiple of 5 of the method detection limit (a value designated as the practical quantification limit (PQL)) where analytical uncertainty is typically elevated.

All field instrumentation calibration checks were completed by Pinchin field staff members prior to use on Site. All field operations conducted by Pinchin field staff members were completed using standard equipment decontamination and sampling procedures, and no deviations from the sampling plan were noted.

5.0 ASSESSMENT, INTERPRETATION AND DISCUSSION

5.1 Groundwater Quality Monitoring

5.1.1 The Ontario Drinking Water Quality Standards (ODWQS)

Through the establishment of the ODWQS, the province of Ontario has determined legally enforceable standards on contaminants in drinking water. The standards are designed to protect public health by restricting the quality of specific contaminants in drinking water. Three categories of contaminates are regulated under the Ontario Regulation 169/03 Drinking Water Standards:

- Microbiological – Originating from human and animals waste, coliforms and bacteria are common in the environment. Most are harmless; however, their presence may be indicative of other harmful bacteria in the water. Under the ODWQS, *Escherichia coli* (*E. coli*), fecal coliforms and total coliforms must be non-detectable in drinking water;
- Chemical – ODWQS regulates maximum quantities of organic and inorganic chemicals allowed in drinking water. Industrial discharges or agricultural runoff are not necessarily removed by drinking water treatment. Consuming water exhibiting a greater concentration of these chemicals than the ODWQS may cause serious health problems; and
- Radiation – Natural and artificial radio nuclides are also regulated in the ODWQS. Standards are expressed as maximum allowable concentrations in becquerels per litre. Radiological contaminants include radio nuclides, such as radium 228, which are caused from the erosion of naturally occurring deposits, or artificial radio nuclides, such as tritium, released into the water by nuclear power plants. Radiological contaminants do not naturally occur within the study area, and the disposal of radiological waste was not suspected in the McGarry WDS. As a result, radiation was not monitored for this study.

The ODWQS Guideline Document is the MECP technical guidance document which provides guidance on applicability of the ODWQS and also provides applicable interim guidelines where legal standards are absent. Both the ODWQS and the Guideline B-7 were used in assessing the groundwater results obtained during the 2024 monitoring program.

5.1.2 The Reasonable Use Criteria Assessment (RUC)

Guideline B-7, the "reasonable use concept" (RUC) approach, is the MECP's groundwater management strategy for mitigating the effect of contamination on properties adjacent to its source.

It establishes procedures for determining the reasonable use of groundwater on a property adjacent to sources of contaminates and establishes limits on the discharge of contaminants from facilities which dispose of waste into the shallow subsurface.

The application of "reasonable use" is outlined in Procedure B-7-1 "Determination of Contaminant Limits and Attenuation Zones." The procedure determines the maximum concentration (C_m) of a particular contaminant that would be acceptable in the groundwater beneath an adjacent property and is calculated in accordance with the relationship:

$$C_m = C_b + x(C_r - C_b)$$

C_b – This is the background concentration of the particular groundwater contaminant in consideration before it has been affected by human activities. From this, it is possible to calculate the extent of human activities impact on contaminant levels.

C_r – In accordance with the Ontario Water Management Guideline, this is the maximum concentration of a particular contaminant that should be present in the groundwater. This value is dependent on property's use of the groundwater as outlined in B-7. It also allows for the total amount of contamination. Pinchin conservatively assumes that the reasonable use of the groundwater on-site is potentially for potable drinking water purposes.

x – As determined by the MECP, this constant determines the extent which the contamination has on the groundwater's use. For drinking water, x is 0.5 for non-health related parameters or 0.25 for health-related parameters. For other reasonable uses, it is 0.5.

Contamination concentrations which exceed C_m may have an appreciable effect on the use of an adjacent property, and as such the Site should be managed in a manner to minimize environmental damage, or the operation should be modified. It is acceptable to modify the operation of the disposal site to meet the specified limits. However, if these limits are exceeded, all waste disposals except for that done in conjunction with a reasonable plan for closure or with remedial activities should be terminated until the specified limits have been met, or until monitoring data indicate that these limits will be met. Determination of the replacement of contaminated water supplies and the abatement of the contaminate plume must be made on a case-by-case basis in accordance with "*Resolution of Groundwater Quality Interference Problems*" Guideline B-9. For the purpose of evaluating compliance with respect to the RUC, Pinchin has compared the calculated C_m values versus the applicable down- and cross-gradient

compliance monitoring wells (MW3, MW5, MW7 and MW8) as these monitors are located downgradient of the waste areas and/or closest to the property boundaries.

5.2 Groundwater Results

The following discussion of parameters documents the groundwater quality in comparison to the calculated RUC as per Guideline B-7. To implement Guideline B-7, groundwater samples collected from monitoring wells located closest to the property boundaries of the Site (MW3, MW5, MW7 and MW8) are applicable. Given the recent interpretation of the groundwater flow within the unconfined aquifer, MW5 is currently representative of the groundwater quality at the downgradient property boundary and should be considered the compliance trigger well.

Previous investigations have indicated that groundwater quality observed at MW1 located along the northeast boundary of the Site is representative of background conditions. However, the 2014 A&A Monitoring Report made the following conclusion:

"The monitoring well MW-1 was used as the background well by HATCH (the previous consultant) in 1999. Their selection was based on their belief that the groundwater was flowing toward the west. Although this well shows low levels for most of the tested parameters, it has also exceeded the ODWS [Ontario Drinking Water Standards] on several sampling occasions. Since it has been established that the groundwater is flowing northwest-north and MW-1 is located close to the site boundary northeast of the site, replacing this well with a new installed well (MW-8) is recommended in the future events."

This recommendation was re-affirmed in the 2014 Thomas Guo Memo which concluded that a new background monitoring well should be established along the south boundary of the property.

Monitoring well MW8 was installed along the south property boundary in August 2014. Based on Pinchin's review of the historical groundwater quality data observed at MW8, elevated concentrations of DOC, aluminum, iron and manganese were found to exceed the ODWQS during the 2015 sampling events. Furthermore, groundwater quality observed at MW8 during the 2017 monitoring program exhibited elevated concentrations of TDS, alkalinity and DOC, as well as depressed pH when compared to MW1. During the 2018 and 2019 sampling events, low levels of alkalinity and pH similar to those observed at well MW1, as well as slightly elevated DOC and nitrate concentrations were observed.

Based on the above-noted historical monitoring results, as well as groundwater contouring and the associated inferred groundwater flow direction as depicted in Figures 3, 4 and 5, the use of MW8 located south of the waste deposits is not appropriate for utilization within the Guideline B-7 calculations to derive the Site-specific discharge criteria.

Based on the information provided above, it is Pinchin's opinion that groundwater quality observed at MW1 reflects unimpacted groundwater quality; therefore, MW1 has been allocated as the "best case" background monitor at this time. Pinchin has calculated the maximum off-Site acceptable contaminant concentration (C_m) using the groundwater quality observed at MW1. The groundwater quality results observed at MW1 obtained since May 2015 were used as background concentration criteria (C_b) to calculate the maximum off-Site acceptable contaminant concentration (C_m).

The analytical data for each well in comparison to the applicable regulatory criteria is provided in Tables 2 through 9. An evaluation of the RUC criteria in comparison to the downgradient compliance wells is provided in Table 10. Copies of the laboratory analytical reports are presented in Appendix VI. The following is a breakdown of the water quality observed the monitoring well locations with comparison to the background quality and leachate being produced on-Site.

5.2.1 Background Water Quality Evaluation

Monitoring Well MW1

Monitoring well MW1 was installed on June 1, 1999, and is located along the northeast boundary of the Site. During the 2024 monitoring program, alkalinity was observed to be below the acceptable range specified by the ODWQS during all sampling events. The depressed alkalinity is interpreted to be representative of background groundwater quality conditions at the Site; and therefore, this parameter cannot be utilized in the Guideline B-7 analysis for the Site. Pinchin notes that pH levels falling below the ODWQS were not reported in 2024, but have historically been reported at MW1.

Monitoring Well MW2

Monitoring well MW2 was installed on June 1, 1999, and located along the northwest boundary of the Site. During the 2024 monitoring program, alkalinity was observed to be below the acceptable range specified by the ODWQS during all sampling events. Additionally, pH was observed to be below the acceptable range specified by the ODWQS during the summer sampling event. The low pH is consistent with historical results for MW2, as well as with low pH values historically observed at background monitoring well MW1. Water quality observed at MW2 is generally similar to those reported at MW1.

5.2.2 Leachate Source Quality Evaluation

Monitoring Well MW4

Monitoring well MW4 was installed on June 1, 1999, and is located centrally within the waste fill area of the Site. During the 2024 monitoring program, concentrations of TDS (all events), alkalinity (high, fall), DOC (all events), arsenic (spring), iron (all events) and manganese (spring) were found to exceed the

ODWQS indicating impacts from landfill leachate. The water quality at this location is interpreted to be representative of leachate source quality.

5.2.3 Cross Gradient Water Quality Evaluation

Monitoring Well MW3

Monitoring well MW3 was installed on June 1, 1999, and located along the west portion of the Site. Based on the inferred groundwater flow direction and the location of MW3 in relation to the property boundary, this monitoring location has been designated as a compliance well for assessing the Guideline B-7 RUC.

During the 2024 monitoring program, all parameters analyzed at MW3 met the applicable ODWQS criteria with the exception of alkalinity (low, all events) and pH (low, spring). In addition, pH (summer) fell below the acceptable range specified in the Guideline B-7 Criteria. pH is an operational guideline set by the ODWQS for drinking water systems and is not considered to be a significant human health or environmental concern originating from the Site.

Monitoring Well MW6

Monitoring well MW6 was installed on May 22, 2004, and was located along the south boundary of the Site. MW6 has not been located since the fall of 2015 and is assumed to be destroyed. Similar to the 2016-2023 efforts, groundwater samples were not collected at this location during the 2024 monitoring program.

Monitoring Well MW7

Monitoring well MW7 was installed on May 22, 2004, and is located along the northwest boundary of the Site. During the 2024 monitoring program, all parameters analyzed at MW7 satisfied the ODWQS with the exception of alkalinity (low, spring and summer), iron (fall) and manganese (spring). Manganese (spring) and iron (fall) also exceeded the Guideline B-7 Criteria. Depressed alkalinity is consistent with background water quality at the Site. Alkalinity, iron and manganese are all either aesthetic objectives or operational guidelines for drinking water systems set by the ODWQS and are not considered to be significant human health or environmental concerns originating from the Site.

Monitoring Well MW8

Monitoring well MW8 was installed on August 5, 2014, and is located along the south boundary of the Site. During the 2024 monitoring program, all parameters analyzed at MW8 met the ODWQS with the exception of pH (low, all events) and alkalinity (low, all events). pH also fell below the acceptable range specified by the Guideline B-7 Criteria. In addition, nitrate exceeded the Guideline B-7 Criteria during the fall sampling event.

Both pH and alkalinity are operational guidelines for drinking water systems set by the ODWQS and are not considered to be significant human health or environmental concerns originating from the Site. Concentrations of nitrate identified at MW8 did not exceed the ODWQS. Furthermore, based on the inferred groundwater flow direction, as well as the absence of detectable concentrations of nitrate within the leachate source well MW4, the concentrations of nitrate exceeding the Guideline B-7 Criteria at MW8 are not considered to be landfill-derived.

5.2.4 Trigger Well Water Quality Evaluation

Monitoring Well MW5

Monitoring well MW5 was installed on May 22, 2004, and is located within the central-east portion of the Site. MW5 is considered to be most representative of the groundwater quality at the downgradient property boundary. During the 2024 monitoring program, all parameters analyzed at MW5 satisfied the ODWQS with the exception of alkalinity which was observed to be below the range specified by the ODWQS during the spring and summer sampling events. The depressed alkalinity at MW5 is consistent with background concentrations. No exceedances of the Guideline B-7 criteria were identified at MW5 during the spring, summer and fall monitoring events of 2024.

In general, the groundwater quality concentrations within the monitoring well network for the Site appear to be stable and consistent with the historical monitoring record. Based on the current groundwater monitoring well network configuration, Pinchin has not identified any significant human health or ecological impacts originating from the landfill at the Site. In summary, it is inferred that the Site is continuing to effectively operate as designed; as a natural attenuation type facility with any landfill derived groundwater impacts attenuated to acceptable levels prior to the downgradient property boundaries.

5.3 Groundwater Field Measurement Results

On May 15, July 23 and October 16, 2024, Pinchin collected groundwater monitoring parameters from each of the well locations using a YSI-556 water quality meter for measurement of field parameters. The field parameter measurements are provided in Tables 2 through 9.

A review of the field parameters for the project identified no significant concerns in the water quality during the monitoring events. The water quality at the Site monitoring locations did not change significantly between each of the monitoring locations, and the measured field parameters were within the normal variability associated with shallow groundwater monitoring systems with the exception of MW4 which was observed to have higher conductivity measurements across all events as compared to the other monitoring wells. This is an indicator of stagnant anaerobic conditions which are attributed to leachate impacts from the landfill.

5.4 Surface Water Quality Monitoring

5.4.1 The Provincial Water Quality Standards (PWQO)

The PWQO are numerical and narrative criteria which serve as chemical and physical indicators representing satisfactory levels for surface water and groundwater where it discharges to the surface. The PWQO are levels which are protective of the water quality for all forms of aquatic life during their indefinite exposures to the water. The PWQO levels include protection for anthropogenic recreational water uses where there is a high potential of exposure and are based on public health and aesthetic considerations.

In general, the PWQO state that the surface water quality of a water body shall be "free from contaminating levels of substances and materials attributable to human activities which in themselves, or in combination with other factors can: settle to form objectionable deposits; float as debris or scum or oil or other matter to form nuisances; product objectionable colour, odour, taste, or turbidity; injure, are toxic to or produce adverse physiological or behavioural responses in humans, animals, or plants; or enhance the production of undesirable aquatic life or result in the dominance of nuisance species".

5.4.2 Aquatic Protection Values

Under Ontario Regulation 153/04, the MECP have developed APVs to protect aquatic organisms exposed to contaminants from migration of contaminated groundwater to surface water. Protection of aquatic biota from migration of contaminants by overland flow is provided by a Site being designated an environmentally sensitive area if the property includes or is adjacent to a water body or includes land that is within 30 m of a water body.

APVs are designed to provide a scientifically defensible and reasonably conservative level of protection for most aquatic organisms from the migration of contaminated groundwater to surface water resources.

5.4.3 Canadian Water Quality Guidelines (CWQG)

The CWQG were developed by the Canadian Council of Resources and Environment to provide basic scientific information about the effects of water quality parameters on uses in order to assess water quality issues and concerns and to establish water quality objectives for specific sites. The guidelines contain recommendations for chemical, physical, radiological and biological parameters necessary to protect and enhance designated uses of water. They apply only to inland surface waters and groundwater and not to estuarine and marine waterbodies. The rationale for each parameter is included to assist in the development of water quality objectives to suit local water conditions.

5.5 Surface Water Results

During the 2024 monitoring program, Pinchin collected surface water samples from each of the established monitoring locations with the exception of Ditch which was observed to be dry during the fall

event and Pond which was observed to be dry during all sampling events. A summary of the surface water quality monitoring data relative to the regulatory standards is presented in the attached Tables 11 through 14. Copies of the laboratory analytical reports are presented in Appendix VI.

Surface Water Station Ditch

Surface water sampling station Ditch is located immediately west of the Site. Ditch was observed to be dry during the fall sampling event; therefore, only spring and summer samples were collected from this location. During the 2024 monitoring period, pH (low, all events), phosphorous (summer), phenols (all events) and iron (summer) failed to satisfy the PWQO. In addition, pH (low, all events) and iron (summer) failed to satisfy the APV and pH (low, summer) and cadmium (summer) failed to satisfy the CWQG.

Surface Water Station Pond

Surface water sampling station Pond was observed to be dry during all sampling events in 2024; therefore, no samples were collected from this location.

Surface Water Station SW1

Surface water sampling station SW1 located within Milky Creek is situated upstream of the Site and is inferred to be representative of background surface water conditions. During the 2024 monitoring period, pH (low, spring and fall), phenols (all events) and iron (all events) failed to satisfy the PWQO. In addition, pH (low, spring and fall) and iron (summer) failed to satisfy the APV, and cadmium (spring) exceeded the CWQG. Pinchin notes that concentrations of phosphorous exceeding the PWQO were not reported in 2024, but have historically been observed at SW1.

Surface Water Station SW2

Surface water sampling station SW2 located within Milky Creek is situated downstream of the Site and represents a potential receptor of landfill leachate originating at the Site. During the 2024 monitoring period, concentrations of phenols (spring and summer) and iron (all events) exceeded the PWQO. In addition, concentrations of iron (summer) exceeded the APV, and concentrations of cadmium (spring) exceeded the CWQG.

It is Pinchin's opinion that the depressed pH and elevated concentrations of phosphorous, phenols, cadmium and iron are likely a result of naturally occurring elements within the watershed system and are not considered landfill-derived impacts. Based on Pinchin's review of the surface water analytical dataset, it does not appear as though surface water impacts are occurring at the downstream surface water receptors.

5.6 Surface Water Field Measurement Results

Pinchin collected surface water monitoring parameters from each surface water monitoring location using a YSI-556 water quality meter for real-time in-situ measurement of field parameters. The field parameter measurements are provided in Tables 11 through 14.

A review of the field parameters for the project identified no significant concerns in the water quality during the monitoring event. The quality at the surface water monitoring locations did not change significantly between each of the monitoring locations.

5.7 Groundwater Flow Interpretation

Based on the 2014 A&A Monitoring Report, historical groundwater flow was reportedly in a northwest-north direction towards the lowlands of Milky Creek. As such, it has historically been interpreted that the leachate plume originating from the waste area would migrate towards monitoring wells MW2 and MW7 which are located northwest and west of the Site, respectively.

Based on the relative elevation survey of the monitoring well network completed on May 20, 2017, and the depth to groundwater measurements collected during the 2018 through 2023 monitoring events (provided in Table 1), the groundwater has been interpreted to flow in a radial pattern appearing to converge towards the low-lying area in the vicinity of monitoring well MW5. The groundwater elevations collected during the spring, summer and fall of 2024 are consistent with this interpretation. The spring, summer and fall 2024 groundwater contours have been provided in Figures 3, 4 and 5, respectively.

5.8 Leachate Characterization

A review of the 2024 groundwater quality data set indicates that leachate impacts observed at monitoring well MW4 are characterized by elevated levels of conductivity, TDS, alkalinity, DOC, arsenic, iron and manganese which is consistent with previous investigations. Concentrations of sodium satisfied the ODWQS during the 2024 sampling events, but have exceeded the ODWQS several times over the available monitoring record. These results are expected at this location given the proximity of MW4 to the waste area. It is Pinchin's opinion that the groundwater quality observed at this location is representative the worst-case "source" landfill leachate and can be used to identify leachate constituents.

A review of the 2024 groundwater quality data set for monitoring wells MW1, MW2, MW3, MW5, MW7 and MW8 identified low concentrations of pH and alkalinity often below the acceptable range as specified in the ODWQS. It is Pinchin's opinion that low concentrations of pH and alkalinity are likely naturally occurring conditions within the unconfined groundwater unit. Furthermore, alkalinity and pH are operating guidelines for drinking water systems set by the ODWQS and are not considered an environmental concern originating from the Site.

Based on Pinchin's review of the analytical data set collected to date, monitoring wells MW1, MW2, MW3, MW5, MW7 and MW8 are not being influenced by landfilling activities at this time. It appears that landfill leachate is naturally attenuating within proximity of the waste area (MW4) and is not influencing the shallow unconfined groundwater unit in the vicinity of monitoring wells MW1, MW2, MW3, MW5, MW7 and MW8.

5.9 Contaminant Attenuation Zone

A Contaminant Attenuation Zone (CAZ) has not been established for the Site. However, it should be noted that based on the current observed water quality data, landfill derived leachate impacts appear to attenuate prior to the property boundary.

5.10 Adequacy of the Monitoring Program

Based on Pinchin's review of the current and historical groundwater and surface water data, it is Pinchin's opinion that annual monitoring should consist of tri-annual sampling conducted in the spring (May-June), mid-summer (August-September) and late fall (October-November) at all groundwater and surface water monitoring locations on Site. While the Site is operational, it is recommended that continual monitoring and trend analysis be completed in the future. During these sampling and reporting events, it is recommended that the monitoring well network be evaluated for adequacy and to determine if there is a need for additional monitoring locations.

5.11 Monitoring Well Network Efficiency

Pinchin concludes that the current groundwater monitoring network is considered adequate for evaluating the shallow groundwater quality north (MW1 and MW2), northwest (MW7), southwest (MW3), south (MW8) and directly east (MW5) of the Site. In addition, Pinchin concludes that monitoring well MW4 is representative of "worst case" landfill leachate and is adequate in representing leachate being sourced from the Site.

All wells were observed to be in compliance with O. Reg. 903 with the exception of MW3 which was found to have its casing sunk and to be missing the casing lid and MW4 which was found to have its riser sticking up to a height that prevents the casing lid from closing. In addition, the surficial concrete seal at the base of MW8 appeared to be compromised; however, the underlying bentonite seal remains intact and serves as an effect barrier against vertical migration or preferential water infiltration around the base of the well.

5.11.1 Background Monitoring Well Efficiency

It is Pinchin's opinion that monitoring well MW1 is currently the most representative background water quality at this time given the inferred groundwater flow direction and quantified groundwater concentrations.

5.12 Supplemental Monitoring: Sediment, Benthic and/or Toxicity Monitoring

No supplemental monitoring was completed as part of the 2024 monitoring program completed by Pinchin.

5.13 Assessment of the Need for Implementation of Contingency Measures

There is currently no set trigger levels designed for the Site. At this time, Pinchin does not recommend any need or implementation for contingency measures.

5.14 Waste Disposal Site Gas Impacts

At this time, no evidence has been documented to suggest that methane gas generation from the Site is a significant concern.

5.15 Effectiveness of Engineered Controls

With the exception of the intermittent landfill cover, there are no operational engineered controls in effect at the Site. The Client should continue to maintain the integrity of the landfill cover as per the D&O Plan. Annual monitoring and inspections should continue to be completed to ensure regular maintenance is occurring on an as needed basis. At the time of the 2024 monitoring events, no significant damage or concerns were noted.

5.16 Controls System Monitoring

Environmental control systems are designed, constructed and utilized at some waste disposal sites to reduce or increase an environmental variable to an acceptable level, or to maintain an environmental variable within an acceptable range in order to prevent a negative environmental outcome. Certain environmental control systems, such as a leachate collection system or a methane gas collection system, can provide the basis for operator intervention to bring about or maintain a desired condition to operate the landfill. The Site does not currently operate any control systems; therefore, no control system monitoring was completed as part of the 2024 monitoring program.

5.17 QA/QC Results

In order to provide confidence in the data obtained, a comprehensive QA/QC component was included in the monitoring program. The QA/QC procedures developed for this monitoring program are prepared in accordance with MECP Sampling Document and in most cases, exceed the minimum requirements.

Water quality samples collected by Pinchin were generated in accordance with acceptable procedures. No analytical hold times were exceeded for samples submitted for analyses, and sample temperatures upon receipt at the project laboratory were below 10˚ Celsius with the exception of spring groundwater and surface water samples (10˚ Celsius) and fall groundwater samples (11˚ Celsius).

Groundwater duplicate sample pair were collected from the Site during each of the spring (MW7), summer (MW7) and fall (MW3) sampling events. Each sample and duplicate pair were submitted for laboratory analysis of the full suite of analytical parameters.

When compared to concentrations reported in the original samples, duplicate water quality data reported that all parameters were within an acceptable range with respect to relative percent difference (i.e., the industry standard of less than 50%).

The analytical laboratory employed to perform the laboratory analysis (SGS) is accredited by the Standards Council of Canada/Canadian Association for Laboratory Accreditation in accordance with ISO/IEC 17025:1999 – "*General Requirements for the Competence of Testing and Calibration Laboratories*" for the tested parameters and has met the standards for proficiency testing developed by the Standards Council of Canada for parameters set out in the Soil, Ground Water and Sediment Standards.

Sample analysis dates provided on the laboratory analytical reports issued by SGS indicate that all sample analyses were performed within the required sample/extract hold times as indicated by the dates presented in columns for each sample parameter on the analytical report. The laboratory minimum detection limits were reported to be at or lower than the required MECP reporting detection limits for the parameters analyzed. A comparison of the internal laboratory duplicate samples indicates that all samples and the respective duplicates are within acceptable limits.

Upon review of the QA/QC results for the spring, summer and fall sampling programs, Pinchin has not identified any significant concerns that would warrant the invalidation of any of the field or laboratory data; therefore, considers the data generated as part of this program to be reliable.

- Iron at MW7; and
- Manganese at MW7.

- In summary, it is inferred that the Site is continuing to effectively operate as designed; as a natural attenuation type facility with any landfill-derived groundwater impacts attenuated to acceptable levels prior to the downgradient property boundaries;
- All reported surface water samples submitted for analysis satisfied the applicable PWQO, APV and/or CWQG standards for the parameters analyzed with the exception of the following:
  - pH (low) at Ditch and SW1;
  - Total phosphorous at Ditch;
  - Phenols at Ditch, SW1 and SW2;
  - Cadmium at Ditch, SW1 and SW2; and
  - Iron at Ditch, SW1 and SW2.
- It is Pinchin's opinion that low pH concentrations and elevated iron, phenols, cadmium and total phosphorous concentrations within the surface water samples are likely naturally occurring elements within the watershed system.

Based on Pinchin's review of the analytical data set collected to date, monitoring wells MW1, MW2, MW3, MW5, MW7 and MW8 are not being influenced by landfilling activities at this time. It appears that landfill leachate is naturally attenuating within proximity of the waste area (MW4) and is not influencing the shallow unconfined groundwater unit in the vicinity of monitoring wells MW1, MW2, MW3, MW5, MW7 and MW8.

Based on the 2024 results obtained from the existing groundwater monitoring wells, Pinchin has not identified any significant human health or ecological landfill related impacts downgradient of the landfill in the vicinity of the property boundaries. All exceedances of the RUC Guideline B-7 are related to aesthetic objectives or operational guidelines associated with drinking water systems set by the ODWQS.

Similarly, based on Pinchin's review of the surface water analytical data set, it appears that landfill-derived surface water impacts are not occurring at the downstream surface water receptors.

7.0 RECOMMENDATIONS

Based on a review of the existing dataset and regulatory requirements to date, Pinchin recommends the following:

- The Client should continue to ensure that the current landfill cover material is inspected and maintained as part of the ongoing monitoring program. In the future, any damage to the cover due to weathering or other cause should be rectified;
- It is Pinchin's opinion that the monitoring frequency should continue to consist of tri-annual sampling, spring (May-June), mid-summer (August-September) and late fall (October-November) at all groundwater and surface water monitoring locations on Site. While the Site is operational, it is recommended that continual monitoring and trend analysis be completed in the future. During these sampling and reporting events, it is recommended that the monitoring well network be evaluated for adequacy and to determine if there is a need for additional monitoring locations;
- MW6 has not been located since the fall of 2015 and is presumed destroyed. It is Pinchin's opinion that monitoring well MW6 should be discontinued from the annual monitoring program;
- As part of the 2023 Pinchin Annual Monitoring Report, Pinchin recommended that the analysis of VOCs in the groundwater samples collected during the spring monitoring events be removed from the program (with the exception of the source well MW4) as these parameters had consistently been non-detectable at all locations, including the source well. However, Pinchin notes that toluene was detected for the first time in MW8 during the spring monitoring event in 2024. Therefore, Pinchin recommends that the analysis of VOCs in the groundwater samples collected during the spring monitoring events be removed from the program with the exception of MW4 and MW8; and
- The well casings for monitoring wells MW3 and MW4 should be repaired/modified to allow for closing and locking to ensure that contaminants do not enter the well. In addition, the surficial seal for MW8 should be repaired to ensure that the bentonite seal in the annular space is protected and does not result in a pathway for surface contaminants to impact the aquifer.

8.0 MONITORING AND SCREENING CHECKLIST

In accordance with the MECP Landfill Standards, the Monitoring and Screening Checklist for the Site completed by the Pinchin CEP is completed and provided in Appendix VII.

9.0 DISCLAIMER

This Monitoring Report was performed for the Township of McGarry (Client) in order to investigate the environmental condition of the groundwater and surface water at the McGarry Waste Disposal Site (Site). The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property. This Monitoring Report does not quantify the extent of the extent of the current and/or recognized environmental condition or the cost of any remediation.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analyzed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of this Monitoring Report to the standards established by Pinchin is intended to reduce, but not eliminate uncertainty regarding the potential for recognized environmental conditions on the Site and recognizes reasonable limits on time and cost.

This Monitoring Report was performed in general compliance with currently acceptable practices for environmental site investigations and specific Client requests as applicable to this Site.

This report was prepared for the exclusive use of the Client subject to the conditions and limitations contained within the duly authorized work plan. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it is the responsibility of the third parties. If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice.

Pinchin will not be responsible for any consequential or indirect damages. Pinchin will only be held liable for damages resulting from the negligence of Pinchin. Pinchin will not be liable for any losses or damage if the Client has failed, within a period of two years following the date upon which the claim is discovered within the meaning of the Limitations Act, 2002 (Ontario) to commence legal proceedings against Pinchin to recover such losses or damage.

Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

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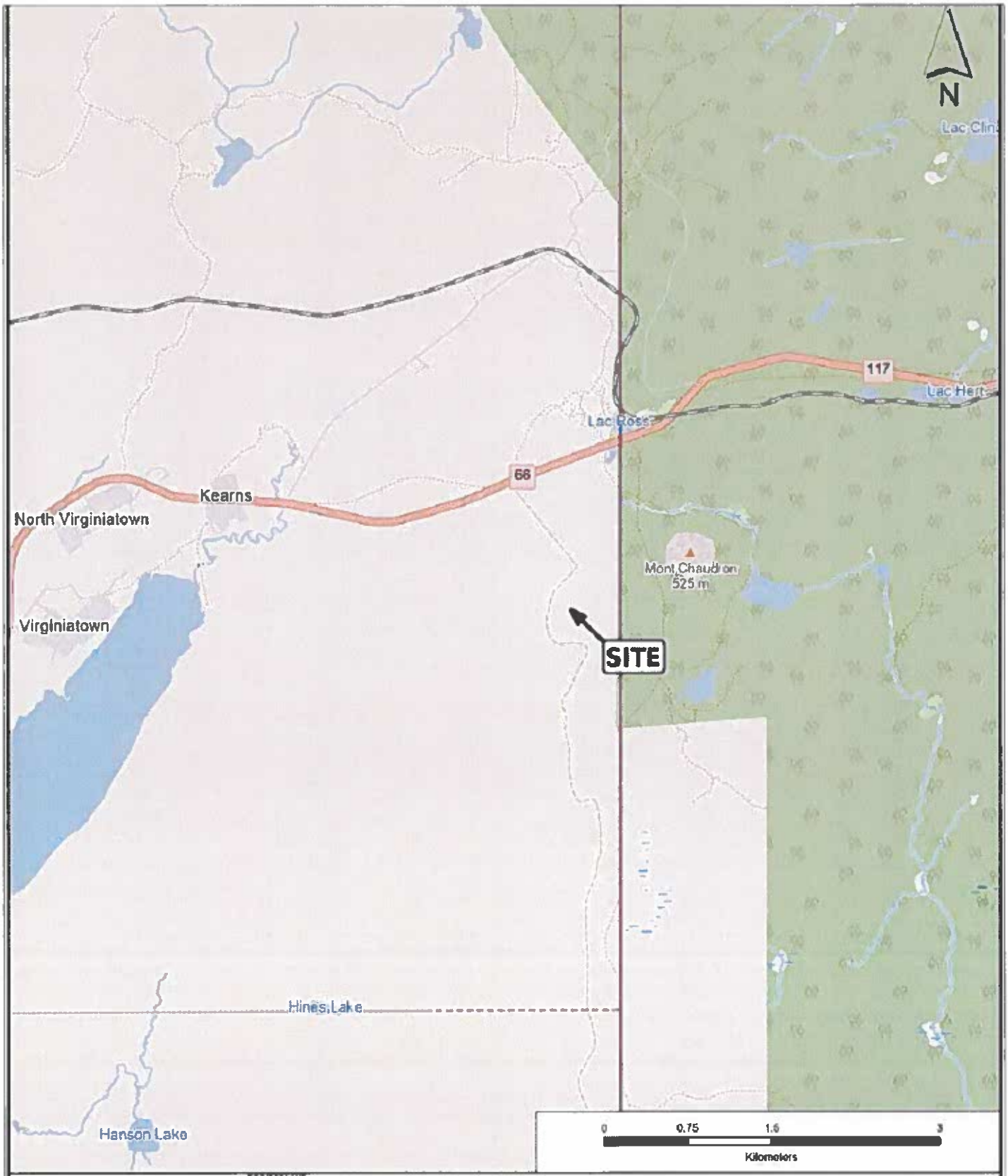
Template: Groundwater Monitoring Template – Oil and Gas, EDR, November 19, 2023

APPENDIX I
Figures



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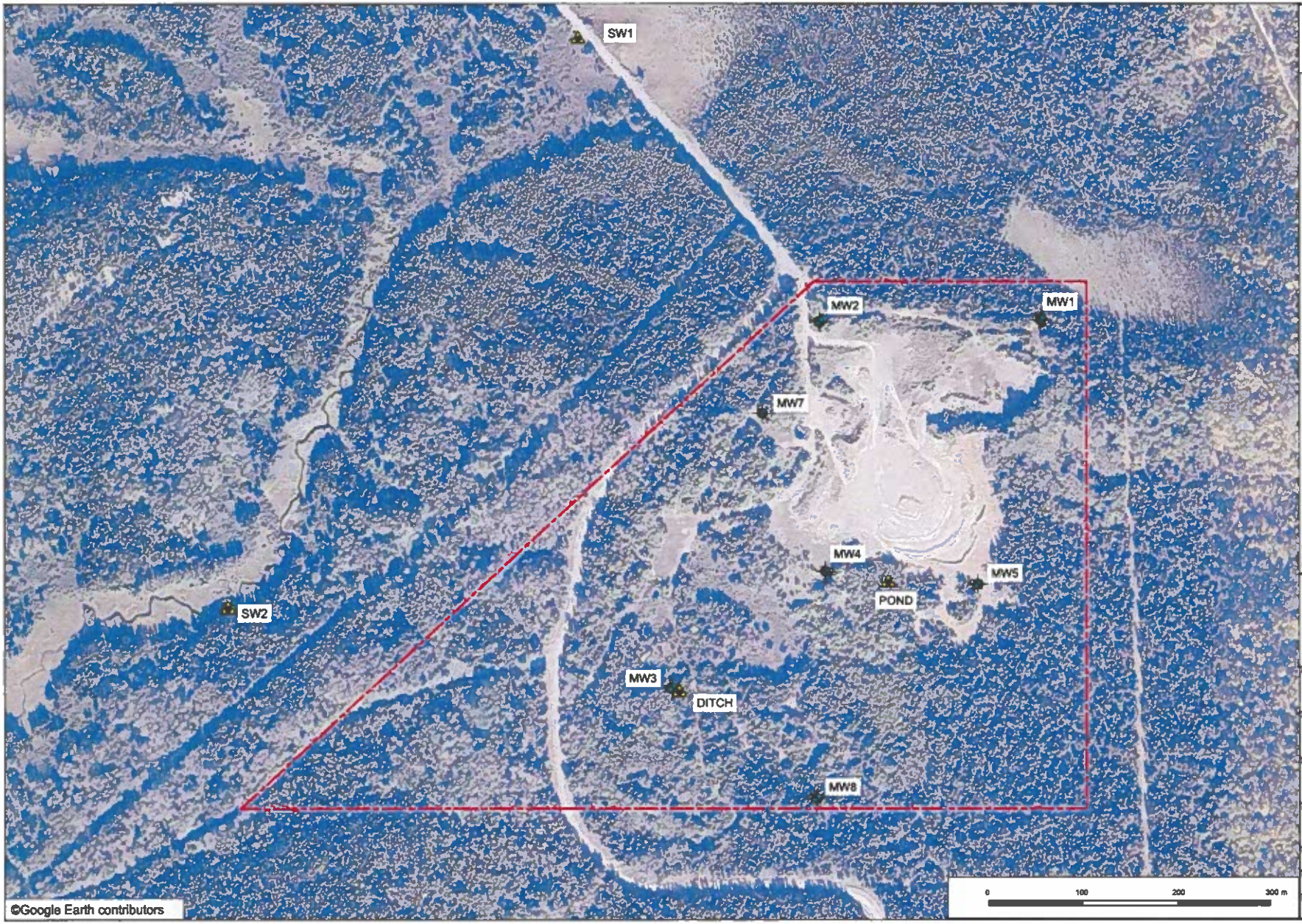
CLIENT NAME	TOWNSHIP OF MCGARRY				
PROJECT LOCATION	MCGARRY WASTE DISPOSAL SITE, ONTARIO				
FIGURE NAME	KEY MAP				FIGURE NUMBER 1
PROJECT NUMBER 304108.003	SCALE AS SHOWN	DRAWN BY NJ	REVIEWED BY OK	DATE FEBRUARY 2025	



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LEGEND

- SITE BOUNDARY
- GROUNDWATER MONITORING WELL
- SURFACE WATER MONITORING LOCATION

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2024 ANNUAL MONITORING REPORT

TOWNSHIP OF MCGARRY

MCGARRY WASTE DISPOSAL SITE, ONTARIO

SURFACE AND GROUNDWATER SAMPLING LOCATIONS

PROJECT NUMBER	SCALE
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DRAWN BY	REVIEWED BY
NJ	OK
DATE	FIGURE NUMBER
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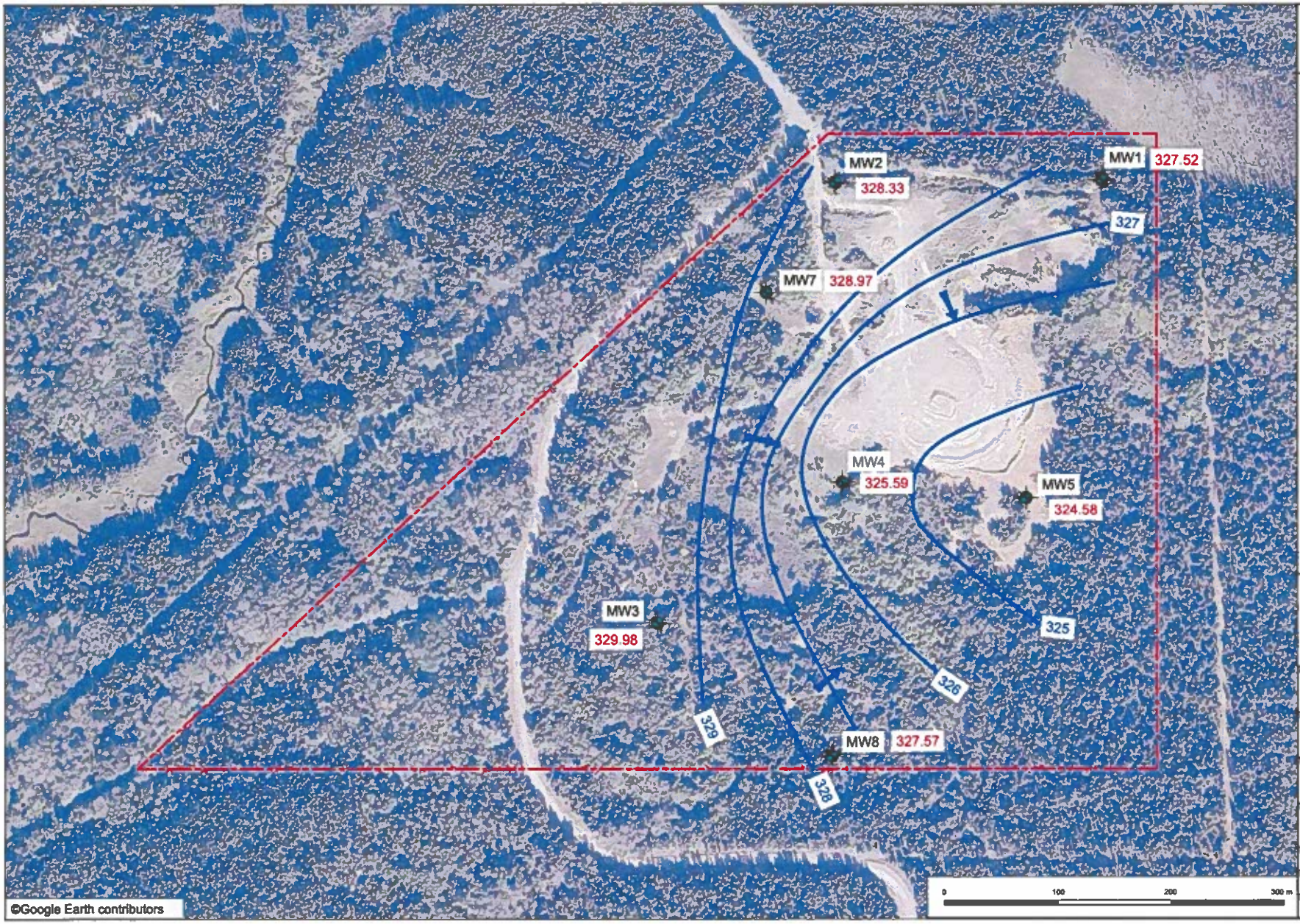
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LEGEND
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GROUNDWATER MONITORING WELL
MONITORING WELL ELEVATION (masl.)
GROUNDWATER CONTOUR ELEVATION (masl.)
GROUNDWATER CONTOUR LINES
GROUNDWATER FLOW DIRECTION
masl METERS ABOVE SEA LEVEL
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MW2 328.33
MW3 329.98
MW4 325.59
MW5 324.58
MW7 328.97
MW8 327.57
327
325
326
328
329
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2024 ANNUAL MONITORING REPORT
TOWNSHIP OF MCGARRY
MCGARRY WASTE DISPOSAL SITE, ONTARIO
INFERRED GROUNDWATER ELEVATION CONTOUR PLAN SPRING 2024
304106.003
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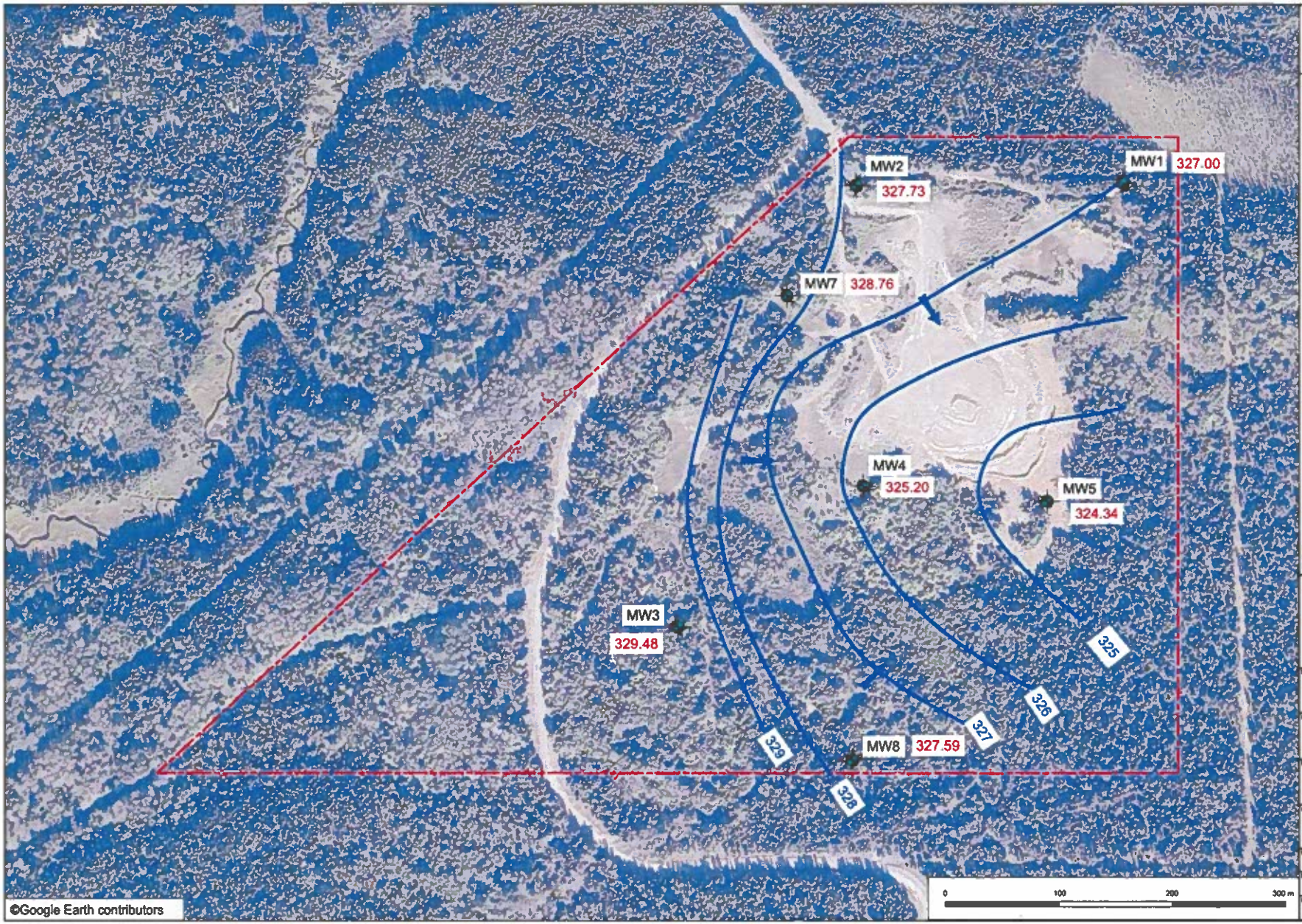
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MONITORING WELL ELEVATION (masl.)
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GROUNDWATER FLOW DIRECTION
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MW3 329.48
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MW8 327.59
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CLIENT NAME
TOWNSHIP OF MCGARRY
PROJECT LOCATION
MCGARRY WASTE DISPOSAL SITE, ONTARIO
FIGURE NAME
INFERRED GROUNDWATER ELEVATION CONTOUR PLAN SUMMER 2024
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DATE
FEBRUARY 2025
FIGURE NUMBER
4
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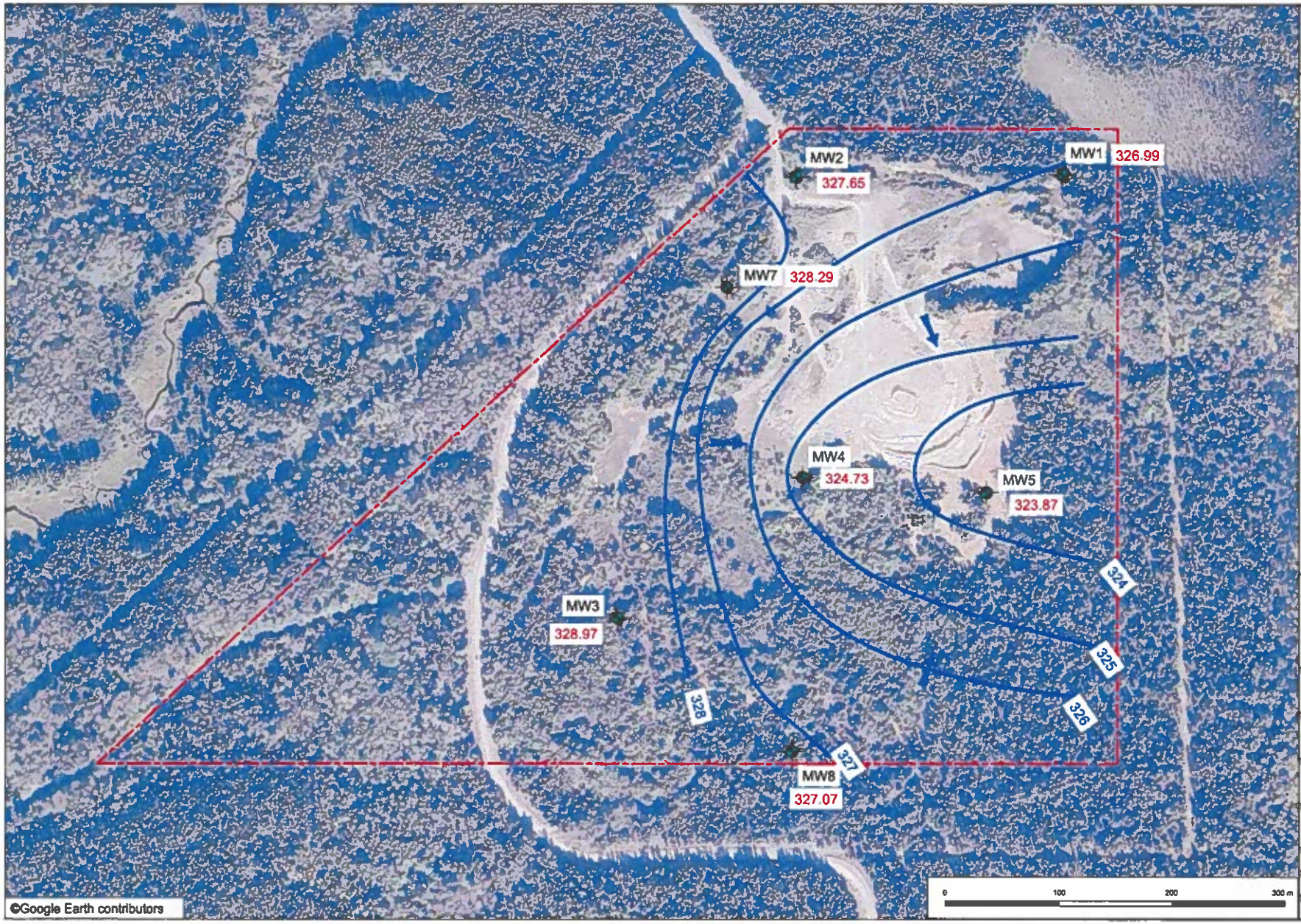


N

LEGEND

- SITE BOUNDARY
- GROUNDWATER MONITORING WELL
- MONITORING WELL ELEVATION (masl.)
- GROUNDWATER CONTOUR ELEVATION (masl.)
- GROUNDWATER CONTOUR LINES
- GROUNDWATER FLOW DIRECTION
- masl METERS ABOVE SEA LEVEL

LEGEND IS COLOUR DEPENDENT. NON-COLOUR COPIES MAY ALTER INTERPRETATION.

PINCHIN

PROJECT NAME: 2024 ANNUAL MONITORING REPORT

CLIENT NAME: TOWNSHIP OF MCGARRY

PROJECT LOCATION: MCGARRY WASTE DISPOSAL SITE, ONTARIO

FIGURE NAME: INFERRED GROUNDWATER ELEVATION CONTOUR PLAN FALL 2024

PROJECT NUMBER	SCALE
304108.003	AS SHOWN
DRAWN BY: NJ	REVIEWED BY: OK
DATE: FEBRUARY 2025	FIGURE NUMBER: 5

APPENDIX II

Certificate of Approval

Ministry of the Environment
Ontario

Provisional Certificate No. A 572402

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:

The Corporation of the Township of McGarry
P.O. Box 99
Virginiatown, Ontario

for the use and operation of a 35 hectare landfilling site

all in accordance with the following plans and specifications: the Site Plan dated Feb.8, 1977, the "Surveyors Certificate" prepared by Pit, Blackburn, Ontario Land Surveyor dated July 2,1974 and "McGarry Sanitary Landfill Site" operating program and drawings #7012-1 and 7012-2 prepared by Heathwood Engineering Associates Limited.

Located: South Part of Sand-Gravel Reserve
File 126090, Mining Claim L 40808
Township of McGarry, District of Timiskaming

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 commercial wastes

and subject to the following conditions:

Dated this 20th day of August, 1980.

Director, Section 39,
The Environmental Protection Act, 1971

APPENDIX III

Borehole Logs

MONITORING WELL LOG MW-1

PROJECT No: 1010146
SITE: McGarry Landfill
CLIENT: McGarry Township

DATE: April 2004
LOGGED BY: HATCH
CONTRACTOR: HATCH

EASTING:
NORTHING:
ELEVATION: 317.986

	WATER LEVEL	WELL DEPTH (m)	WELL	LEGEND	DEPTH (m)	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	DEPTH (m)
0						Ground Surface				
						Silty Sand to fine Sand (Loose, Brown) Moist, occasional silt and coarse sand seams	No odour		Sa1	
1										
2							No odour		Sa2	
3							No odour		Sa3	
4										
5						**Silty Sand to fine Sand(Very loose, Grey)** Wet, occasional silt and coarse sand seams	No odour		Sa4	
6										
7										
8										
9										

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater
Static Groundwater Level

Reviewed By:

FILE

MONITORING WELL LOG MW-2

PROJECT No: 1010146
SITE: McGarry Landfill
CLIENT: McGarry Township

DATE: April 2004
LOGGED BY: HATCH
CONTRACTOR: HATCH

EASTING:
NORTHING:
ELEVATION: 318.641

WATER LEVEL	WELL DEPTH (m)	WELL	LEGEND	DEPTH (m)	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	DEPTH (m)
					Ground Surface				
				0	**Compact Sand with trace of silt** Cmpact, brown sand with trace to some silt becoming grey at 0.15 mbgs. Moist becoming wet at 0.15 mbgs.	No odour		Sa1	
				2	**Very loose Sand with trace of silt** Very loose, grey sand with trace to some silt becoming silty sand to sandy silt. Wet, occasional silt and coarse sand seams	No odour		Sa2	
				3		No odour		Sa3	
				5	**Very loose Silty Sand to fine Sand** Very loose, grey silty sand to fine sand with some silt. Wet				

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater
Static Groundwater Level

Reviewed By:

FILE

MONITORING WELL LOG MW-3

PROJECT No: 1010146
SITE: McGarry Landfill
CLIENT: McGarry Township

DATE: April 2004
LOGGED BY: HATCH
CONTRACTOR: HATCH

EASTING:
NORTHING:
ELEVATION: 316.310

WATER LEVEL	WELL DEPTH (m)	WELL	LEGEND	DEPTH (m)	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	DEPTH (m)
					Ground Surface				
					Compact Sand Compact, brown sand with trace to some silt becoming grey at 0.3 mbgs. Moist with silty zones.	No odour		Sa1	
					Loose Sand Loose, grey fine sand with trace to some silt becoming silty sand to sandy silt. Wet, occasional silt and coarse sand seams.	No odour		Sa2	
						No odour		Sa3	
					Very loose fine Sand Very loose, grey fine sand with some silt. Wet.				

0
1
2
3
4
5
6
7
8
9

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater
Static Groundwater Level

Reviewed By:

FILE

MONITORING WELL LOG MW-4

PROJECT No: 1010146 | DATE: April 2004 | EASTING:

SITE: McGarry Landfill | LOGGED BY: HATCH | NORTHING:

CLIENT: McGarry Township | CONTRACTOR: HATCH | ELEVATION: 320.106

WATER LEVEL	WELL DEPTH (m)	WELL	LEGEND	DEPTH (m)	DESCRIPTION	ODOUR	PID (ppmv)	SAMPLE LABEL	DEPTH (m)
				0	**Ground Surface**				
					Waste and Sand cover material Drillied to 3.05 mbgs through waste and sand cover material. Auger cuttings indicate 0.63 mof dray sand cover with pieces of waste, over waste mixed with sand including plastic, bags. oil bottles, cloth, metal, etc.				
				3	**Dense Sand** Dense, brown and grey sand mixed with pieces of waste material. Moist, black fibrous material recovered on the shoe of the sampler.Drill rig stalled at about 3.7 mbgs due to steel cable wrapped around augers.	Moderat e to stronge landfill type odours		Sa1	
				4.6	**Dense Sand** Dense, grey sand becomming silty sand below about 5 mbgs. Moistbecoming wet at about 5 mbgs, occasional silt and coarse sand seams.	Moderat e landfill odours		Sa2	
				6.2	**Loose Sand** Loose, grey fine sand to silt sand. Wet, occasional silt and coarse sand seams.	Slight odour		Sa3	
				7.6					
				9					

NOTES

Descriptions are based on observations and hand testing of grab samples. Mechanical Tests were not performed unless otherwise stated.

First Occurrence of Groundwater
Static Groundwater Level

Reviewed By: | FILE

Project No: A0048-McGarry *Location: McGarry Landfill Site*

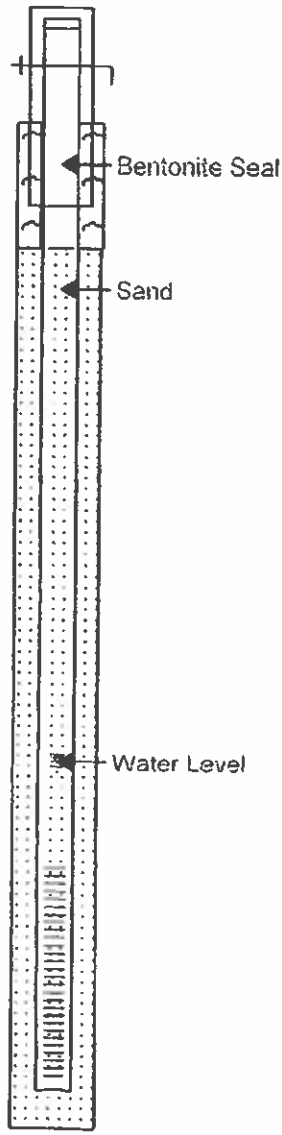
Project: Installtion of 3 Monitoring Wells

A&A ENVIRONMENTAL SERVICES INC.

Consultants in Soil, Water & Air Quality

Log of Borehole: BH-1 (MW-5)

SUBSURFACE PROFILE				SAMPLE			
Depth (ft / m)	Symbol	Description	Elev.	Number	Type	Recovery	Well Completion Details
		Ground Surface	0				
		Sand, light brown, medium grained, moist	-2				
1		Sand, light brown, medium grained, saturated	-4				
		Sand, light brown, medium grained, wet	-6				
2		Sand, light brown, medium grained, moist	-8				
3		Sand, light brown, medium grained, wet					
4							
5							
6			-20				
		Sand, brown, medium grained, saturated	-22				
7		Sand/Gravel, brown, saturated	-24				
		End of Borehole					



Drill Method: Hollow Stem Auger

Drill Date: May 22, 2004

Hole Size: 6in

Datum:

Checked by: Dr. G. Duncan

Project No: A0048-McGarry *Location: McGarry Landfill Site*

Project: Installtion of 3 Monitoring Wells

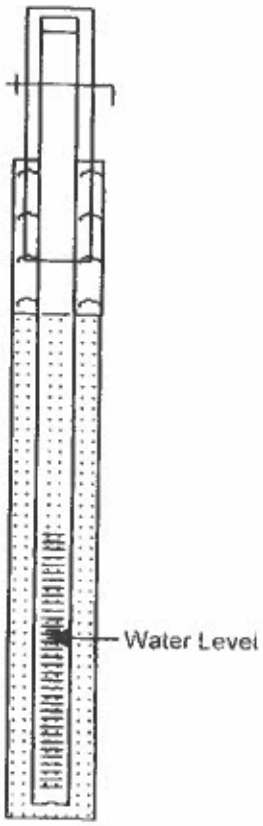
A&A ENVIRONMENTAL SERVICES INC.

Consultants in Soil, Water & Air Quality

Log of Borehole: BH-2 (MW-6)

Depth (ft)	Depth (m)	Symbol	Description	Elev.
			Ground Surface	0
			Sand, light brown, medium fine, wet	
				-8
			Sand, light brown, fine, saturated	
				-18
			End of Borehole	

SAMPLE			Well Completion Details
Number	Type	Recovery	



Drill Method: Hollow Stem Auger

Drill Date: May 22, 2004

Hole Size: 6in

Datum:

Checked by: Dr. G. Duncan

Project No: A0048-McGarry *Location: McGarry Landfill Site*

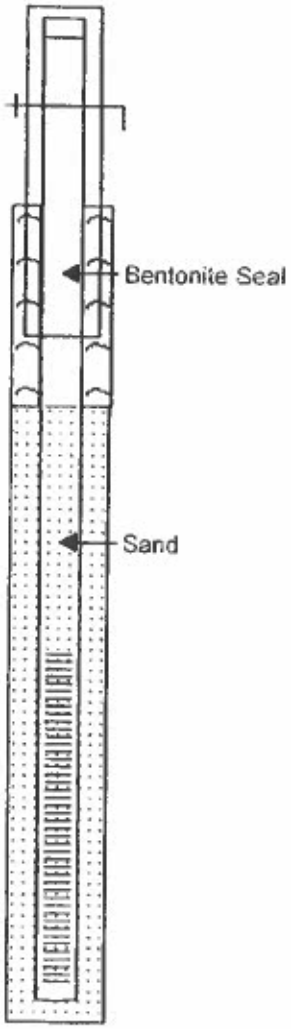
Project: Installtion of 3 Monitoring Wells

A&A ENVIRONMENTAL SERVICES INC.

Consultants in Soil, Water & Air Quality

Log of Borehole: BH-3 (MW-7)

SUBSURFACE PROFILE				SAMPLE			Well Completion Details
Depth	Symbol	Description	Elev.	Number	Type	Recovery	
m		Ground Surface	0				
		Sand,light brown, medium fine, moist	-2				
		Sand, brown, coarse, moist	-8				
		Sand, brown, medium fine, moist	-12				
		End of Borehole					



Drill Method: Hollow Stem Auger

Drill Date: May 22, 2004

Hole Size: 6in

Datum:

Checked by: Dr. G. Duncan

Project No: 2551

Project: Landfill Monitoring Program

Client: McGarry Township

Location: South landfill Area

Log of Borehole: MW-8

Engineer: P. Crawford

Depth (ft)	Depth (m)	Symbol	Description	Elev.	Number	Type	Recovery
0	0		Ground Surface	0			
0–2	0–0.6		**Sand** Light brown fine sand. Dry, no odour.	-2	1		
2–7	0.6–2		**Coarse Sand** Medium to light brown coarse sand. Moist, no odour.	-8	2, 3, 4		
7–16	2–5		**Sand** Medium to light brown fine sand. Moist to saturated, no odour.	-16	5, 6, 7, 8		
16	5		End of Borehole				

VOC Concentration
ppm: 125, 250, 375
%LEL: 10 20 30 40 50 60 70 80 90

Well Completion Details

Drill Method: Conventional

Drill Date: Aug. 5, 2014

Hole Size: 4"

A & A Environmental Consultants Inc.
16 Young Street
Woodstock, ON N4S 3L4
www.aaenvironmental.ca

Checked by: A. Rasoul

APPENDIX IV
Summary Tables

TABLE 1
Groundwater Monitoring Location Data
McGarry Waste Disposal Site
Township of McGarry, Ontario

Well Number	Date (dd/mm/yy)	Ground Surface Elevation (masl)	TOC Elevation (masl)	Height of TOC from Ground Surface (m)	Water Level Measurement from TOC (m)	Total Well Depth from TOC - Field (m)	Depth to Groundwater (mbgs)	Calculated Water Level Elevation (masl)	UTM Coordinates (Field)			Comments
									Zone	Easting (m)	Northing (m)	
MW1	26-May-16	98.9	99.82	0.92	2.563	5.355	1.64	97.26	17 U	610192	5332545	Brown, cloudy, lots of sediment.
	25-Oct-16	98.9	99.82	0.92	3.161	5.44	2.24	96.66				Brown, cloudy, lots of sediment.
	20-May-17	328.994	329.947	0.95	2.84	5.19	1.89	327.31				Well is in good condition.
	2-Nov-17	328.994	329.947	0.95	3.18	5.12	2.23	326.77				Brownish, cloudy, good recovery, no odours (duplicate).
	23-May-18	328.994	329.947	0.95	3.72	5.14	2.77	326.23				Brownish with sand, no odour.
	3-Aug-18	328.994	329.947	0.95	3.44	5.41	2.49	326.51				Brown, no odour.
	4-Oct-18	328.994	329.947	0.95	3.42	5.55	2.47	326.53				Cloudy, no odour.
	9-May-19	328.994	329.947	0.95	2.71	5.55	1.76	327.24				Light brown, silty, no odour.
	25-Jul-19	328.994	329.947	0.95	2.27	5.41	1.32	327.68				Silty, no odour.
	23-Sep-19	328.994	329.947	0.95	2.71	5.99	1.76	327.24				Silty, no odour, good recovery.
	11-Jun-20	328.994	329.947	0.95	2.84	5.83	1.89	327.31				Light brown, silty, no odour.
	25-Aug-20	328.994	329.947	0.95	3.1	5.76	2.15	326.85				Silty, no odour.
	20-Oct-20	328.994	329.947	0.95	2.96	5.84	2.01	326.99				Silty, no odour, good recovery.
	3-Jun-21	328.994	329.947	0.95	3.72	8.07	2.77	326.23				Silty, no odour, good recovery.
	5-Aug-21	328.994	329.947	0.95	3.53	5.83	2.58	326.42				Silty, no odour, good recovery.
	14-Oct-21	328.994	329.947	0.95	3.73	6	2.78	326.22				Silty, no odour, good recovery.
	25-May-22	328.994	329.947	0.98	3	8.06	2.02	326.95				Silty, no odour, good recovery.
	3-Aug-22	328.994	329.947	0.95	2.89	8.11	1.94	327.06				Silty, no odour, good recovery.
	27-Sep-22	328.994	329.947	0.97	2.86	6.06	1.89	327.09				Silty, no odour, good recovery.
	30-May-23	328.994	329.947	0.97	2.55	6.06	1.58	327.40				Silty, no odour, purged dry.
	1-Aug-23	328.994	329.947	0.97	3.05	6.16	2.08	326.90				Silty, no odour, good recovery.
	18-Oct-23	328.994	329.947	0.94	3.15	6.16	2.21	326.80				Silty, no odour, purged dry.
	15-May-24	328.994	329.947	0.96	2.43	6.15	1.47	327.52				Brown, no odour, moderate recovery
	23-Jul-24	328.994	329.947	0.96	2.95	6.32	1.99	327.00				Grey, no odour.
	16-Oct-24	328.994	329.947	0.95	2.96	6.13	2.01	326.99				Brown, silty, no odour. Purged dry, moderate recovery.
MW2	26-May-16	99.46	100.31	0.85	2.412	4.325	1.56	97.90	17 U	609836	5332547	Brown, cloudy, lots of sediment.
	25-Oct-16	99.46	100.31	0.85	3.325	4.442	2.47	96.99				Brown, cloudy, lots of sediment.
	20-May-17	329.783	330.64	0.86	2.36	4.38	1.50	328.28				Slightly brown, no odours.
	2-Nov-17	329.783	330.64	0.86	3.37	4.51	2.51	327.27				Brownish, sandy, no odours.
	23-May-18	329.783	330.64	0.86	3.37	4.72	2.51	327.27				Brown with sand, no odour.
	3-Aug-18	329.783	330.64	0.86	3.41	4.701	2.55	327.23				Brown, no odour.
	4-Oct-18	329.783	330.64	0.86	3.38	4.9	2.50	327.26				Cloudy, no odour.
	9-May-19	329.783	330.64	0.86	2.03	4.9	1.17	328.61				Dark grey, silty, no odour.
	25-Jul-19	329.783	330.64	0.86	2.84	4.7	1.78	328.00				Silty, no odour.
	23-Sep-19	329.783	330.64	0.86	3.05	4.81	2.19	327.59				Silty, no odour, good recovery.
	11-Jun-20	329.783	330.64	0.86	2.39	4.61	1.53	328.25				Dark grey, silty, no odour.
	25-Aug-20	329.783	330.64	0.86	3.14	4.79	2.28	327.50				Silty, no odour.
	20-Oct-20	329.783	330.64	0.86	2.97	4.79	2.11	327.67				Silty, no odour, good recovery.
	3-Jun-21	329.783	330.64	0.86	3.3	4.9	2.44	327.34				Silty, no odour.
	5-Aug-21	329.783	330.64	0.86	3.21	5.02	2.35	327.43				Cloudy, no odour, purged dry.
	14-Oct-21	329.783	330.64	0.86	3.47	5.91	2.61	327.17				Cloudy, no odour, good recovery.
	25-May-22	329.783	330.64	0.83	2.81	5	1.78	328.03				Silty, no odour.
	3-Aug-22	329.783	330.64	0.84	2.8	5.91	1.96	327.84				Cloudy, no odour, purged dry.
	27-Sep-22	329.783	330.64	0.84	2.86	5	2.02	327.78				Silty, no odour, good recovery.
	30-May-23	329.783	330.64	0.84	2.8	5.08	1.96	327.84				Silty, no odour, purged dry.
	1-Aug-23	329.783	330.64	0.84	3.25	5.08	2.41	327.39				Cloudy, no odour, purged dry.
	18-Oct-23	329.783	330.64	0.81	2.97	5.11	2.16	327.67				Silty, no odour, purged dry.
	15-May-24	329.783	330.64	0.83	2.31	5.14	1.48	328.33				Silty/brown, no odour, poor recovery.
	23-Jul-24	329.783	330.64	0.85	2.91	5.14	2.06	327.73				Brown, no odour.
	16-Oct-24	329.783	330.64	0.85	2.99	5.05	2.14	327.65				Grey, no odour. Purged dry, moderate recovery.
MW3	26-May-16	97.7	97.9	0.20	0.557	5.316	0.36	97.34	17 U	609743	5332126	Brownish yellow, cloudy.
	25-Oct-16	97.7	97.9	0.20	1.565	5.298	1.37	96.34				Brownish yellow, cloudy.
	20-May-17	330.088	330.218	0.13	0.5	5.17	0.37	329.72				Slightly brown, no odour.
	2-Nov-17	330.088	330.218	0.13	1.62	5.2	1.49	328.60				Clear/ish brown, lots of water, no odours.
	23-May-18	330.088	330.218	0.13	0.25	5.7	0.12	329.97				Brown, odour.
	3-Aug-18	330.088	330.218	0.13	1.81	5.26	1.68	328.41				Clear, no odour.
	4-Oct-18	330.088	330.218	0.13	1.79	5.2	1.66	328.43				Clear, no odour.
	9-May-19	330.088	330.218	0.13	-	-	-	-				Well not accessable. No sample.
	25-Jul-19	330.088	330.218	0.13	0.35	5.2	0.22	329.87				Clear, no odour.
	23-Sep-19	330.088	330.218	0.13	0.9	5.16	0.77	329.32				Clear, no odour.
	11-Jun-20	330.088	330.218	0.13	0.67	5.03	0.54	329.55				Well not accessable. No sample.
	25-Aug-20	330.088	330.218	0.13	1.42	5.17	1.29	328.80				Clear, no odour.
	20-Oct-20	330.088	330.218	0.13	1.26	5.24	1.13	328.96				Clear, no odour.
	3-Jun-21	330.088	330.218	0.13	2.53	5.24	2.40	327.69				Clear, no odour.
	5-Aug-21	330.088	330.218	0.13	1.76	5.16	1.63	328.46				Clear, no odour, good recovery
	14-Oct-21	330.088	330.218	0.13	2.03	5.23	1.90	328.19				Cloudy, no odour, casing sunk
	25-May-22	330.088	330.218	0.12	0.86	5.17	0.74	329.36				Clear, no odour. Casing sunk
	3-Aug-22	330.088	330.218	0.10	1.19	5.19	1.09	329.03				Clear, no odour, good recovery
	27-Sep-22	330.088	330.218	0.13	2.94	5.22	2.81	327.28				Cloudy, no odour, casing sunk
	30-May-23	330.088	330.218	0.12	0.54	5.29	0.42	329.68				Clear, no odour, good recovery, casing sunk.
	1-Aug-23	330.088	330.218	0.12	0.4	5.23	0.28	329.82				Clear, no odour, good recovery, casing sunk.
	18-Oct-23	330.088	330.218	0.09	1.27	5.21	1.18	328.95				Clear, no odour, good recovery, casing sunk.
	15-May-24	330.088	330.218	0.20	0.24	5.2	0.04	329.98				Clear, no odour, good recovery, casing sunk.
	23-Jul-24	330.088	330.218	0.11	0.74	5.24	0.63	329.48				Clear, no odour, good recovery.
	16-Oct-24	330.088	330.218	0.12	1.25	5.26	1.13	328.97				Cloudy, no odour. Casing sinking into ground, casing lid missing.
MW4	26-May-16	100.78	101.84	0.88	4.507	6.006	3.83	97.13	17 U	609952	5332279	Dark brown slightly cloudy.
	25-Oct-16	100.78	101.84	0.88	5.273	8.221	4.39	96.37				Dark brown slightly cloudy.
	20-May-17	328.811	329.694	0.88	4.63	8.11	3.75	325.06				Clear, appears impacted, odours.
	2-Nov-17	328.811	329.694	0.88	5.39	8.03	4.51	324.30				Odours, cloudy, appears impacted.
	23-May-18	328.811	329.694	0.88	5.22	8.02	4.34	324.47				Brown, cloudy with odour, duplicate.
	3-Aug-18	328.811	329.694	0.88	5.5	8.08	4.62	324.19				Cloudy, strong odour.
	4-Oct-18	328.811	329.694	0.88	5.54	8.1	4.66	324.15				Clear, no odour.
	9-May-19	328.811	329.694	0.88	4.29	7.97	3.41	325.40				Clear, strong leachate odours.
	25-Jul-19	328.811	329.694	0.88	4.04	7.95	3.16	325.65				Clear, odour
	23-Sep-19	328.811	329.694	0.88	4.63	7.97	3.75	325.06				Clear, odour
	11-Jun-20	328.811	329.694	0.88	4.56	8.06	3.68	325.13				Clear, strong leachate odours.
	25-Aug-20	328.811	329.694	0.88	5.09	8.04	4.21	324.60				Clear, odour
	20-Oct-20	328.811	329.694	0.88	5.12	8.07	4.24	324.57				Clear, odour
	3-Jun-21	328.811	329.694	0.88	5.57	8.07	4.69	324.12				Clear, no odour.
	5-Aug-21	328.811	329.694	0.88	5.52	8.18	4.64	324.17				Clear, odour, good recovery
	14-Oct-21	328.811	329.694	0.88	5.75	8.02	4.87	323.94				Clear, no odour, purged dry.
	25-May-22	328.811	329.694	0.89	5.04	8.13	4.15	324.65				Clear, no odour.
	3-Aug-22	328.811	329.694	0.92	4.96	8.01	4.04	324.73				Clear, odour, good recovery
	27-Sep-22	328.811	329.694	0.90	4.9	8.05	4.00	324.79				Clear, odourous, good recovery.
	30-May-23	328.811	329.694	0.90	4.42	8.02	3.52	325.27				Clear, no odour, good recovery, duplicate.
	1-Aug-23	328.811	329.694	0.90	5.03	8.07	4.13	324.66				Clear, odourous, good recovery.
	18-Oct-23	328.811	329.694	0.90	5.04	8.04	4.14	324.65				Clear, odourous, good recovery.
	15-May-24	328.811	329.694	0.90	4.1	8.14	3.20	325.59				Clear, odourous, good recovery.
	23-Jul-24	328.811	329.694	0.93	4.49	8.2	3.56	325.20				Clear, odourous, good recovery.
	16-Oct-24	328.811	329.694	0.88	4.96	8.18	4.08	324.73				Clear, odourous. PVC too tall to close casing lid, no well cap.

TABLE 1
Groundwater Monitoring Location Data
McGarry Waste Disposal Site
Township of McGarry, Ontario

Well Number	Date (dd/mm/yy)	Ground Surface Elevation (masl)	TOC Elevation (masl)	Height of TOC from Ground Surface (m)	Water Level Measurement from TOC (m)	Total Well Depth from TOC - Field (m)	Depth to Groundwater (mbgs)	Calculated Water Level Elevation (masl)	UTM Coordinates (Field)			Comments
									Zone	Easting (m)	Northing (m)	
MW5	28-May-18	101.87	102.52	0.65	5.445	8.255	4.60	97.08	17 U	610067	5332257	Clear.
	25-Oct-18	101.87	102.52	0.65	6.25	7.976	5.60	96.27				Clear.
	20-May-17	329.057	329.747	0.69	5.53	8.19	4.84	324.22				Clear, no odour.
	2-Nov-17	329.057	329.747	0.69	6.21	8.245	5.52	323.54				Clear, no odours.
	23-May-18	329.057	329.747	0.69	6.03	8.39	5.34	323.72				Clear, no odour.
	3-Aug-18	329.057	329.747	0.69	6.38	8.29	5.69	323.37				Cloudy, odour.
	4-Oct-18	329.057	329.747	0.69	6.46	8.29	5.77	323.29				Clear, no odour.
	9-May-19	329.057	329.747	0.69	5.53	8.2	4.84	324.22				Clear, no odour.
	25-Jul-19	329.057	329.747	0.69	4.85	8.22	4.26	324.80				Clear, no odour.
	23-Sep-19	329.057	329.747	0.69	5.55	8.25	4.86	324.20				Clear, no odour, purged dry.
	11-Jun-20	329.057	329.747	0.69	5.62	8.25	4.93	324.13				Clear, no odour.
	25-Aug-20	329.057	329.747	0.69	5.99	8.27	5.30	323.76				Clear, no odour.
	20-Oct-20	329.057	329.747	0.69	6.07	8.28	5.38	323.68				Clear, no odour, purged dry.
	3-Jun-21	329.057	329.747	0.69	6.51	8.15	5.82	323.24				Clear, no odour, purged dry.
	5-Aug-21	329.057	329.747	0.69	6.41	8.15	5.72	323.34				Clear, no odour, purged dry.
	14-Oct-21	329.057	329.747	0.69	6.65	8.23	5.96	323.10				Clear, no odour, purged dry.
	25-May-22	329.057	329.747	0.77	5.97	8.17	5.20	323.76				Clear, no odour, purged dry.
	3-Aug-22	329.057	329.747	0.72	5.86	8.32	5.14	323.89				Clear, no odour, purged dry.
	27-Sep-22	329.057	329.747	0.70	5.85	8.15	5.15	323.90				Clear, no odour, purged dry.
	30-May-23	329.057	329.747	0.70	5.49	8.30	4.79	324.26				Clear, no odour, purged dry.
	1-Aug-23	329.057	329.747	0.70	6.33	8.23	5.63	323.42				Cloudy, no odour, good recovery.
	18-Oct-23	329.057	329.747	0.72	6.4	8.33	5.68	323.35				Cloudy, no odour, purged dry.
	15-May-24	329.057	329.747	0.68	5.17	8.22	4.49	324.58				Cloudy, no odour, poor recovery.
	23-Jul-24	329.057	329.747	0.71	5.41	8.36	4.70	324.34				Clear, no odour.
	16-Oct-24	329.057	329.747	0.71	5.88	8.29	5.17	323.87				Clear, no odour. Purged dry, moderate recovery.
MW6	26-May-16	99.4	99.97	0.57	-	-	-	-	17 U	609912.2	5332069.92	Unable to locate.
	25-Oct-16	99.4	99.97	0.57	-	-	-	-				Unable to locate.
	20-May-17	-	-	-	-	-	-	-				Unable to locate.
	2-Nov-17	-	-	-		-	-	-				Unable to locate.
	23-May-18	-	-	-	-	-	-	-				Unable to locate.
	3-Aug-18	-	-	-	-	-	-	-				Unable to locate.
	4-Oct-18	-	-	-	-	-	-	-				Unable to locate.
	9-May-19	-	-	-	-	-	-	-				Unable to locate.
	25-Jul-19	-	-	-	-	-	-	-				Unable to locate.
	23-Sep-19	-	-	-	-	-	-	-				Unable to locate.
	11-Jun-20	-	-	-	-	-	-	-				Unable to locate.
	25-Aug-20	-	-	-	-	-	-	-				Unable to locate.
	20-Oct-20	-	-	-	-	-	-	-				Unable to locate.
	3-Jun-21	-	-	-	-	-	-	-				Unable to locate.
	5-Aug-21	-	-	-	-	-	-	-				Unable to locate.
	14-Oct-21	-	-	-	-	-	-	-				Unable to locate.
	25-May-22	-	-	-	-	-	-	-				Unable to locate.
	3-Aug-22	-	-	-	-	-	-	-				Unable to locate.
	27-Sep-22	-	-	-	-	-	-	-				Unable to locate.
	30-May-23	-	-	-	-	-	-	-				Unable to locate.
	1-Aug-23	-	-	-	-	-	-	-				Unable to locate.
	18-Oct-23	-	-	-	-	-	-	-				Unable to locate.
	15-May-24	-	-	-	-	-	-	-				Unable to locate.
	23-Jul-24	-	-	-	-	-	-	-				-
	16-Oct-24	-	-	-	-	-	-	-				-
MW7	26-May-16	97.06	97.8	0.74	0.839	3.52	0.10	96.96	17 U	609868	5332430	Clear.
	25-Oct-16	97.06	97.8	0.74	1.968	3.467	1.23	95.83				Clear.
	20-May-17	328.736	329.526	0.79	1.03	3.5	0.24	328.50				Clear, no odour.
	2-Nov-17	328.736	329.526	0.79	1.64	3.075	0.85	327.89				Slip cap removed, clear, good well, no odours.
	23-May-18	328.736	329.526	0.79	1.37	3.54	0.58	328.16				Clear, no odour.
	3-Aug-18	328.736	329.526	0.79	1.73	3.56	0.94	327.80				Clear, no odour.
	4-Oct-18	328.736	329.526	0.79	1.79	3.12	1.00	327.74				Clear, no odour.
	9-May-19	328.736	329.526	0.79	0.87	3.08	0.08	328.66				Clear water, no odour. Duplicate.
	25-Jul-19	328.736	329.526	-	-	-	-	-				Submerged, no sample.
	23-Sep-19	328.736	329.526	0.71	0.91	3.02	0.20	328.62				Clear , no odour.
	11-Jun-20	328.736	329.526	0.79	0.93	2.7	0.14	328.60				Clear water, no odour. Duplicate.
	25-Aug-20	328.736	329.526	-	1.27	3.08	-	-				Submerged, no sample
	20-Oct-20	328.736	329.526	0.71	1.42	3.11	0.71	328.11				Clear , no odour.
	3-Jun-21	328.736	329.526	0.71	1.82	3.57	1.11	327.71				Clear , no odour, purged dry
	5-Aug-21	328.736	329.526	0.71	1.82	3.2	1.11	327.71				Clear, no odour, purged dry.
	14-Oct-21	328.736	329.526	0.71	2	3.2	1.29	327.53				Clear, no odour, good recovery.
	25-May-22	328.736	329.526	0.80	1.36	3.24	0.56	328.17				Clear, no odour.
	3-Aug-22	328.736	329.526	0.77	1.2	3.11	0.43	328.33				Clear, no odour, purged dry.
	27-Sep-22	328.736	329.526	0.80	1.22	3.13	0.42	328.31				Clear, odourous, good recovery.
	30-May-23	328.736	329.526	0.80	0.74	3.55	-0.06	328.79				Clear, odourous, good recovery.
	1-Aug-23	328.736	329.526	0.80	1.31	3.57	0.51	328.22				Clear, no odour, good recovery, duplicate.
	18-Oct-23	328.736	329.526	0.83	1.37	3.49	0.54	328.18				-
	15-May-24	328.736	329.526	0.77	0.56	3.01	-0.21	328.97				Clear, no odour, good recovery. Duplicate.
	23-Jul-24	328.736	329.526	0.80	0.77	3.15	-0.03	328.76				Yellow, no odour, duplicate.
	16-Oct-24	328.736	329.526	0.77	1.24	3.59	0.47	328.29				Clear, no odour. Purged dry, moderate recovery.
MW8	26-May-16	-	-	-	-	-	-	-	17 U	609962	5331968	Unable to locate.
	25-Oct-16	-	-	-	-	-	-	-				Unable to locate.
	20-May-17	328.619	328.77	0.15	0.24	3.11	0.09	328.53				Strong sewage odour, no protective casing.
	2-Nov-17	328.619	328.77	0.15	0.14	3.10	-0.01	328.63				Organic odours, cloudy, good recharge, no protective casing.
	23-May-18	328.619	328.77	0.15	2.26	3.71	2.11	326.51				Brown, slight odour.
	3-Aug-18	328.619	328.77	0.15	2.26	3.76	2.11	326.51				Cloudy, very strong odour, duplicate.
	4-Oct-18	328.619	328.77	0.15	2.46	3.80	2.31	326.31				Clear, no odour.
	9-May-19	328.619	328.77	0.15	0.84	3.75	0.69	327.93				Light brown, some silt, no odour.
	25-Jul-19	328.619	328.77	0.15	1.83	3.74	1.68	326.94				Cloudy, no odour.
	23-Sep-19	328.619	328.77	0.68	2.59	3.73	1.91	326.18				Clear, no odour.
	11-Jun-20	328.619	328.77	0.15	-	-	-	-				No sample.
	25-Aug-20	328.619	328.77	0.15	2.71	3.79	2.56	326.06				Cloudy, no odour.
	20-Oct-20	328.619	328.77	0.68	1.00	3.70	0.32	327.77				Clear, no odour.
	3-Jun-21	328.619	328.77	0.68	2.34	3.78	1.66	326.43				Clear/Orange, no odour.
	5-Aug-21	328.619	328.77	0.68	2.27	3.78	1.59	326.50				Clear, no odour, purged dry.
	14-Oct-21	328.619	328.77	0.68	2.76	3.78	2.09	326.01				Cleam no odour, poor recovery.
	25-May-22	328.619	328.77	0.85	1.20	3.72	0.35	327.57				Clear, no odour. Purged dry
	3-Aug-22	328.619	328.77	0.85	1.86	3.74	1.01	326.91				Clear, no odour, purged dry.
	27-Sep-22	328.619	328.77	0.86	1.20	3.79	0.34	327.57				Clear, odourous, good recovery.
	30-May-23	328.619	328.77	0.86	1.63	3.85	0.77	327.14				Clear, no odour, purged dry.
	1-Aug-23	328.619	328.77	0.86	2.82	3.80	1.96	325.95				Cloudy, no odour, purged dry.
	18-Oct-23	328.619	328.77	0.86	1.19	3.76	0.33	327.58				Clear, no odour, purged dry.
	15-May-24	328.619	328.77	0.87	1.20	3.81	0.33	327.57				Clear, no odour, good recovery.
	23-Jul-24	328.619	328.77	0.87	1.18	3.81	0.31	327.59				Grey, no odour, good recovery.
	16-Oct-24	328.619	328.77	0.84	1.70	3.76	0.86	327.07				Grey tint, no odour. Purged dry, moderate recovery. Damage to concrete base, but well appears stable.

Notes:
masl - Elevations after 2017 are presented in metres above sea level.
mbgs - metres below ground suface
TOC - Top of Casing

Table 2.3

Groundwater Quality Results - 2021

Bethany Glass Disposal Site

Township of Bethany, Ontario

Parameter	Units	MDL	Sample Designation																													Criteria
			Sample Collection Date (dd/mm/yyyy)																													
			2021																													
			29-Aug-19	26-Jun-20	30-Sep-20	15-May-20	05-Oct-20	23-Sep-21	3-Nov-21	7-[illegible]-21 (Dup)	23-Sep-21	5-Aug-21	4-Oct-21	6-Sep-21	26-Jun-20	23-Sep-21	5-Aug-21	7-Jun-20	26-Aug-21	26-Jun-20	7-Jun-21 (DUP)	5-Aug-21	04-Oct-21	23-May-21	7-Jun-21	27-Aug-21	23-May-21	5-Aug-21	14-Jun-21	15-May-24	23-Jul-24	10-Oct-24	
Aluminum	ug/L	0.2	-	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.20	-	-	<0.20	-	-	< 5.0	< 5.0	-	-	< 5.0	< 5.0	-	-	< 5.0	-	-	< 5.0	-	1
Ammonia, Chloride	ug/L	0.2	-	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.2	-	-	-	-	-	< 0.5	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	50
Toluene	ug/L	0.2	-	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	<0.20	-	-	<0.20	-	-	< 0.5	< 0.5	-	-	< 0.5	< 0.5	-	-	< 0.5	-	-	< 0.5	-	60
Vinyl Chloride	ug/L	0.17	-	<0.17	-	-	<0.17	<0.17	<0.17	<0.17	<0.17	-	-	<0.20	-	-	<0.20	-	-	< 0.2	< 0.2	-	-	< 0.2	< 0.2	-	-	< 0.2	-	-	< 0.5	-	1
1,2-Dichloroethane	ug/L	0.1	-	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	-	-	<0.20	-	-	<0.20	-	-	< 0.5	< 0.5	-	-	< 0.5	< 0.5	-	-	< 0.5	-	-	< 0.5	-	5
pH	pH Units	MDL	6.69	6.76	6.85	6.91	6.69	6.5	6.84	6.76	6.91	6.74	6.69	6.12	6.69	6.59	6.59	6.59	6.5	7.19	6.89	6.89	6.89	6.79	6.98	6.92	6.89	6.94	6.81	6.89	6.89	6.5-8.5
BOD	mg/L	2	-	-	-	-	-	40	40	40	40	40	40	13.0	15.0	15.0	15.3	15.0	15.0	< 4	< 4	14	-	< 4	< 4	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	< 1.9	
Electrical Conductivity	uS/cm	3	27	27	30	29	28	30	30	35	27	29	29	24.0	29.4	25.7	22.5	22.3	24.5	31	27	31	34	35	30	27	30	30	30	31	28	30	
Total Dissolved Solids	mg/L	20	39	40	170	60	84	100	72	76	100	100	140	247	141	160	107	105	107	110	120	170	160	160	80	160	130	84	107	100	80	77	500
Total Suspended Solids	mg/L	10	-	-	-	-	10*1000	10*10	2000	10*100	5000	10000	10000	10*100	10000	10*100	10*100	10*100	13000	10*10	11000	14000	-	10000	-	10000	10*10	20000	10*10	10*10	10*10	10*10	
Alkalinity (as CaCO3)	mg/L	5	9	11	10	12	12	12	11	9	9	9	9	10	11	12	9.4	9	10	10	10	13	-	10	-	10	10	11	10	10	10	10	20-300
Total Hardness (as CaCO3)	mg/L	0.5	0.5	0.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20-100
Fluoride	mg/L	0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
Chloride	mg/L	0.1	0.39	0.17	0.35	0.49	0.39	0.33	0.35	0.33	0.37	0.37	1.57	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	1	1	1	1.1	1	0.45	1	0	0	0	0	1	1	250
Nitrate as N	mg/L	0.05	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.033	<0.033	0.225	0.153	0.157	<0.033	<0.05	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.10	<0.05	<0.05	10
Nitrite as N	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	0.0210		<0.010		<0.010	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	1
Bromide	mg/L	0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	0.1	3.39	3.39	5.45	3.10	-	3.65	3.82	3.84	3.85	3.44	3.88	6.13	5.10	4.32	1.85	2.35	0	0	0	0	7	0	0	0	14	10	7	0	10	7	500
Zinc, dissolved, as F	mg/L	0.1	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.05	-	-	-	-	-	-	-	
Ammonia as N	mg/L	0.02	<0.02	0.03	0.04	0.04	<0.02	0.01	0.03	0.05	0.05	0.03	0.05	0.021	0.023	0.015	0.010	0.021	0.013	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.02	0.01	0.01	0.01	
Total Alkalinity (Mineral)	mg/L	0.1	9.13	9.14	9.32	<0.10	<0.10	0.30	0.30	0.30	<0.10	-	-	<0.10	9.2	-	-	0.25	-	<0.10	-	-	-	-	<0.05	-	-	<0.05	-	-	0.05	-	-
Chromium (Cr6+), Dissolved	mg/L	5	<5	15	7	-	<5	<5	<5	<5	<5	<5	<5	13	<5	<5	<50	<50	<50	< 5	< 5	<5	< 5	11	-	< 5	< 5	< 5	13	< 5	< 5	< 5	-
Chromium (Cr6+), Dissolved	mg/L	0.1	0.4	0.3	<0.5	1.2	1.0	2.3	1.7	1.7	2.4	2.1	2.5	2.03	1.36	1.47	0.29	1.42	0.35	1	<	1	1	<	-	1	2	1	1.1	1.1	2	1	0.1	5
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	<0.0010	0.0020		0.0010			< 0.002	< 0.002	-	-	< 0.002	-	-	0.0010	<0.001	-	-	0.002	-	-
Calcium	mg/L	0.05	1.21	1.1	1.19	1.29	1.24	1.41	1.49	1.47	1.12	1.27	1.22	2.01	1.41	1.31	1.2	1.49	1.22	1.2	1.2	1.2	1.22	1.2	1.22	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
Magnesium	mg/L	0.05	0.31	0.27	0.29	0.29	0.29	0.41	0.45	0.45	0.34	0.34	0.34	0.77	0.71	0.619	0.51	0.579	0.514	0.58	0.58	0.58	0.578	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	
Sodium	mg/L	0.05	1.43	1.25	1.23	1.25	1.27	1.15	1.29	1.25	1.11	1.13	1.22	1.57	1.27	1.27	1.25	1.45	1.22	1.22	1.22	1.22	1.23	1.22	1.22	1.22	1.22	1.21	1.22	1.22	1.22	1.22	20 (ppm)
Potassium	mg/L	0.05	2.71	0.3	0.43	0.39	0.41	0.39	0.35	0.37	0.34	-	-	0.3	0.302	-	0.291	-	-	0.409	0.401	-	-	0.345	-	-	0.35	-	-	0.51	-	-	
Tannins and Lignins	mg phenols	0.1	0.3	0.1	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum	mg/L	0.004	0.007	0.007	0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
Antimony	mg/L	0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006
Arsenic	mg/L	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	<0.00048	-	0.0021	-	-	-	< 0.0005	< 0.0005	-	-	< 0.0005	-	-	< 0.0005	-	-	< 0.0005	-	-	0.01
Barium	mg/L	0.002	<0.002	<0.002	<0.002	0.005	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.0147	0.0140	0.0139	0.0140	0.0139	0.0140	0.016	0.016	0.016	0.0153	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	1
Beryllium	mg/L	0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.004
Bismuth	mg/L	0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	mg/L	0.01	0.013	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.012	0.0111	0.0111	0.0111	0.0111	0.0111	0.0111	0.010	0.010	0.010	0.0111	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	5
Cadmium	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	<0.0000141	-	-	0.0000035	-	-	-	-	-	-	-	-	-	-	-	-	0.000020	-	-	0.002
Chromium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	0.00148	-	-	0.00203	-	-	0.00005	0.00004	-	-	0.00005	-	-	0.00007	-	-	0.00007	-	-	0.05
Cobalt	mg/L	0.004	<0.004	<0.004	<0.004	<0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper	mg/L	0.005	<0.005	<0.005	<0.010	<0.005	0.009	<0.005	<0.005	<0.005	<0.005	-	-	0.0141	-	-	-	-	-	0.0011	0.0009	-	-	0.0004	-	-	0.0006	-	-	0.0004	-	-	1
Iron	mg/L	0.01	<0.010	<0.010	<0.010	<0.010	0.020	0.020	<0.010	<0.010	<0.010	0.015	<0.010	0.054	0.027	0.01	-	-	0.021	0.010	0.01	0.01	0.013	0.01	0.010	0.01	0.01	0.01	0.01	0.010	0.01	0.01	0.3
Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-	0.000111	-	-	0.000061	-	-	< 0.00005	< 0.00005	-	-	< 0.00005	-	-	< 0.00005	-	-	< 0.00005	-	-	0.01
Manganese	mg/L	0.002	<0.002	<0.002	<0.002	-	0.005	0.017	0.003	0.003	<0.002	-	-	<0.00200	0.00204	-	0.00154	-	-	0.00101	0.00100	0.00103	0.00101	0.00103	-	0.00143	0.00100	-	-	0.00100	-	-	0.05
Mercury	mg/L	0.0001	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	<0.00001[4]	-	-	<0.000005	-	-	= 0.00001	= 0.00001	-	-	< 0.00001	-	-	= 0.00001	-	-	-	-	-	0.001
Molybdenum	mg/L	0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel	mg/L	0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	mg/L	0.004	<0.004	<0.004	<0.004	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Silver	mg/L	0.002	<0.002	<0.002	0.31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium	mg/L	0.002	0.010	0.011	<0.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium	mg/L	0.002	<0.002	<0.002	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thorium	mg/L	0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uranium	mg/L	0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-	-	0.0003	-	0.0007	-	-	< 0.002	< 0.002	-	-	< 0.002	-	-	< 0.002	-	-	< 0.002	-	-	5
Field Observations																																	
Temperature	C	-	-	-	-	-	3.25	7.01	4.32	0.46	-	5.00	5.02	6.01	5.45	6.75	6.45	6.39	6.79	7.65	15.89	-	5.16	5.70	7.70	10.69	5.39	5.75	7.29	6.46	4.69	6.69	7.75	-
pH	pH Units	-	-	-	-	-	6.97	6.1	6.12	6.37	-	6.69	6.44	6.34	6.3	6.6	6.47	6.1	6.45	6.13	6.38	-	6.36	6.29	6.3	6.84	6.79	6.77	6.91	6.87	6.82	6.89	-	-
Conductivity	uS/cm	-	-	-	-	-	69	-	46	0.058	-	46	46	39	46.6	39.3	36	42	39.9	46	39.4	-	31.7	31	0.064	37.7	46.9	49.6	55.1	46.9	47.6	0.0048	17.6	46.4	-
Oxidation Reduction Potential	mV	-	-	-	-	-	90	333.6	97.9	305	-	75	132.9	-110.9	354.4	334.1	140.3	169	76.5	211.7	109	-	212.3	164.4	165	-9.7	103.9	69.4	101.1	139.1	126.4	162.8	90.6	-
Dissolved Oxygen	mg/L	-	-	-	-	-	13.02	7.85	13.42	6.65	-	9.42	10.2	10.5	13.01	13.36	9.01	9.8	9.31	10.69	4.69	-	8.17	87.9	8.49	3.39	9.04	11.69	9.89	8.89	10.11	10.89	-

Notes

CRITERIA
MDL &
Units

Criteria Regulation 153/04 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", since 2006, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003
Example CRITERIA Exceedance
Example Detection Limit
All Units in mg/L Unless Otherwise Noted

TABLE 1

Groundwater Quality Results - MW2

Sample Designation: MW2 — Sample Collection Date (dd/mmm/yy)

Parameter	Units	27-May-15	30-Jul-15	30-Sep-15	26-May-16	25-Oct-16	30-May-17	5/30/2017 (Dup)	3-Nov-17	22-May-18	2-Aug-18	4-Oct-18
Benzene	µg/L	-	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	-
Methylene Chloride	µg/L	-	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	-	-
Toluene	µg/L	-	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	-
Vinyl Chloride	µg/L	-	<0.17	-	-	<0.17	<0.17	<0.17	<0.17	<0.17	-	-
1,4-Dichlorobenzene	µg/L	-	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	-	-
pH	pH Units	6.38	6.72	7.62	6.40	6.80	6.64	6.62	6.22	6.32	6.82	6.01
BOD	mg/L	-	-	-	-	-	<5	<5	<5	<5	<5	<5
Electrical Conductivity	uS/cm	15	25	47	30	40	14	14	40	34	40	52
Total Dissolved Solids	mg/L	<20	70	76	30	80	686	1220	74	400	84	130
Total Suspended Solids	mg/L	-	-	-	-	-	207000	851000	65100	46400	22000	20300
Alkalinity (as CaCO3)	mg/L	6	9	13	8	22	7	6	22	20	17	10
Total Hardness (as CaCO3)	mg/L	4.5	8	14.8	-	-	-	-	-	-	-	-
Fluoride	mg/L	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-
Chloride	mg/L	0.33	1.37	3.37	0.40	1.52	0.33	0.31	1.00	0.60	1.43	2.06
Nitrate as N	mg/L	<0.06	<0.06	<0.06	<0.06	<0.06	0.06	0.08	<0.06	<0.06	<0.06	<0.06
Nitrite as N	mg/L	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	-	-
Bromide	mg/L	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-
Sulphate	mg/L	0.64	0.8	2.62	1.11	2.87	1.64	0.88	2.40	1.6	2.08	2.06
Ortho phosphate as P	mg/L	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	<0.02	<0.02	0.04	0.06	<0.02	0.12	0.15	0.03	0.06	<0.02	3.34
Total Kjeldahl Nitrogen	mg/L	<0.10	0.36	0.42	0.13	0.10	0.81	0.46	0.10	<0.10	-	-
Chemical Oxygen Demand	mg/L	<5	40	<5	<5	<5	5	6	<5	<5	<5	<5
Dissolved Organic Carbon	mg/L	<0.5	1.1	0.6	0.9	0.9	8.2	6.6	1.7	2.2	8.6	4.7
Phenols	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-
Calcium	mg/L	1.36	2.37	4.48	5.84	4.17	5.61	5.60	3.93	0.53	3.88	4.23
Magnesium	mg/L	0.25	0.51	0.88	0.28	0.84	0.14	0.14	0.82	0.29	0.9	1.02
Sodium	mg/L	1.32	1.31	2.82	1.66	3.30	1.27	1.34	3.66	6.01	5.40	5
Potassium	mg/L	0.46	0.57	0.86	0.37	0.75	0.30	0.34	0.61	0.63	-	-
Tannins and Lignins	mg phenol/L	0.2	0.2	<0.1	-	-	-	-	-	-	-	-
Aluminum	mg/L	0.014	0.009	0.013	-	-	-	-	-	-	-	-
Antimony	mg/L	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-
Arsenic	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Barium	mg/L	<0.002	<0.002	0.003	0.007	0.007	0.003	0.006	0.003	<0.002	0.004	0.004
Beryllium	mg/L	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-
Boron	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-
Chromium	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Cobalt	mg/L	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-
Copper	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Iron	mg/L	<0.010	<0.010	<0.010	0.114	0.130	0.180	0.217	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	-	-
Manganese	mg/L	<0.002	<0.002	0.004	0.002	0.007	0.007	0.008	0.006	<0.002	-	-
Mercury	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0001	<0.0002	-	-
Molybdenum	mg/L	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-
Nickel	mg/L	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.004	<0.004	<0.004	-	-	-	-	-	-	-	-
Silver	mg/L	<0.002	<0.002	0.10	-	-	-	-	-	-	-	-
Strontium	mg/L	0.01	0.021	<0.002	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.006	<0.006	0.034	-	-	-	-	-	-	-	-
Titanium	mg/L	<0.002	<0.002	<0.006	-	-	-	-	-	-	-	-
Vanadium	mg/L	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-
Zinc	mg/L	<0.006	<0.006	<0.002	0.011	<0.006	<0.006	0.006	<0.008	<0.008	-	-
Field Measurements												
Temperature	C	-	-	-	3.30	8.86	3.63	3.63	6.7	9.19	11.8	9.90
pH	pH Units	-	-	-	5.54	6.42	6.47	6.47	7.14	6.66	5.26	5.43
Conductivity	uS/cm	-	-	-	41	-	8	8	28	32	23	38
Oxidation Reduction Potential	mV	-	-	-	98.8	346.8	181.6	181.6	267	129.6	183	-114.4
Dissolved Oxygen	mg/L	-	-	-	12.8	4.84	16.82	16.82	7.69	11.91	17.2	86.2

Parameter	9-May-19	25-Jul-19	23-Sep-19	11-Jun-20	26-Aug-20	20-Oct-20	3-Jun-21	5-Aug-21	21-Oct-21	30-May-22	3-Aug-22	27-Sep-22	30-May-23	1-Aug-23	19-Oct-23	15-May-24	23-Jul-24	16-Oct-24	ODWQS
Benzene	<0.50	-	-	<0.05	-	-	<0.5	-	-	<0.5	<0.5	-	<0.5	-	-	<0.5	-	-	1
Methylene Chloride	<2.0	-	-	-	-	-	<0.5	-	-	<0.5	-	-	-	-	-	-	-	-	50
Toluene	<0.50	-	-	<0.05	-	-	<0.5	-	-	<0.5	<0.5	-	<0.5	-	-	<0.5	-	-	60
Vinyl Chloride	<0.50	-	-	<0.50	-	-	<0.2	-	-	<0.2	<0.2	-	<0.2	-	-	<0.2	-	-	1
1,4-Dichlorobenzene	<0.50	-	-	<0.05	-	-	<0.5	-	-	<0.5	<0.5	-	<0.5	-	-	<0.5	-	-	5
pH	6.31	6.16	6.13	6.17	6.17	6.06	6.30	6.55	6.06	6.83	6.82	6.82	7.1	6.87	6.80	6.86	6.35	7.11	(6.5-8.5)
BOD	<3.0	<3.0	<3.0	<3.3	<3.0	<3.0	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	
Electrical Conductivity	13.4	21.4	26.0	10.6	46.0	50.7	57	60	61	20	52	61	36	50	66	37	27	60	
Total Dissolved Solids	463	240	204	201	60	40	60	60	71	300	66	80	40	60	80	64	63	54	500
Total Suspended Solids	88900	18900	15600	22600	7420	9830	60200	3820	3790	12100	13600	10400	10800	2210	26300	68300	8360	10360	
Alkalinity (as CaCO3)	<50	<10	11	8.3	38	22	26	27	23	12	22	25	13	22	28	10	10	20	(30-500)
Total Hardness (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(80-100)
Fluoride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
Chloride	<0.60	<0.60	<0.60	<0.60	1.34	1.33	1	1	<1	4	5	5	6	5	6	12	2	4	250
Nitrate as N	<0.020	0.024	0.043	<0.020	<0.020	0.022	<0.06	<0.06	<0.03	0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.04	10
Nitrite as N	<0.010	<0.010	-	<0.010	-	-	<0.03	<0.03	0.02	<0.03	-	-	<0.03	<0.03	-	<0.03	-	-	1
Bromide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00001	-	-	
Sulphate	1.93	3.90	0.77	0.83	1.23	1.68	4	3	4	41	12	-	30	5	5	19	8	2	500
Ortho phosphate as P	-	-	-	-	-	-	-	-	-	3.86		-	-	-	-	-	-	-	
Ammonia as N	0.014	0.079	0.012	0.026	<0.010	<0.010	<0.04	<0.04	0.06	0.06	<0.04	<0.04	<0.04	<0.04	0.04	0.1	0.05	<0.1	
Total Kjeldahl Nitrogen	<15	<1.5	-	<0.15	-	-	<0.05	4		<0.05	-	-	0.10	-	-	0.06	-	-	
Chemical Oxygen Demand	84	131	90	100	60	30	<8	<8	<8	10	<8	<8	<8	<8	<8	<8	<8	<8	
Dissolved Organic Carbon	3.78	1.8	1.6	1.11	1.67	1.58	<1	1	2	2	1	2	1	1	1	1	1	<1	5
Phenols	<0.0010	<0.0010	-	0.0001			<0.002	-	-	<0.002	-	-	<0.002	-	-	0.002	-	-	
Calcium	6.440	1.40	1.84	1.36	3.48	3.73	5.86	5.5	6.04	2.21	4.46	4.86	2.38	5.36	4.81	2.22	4.32	6.06	
Magnesium	0.160	0.360	0.471	0.36	0.881	1.02	1.31	1.28	1.38	0.673	0.831	1.28	0.862	1.28	1.46	0.842	0.78	1.62	
Sodium	2.18	2.16	2.64	1.06	4.1	5.06	4.83	4.88	5.34	2.64	3.55	3.77	2.84	4.21	4.10	2.04	2.44	3.83	20 (200)
Potassium	0.340	0.340	-	0.340	-	-	0.41	-	-	0.414	-	-	0.386	-	-	0.25	-	-	
Tannins and Lignins	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006
Arsenic	-	<0.00010	-	0.00010	-	-	0.0002	-	-	<0.0002	-	-	<0.0002	-	-	<0.0002	-	-	0.01
Barium	-	0.00122	0.00147	0.0041	0.00101	0.00104	0.00234	0.00211	0.00233	0.00097	0.0107	0.00172	0.00181	0.00188	0.00186	0.00075	0.00137	0.00182	1
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	
Boron	-	<0.010	<0.010	<0.010	<0.010	<0.010	0.01	0.003	0.029	0.007	<0.002	0.002	0.004	0.002	0.080	0.015	0.003	<0.002	5
Cadmium	-	<0.000010	-	0.0000066	-	-	-	-	-	0.000003	-	-	0.000004	-	-	<0.000003	-	-	0.005
Chromium	-	<0.00080	-	0.00061	-	-	0.00066	-	-	0.00023	-	-	0.00047	-	-	0.00032	-	-	0.05
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper	-	0.00430	-	-	-	-	0.0006	-	-	<0.0002	-	-	0.0016	-	-	<0.001	-	-	1
Iron	-	0.03	0.010	0.182	-	0.028	0.07	0.03	0.036	<0.007	0.014	0.044	0.078	0.146	<0.007	0.009	0.030	0.006	0.3
Lead	-	0.000112	-	0.000163	-	-	<0.00009	-	-	<0.00009	-	-	<0.00009	-	-	<0.00009	-	-	0.01
Manganese	0.00204	0.00266	-	0.00670	-	-	0.00089	0.00815	0.00795	0.00166	-	0.00149	0.00411	-	-	0.00137	-	-	0.05
Mercury	<0.000010	-	-	<0.0000066	-	-	<0.00001	-	-	<0.00001	-	-	<0.00001	-	-	-	-	-	0.001
Molybdenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Silver	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	-	0.0023	-	0.0021	-	-	0.003	-	-	<0.002	-	-	0.004	-	-	<0.002	-	-	5
Field Measurements																			
Temperature	2.4	13	8.1	6.3	18	7.0	15.1	12.1	11.8	9.3	11.3	8	7	8.4	9.2	4.9	8	8.8	-
pH	5.40	5.47	6.1	5.90	5.90	5.83	6.12	6.03	6.23	6.06	6.16	6.32	5.80	6.32	6.06	5.34	6.75	6.63	-
Conductivity	6.8	16	22.1	21	33.3	31	49.7	47.8	40	0.041	46	39	19.2	43.6	36.3	15.8	20.9	40.9	-
Oxidation Reduction Potential	104.3	215.5	29	117.7	256.3	171.8	203	97.3	80.6	74.8	113.1	101.4	142.3	167.1	170.5	170.4	184.8	126.3	-
Dissolved Oxygen	14.01	7.80	4.00	6.30	6.08	7.11	8.21	8.33	72.7	7.86	7.04	8.04	10.86	9.63	6.53	12.87	8.03	10.08	-

Notes:

ODWQS — Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2006

TABLE 4
Groundwater Quality Results - MW3
McCarty Waste Disposal Site
Township of McCarty, Ontario

Parameter	Units	Sample Designation																															GDWQS
		Sample Collection Date (dd/mmm/yy)																															
		MW3																															
		27-May-15	27-May-15	30-Jul-15	30-Sep-15	26-May-16	25-Oct-16	DUP 25-OCT-16	29-May-17	3-Nov-17	23-May-18	3-Aug-18	4-Oct-18	9-May-19	25-Jul-19	23-Sep-19	11-Jun-20	25-Aug-20	29-Oct-20	29-Oct-20 (DUP)	3-Jun-21	5-Aug-21	21-Oct-21	21-Oct-21 (DUP)	26-May-22	3-Aug-22	27-Sep-22	26-May-23	1-Aug-23	18-Oct-23	18-May-24	23-Jul-24	16-Oct-24	2024-16-16 (DUP)	
Benzene	µg/L	-	-	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	No sample	-	-	<0.50	-	-	-	< 0.5	-	-	-	< 0.5	< 0.5	-	< 0.5	-	-	< 0.5	-	-	-	1
Methylene Chloride	µg/L	-	-	<0.30	-	-	<0.30	<0.30	<0.30	<0.30	<0.30	-	-		-	-	-	-	-	-	< 0.5	-	-	-	< 0.5	-	-	-	-	-	-	-	-	-	50
Toluene	µg/L	-	-	<0.20	-	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	-		-	-	<0.50	-	-	-	< 0.5	-	-	-	< 0.5	< 0.5	-	< 0.5	-	-	< 0.5	-	-	-	60
Vinyl Chloride	µg/L	-	-	<0.17	-	-	<0.17	<0.17	<0.17	<0.17	<0.17	-	-		-	-	<0.50	-	-	-	< 0.2	-	-	-	< 0.2	< 0.2	-	< 0.2	-	-	< 0.2	-	-	-	1
1,4-Dichlorobenzene	µg/L	-	-	<0.10	-	-	<0.10	<0.10	<0.10	<0.10	<0.10	-	-		-	-	<0.50	-	-	-	< 0.5	-	-	-	< 0.5	< 0.5	-	< 0.5	-	-	< 0.5	-	-	-	5
pH	pH Units	6.99	6.91	6.87	6.99	6.47	6.82	6.86	6.71	6.99	6.96	6.30	6.2		6.99	6.95	6.99	6.79	6.96	6.96	6.57	6.33	6.30	6.12	6.99	6.82	6.89	6.7	6.48	6.26	6.68	6.32	6.61	6.75	(6.5-8.5)
BOD	mg/L	-	-	-	-	-	-	-	<5	<5	<5	<5	<5		<2.0	<3.0	<2.0	<3.0	<3.0	<3.0	< 4	44	< 4	< 4	< 4	< 4	< 4	< 4	8	< 4	< 4	< 4	< 4	< 4	-
Electrical Conductivity	uS/cm	29	32	22	30	26	25	25	22	22	21	22	21		21.4	23.4	53.8	57.5	41.7	41.2	41	28	36	26	33	24	24	28	26	22	21	26	26	24	-
Total Dissolved Solids	mg/L	22	24	22	<20	20	36	34	24	<20	20	<20	24		27	34	41	44	28	31	< 30	43	31	< 30	< 30	< 30	< 30	< 30	34	< 30	< 30	40	< 30	37	500
Total Suspended Solids	mg/L	-	-	-	-	-	-	-	2960	2630	2360	1290	580		2810	1250	32.1	176	302	214	175	694	79	111	816	322	788	1810	821	1020	820	674	438	383	-
Alkalinity (as CaCO3)	mg/L	9	10	11	9	9	9	9	8	7	6	6	<6		<10	<10	13.2	11	12	12	14	10	12	11	12	7	9	9	8	9	7	7	8	8	(30-500)
Total Hardness (as CaCO3)	mg/L	9	11.3	8.3	9.3	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(80-100)
Fluoride	mg/L	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
Chloride	mg/L	0.24	0.2	0.34	<0.10	0.33	0.22	-	<0.10	0.18	0.47	0.24	0.27		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	< 1	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	250
Nitrate as N	mg/L	0.21	0.3	0.52	0.43	0.18	0.19	0.23	0.18	0.18	0.18	0.14	0.18		0.147	0.152	2.57	3.18	1.13	1.14	0.33	0.25	< 0.03	< 0.03	0.61	0.46	0.67	0.26	0.15	0.13	0.14	0.10	0.12	0.12	10
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-		<0.010	-	<0.010	-	-	-	< 0.03	<0.03	0.29	0.36	< 0.03	-	-	< 0.03	< 0.03	-	< 0.03	-	-	-	1
Bromide	mg/L	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00001	-	-	-	-
Sulphate	mg/L	2.36	2.17	2.04	2.57	2.5	2.06	2.06	2.2	2.35	2.88	2.23	2.44		2.11	2.04	0.98	1	1.39	1.35	< 2	2	< 2	2	2	< 2	2	2	2	2	2	3	2	28	500
Ortho phosphate as P	mg/L	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	0.14	-	-	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.08		<0.010	<0.010	<0.010	0.017	<0.010	0.011	< 0.04	<0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.05	< 0.04	< 0.04	< 0.1	< 0.1	-
Total Kjeldahl Nitrogen	mg/L	<0.10	<0.10	<0.10	0.3	<0.10	0.19	0.11	<0.10	0.17	<0.10	-	-		0.23	-	0.28	-	-	-	< 0.05	-	-	-	< 0.05	-	-	< 0.05	-	-	0.07	-	-	-	-
Chemical Oxygen Demand	mg/L	<5	<5	10	<5	<5	<5	<5	<5	<5	<5	<5	<5		27	20	<10	<10	<10	<10	< 8	<8	< 8	< 8	< 8	< 8	< 8	< 8	8	< 8	< 8	< 8	< 8	< 8	-
Dissolved Organic Carbon	mg/L	0.8	0.8	1.4	0.9	1.4	1.7	2	0.9	1.4	0.9	1.8	1.5		3.77	1.32	1.67	2.87	2.33	2.52	2	1	1	2	1	2	2	1	1	1	2	1	< 1	< 1	5
Phenols	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-		0.0055	-	<0.0010	-	-	-	< 0.002	-	-	-	< 0.002	-	-	< 0.002	-	-	0.003	-	-	-	-
Calcium	mg/L	2.73	3.4	2.8	2.83	2.28	2.21	2.15	1.62	1.82	1.71	1.87	1.8		2.28	2.08	4.86	5.02	3.86	3.82	3.87	3.16	3.03	2.83	3.18	2.16	2.89	2.35	2.18	1.89	2.48	2.19	2.07	2.07	-
Magnesium	mg/L	0.54	0.65	0.57	0.54	0.51	0.47	0.48	0.4	0.43	0.36	0.39	0.39		0.438	0.442	1.23	1.16	1.01	0.991	0.71	0.598	0.845	0.617	0.631	0.388	0.393	0.469	0.448	0.414	0.533	0.483	0.411	0.408	-
Sodium	mg/L	1.15	1.13	1.63	1.98	0.99	1.33	1.24	0.78	1.12	0.84	1.2	1		0.82	1.03	1.6	2.36	2.02	1.95	1.6	1.27	1.48	1.43	1.24	1.21	0.92	0.96	1.18	1.06	0.98	1.11	1.12	1.11	20 (200)
Potassium	mg/L	0.68	0.72	0.88	0.95	0.63	0.81	0.78	0.56	0.75	0.48	-	-		0.629	-	0.827	-	-	-	0.951	-	-	-	0.842	-	-	0.748	-	-	0.716	-	-	-	-
Tannins and Lignins	mg phenol/L	0.2	0.1	<0.1	<0.1	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	mg/L	0.039	0.039	0.038	0.03	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
Antimony	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006
Arsenic	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-		<0.00010	-	0.00011	-	-	-	< 0.0002	-	-	-	< 0.0002	-	-	< 0.0002	-	-	< 0.0002	-	-	-	0.01
Barium	mg/L	0.011	0.01	0.013	0.011	0.01	0.009	0.009	0.009	0.009	0.008	0.008	0.012		0.00974	0.00984	0.019	0.0235	0.0174	0.0174	0.0157	0.0157	0.0158	0.0159	0.0169	0.0218	0.0164	0.0111	0.00979	0.0107	0.0107	0.01080	0.01080	0.0111	1
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-	-	-	-
Boron	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.027	0.003	0.010	0.010	0.008	0.003	0.003	0.003	0.003	0.015	< 0.002	0.016	0.003	0.003	5
Cadmium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-		<0.000010	-	0.000012	-	-	-	-	-	-	-	0.000007	-	-	0.000003	-	-	0.000008	-	-	-	0.005
Chromium	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-		<0.00050	-	<0.00050	-	-	-	0.00036	-	-	-	0.00048	-	-	0.00037	-	-	0.00042	-	-	-	0.05
Cobalt	mg/L	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-		0.0063	-	-	-	-	-	0.0011	-	-	-	0.001	-	-	0.0008	-	-	< 0.001	-	-	-	1
Iron	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010		0.013	0.013	<0.010	-	<0.010	<0.010	0.02	<0.007	< 0.007	0.010	< 0.007	0.025	0.033	< 0.007	0.295	0.008	< 0.007	0.020	< 0.007	< 0.007	0.3
Lead	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	-	-		<0.00050	-	0.000063	-	-	-	< 0.00008	-	-	-	< 0.00008	-	-	< 0.00008	-	-	< 0.00008	-	-	-	0.01
Manganese	mg/L	0.011	0.011	0.011	0.009	0.01	0.014	0.012	0.013	0.007	0.007	-	-		0.00748	-	0.0068	-	-	-	0.0233	0.0329	0.0366	0.0366	0.0269	-	0.0231	0.0366	-	-	0.0233	-	-	-	0.05
Mercury	mg/L	-	-	-	-	-	-	-	<0.0001	<0.0001	<0.00002	-	-		-	-	<0.0000050	-	-	-	< 0.00001	-	-	-	< 0.00001	-	-	< 0.00001	-	-	-	-	-	-	0.001
Molybdenum	mg/L	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.004	<0.004	<0.004	<0.004	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Silver	mg/L	<0.002	<0.002	<0.002	4.25	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	0.022	0.022	0.023	<0.002	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.008	<0.008	<0.008	0.02	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	<0.002	<0.002	<0.002	<0.006	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	<0.002	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	<0.005	<0.005	<0.005	<0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-		<0.0010	-	0.002	-	-	-	0.003	-	-	-	< 0.002	-	-	< 0.002	-	-	< 0.002	-	-	-	5
Field Measurements																																			
Temperature	C	-	-	-	-	3.47	8.62	-	4.12	8.35	8.58	11.29	9.18	-	8.3	11.4	6.1	10.8	6.78	-	8.2	12.8	11.7	-	8.1	11	10.2	10.4	9.2	8	4.2	9.3	9.8	-	-
pH	pH Units	-	-	-	-	3.34	5.74	-	5.35	6.14	5.42	6.47	5.39	-	6.47	5.23	6.04	4.76	6.34	-	5.3	4.91	5.3	-	5.18	5.45	4.8	7.48	5.2	5.21	5.55	5.08	5.9	-	-
Conductivity	uS/cm	-	-	-	-	14	-	-	12	36	14	19	17	-	18.4	20.7	58.1	43.4	27	-	23	28.4	28	-	0.048	25.9	18.2	17.8	18.7	16.1	15.8	16.7	17.7	-	-
Oxidation Reduction Potential	mV	-	-	-	-	158.1	323.6	-	155.3	182	111	206.4	-69	-	127.4	161.8	343.7	343.6	286.7	-	239.8	131.6	172.2	-	178.1	130.9	274.8	182.8	282.8	218.6	182.3	229.8	165	-	-
Dissolved Oxygen	mg/L	-	-	-	-	9.98	7.43	-	21.29	8.43	15.08	8.59	81.1	-	8.32	6.24	8.07	2.49	9.75	-	6.6	7.58	33.3	-	6.13	4.57	3.12	7.48	7.01	8.02	13.43	19.89	19.17	-	-

Notes

GDWQS — Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2003, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2006.

MW3 — Exceeds GDWQS (Bolded)

RDL — Reportable Detection Limit

Units — All Units in mg/L Unless Otherwise Noted.

TABLE 9

Groundwater Quality Results - MW4

McGarry Waste Disposal Site

Township of McGarry, Ontario

Sample Designation: MW4 — Sample Collection Date (dd-mmm-yy)

Parameter	Units	27-May-15	26-Jul-15	29-Sep-15	30-May-16	DUP 30-May-16	25-Oct-16	30-May-17	3-Nov-17	23-May-18	23-May-18	2-Aug-18	4-Oct-18
Benzene	µg/L	-	0.31	-	-	-	<0.10	<0.20	<0.20	<0.50	<0.50	-	-
Methylene Chloride	µg/L	-	<0.30	-	-	-	<0.30	<0.30	<0.30	<1.20	<1.20	-	-
Toluene	µg/L	-	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.50	<0.50	-	-
Vinyl Chloride	µg/L	-	<0.17	-	-	-	<0.17	<0.17	<0.17	<0.08	<0.08	-	-
1,4-Dichlorobenzene	µg/L	-	<0.10	-	-	-	<0.10	<0.10	<0.10	<0.40	<0.40	-	-
pH	pH Units	-	7.91	-	-	-	8.05	7.83	7.08	7.84	7.7	7.44	7.47
BOD	mg/L	-	-	-	-	-	-	<5	<5	<5	<5	<5	<5
Electrical Conductivity	uS/cm	1140	1080	1340	1230	1220	1330	1320	1220	1260	1260	1430	1320
Total Dissolved Solids	mg/L	672	734	762	760	746	814	840	860	840	800	860	838
Total Suspended Solids	mg/L	-	-	-	-	-	-	163	208	220	224	161	174
Alkalinity (as CaCO3)	mg/L	648	666	613	643	643	660	667	681	766	776	680	680
Total Hardness (as CaCO3)	mg/L	572	680	634	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	<0.25	<0.05	<0.25	-	-	-	-	-	-	-	-	-
Chloride	mg/L	3.74	3.60	5.44	5.19	4.91	3.47	3.77	2.66	8.77	8.29	4.62	5.06
Nitrate as N	mg/L	<0.25	<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nitrite as N	mg/L	<0.25	<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	-	-
Bromide	mg/L	<0.25	<0.05	<0.25	-	-	-	-	-			-	-
Sulphate	mg/L	108	71.3	67.1	173	175	108	221	113	87.7	88.4	173	128
Ortho phosphate as P	mg/L	<0.60	<0.10	<0.60	-	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	4.10	2.67	3.09	1.63	1.86	3	1.84	4.3	3.43	3.44	2.63	4.86
Total Kjeldahl Nitrogen	mg/L	6.1	3.01	4.43	2.74	2.75	4.15	3.84	4.83	4.4	4.88	-	-
Chemical Oxygen Demand	mg/L	61	40	36	37	37	37	43	28	36	43	42	36
Dissolved Organic Carbon	mg/L	12.8	13.3	14.5	16	16.2	8.8	16.1	16.1	11.1	16.2	8.8	8.7
Phenols	mg/L	<0.001	0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	-	-
Calcium	mg/L	182	181	208	210	211	238	203	207	203	208	219	228
Magnesium	mg/L	22.8	28	28.7	26.6	26.2	22.3	31.2	30.0	29.4	29.3	36.2	31.6
Sodium	mg/L	11.4	13.1	15.1	14.8	14.8	12.9	22.7	15.6	15.2	14.3	23	16.7
Potassium	mg/L	13.4	14.6	18.2	14.1	14.1	16.6	18.3	17	19.2	18.8	-	-
Tannins and Lignins	mg phenol/L	1.4	1.3	<1	-	-	-	-	-	-	-	-	-
Aluminum	mg/L	0.008	0.013	0.008	-	-	-	-	-	-	-	-	-
Antimony	mg/L	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	0.071	0.022	0.015	0.384	0.35	<0.003	0.349	0.52	1.14	1.16	-	-
Barium	mg/L	0.143	0.106	0.132	0.088	0.084	0.076	0.1	0.182	0.125	0.124	0.139	0.105
Beryllium	mg/L	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-
Boron	mg/L	2.63	3.10	3.36	3.4	3.13	2.88	5.81	3.89	4.01	3.84	4.64	3.72
Cadmium	mg/L	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-
Chromium	mg/L	0.008	0.005	0.007	<0.003	<0.003	<0.003	<0.003	<0.003	0.006	0.007	-	-
Cobalt	mg/L	0.003	0.004	0.003	-	-	-	-	-	-	-	-	-
Copper	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Iron	mg/L	66.9	66.2	74.9	63.3	68	<0.016	48	61.7	62.5	75.9	62.8	64.1
Lead	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	-	-
Manganese	mg/L	2.33	1.86	2.39	2.39	2.33	6.887	2.88	2.84	2.89	2.36	-	-
Mercury	mg/L	-	-	-	-	-	-	<0.0001	<0.0001	<0.0002	<0.0002	-	-
Molybdenum	mg/L	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-
Nickel	mg/L	0.007	0.01	0.007	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.004	<0.004	<0.004	-	-	-	-	-	-	-	-	-
Silver	mg/L	<0.002	<0.002	11.2	-	-	-	-	-	-	-	-	-
Strontium	mg/L	1.88	1.06	<0.002	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.006	<0.006	1.88	-	-	-	-	-	-	-	-	-
Titanium	mg/L	0.002	0.002	<0.006	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-
Zinc	mg/L	<0.006	<0.006	0.002	0.007	0.007	<0.006	0.011	<0.006	<0.006	<0.006	-	-
Field Measurements													
Temperature	C	-	-	-	5.61	-	7.47	5.14	8.87	7.24	7.24	10.16	8.44
pH	pH Units	-	-	-	6.79	-	6.61	6.66	7.42	6.44	6.44	6.41	6.37
Conductivity	uS/cm	-	-	-	863	-	-	887	182	1046	1046	1138	103.8
Oxidation Reduction Potential	mV	-	-	-	-32.9	-	288.6	-31.3	-84	-37.9	-37.9	-72.9	-134
Dissolved Oxygen	mg/L	-	-	-	4.8	-	6.63	8.36	7.19	3.94	3.94	2.88	80.7

Parameter	Units	9-May-19	29-Jul-19	23-Sep-19	23-Sep-19 (DUP)	11-Jun-20	25-Aug-20	25-Aug-20 (DUP)	30-Oct-20	3-Jun-21	5-Aug-21	21-Oct-21
Benzene	µg/L	<0.50	-	-	-	<0.50	-	-	-	<0.5	-	-
Methylene Chloride	µg/L	<2.0	-	-	-	-	-	-	-	<0.5	-	-
Toluene	µg/L	<0.50	-	-	-	<0.50	-	-	-	<0.5	-	-
Vinyl Chloride	µg/L	<0.50	-	-	-	<0.50	-	-	-	<0.2	-	-
1,4-Dichlorobenzene	µg/L	<0.50	-	-	-	<0.50	-	-	-	<0.5	-	-
pH	pH Units	6.63	6.71	6.71	6.81	6.74	6.78	6.74	6.7	7.00	7.31	7.04
BOD	mg/L	5.1	<3.0	6	<3.0	<2.0	<3.0	3.0	3.1	<4	5	<4
Electrical Conductivity	uS/cm	1440	880	1190	1140	1280	1290	1280	1300	1340	1340	1290
Total Dissolved Solids	mg/L	871	780	784	784	730	676	665	811	880	840	675
Total Suspended Solids	mg/L	112	87.7	130	130	111	122	116	106	148	131	149
Alkalinity (as CaCO3)	mg/L	680	430	667	691	672	691	674	611	684	648	639
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/L	4	2.80	2.01	2.01	3.1	2.0	2.4	<2.0	2	2	-
Nitrate as N	mg/L	<0.10	<0.020	0.046	0.021	<0.10	<0.10	<0.10	<0.10	0.43	<0.06	-
Nitrite as N	mg/L	<0.060	<0.010	-	-	<0.060	-	-	-	<0.03	<0.03	-
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	-
Sulphate	mg/L	308	184	104	187	240	189	183	143	118	210	-
Ortho phosphate as P	mg/L	-	-	-	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	3.51	1.84	2.36	2.28	1.63	2.84	4.19	3.34	2.81	3.88	-
Total Kjeldahl Nitrogen	mg/L	4.7	2.30			2.45				2.87		-
Chemical Oxygen Demand	mg/L	79	70	70	69	48	53	80	40	36	41	26
Dissolved Organic Carbon	mg/L	19.9	18.3	13.8	13.8	1.37	8.8	12.1	13.3	10	8	8
Phenols	mg/L	0.0012	0.0081			0.0010				0.003		
Calcium	mg/L	237	180	180	209	234	267	228	230	261	255	265
Magnesium	mg/L	40	18.4	20.0	27.3	32.0	29.2	31.4	31.2	26.5	29.9	27.1
Sodium	mg/L	24.4	8.01	15.6	16.7	17.9	14.3	16.3	14.1	13.2	11.8	10.9
Potassium	mg/L	16.1	7.67	-	-	11.9	-	-	-	17.5	-	-
Tannins and Lignins	mg phenol/L	-	-	-	-	-	-	-	-	-	-	-
Aluminum	mg/L	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	-	0.180	-	-	0.435	-	-	-	0.15	-	-
Barium	mg/L	-	0.0795	0.0927	0.0928	0.0903	0.104	0.117	0.115	0.139	0.138	0.157
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	-	2.1	2.81	2.78	3.41	3.13	3.37	2.86	3.27	2.75	2.75
Cadmium	mg/L	-	0.000060	-	-	<0.000060	-	-	-	-	-	-
Chromium	mg/L	-	<0.0050	-	-	<0.0050	-	-	-	0.00074	-	-
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	-	0.0030	-	-	-	-	-	-	0.0060	-	-
Iron	mg/L	-	48.2	63.8	63.8	88.8			34.5	37.3	66.3	67.1
Lead	mg/L	-	0.00030	-	-	0.00101	-	-	-	<0.00030	-	-
Manganese	mg/L	3.80	2.86	-	-	3.16	-	-	-	4	3.80	3.81
Mercury	mg/L	<0.000010	-	-	-	<0.0000050	-	-	-	<0.00001	-	-
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	-	0.027	-	-	0.026	-	-	-	0.009	-	-
Field Measurements												
Temperature	C	6.6	19.6	8.4	-	9.9	16.2	-	7.43	15.3	21.1	11.1
pH	pH Units	6.80	7.33	6.80	-	6.41	6.3	-	6.42	6.51	6.38	6.47
Conductivity	uS/cm	880	825	864	-	1416	1062	-	937	1211	1300	1.00
Oxidation Reduction Potential	mV	230	-20.7	-84.1	-	212.6	84.6	-	0	-16.7	-40.6	64.4
Dissolved Oxygen	mg/L	14.01	2.17	1.9	-	1.7	1.6	-	7.12	2.01	6.87	11.1

Parameter	Units	26-May-22	26-May-22 (DUP)	3-Aug-22	3-Aug-22 (DUP)	27-Sep-22	27-Sep-22 (DUP)	30-May-23	30-May-23 (DUP)	1-Aug-23	19-Oct-23	15-May-24	23-Jul-24	19-Oct-24	ODWQS
Benzene	µg/L	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	-	-	<0.5	-	-	1
Methylene Chloride	µg/L	<0.5	<0.5			-	-	-	-	-	-	-	-	-	50
Toluene	µg/L	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	-	-	<0.5	-	-	60
Vinyl Chloride	µg/L	<0.2	<0.2	<0.2	<0.2	-	-	<0.2	<0.2	-	-	<0.2	-	-	1
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	-	-	<0.5	-	-	5
pH	pH Units	7.94	7.57	7.32	7.30	7.47	7.46	7.82	7.61	7.84	7.90	7.85	7.42	7.74	(6.5-8.5)
BOD	mg/L	5	5	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<12	-
Electrical Conductivity	uS/cm	1540	1510	1410	1400	1280	1270	1010	1020	1160	1120	886	876	1040	-
Total Dissolved Solids	mg/L	1060	1100	1040	884	865	866	640	634	640	714	687	640	640	500
Total Suspended Solids	mg/L	138	122	138	78	77	108	84	82	102	83	40	40	41	-
Alkalinity (as CaCO3)	mg/L	686	891	816	883	842	846	418	436	480	582	402	480	522	(30-500)
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	(80-100)
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
Chloride	mg/L	4	3	3	4	2	2	3	4	4	3	1	2	2	250
Nitrate as N	mg/L	<0.06	<0.06	<0.06	<0.06	0.07	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	10
Nitrite as N	mg/L	<0.03	<0.03	-	-	-	-	<0.03	<0.03	<0.03	-	<0.03	-	-	1
Bromide	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00001	-	-	-
Sulphate	mg/L	408	480	318	310	180	180	140	140	150	138	100	110	80	500
Ortho phosphate as P	mg/L	0.07	0.08	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	3.07	3.83	2.48	2.43	2.05	1.84	0.88	0.87	1.41	1.46	0.72	1.18	1.20	-
Total Kjeldahl Nitrogen	mg/L	4	4.19	-	-	-	-	2.21	1.29	-	-	0.88	-	-	-
Chemical Oxygen Demand	mg/L	40	30	33	28	34	28	37	33	34	20	18	27	24	-
Dissolved Organic Carbon	mg/L	16	10	9	9	9	9	6	6	6	6	5	7	8	5
Phenols	mg/L	0.004	0.006	-	-	-	-	<0.002	<0.002	-	-	<0.002	-	-	-
Calcium	mg/L	334	311	237	238	215	211	201	207	194	204	164	171	177	-
Magnesium	mg/L	37.8	33.4	36.1	36.6	30.8	31.4	23.1	22.4	20.8	24.7	16.9	25.7	23.4	-
Sodium	mg/L	16.7	14.9	28.4	28.8	18.4	18.3	13.5	13.6	16.0	14.5	8.7	10.2	10.6	20 (200)
Potassium	mg/L	19	17.4	-	-	-	-	8.64	8.63	-	-	8.62	-	-	-
Tannins and Lignins	mg phenol/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006
Arsenic	mg/L	0.200	0.279	-	-	-	-	0.164	0.164	-	-	0.0000	-	-	0.01
Barium	mg/L	0.119	0.115	0.0730	[illegible]	0.0874	0.086	0.0886	0.0888	0.0818	0.0880	0.0701	0.0886	0.0880	1
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.5	-	-	-
Boron	mg/L	3.90	3.36	3.03	3.10	3.00	3.06	2.86	2.57	3.44	3.27	2.04	3.11	2.90	5
Cadmium	mg/L	<0.000003	6E-06	-	-	-	-	0.000016	0.000021	-	-	0.000101	-	-	0.005
Chromium	mg/L	0.00182	0.002	-	-	-	-	0.00113	0.00113	-	-	0.001	-	-	0.05
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	0.0007	0.000[illegible]	-	-	-	-	0.001	0.0012	-	-	0.002	-	-	1
Iron	mg/L	61.2	66.5	41.4	38.9	38.8	37.2	36.3	37.4	38.8	64.7	19.4	38.1	31.9	0.3
Lead	mg/L	0.00013	1E-04	-	-	-	-	0.00026	0.00032	-	-	0.00283	-	-	0.01
Manganese	mg/L	6.1	5.75	-	-	2.91	2.95	2.85	2.84	-	-	1.01	-	-	0.05
Mercury	mg/L	<0.00001	0.0000[illegible]	-	-	-	-	<0.00001	<0.00001	-	-	-	-	-	0.001
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	0.082	0.084	-	-	-	-	0.009	0.011	-	-	0.046	-	-	5
Field Measurements															
Temperature	C	16.3	-	16.3	-	9.3	-	7.8	-	11.8	9.9	7.9	7.4	9.4	-
pH	pH Units	6.6	-	6.64	-	6.12	-	6.79	-	7.14	6.8	6.2	6.4	6.80	-
Conductivity	uS/cm	1.00	-	1230	-	801	-	748	-	842	866	841	710	773	-
Oxidation Reduction Potential	mV	-15.6	-	-60.2	-	-9.3	-	-40.1	-	-22.6	-33.6	10.3	-17.3	228.2	-
Dissolved Oxygen	mg/L	2.41	-	1.32	-	2.30	-	1.6	-	4.3	4.80	1.51	4.62	4.90	-

Notes: [illegible]

TABLE 6
Groundwater Quality Results - MW5
McGarry Waste Disposal Site
Township of McGarry, Ontario

Sample Designation: MW5 — Sample Collection Date (dd/mmm/yy)

Parameter	Units	27-May-15	30-Jul-15	30-Sep-15	30-Sep-15	26-May-16	25-Oct-16	29-May-17	2-Nov-17	23-May-18	3-Aug-18	4-Oct-18
Benzene	µg/L	-	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20	-	-
Methylene Chloride	µg/L	-	<0.30	-	-	-	<0.30	<0.30	<0.30	<0.30	-	-
Toluene	µg/L	-	<0.20	-	-	-	<0.20	<0.20	<0.20	<0.20	-	-
Vinyl Chloride	µg/L	-	<0.17	-	-	-	<0.17	<0.17	<0.17	<0.17	-	-
1,4-Dichlorobenzene	µg/L	-	<0.10	-	-	-	<0.10	<0.10	<0.10	<0.10	-	-
pH	pH Units	6.82	6.55	6.53	6.53	6.50	6.11	6.59	6.67	6.42	6.36	6.30
BOD	mg/L	-	-	-	-	-	-	<5	<5	<5	<5	<5
Electrical Conductivity	uS/cm	43	41	44	44	43	47	43	44	41	46	46
Total Suspended Solids	mg/L	-	-	-	-	-	-	154	164	32	20	36
Total Dissolved Solids	mg/L	30	24	30	30	26	32	34	<20	141	88	60
Alkalinity (as CaCO3)	mg/L	12	10	11	11	32	44	6	21	20	10	15
Total Hardness (as CaCO3)	mg/L	16.6	18.1	17.1	17.1	-	-	-	-	-	-	-
Fluoride	mg/L	<0.05	<0.05	<0.05	<0.05	-	-	-	-	-	-	-
Chloride	mg/L	0.41	0.51	0.22	0.22	1.01	0.85	0.29	0.34	0.33	0.3	0.3
Nitrate as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	0.25	<0.05
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-
Bromide	mg/L	<0.05	<0.05	<0.05	<0.05	-	-	-	-		-	-
Sulphate	mg/L	6.82	7.49	6.39	6.39	6.34	8.7	6.39	6.56	5.54	5.87	5.02
Ortho phosphate as P	mg/L	<0.10	<0.10	<0.10	<0.10	-	-	-	-	-	-	-
Ammonia as N	mg/L	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	0.08
Total Kjeldahl Nitrogen	mg/L	<0.10	<0.10	0.45	0.45	<0.10	0.33	<0.10	0.12	<0.10	-	-
Chemical Oxygen Demand	mg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dissolved Organic Carbon	mg/L	0.8	1.3	0.9	0.6	0.9	1	0.6	1.4	0.7	1.5	1.5
Phenols	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	-
Calcium	mg/L	4.84	4.5	5.19	5.19	4.16	5.04	4.86	5.09	4.18	5.19	5.63
Magnesium	mg/L	1.09	0.94	1.01	1.01	0.86	1	1.02	1.09	0.89	0.87	1.06
Sodium	mg/L	1.3	1.28	1.27	1.27	1.35	1.28	1.14	1.15	0.89	1.08	1.1
Potassium	mg/L	0.32	0.27	0.28	0.28	0.34	0.43	0.64	0.34	0.21	-	-
Tannins and Lignins	mg phenol/L	0.1	<0.1	<0.1	<0.1	-	-	-	-	-	-	-
Aluminum	mg/L	<0.004	<0.004	<0.004	<0.004	-	-	-	-	-	-	-
Antimony	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	-	-	-	-	-
Arsenic	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Barium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	0.008	<0.002	0.002	<0.002	<0.002	0.003
Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-
Boron	mg/L	< 0.010	<0.010	0.013	0.013	0.05	0.043	0.07	0.021	0.038	0.071	0.048
Cadmium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	-	-
Chromium	mg/L	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	-	-
Cobalt	mg/L	<0.001	<0.001	<0.001	<0.001	-	-	-	-	-	-	-
Copper	mg/L	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	-	-
Iron	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	0.116	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	-	-
Manganese	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	0.011	<0.002	<0.002	<0.002	-	-
Mercury	mg/L	-	-	-	-	-	-	<0.0001	<0.0001	<0.0002	-	-
Molybdenum	mg/L	<0.002	<0.002	<0.002	<0.002	-	-	-		-	-	-
Nickel	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	-		-	-	-
Selenium	mg/L	<0.004	<0.004	<0.004	<0.004	-	-	-		-	-	-
Silver	mg/L	<0.002	<0.002	4.07	4.07	-	-	-		-	-	-
Strontium	mg/L	0.011	0.011	<0.002	<0.002	-	-	-		-	-	-
Thallium	mg/L	<0.008	<0.008	0.011	0.011	-	-	-		-	-	-
Titanium	mg/L	<0.002	<0.002	<0.008	<0.008	-	-	-		-	-	-
Vanadium	mg/L	<0.002	<0.002	<0.002	<0.002	-	-	-		-	-	-
Zinc	mg/L	<0.005	<0.005	<0.002	<0.002	<0.005	0.007	<0.005	<0.005	<0.005	-	-
Field Measurements												
Temperature	C	-	-	-	-	4.74	4.71	5.81	5.25	8.58	8.18	6.24
pH	pH Units	-	-	-	-	5.58	6.89	6.46	7.32	6.04	6.65	5.58
Conductivity	uS/cm	-	-	-	-	22	-	41	103	21	34	30
Oxidation Reduction Potential	mV	-	-	-	-	74.3	255.3	66.3	12	81.1	34	-77.7
Dissolved Oxygen	mg/L	-	-	-	-	15.44	8.72	12.29	7.28	11.46	16.95	99.7

Parameter	8-May-19	25-Jul-19	25-Jul-19 (Dup)	23-Sep-19	11-Jun-20	25-Aug-20	29-Oct-20	3-Jun-21	6-Aug-21	6-Aug-21 (DUP)	21-Oct-21	25-May-22	3-Aug-22	27-Sep-22	30-May-23	1-Aug-23	18-Oct-23	15-May-24	23-Jul-24	16-Oct-24	ODWQS
Benzene	<0.50	-	-	-	<0.50	-	-	< 0.5	-	-	-	< 0.5	<0.5	-	< 0.5	-	-	< 0.5	-	-	1
Methylene Chloride	<2.0	-	-	-		-	-	< 0.5	-	-	-	< 0.5	-	-	-	-	-	-	-	-	50
Toluene	<0.50	-	-	-	<0.50	-	-	< 0.5	-	-	-	< 0.5	<0.5	-	< 0.5	-	-	< 0.5	-	-	60
Vinyl Chloride	<0.50	-	-	-	<0.50	-	-	< 0.2	-	-	-	< 0.2	<0.2	-	< 0.2	-	-	< 0.2	-	-	1
1,4-Dichlorobenzene	<0.50	-	-	-	<0.50	-	-	< 0.5	-	-	-	< 0.5	<0.5	-	< 0.5	-	-	< 0.5	-	-	5
pH	6.88	6.61	6.76	6.88	6.66	7.01	6.90	6.90	7.12	6.96	7.33	7.33	7.1	7.06	7.3	7.06	7.15	7.22	6.81	7.40	(6.5-8.5)
BOD	<3.0	<2.0	<2.0	<3.0	<2.0	<3.0	<3.0	< 4	<4	< 4	< 4	< 4	<4	< 4	< 4	< 4	< 4	< 4	< 4	4	-
Electrical Conductivity	46.8	38.9	40.8	42.4	39	38.8	42.4	36	36	34	42	41	39	39	40	48	59	63	66	73	-
Total Suspended Solids	40	39	39	42	27	28	27	< 30	78	71	55	< 30	<30	34	31	<30	34	40	< 30	51	-
Total Dissolved Solids	77.2	21.5	12.6	44.6	64.3	73.2	78.9	60	48	48	37	51	34	89	75	93	143	115	75	73	500
Alkalinity (as CaCO3)	10	12	12	11	13.1	<10	11	12	11	11	17	14	18	19	15	18	17	25	22	31	(30-500)
Total Hardness (as CaCO3)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(80-100)
Fluoride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
Chloride	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	< 1	<1	< 1	< 1	< 1	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	250
Nitrate as N	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.18	<0.06	< 0.03	< 0.03	< 0.06	<0.06	< 0.06	0.25	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	10
Nitrite as N	<0.010	<0.010	<0.010		<0.010	-	-	< 0.03	<0.03	< 0.06	< 0.06	< 0.03	-	-	< 0.03	< 0.03	-	< 0.03	-	-	1
Bromide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.00001	-	-	-
Sulphate	6.11	7.4	7.51	7.01	4.55	7.16	6.73	5	5	4	4	5	6	7	6	6	7	6	6	8	500
Ortho phosphate as P	-	-	-	-	-	-	-	-	-	-	-	< 0.03	-	-	-	-	-	-	-	-	-
Ammonia as N	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.04	<0.04	-	< 0.04	< 0.04	<0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.07	< 0.04	< 0.1	-
Total Kjeldahl Nitrogen	<0.15	<0.15	<0.15		<0.15			< 0.05	-	-	-	< 0.05	-	-	< 0.05	-	-	< 0.05	-	-	-
Chemical Oxygen Demand	<10	<10	<10	17	<10	<10	11	< 8	<8	< 8	< 8	< 8	<8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	-
Dissolved Organic Carbon	3.78	2.82	1.66	3.12	1.7	1.61	2.22	1	1	1	2	< 1	1	1	2	1	1	1	1	< 1	5
Phenols	<0.0010	0.0015	0.0013		<0.0010			< 0.002	-	-	-	< 0.002	-	-	< 0.002	-		0.003	-	-	-
Calcium	6.03	5.4	5.26	4.92	5.06	4.42	4.81	5.18	4.53	4.81	4.67	5.34	4.71	4.44	5.47	5.04	5.39	7.6	6.08	7.63	-
Magnesium	1.06	0.82	0.843	0.9	0.818	0.797	0.809	0.804	0.706	0.724	0.766	0.968	0.67	0.763	1.27	1.22	1.72	1.85	1.52	1.78	-
Sodium	1.21	0.92	0.93	1.08	1.02	0.99	1.34	1.12	0.98	0.97	1.110	1.29	1.11	0.880	1.47	1.31	1.51	1.47	1.46	1.43	20 (200)
Potassium	0.391	0.198	0.204	-	0.233	-	-	0.289	-	-	-	0.384	-	-	0.386	-	-	0.383	-	-	-
Tannins and Lignins	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
Antimony	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006
Arsenic	-	<0.00010	<0.00010	-	<0.00010	-	-	< 0.0002	-	-	-	< 0.0002	-	-	< 0.0002	-	-	< 0.0002	-	-	0.01
Barium	-	0.00039	0.00086	0.00084	0.00043	0.00078	0.00054	0.00087	0.00076	8E-04	0.00122	0.00589	0.00974	0.00438	0.00104	0.00048	0.00059	0.0006	0.00087	0.00088	1
Beryllium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 0.5	-	-	-
Boron	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.006	0.004	0.027	0.004	0.004	0.006	0.006	0.008	0.008	0.007	0.004	0.004	5
Cadmium	-	<0.000010	<0.000010	-	<0.0000050	-	-	-	-	-	-	< 0.000003	-	-	< 0.000003	-	-	0.000006	-	-	0.005
Chromium	-	0.00314	0.00289	-	0.00336	-	-	0.00418	-	-	-	0.00425	-	-	0.00146	-	-	0.00204	-	-	0.05
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	-	0.00039	0.00125	-	-	-	-	0.001	-	-	-	0.0007	-	-	0.0006	-	-	< 0.001	-	-	1
Iron	-	0.012	0.01	0.015	<0.010	-	<0.010	0.08	0.12	0.142	0.236	0.08	-	0.101	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	< 0.007	0.3
Lead	-	<0.000050	0.000068	-	<0.000050	-	-	< 0.00009	-	-	-	< 0.00009	-	-	< 0.00009	-	-	< 0.00009	-	-	0.01
Manganese	0.00052	<0.00050	<0.00050	-	<0.00050	-	-	0.00544	0.00827	0.009	0.0116	0.0035	-	0.0034	0.00129	-	-	0.0007	-	-	0.05
Mercury	<0.000010	-	-	-	<0.0000050	-	-	< 0.00001	-	-	-	< 0.00001	-	-	< 0.00001	-	-		-	-	0.001
Molybdenum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Silver	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	-	<0.0010	0.0029	-	<0.0010	-	-	0.005	-	-	-	< 0.002	-	-	0.003	-	-	< 0.002	-	-	5
Field Measurements																					
Temperature	4	11.8	-	8	6.2	9.2	4.15	11.2	10.2	-	9.8	8.7	8.5	7.5	8.3	8.5	8.2	8.3	6.7	7.2	-
pH	6.99	7.47	-	7.84	5.64	6.7	7.42	6.68	7.37	-	7.36	7.56	5.03	6.4	6.91	7.79	6.78	6.91	6.78	4.06	-
Conductivity	44.9	36.8	-	30	30.3	28	24	27.5	30.6	-	30	0.061	34.3	27.6	38.4	61.5	89.1	38.4	38	48.1	-
Oxidation Reduction Potential	82.4	136.3	-	197.9	372.1	331	-17.4	314.1	-67.4	-	-42.7	-63.3	165.1	243.4	17.4	-21.1	6.2	17.4	225.8	190.2	-
Dissolved Oxygen	8.73	11.89	-	10.77	7.87	10.66	10.25	7.86	10.43	-	9.89	8.05	11.81	5.56	15.3	7.89	9.34	19.3	22.85	10.25	-

Notes:
ODWQS — Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act, dated 2003, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2006
BOLD — Exceeds ODWQS Standard
RDL — Reporting Detection Limit
Units — All Units in mg/L Unless Otherwise Noted

TABLE 7
Groundwater Quality Results - MW6
McGarry Waste Disposal Site
Township of McGarry, Ontario

Parameter	Units	Sample Designation: MW6 — Sample Collection Date (dd/mmm/yy)																										ODWQS
		27-May-15	30-Jul-15	30-Sep-15	28-May-16	25-Oct-16	29-May-17	2-Nov-17	23-May-18	3-Aug-18	4-Oct-18	9-May-19	25-Jul-19	23-Sep-19	11-Jun-20	25-Aug-20	28-Oct-20	3-Jun-21	25-May-22	3-Aug-22	27-Sep-22	30-May-23	1-Aug-23	18-Oct-23	15-May-24	23-Jul-24	16-Oct-24	
Benzene	µg/L	DRY	DRY	DRY	Could not locate due to flooding.	Could not locate due to flooding.	Could not locate due to flooding.	Could not locate due to flooding.	Could not locate due to flooding.	Could not locate due to flooding.	Could not locate due to flooding.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	Could not locate.	1
Methylene Chloride	µg/L																											50
Toluene	µg/L																											60
Vinyl Chloride	µg/L																											1
1,4-Dichlorobenzene	µg/L																											5
pH	pH Units																											(6.5-8.5)
BOD	mg/L																											-
Electrical Conductivity	uS/cm																											-
Total Suspended Solids	mg/L																											-
Total Dissolved Solids	mg/L																											500
Alkalinity (as CaCO3)	mg/L																											(30-500)
Total Hardness (as CaCO3)	mg/L																											(80-100)
Fluoride	mg/L																											1.5
Chloride	mg/L																											250
Nitrate as N	mg/L																											10
Nitrite as N	mg/L																											1
Bromide	mg/L																											
Sulphate	mg/L																											500
Ortho phosphate as P	mg/L																											
Ammonia as N	mg/L																											
Total Kjeldahl Nitrogen	mg/L																											
Chemical Oxygen Demand	mg/L																											
Dissolved Organic Carbon	mg/L																											5
Phenols	mg/L																											
Calcium	mg/L																											
Magnesium	mg/L																											
Sodium	mg/L																											20 (200)
Potassium	mg/L																											
Tannins and Lignins	mg phenol/L																											
Aluminum	mg/L																											0.1
Antimony	mg/L																											0.006
Arsenic	mg/L																											0.01
Barium	mg/L																											1
Beryllium	mg/L																											
Boron	mg/L																											5
Cadmium	mg/L																											0.005
Chromium	mg/L																											0.05
Cobalt	mg/L																											
Copper	mg/L																											1
Iron	mg/L																											0.3
Lead	mg/L																											0.01
Manganese	mg/L																											0.05
Mercury	mg/L																											0.001
Molybdenum	mg/L																											
Nickel	mg/L																											
Selenium	mg/L																											0.01
Silver	mg/L																											
Strontium	mg/L																											
Thallium	mg/L																											
Titanium	mg/L																											
Vanadium	mg/L																											
Zinc	mg/L																											5
Field Measurements																												
Temperature	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Notes:
ODWQS — Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2003, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2006.
Exceeds ODWQS Standard
RDL — Reportable Detection Limit
Units — All Units in mg/L Unless Otherwise Noted.

TABLE [illegible]

Groundwater Quality Results - [illegible]

[illegible]

[illegible]

Parameter	Units	Sample Designation / Sample Collection Date (dd/mmm/yy)
Benzene	µg/L	[illegible]
Methylene Chloride	µg/L	[illegible]
Toluene	µg/L	[illegible]
Vinyl Chloride	µg/L	[illegible]
1,4-Dichlorobenzene	µg/L	[illegible]
pH	pH Units	[illegible]
BOD	mg/L	[illegible]
Specific Conductivity	uS/cm	[illegible]
Total Suspended Solids	mg/L	[illegible]
Total Dissolved Solids	mg/L	[illegible]
Alkalinity as CaCO3	mg/L	[illegible]
Total Hardness as CaCO3	mg/L	[illegible]
Fluoride	mg/L	[illegible]
Chloride	mg/L	[illegible]
Nitrate as N	mg/L	[illegible]
Nitrite as N	mg/L	[illegible]
Bromide	mg/L	[illegible]
Sulphate	mg/L	[illegible]
Ortho-phosphate as P	mg/L	[illegible]
Ammonia as N	mg/L	[illegible]
Total Kjeldahl Nitrogen	mg/L	[illegible]
Chemical Oxygen Demand	mg/L	[illegible]
Dissolved Organic Carbon	mg/L	[illegible]
Phenols	mg/L	[illegible]
Calcium	mg/L	[illegible]
Magnesium	mg/L	[illegible]
Sodium	mg/L	[illegible]
Potassium	mg/L	[illegible]
Tannins and Lignins	[illegible]	[illegible]
Aluminum	mg/L	[illegible]
[illegible]	mg/L	[illegible]
[illegible]	mg/L	[illegible]
[illegible]	mg/L	[illegible]
[illegible]	mg/L	[illegible]
Boron	mg/L	[illegible]
Cadmium	mg/L	[illegible]
Chromium	mg/L	[illegible]
Cobalt	mg/L	[illegible]
Copper	mg/L	[illegible]
Iron	mg/L	[illegible]
Lead	mg/L	[illegible]
Manganese	mg/L	[illegible]
Mercury	mg/L	[illegible]
[illegible]	mg/L	[illegible]
Nickel	mg/L	[illegible]
Selenium	mg/L	[illegible]
Silver	mg/L	[illegible]
Strontium	mg/L	[illegible]
Thallium	mg/L	[illegible]
[illegible]	mg/L	[illegible]
Vanadium	mg/L	[illegible]
Zinc	mg/L	[illegible]
Field Measurements		
Temperature	C	[illegible]
pH	pH Units	[illegible]
Conductivity	uS/cm	[illegible]
Oxidation Reduction Potential	mV	[illegible]
Dissolved Oxygen	mg/L	[illegible]

[illegible]

TABLE 9
Groundwater Quality Results - MW8
McGarry Waste Disposal Site
Township of McGarry, Ontario

Parameter	Units	Sample Designation																												ODWQS
		Sample Collection Date (dd/mmm/yy)																												
		MW8																												
		27-May-15	30-Jul-15	30-Sep-15	30-May-16	29-Oct-16	29-May-17	3-Nov-17	23-May-18	3-Aug-19	3-Aug-19 (dup)	4-Oct-19	4-Oct-19 (dup)	9-May-19	26-Jul-19	23-Sep-19	11-Jun-20	25-Aug-20	26-Oct-20	3-Jun-21	5-Aug-21	21-Oct-21	25-May-22	3-Aug-22	27-Sep-22	30-May-23	1-Aug-23	19-Oct-23	15-May-24	23-Jul-24	16-Oct-24	
Benzene	µg/L	-	<0.20	-	-	-	<0.20	<0.20	<0.20	-	-	-	-	<0.50	-	-		-	-	< 0.5	-	-	< 0.5	< 0.5	-	< 0.5	-	-	< 0.5	-	-	1
Methylene Chloride	µg/L	-	<0.30	-	-	-	<0.30	<0.30	<0.30	-	-	-	-	<2.0	-	-		-	-	< 0.5	-	-	< 0.5	-	-	-	-	-	-	-	-	50
Toluene	µg/L	-	<0.20	-	-	-	<0.20	<0.20	<0.20	-	-	-	-	<0.50	-	-		-	-	< 0.5	-	-	< 0.5	< 0.5	-	< 0.5	-	-	3	-	-	60
Vinyl Chloride	µg/L	-	<0.17	-	-	-	<0.17	<0.17	<0.17	-	-	-	-	<0.50	-	-		-	-	< 0.2	-	-	< 0.2	< 0.2	-	< 0.2	-	-	< 0.2	-	-	1
1,4-Dichlorobenzene	µg/L	-	<0.5	-	-	-	<0.5	<0.10	<0.10	-	-	-	-	<0.50	-	-		-	-	< 0.5	-	-	< 0.5	< 0.5	-	< 0.5	-	-	< 0.5	-	-	5
pH	pH Units	4.99	5.17	5.83	-	-	5.8	5.94	5.82	5.47	5.48	5.48	5.17	5.46	5.2	5.27		5.34	5.84	5.79	5.81	5.37	6.31	5.82	5.36	6.06	5.99	5.82	5.9	5.83	5.83	(6.5-8.5)
BOD	mg/L	-	-	-	-	-	<3	<3	<3	<3	<3	<3	<3	<2.0	<2.0	<3.0		<3.0	<3.0	< 4	<4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	-
Electrical Conductivity	uS/cm	17	25	19	-	-	21	21	20	40	50	22	22	36.2	18.3	21.1		20.4	31.1	19	18	44	21	19	33	22	25	28	18	18	34	-
Total Suspended Solids	mg/L	-	-	-	-	-	1650	1870	1100	4380	706	29	28	1480	29	36		20	36	< 30	81	56	40	< 30	< 30	< 30	<30	< 30	1070	43	34	-
Total Dissolved Solids	mg/L	32	26	<20	-	-	32	20	44	46	<20	200	189	39	128	107		153	145	135	<30	< 30	372	188	184	147	171	136	< 30	188	204	500
Alkalinity (as CaCO3)	mg/L	<5	5	<5	-	-	<5	<5	<5	6	5	<5	<5	<10	<10	<10		<10	<10	< 2	<2	6	3	6	< 2	2	< 2	2	2	< 2	2	(30-500)
Total Hardness (as CaCO3)	mg/L	3.3	4.2	5	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	(80-100)
Fluoride	mg/L	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5
Chloride	mg/L	0.19	0.27	<0.10	-	-	0.42	0.78	0.61	0.37	0.41	0.32	0.33	<0.50	<0.50	<0.50		<0.50	0.58	< 1	<1	< 1	0.57	0.42	1.95	0.79	1.75	0.92	0.48	0.62	2.81	250
Nitrate as N	mg/L	<0.05	0.07	0.46	-	-	0.48	0.22	0.19	0.36	0.31	0.81	0.81	0.932	0.383	0.789		0.672	0.647	0.99	0.78	< 0.03	0.57	0.42	1.95	0.79	1.75	0.92	0.48	0.62	2.81	10
Nitrite as N	mg/L	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	<0.05	-	-	-	-	<0.010	<0.010	-		-	-	< 0.03	<0.03	0.06	< 0.03	-	-	< 0.03	< 0.03	-	< 0.03	-	-	1
Bromide	mg/L	<0.05	<0.05	<0.05	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	< 0.00001	-	-	-
Sulphate	mg/L	2.39	3.81	4.3	-	-	2.86	2.83	3.62	5.8	4.64	3.33	3.49	7.46	3.82	3.46		3.76	5.32	3	3	4	4	3	5	3	2	3	4	4	< 2	500
Ortho phosphate as P	mg/L	<0.10	<0.10	<0.10	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	< 0.03	-	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	<0.02	1.15	0.42	-	-	<0.02	<0.02	0.10	0.80	3.99	0.09	0.09	0.02	<0.010	0.02		<0.010	<0.010	< 0.04	<0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	0.04	0.05	0.05	< 0.04	< 0.1	-
Total Kjeldahl Nitrogen	mg/L	0.19	3.82	1.86	-	-	0.36	1.66	0.33	-	-	-	-	0.28	0.33	-		-	-	< 0.05	-	-	0.1	-	-	0.41	-	-	0.16	-	-	-
Chemical Oxygen Demand	mg/L	18	120	39	-	-	20	19	27	25	68	<5	<5	136	17	26		25	60	< 8	9	19	12	< 8	< 8	15	18	< 8	12	12	< 8	-
Dissolved Organic Carbon	mg/L	16.9	5	6.3	-	-	6.2	11.4	8.6	6.7	14.3	2.8	2.5	4.16	3.15	3.16		3.32	6.23	3	3	3	4	3	4	4	2	3	3	3	2	5
Phenols	mg/L	<0.001	0.014	0.002	-	-	<0.001	<0.001	0.001	-	-	-	-	<0.0010	0.0014	-		-	-	< 0.002	-	-	< 0.002	-	-	< 0.002	-	-	< 0.002	-	-	-
Calcium	mg/L	0.9	1.11	1.37	-	-	1.06	1.23	0.71	0.32	0.4	1.38	1.34	0.874	1.06	1.2		0.949	0.826	1.34	1.16	1.11	0.88	1.34	1.89	1.12	1.53	1.11	0.91	1.17	2.09	-
Magnesium	mg/L	0.25	0.35	0.39	-	-	0.36	0.54	0.15	0.06	<0.05	0.41	0.42	0.31	0.31	0.36		0.34	0.37	0.40	0.33	0.360	0.299	0.323	0.482	0.36	0.488	0.362	0.34	0.387	0.728	-
Sodium	mg/L	0.75	0.84	0.86	-	-	0.75	0.85	2.21	0.15	10.20	1.53	1.27	3.43	0.96	1.23		2.30	4.81	1.09	1.17	1.44	2.30	1.62	1.82	1.42	1.09	1.85	1.85	1.12	1.34	20 (200)
Potassium	mg/L	0.09	0.14	0.15	-	-	0.09	0.25	<0.05	-	-	-	-	0.07	<0.050	-		-	-	0.34	-	-	0.04	-	-	0.30	-	-	0.07	-	-	-
Tannins and Lignins	mg phenol	1.5	5.3	3.6	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	mg/L	0.374	0.273	0.422	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
Antimony	mg/L	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006
Arsenic	mg/L	<0.003	<0.003	<0.003	-	-	<0.003	<0.003	<0.003	-	-	-	-	-	0.0002	-		-	-	< 0.0002	-	-	0.0002	-	-	< 0.0002	-	-	< 0.0002	-	-	0.01
Barium	mg/L	0.007	0.007	0.01	-	-	0.007	0.01	0.01	<0.002	<0.002	0.01	0.01	-	0.01	0.01		0.01	0.01	0.01	0.01	0.00882	0.01710	0.01480	0.02080	0.01	0.0127	0.0130	0.01	0.0150	0.0257	1
Beryllium	mg/L	<0.001	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	< 0.5	-	-	-
Boron	mg/L	<0.010	<0.010	<0.010	-	-	0.012	<0.010	0.01	0.01	<0.010	<0.010	<0.010	-	-	<0.010		<0.010	0.01	0.004	0.004	0.012	0.005	0.012	0.004	0.005	0.002	0.026	0.003	< 0.002	< 0.002	5
Cadmium	mg/L	<0.002	<0.002	<0.002	-	-	<0.002	<0.002	<0.002	-	-	-	-	-	0.00002	-		-	-	-	-	-	0.00001	-	-	0.00002	-	-	0.00001	-	-	0.005
Chromium	mg/L	<0.003	<0.003	<0.003	-	-	<0.003	<0.003	<0.003	-	-	-	-	-	0.00052	-		-	-	0.00059	-	-	0.00066	-	-	0.00047	-	-	0.00052	-	-	0.05
Cobalt	mg/L	<0.001	0.001	0.001	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/L	<0.003	<0.003	<0.003	-	-	<0.003	<0.003	<0.003	-	-	-	-	-	0.00083	-		-	-	0.00180	-	-	0.00080	-	-	0.00150	-	-	< 0.001	-	-	1
Iron	mg/L	0.111	0.299	0.318	-	-	<0.010	0.16	0.07	0.25	0.23	<0.310	<0.310	-	0.04	0.04		-	0.12	0.04	0.03	0.025	0.054	0.053	0.026	0.02	0.014	0.044	0.04	0.011	0.010	0.3
Lead	mg/L	<0.002	<0.002	<0.002	-	-	<0.002	<0.002	<0.001	-	-	-	-	-	0.0001	-		-	-	0.0001	-	-	< 0.00008	-	-	< 0.00008	-	-	< 0.00008	-	-	0.01
Manganese	mg/L	0.039	0.079	0.057	-	-	0.029	0.034	0.013	-	-	-	-	0.0147	0.0167	-		-	-	0.0177	0.0168	0.0168	0.0128	-	0.0275	0.0181	-	-	0.0129	-	-	0.05
Mercury	mg/L	-	-	-	-	-	<0.0001	<0.0001	<0.0002	-	-	-	-	<0.000010	-	-		-	-	< 0.00001	-	-	< 0.00001	-	-	< 0.00001	-	-	-	-	-	0.001
Molybdenum	mg/L	<0.002	<0.002	<0.002	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	<0.003	<0.003	<0.003	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	<0.004	<0.004	<0.004	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.01
Silver	mg/L	<0.002	<0.002	4	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	0.007	0.011	<0.002	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	<0.008	<0.008	0.011	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	<0.002	0.004	<0.006	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	<0.002	<0.002	0.009	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	0.005	0.011	<0.002	-	-	0.008	<0.005	<0.005	-	-	-	-	-	0.0017	-		-	-	0.0080	-	-	< 0.002	-	-	0.0110	-	-	< 0.002	-	-	5
Field Measurements																																
Temperature	C	-	-	-	-	-	4.16	4.82	5.14	11.16	11.16	5.63	5.63	1	10.4	11.8	-	10.6	7.43	8.1	14.1	10.1	6.9	12.1	11.4	8.2	10.8	9.2	5.6	12	8.9	-
pH	pH Units	-	-	-	-	-	4.66	5.82	6.23	5.1	5.1	4.54	4.54	5.41	5.5	4.73	-	4.9	5.65	4.82	4.69	5.71	5.86	6.38	6.04	6.81	4.57	6.04	5.93	5.5	7.13	-
Conductivity	uS/cm	-	-	-	-	-	23	20	57	25	25	17	17	18	18.6	18.8	-	21.3	21	13.4	6.4	17	0.043	28	31.8	17.8	19.8	18.8	18.3	17.2	26	-
Oxidation Reduction Potential	mV	-	-	-	-	-	186.8	27.5	34.6	116.7	116.7	-66.2	-66.2	226.5	236.9	179.6	-	286.7	226.1	308.5	125.1	150.9	145.5	141.3	231.3	5.1	10.26	122.3	73.4	92.9	30.2	-
Dissolved Oxygen	mg/L	-	-	-	-	-	9.23	7.3	11.09	14.62	14.62	83.1	83.1	15.02	8.38	7.02	-	9.45	16.11	10.86	7.41	33.3	8.54	6.59	8.46	10.1	264.7	11.65	15.18	11.34	15.58	-

Notes:
ODWQS — Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2003, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2006
BOLD — Exceeds ODWQS Standard
RDL — Reportable Detection Limit
Units — All Units in mg/L Unless Otherwise Noted

TABLE 18
2024 Reasonable Use Criteria Assessment
McGarry Waste Disposal Site
Township of McGarry, Ontario

Parameter	Units	Sample Designation / Sample Collection Date (dd/mmm/yy)												ODWQS	Guideline B-7 Calculation: Cm = Cb + x (Cr - Cb)			
		MW3			MW5			MW7			MW9				Cb	x	Cr	Cm
		15-May-24	23-Jul-24	16-Oct-24	15-May-24	23-Jul-24	16-Oct-24	15-May-24	23-Jul-24	16-Oct-24	15-May-24	23-Jul-24	16-Oct-24					
Benzene	µg/L	< 0.5	-	-	< 0.5	-	-	< 0.5	-	-	< 0.5	-	-	1	0.152	0.25	1	0.364
Methylene Chloride	µg/L	-	-	-	-	-	-	-	-	-	-	-	-	50	0.207	0.25	50	12.7
Toluene	µg/L	< 0.5	-	-	< 0.5	-	-	< 0.5	-	-	3	-	-	60	0.152	0.5	60	30.1
Vinyl Chloride	µg/L	< 0.2	-	-	< 0.2	-	-	< 0.2	-	-	< 0.2	-	-	1	0.108	0.25	1	0.331
1,4-Dichlorobenzene	µg/L	< 0.5	-	-	< 0.5	-	-	< 0.5	-	-	< 0.5	-	-	5	0.104	0.25	5	1.33
pH	pH Units	6.68	6.32	6.61	7.22	6.81	7.40	6.95	6.67	7.24	5.9	5.63	6.83	(6.5-8.5)	6.63	0.5	(6.5-8.5	6.6 - 7.6
BOD	mg/L	< 4	< 4	< 4	< 4	< 4	4	< 4	< 4	< 4	< 4	< 4	< 4	-	2.02	-	-	-
Electrical Conductivity	uS/cm	21	26	25	53	55	73	48	52	61	19	16	34	-	29.1	-	-	-
Total Dissolved Solids	mg/L	< 30	40	< 30	40	< 30	51	< 30	< 30	49	< 30	43	34	500	136	0.5	500	318
Total Suspended Solids	mg/L	820	674	439	115	75	73	10	4	6	1070	169	204	-	48,978.8	-	-	-
Alkalinity (as CaCO3)	mg/L	7	7	9	26	22	31	24	27	31	2	< 2	2	(30-500)	12.2	0.5	(30-500	NC
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	(80-100)	9.29	0.5	(80-100	45 - 55
Fluoride	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	1.5	0.025	0.25	1.5	0.394
Chloride	mg/L	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	250	0.665	0.5	250	125
Nitrate as N	mg/L	0.14	0.10	0.12	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.46	0.62	2.81	10	0.026	0.25	10	2.52
Nitrite as N	mg/L	< 0.03	-	-	< 0.03	-	-	< 0.03	-	-	< 0.03	-	-	1	0.018	0.25	1	0.26
Bromide	mg/L	< 0.00001	-	-	< 0.00001	-	-	< 0.00001	-	-	< 0.00001	-	-	-	0.025	-	-	-
Sulphate	mg/L	2	3	2	5	5	9	< 2	< 2	< 2	4	4	< 2	500	4.47	0.5	500	252
Ortho phosphate as P	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.157	-	-	-
Ammonia as N	mg/L	< 0.04	< 0.04	< 0.1	0.07	< 0.04	< 0.1	< 0.04	< 0.04	< 0.1	0.05	< 0.04	< 0.1	-	0.028	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.07	-	-	< 0.05	-	-	< 0.05	-	-	0.18	-	-	-	0.105	-	-	-
Chemical Oxygen Demand	mg/L	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	12	12	< 8	-	6.95	-	-	-
Dissolved Organic Carbon	mg/L	2	1	< 1	1	1	< 1	1	1	< 1	3	3	2	5	1.30	0.5	5	3.15
Phenols	mg/L	0.003	-	-	0.003	-	-	0.003	-	-	< 0.002	-	-	-	0.001	-	-	-
Calcium	mg/L	2.46	2.19	2.07	7.6	5.68	7.63	8.39	7.76	9.22	0.91	1.17	2.09	-	2.65	-	-	-
Magnesium	mg/L	0.533	0.483	0.411	1.65	1.52	1.78	1.31	1.19	1.37	0.34	0.397	0.726	-	0.688	-	-	-
Sodium	mg/L	0.98	1.11	1.12	1.47	1.46	1.43	1	0.85	0.97	1.95	1.12	1.34	20 (200)	1.39	0.5	20 (200	11 (101)
Potassium	mg/L	0.716	-	-	0.392	-	-	0.085	-	-	0.07	-	-	-	0.389	-	-	-
Tannins and Lignins	mg phenol/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.114	-	-	-
Aluminum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.009	0.25	0.1	0.032
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.006	0.002	0.5	0.006	0.004
Arsenic	mg/L	< 0.0002	-	-	< 0.0002	-	-	< 0.0002	-	-	< 0.0002	-	-	0.01	0.001	0.25	0.01	0.003
Barium	mg/L	0.0107	0.01060	0.0106	0.0006	0.00067	0.00065	0.00174	0.00171	0.00271	0.01	0.0150	0.0257	1	0.002	0.25	1	0.251
Beryllium	mg/L	< 0.5	-	-	< 0.5	-	-	< 0.5	-	-	< 0.5	-	-	-	0.001	-	-	-
Boron	mg/L	< 0.002	0.015	0.003	0.007	0.004	0.004	0.005	0.005	0.009	0.003	< 0.002	< 0.002	5	0.004	0.25	5	1.25
Cadmium	mg/L	0.000006	-	-	0.000005	-	-	0.000005	-	-	0.00001	-	-	0.005	0.0002	0.25	0.005	0.0014
Chromium	mg/L	0.00042	-	-	0.00204	-	-	0.00024	-	-	0.00062	-	-	0.05	0.001	0.25	0.05	0.013
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Copper	mg/L	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	< 0.001	-	-	1	0.002	0.5	1	0.50
Iron	mg/L	< 0.007	0.020	< 0.007	< 0.007	< 0.007	< 0.007	0.019	0.14	0.336	0.04	0.011	0.010	0.3	0.020	0.5	0.3	0.16
Lead	mg/L	< 0.00009	-	-	< 0.00009	-	-	< 0.00009	-	-	< 0.00009	-	-	0.01	0.001	0.25	0.01	0.0029
Manganese	mg/L	0.0233	-	-	0.0007	-	-	0.0677	-	-	0.0129	-	-	0.05	0.002	0.5	0.05	0.026
Mercury	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.001	0.00002	0.25	0.001	0.00025
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Nickel	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.002	-	-	-
Selenium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.002	0.5	0.01	0.006
Silver	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.017	-	-	-
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.007	-	-	-
Thallium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006	-	-	-
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001	-	-	-
Zinc	mg/L	< 0.002	-	-	< 0.002	-	-	< 0.002	-	-	< 0.002	-	-	5	0.002	0.5	5	2.50

Notes:
ODWQS — Ontario Drinking Water Quality Standards - Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2003, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003
GCLB — Ministry Guideline B-7 (On - MW1)
Units — All Units in mg/L Unless Otherwise Noted
Cb — Background Concentration (Maximum of groundwater quality observed at MW1 since May 2018)
Cr — Maximum Acceptable Contaminant Concentration (ODWQS)
x — Reduction Constant
Cm — Maximum Off-Site Acceptable Contaminant Concentration based on background groundwater quality assumed to be represented by MW1
NC — Cm is Non-Calculable as the Cb value exceeds the Cr value (i.e. the ODWQS)

TABLE 11
Surface Water Quality Results - Ditch
McGarry Waste Disposal Site
Township of McGarry, Ontario

Sample Designation
Sample Collection Date (dd/mmm/yy)
Ditch (17 U 000798 m E, 5332168 m N)

Parameter	Units	27-May-15	30-Jul-15	30-Sep-15	26-May-16	26-Oct-16	29-May-17	2-Nov-17	23-May-18	3-Aug-18	4-Oct-18	9-May-19	25-Jul-19	23-Sep-19	11-Jun-20
pH	pH Units	6.06			6.40		6.28					5.62		5.63	6.55
BOD	mg/L				-		<5					<2.0		7.6	7.1
Electrical Conductivity	uS/cm	17			20		16					10.8		43.4	61
Total Dissolved Solids	mg/L	34			36		30					16		98	63
Total Suspended Solids	mg/L				-		<10					4.1		26.6	17.7
Alkalinity (as CaCO3)	mg/L	<5			7		5					<10		14	26.8
Total Hardness (as CaCO3)	mg/L	5.1			-		-					-		-	-
Fluoride	mg/L	<0.06			-		-					-		-	-
Chloride	mg/L	0.2			-		5					<0.50		0.59	<0.50
Nitrate as N	mg/L	<0.05			<0.05		0.14					<0.020		0.021	<0.020
Nitrite as N	mg/L	<0.06			<0.05		<0.05					<0.010		<0.010	<0.010
Bromide	mg/L	<0.06			-		<0.05					-		-	-
Sulphate	mg/L	1.28			1.84		1.83					1.59		<0.30	<0.30
Ortho phosphate as P	mg/L	<0.10			-		-					-		-	-
Ammonia as N	mg/L	<0.02			0.09		<0.02					0.022		0.04	0.089
Total Kjeldahl Nitrogen	mg/L	1.06			0.93		0.41					0.38		3.85	1.87
Total Phosphorous	mg/L	-			0.30		0.03					0.0187		0.443	3.88
Chemical Oxygen Demand	mg/L	33			24		23					25		168	61
Dissolved Organic Carbon	mg/L	11.2			-		-					7.37		-	-
Phenols	mg/L	<0.001			<0.001		<0.001					<0.0010		0.0387	0.0626
Calcium	mg/L	1.28			-		-					-		-	-
Magnesium	mg/L	0.48			-		-					-		-	-
Sodium	mg/L	0.46			-		-					-		-	-
Potassium	mg/L	0.81	NO DATA	NO DATA	-	DRY	-	DRY	DRY	DRY	DRY	-	DRY	-	-
Tannins and Lignins	mg phenol/L	1.7			-		-					-		-	-
Aluminum	mg/L	0.122			-		-					-		-	-
Antimony	mg/L	<0.003			-		-					-		-	-
Arsenic	mg/L	<0.003			<0.003		<0.003					0.00029		-	0.00622
Barium	mg/L	0.003			0.003		0.004					0.00201			0.00527
Beryllium	mg/L	<0.001			-		-					-		-	
Boron	mg/L	<0.010			0.054		<0.010					<0.010			<0.010
Cadmium	mg/L	<0.002			0.0001		0.0001					0.000039		-	0.0000619
Chromium	mg/L	<0.003			<0.003		<0.003					0.00052		-	0.00165
Cobalt	mg/L	<0.001			-		-					-		-	
Copper	mg/L	<0.003			<0.002		<0.002					0.0013		-	0.0179
Iron	mg/L	0.209			0.175		<0.010					0.056		17.1	2.65
Lead	mg/L	0.005			<0.001		<0.001					0.00031		-	0.000486
Manganese	mg/L	0.11			-		-					0.029		-	-
Molybdenum	mg/L	<0.002			-		-					-		-	-
Nickel	mg/L	<0.003			-		-					-		-	-
Selenium	mg/L	<0.004			-		-					-		-	-
Silver	mg/L	<0.002			-		-					-		-	-
Strontium	mg/L	<0.005			-		-					-		-	-
Thallium	mg/L	<0.006			-		-					-		-	-
Titanium	mg/L	<0.002			-		-					-		-	-
Vanadium	mg/L	<0.002			-		-					-		-	-
Zinc	mg/L	0.016			0.015		0.015					0.0108		-	0.037
Field Measurements															
Temperature	C	-	-	-	12.80	-	11.30	-	-	-	-	0.20	-	15.70	14.30
pH	pH Units	-	-	-	5.30	-	6.06	-	-	-	-	5.82	-	4.87	6.08
Conductivity	uS/cm	-	-	-	102	-	11	-	-	-	-	7.9	-	37.3	68.4
Oxidation Reduction Potential	mV	-	-	-	102.5	-	188.7	-	-	-	-	169.5	-	181.1	364.7
Dissolved Oxygen	mg/L	-	-	-	6.77	-	9.48	-	-	-	-	12.42	-	2.01	3.82

Parameter	25-Aug-20	26-Oct-20	3-Jun-21	5-Aug-21	25-May-22	3-Aug-22	27-Sep-22	30-May-23	1-Aug-23	18-Oct-23	15-May-24	23-Jul-24	16-Oct-24	PWQO	APV	CWQG
pH		6.74			6.73	6.06	5.63	5.84	6.12	5.99	6.27	5.82		6.5 - 8.5	6.5 - 8.5	6.0 - 9.0
BOD		<3.0			4	< 4	< 4	< 4	18	< 4	18	< 4		-	-	-
Electrical Conductivity		15.6			20	21	14	16	25	17	18	16		-	-	-
Total Dissolved Solids		25			87	< 30	60	43	<30	< 30	< 30	60		-	-	-
Total Suspended Solids		<3.0			3	20	< 2	3	62	5	17	6		-	-	-
Alkalinity (as CaCO3)		<10			8	6	< 2	2	4	4	3	2		-	-	-
Total Hardness (as CaCO3)		-			-	7	6	-	5.1	7.3	-	5.6		-	-	-
Fluoride		-			-	-	-	-	-	-	-	-		-	-	-
Chloride		<0.50			< 1	< 1	< 1	< 1	1	< 1	< 1	< 1		-	180	120
Nitrate as N		0.043			< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	0.22	< 0.06	< 0.06		-	-	2.9
Nitrite as N		<0.010			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		-	-	0.06
Bromide		-			-	-	-	-	-	-	-	-				
Sulphate		1.71			< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2		-	100	-
Ortho phosphate as P		-			-	-	-	-	-	-	-	-		-	-	-
Ammonia as N		0.118			< 0.04	0.04	< 0.04	0.04	0.06	< 0.04	0.04	0.04		-	-	-
Total Kjeldahl Nitrogen		0.62			0.67	0.83	0.71	0.5	1.09	0.87	0.45	0.89		-	-	-
Total Phosphorous		0.0286			0.061	0.231	0.036	0.049	0.246	0.047	-	0.061		0.03	-	-
Chemical Oxygen Demand		42			42	37	54	50	69	36	33	57		-	-	-
Dissolved Organic Carbon		-			-	-	-	-	-	-	-	-		-	-	-
Phenols		0.0043			0.001	0.004	0.012	0.001	0.005	0.003	0.004	0.003		0.001	0.04	0.004
Calcium		-			-	2.02	1.51	-	1.26	1.79	-	1.04		-	-	-
Magnesium		-			-	0.472	0.538	-	0.466	0.696	-	0.733		-	-	-
Sodium		-			-	1.26	0.26	-	0.76	0.32	-	0.51		-	-	-
Potassium	Dry	-	DRY	DRY	-	-	-	-	-	-	-	-	DRY	-	-	-
Tannins and Lignins		-			-	-	-	-	-	-	-	-		-	-	-
Aluminum		-			-	-	-	-	-	-	-	-		-	-	-
Antimony		-			-	-	-	-	-	-	-	-		-	-	-
Arsenic		-			0.0011	-	-	0.0005	-	-	0.0003	-		0.1	0.15	-
Barium		-			0.00334	-	-	0.00296	-	-	0.00263	-		-	2.3	-
Beryllium		-				-	-		-	-	-	-		-	-	-
Boron		-			0.003	-	-	0.003	-	-	0.003	-		0.2	3.55	1.5
Cadmium		-			0.000116	-	-	0.000114	-	-	0.000124	-		0.0002	0.00021	1.700E-05
Chromium		-			0.00209	-	-	0.00083	-	-	0.00084	-		-	0.064	-
Cobalt		-			-	-	-	-	-	-	-	-				
Copper		-			0.0033	-	-	0.0019	-	-	0.002	-		0.005	0.0069	-
Iron		0.297			0.839	0.771	0.906	0.169	2.39	1.15	0.143	1.09		0.3	1	-
Lead		-			0.00023	-		0.00013	-	-	0.00011	-		0.005	0.002	-
Manganese		-			-	-	0.242	-	-	-	-	-		-	-	-
Molybdenum		-			-	-	-	-	-	-	-	-		-	-	-
Nickel		-			-	-	-	-	-	-	-	-		-	-	-
Selenium		-			-	-	-	-	-	-	-	-		-	-	-
Silver		-			-	-	-	-	-	-	-	-		-	-	-
Strontium		-			-	-	-	-	-	-	-	-		-	-	-
Thallium		-			-	-	-	-	-	-	-	-		-	-	-
Titanium		-			-	-	-	-	-	-	-	-		-	-	-
Vanadium		-			-	-	-	-	-	-	-	-		-	-	-
Zinc		-			0.026	-	-	0.016	-	-	0.017	-		0.03	-	-
Field Measurements																
Temperature	-	3.75	-	-	8.60	11.00	10.80	23.90	23.40	7.50	10.00	15.40	-	-	-	-
pH	-	6.35	-	-	6.2	5.56	4.86	6	5.69	5.24	5.04	6.29	-	-	-	-
Conductivity	-	10	-	-	0.04	19.6	11.8	18.1	15.8	14.5	10.7	17.4	-	-	-	-
Oxidation Reduction Potential	-	277.3	-	-	170.71	168.6	270.6	135	251.8	213.8	171.7	209.5	-	-	-	-
Dissolved Oxygen	-	11.01			2.24	2.14	4.63	3.3	6.34	10.4	8.27	3.06		-	-	-

Notes:
PWQO — Provincial Water Quality Objectives - "Water Management Policies Guidelines Provincial Water Quality Objectives", dated July 1994, revised February 1999
APV — Aquatic Protection Values
CWQG — Canadian Water Quality Guidelines
Exceeds PWQO
Exceeds APV
Exceeds CWQG
RDL — Reportable Detection Limit
Units — All Units in mg/L Unless Otherwise Noted

TABLE 12

Surface Water Quality Results - Pond

McCarty Waste Disposal Site

Township of McCarty, Ontario

Parameter	Units	R.D.L.	Sample Designation																PWQO	APV	CWQG
			Sample Collection Date (dd/mm/yy)																		
			Pond (17 U 0416883 m E, 5332341 m N)																		
			23-May-18	4-Oct-18	9-May-19	25-Jul-19	23-Sep-19	3-Jun-21	5-Aug-21	25-May-22	3-Aug-22	27-Sep-22	30-May-23	1-Aug-23	16-Oct-23	15-May-24	23-Jul-24	16-Oct-24			
pH	pH Units	NA	8.6	8.74	Could not locate, no sample	7.6	8.08	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	6.5 - 8.5	6.5 - 9.5	6.5 - 9.0
BOD	mg/L	5	<5	<5		<3.0	3.9												-	-	-
Electrical Conductivity	uS/cm	2	16	5		413	101												-	-	-
Total Dissolved Solids	mg/L	20	38	28		303	86												-	-	-
Total Suspended Solids	mg/L		<10	173		21	10												-	-	-
Alkalinity (as CaCO3)	mg/L	5	<5	<5		186	52												-	-	-
Total Hardness (as CaCO3)	mg/L	0.5	-	-		-	-												-	-	-
Fluoride	mg/L	0.05	-	-		-	-												-	-	-
Chloride	mg/L	0.1	0.23	1.47		13.7	<0.50												-	190	120
Nitrate as N	mg/L	0.05	<0.05	<0.05		<0.020	<0.020												-	-	2.9
Nitrite as N	mg/L	0.05	<0.05	<0.05		<0.010	<0.010												-	-	0.06
Bromide	mg/L	0.05	-	-		-	-														
Sulphate	mg/L	0.1	1.78	0.46		23	0.38												-	100	-
Ortho phosphate as P	mg/L	0.1	-	-		-	-												-	-	-
Ammonia as N	mg/L	0.02	<0.02	<0.02		0.087	<0.010												-	-	-
Total Kjeldahl Nitrogen	mg/L	0.1	0.41	0.18		1.48	0.9												-	-	-
Total Phosphorous	mg/L	0.02	0.1	0.22		0.131	0.0446												0.03	-	-
Chemical Oxygen Demand	mg/L	5	21	<5		83	46												-	-	-
Dissolved Organic Carbon	mg/L	0.5	-	-		-													-	-	-
Phenols	mg/L	0.001	0.004	0.002		0.004	<0.0010												0.001	0.04	0.004
Calcium	mg/L	0.05	-	-		-													-	-	-
Magnesium	mg/L	0.05	-	-		-													-	-	-
Sodium	mg/L	0.05	-	-		-													-	-	-
Potassium	mg/L	0.05	-	-		-	-												-	-	-
Tanning and Lignins	mg phenol/L	0.1	-	-		-	-												-	-	-
Aluminum	mg/L	0.004	-	-		-	-												-	-	-
Antimony	mg/L	0.003	-	-		-	-												-	-	-
Arsenic	mg/L	0.003	<0.003	-		-	-												0.1	0.15	-
Barium	mg/L	0.002	0.005	-		-	-												-	2.3	-
Beryllium	mg/L	0.001	-	-		-	-												-	-	-
Boron	mg/L	0.01	<0.010	-		-													0.2	3.85	1.5
Cadmium	mg/L	0.002	0.0021	-		-	-												0.0002	0.00021	0.000017
Chromium	mg/L	0.003	<0.003	-		-	-												-	0.064	-
Cobalt	mg/L	0.001	-	-		-	-														
Copper	mg/L	0.003	<0.002	-		-	-												0.005	0.0068	-
Iron	mg/L	0.01	0.099	1.01		1.46	0.081												0.3	1	-
Lead	mg/L	0.002	<0.001	-		-	-												0.005	0.002	-
Manganese	mg/L	0.002	-	-		-	-												-	-	-
Molybdenum	mg/L	0.002	-	-		-	-												-	-	-
Nickel	mg/L	0.003	-	-		-	-												-	-	-
Selenium	mg/L	0.004	-	-		-	-												-	-	-
Silver	mg/L	0.002	-	-		-	-												-	-	-
Strontium	mg/L	0.005	-	-		-	-												-	-	-
Thallium	mg/L	0.005	-	-		-	-												-	-	-
Titanium	mg/L	0.002	-	-		-	-												-	-	-
Vanadium	mg/L	0.002	-	-		-	-												-	-	-
Zinc	mg/L	0.005	0.008	-		-	-												0.03	-	-
Field Measurements																					
Temperature	C	-	16.35	8.98	-	25.6	16.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-
pH	pH Units	-	5.19	6.04	-	7.72	8.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	uS/cm	-	13	5	-	494.1	98.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxidation Reduction Potential	mV	-	115.3	-101.3	-	167.1	183.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	-	8.93	70.8	-	1.79	8.36	-	-	-	-	-	-	-	-	-	-	-	-	-	-

[illegible]

PWQO [illegible]

APV [illegible]

CWQG [illegible]

[illegible]

[illegible]

[illegible]

NA [illegible]

NA [illegible]

- [illegible]

TABLE 13
Surface Water Quality Results - SW1
McGarry Waste Disposal Site
Township of McGarry, Ontario

Parameter	Units	Sample Designation																							PWQO	APV	CWQG
		Sample Collection Date (dd/mmm/yy)																									
		SW1 (17U 609654 m E 5332801 m N)																									
		25-Oct-16	29-May-17	2-Nov-17	23-May-18	3-Aug-18	4-Oct-18	4-Oct-18 (dup)	9-May-19	25-Jul-19	23-Sep-19	11-Jun-20	25-Aug-20	29-Oct-20	3-Jun-21	#####	#####	#####	#####	27-Sep-22	30-May-23	1-Aug-23	18-Oct-23	15-May-24	23-Jul-24	16-Oct-24			
pH	pH Units	6.78	6.38	4.77	6.15	6.35	6.23	6.06	5.45	6.73	6.02	4.82	6.54	4.72	6.51	6.34	6.60	6.4	6.44	6.23	6.32	7.10	5.95	6.26	6.84	6.41	6.5 - 8.5	6.5 - 8.5	6.0 - 9.0
BOD	mg/L		<5	<5	<5	<5	<5	<5	<2.0	<3.0	<3.0	2.1	<3.0	<3.0	< 4	<4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	4	< 4	-	-	-
Electrical Conductivity	uS/cm	82	87	51	82	49	54	54	45.8	116	153	19.9	94.7	28.1	80	56	62	79	54	58	83	136	50	51	52	54	-	-	-
Total Dissolved Solids	mg/L	78	64	58	66	70	122	120	39	110	137	42	64	64	77	80	97	97	49	64	63	149	37	37	80	66	-	-	-
Total Suspended Solids	mg/L		<10	<10	<10	31	28	21	<2.0	15.2	<2.0	11.9	12.7	3.4	4	38	4	2	2	2	12	39	< 2	6	3	2	-	-	-
Alkalinity (as CaCO3)	mg/L	35	5	<5	6	5	8	7	<10	16	<10	<2.0	20	-	4	3	5	4	4	4	2	26	3	3	7	4	-	-	-
Total Hardness (as CaCO3)	mg/L	14.7		-	-	-	-	-	-	-	-	-	-	-	-	8.6	8.7	-	6.2	8.0	-	31.4	7.7	-	12.0	9.8	-	-	-
Fluoride	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/L	-	19.6	9.07	18.9	5.64	2.9	2.92	9.75	24.3	36.3	<0.50	15.8	<0.50		17	13	23	13	15	24	30	12	13	15	16	-	180	128
Nitrate as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.031	0.041	0.04	<0.020	0.063	<0.020	0.06	<0.06	< 0.03	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	< 0.06	-	-	2.9
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.03	<0.03	< 0.06	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	-	-	0.06
Bromide	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Sulphate	mg/L	3.6	3.72	3.11	4.2	1.43	3.03	3.05	3.18	4.97	3.96	0.34	1.38	1.46	< 2	<2	< 20	< 2	< 2	< 2	3	< 2	< 2	2	< 2	< 2	-	100	-
Ortho phosphate as P	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia as N	mg/L	<0.02	<0.02	<0.02	<0.02	0.21	<0.02	<0.02	<0.010	0.116	0.04	<0.010	0.2	0.01	< 0.04	<0.04	0.04	< 0.04	0.06	< 0.04	0.06	0.18	< 0.04	< 0.04	0.11	< 0.1	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.56	0.24	0.56	0.19	0.76	1.06	1.17	0.17	0.58	0.58	<1.5	1.1	<0.50		0.44	0.35	0.19	0.45	0.39	0.27	0.58	0.43	0.24	0.55	0.29	-	-	-
Total Phosphorous	mg/L	<0.02	<0.02	0.02	0.04	0.04	0.06	0.1	0.0051	0.0236	0.0158	0.0239		0.0121		0.006	0.019	0.012	0.121	0.020	0.009	0.041	0.011	0.013	0.025	0.009	0.03	-	-
Chemical Oxygen Demand	mg/L	30	28	31	9	-	107	108	20	50	53	118	67	89	31	43	35	19	37	41	21	49	33	20	41	34	-	-	-
Dissolved Organic Carbon	mg/L	-		-	-	-	-	-	8.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenols	mg/L	<0.001	<0.001	<0.001	0.001	0.002	0.002	0.002	0.0034	0.0048	<0.0010	0.0057	0.004	<0.0050	0.001	0.003	0.002	< 0.001	0.001	0.002	< 0.001	< 0.001	0.001	0.002	0.002	0.002	0.001	0.04	0.004
Calcium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	2.47	2.47	-	2.32	2.21	-	9.25	2.03	-	3.20	2.75	-	-	-
Magnesium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	0.586	0.619	-	0.585	0.603	-	2.01	0.835	-	0.96	0.725	-	-	-
Sodium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	8.47	7.57	-	8.98	9.84	-	15.7	7.61	-	7.8	9.30	-	-	-
Potassium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tannins and Lignins	mg phenol/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	-	0.0004	-	-	0.00209	-	-	0.0013	0.001	-	0.001	-	-	0.0006	-	-	0.0005	-	-	0.1	0.15	-
Barium	mg/L	0.007	0.007	0.005	0.007	-	-	-	0.00356	-		0.00509	-	-	0.00766	0.008	-	0.006	-	-	0.00519	-	-	0.00411	-	-	-	2.3	-
Beryllium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron	mg/L	<0.010	<0.010	<0.010	0.04	-	-	-	<0.010	-		<0.010	-	-	0.004	-	-	0.002	-	-	0.003	-	-	< 0.002	-	-	0.2	3.55	1.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	-	-	-	0.000035	-	-	0.00005	-	-	-	-	-	4E-05	-	-	0.000037	-	-	0.000031	-	-	0.0002	0.00021	0.000017
Chromium	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	-	<0.00050	-	-	0.002	-	-	0.0015	-	-	0.001	-	-	0.0008	-	-	0.00089	-	-	-	0.064	-
Cobalt	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Copper	mg/L	0.003	0.002	0.003	0.002	-	-	-	0.0018	-	-	0.0015	-	-	0.0035	-	-	#####	-	-	0.0025	-	-	0.0020	-	-	0.005	0.0069	-
Iron	mg/L	0.497	0.168	0.634	0.203	2.42	1.8	1.69	0.171	3.1	1.66	1.17	-	0.991	0.987	1.08	0.949	0.842	0.884	0.744	0.348	4.17	0.486	0.322	1.99	0.448	0.3	1	-
Lead	mg/L	<0.001	<0.001	<0.001	<0.001	-	-	-	0.00017	-	-	0.00107	-	-	0.00046	-	-	5E-04	-	-	0.00031	-	-	0.00027	-	-	0.005	0.002	-
Manganese	mg/L	-		-	-	-	-	-	0.0234	-	-	-	-	-	-	0.023	#####	-	-	0.0138	-	-	-	-	-	-	-	-	-
Molybdenum	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selenium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	mg/L	0.01	0.009	0.01	<0.005	-	-	-	0.0048	-	-	0.0063	-	-	0.009	-	-	0.006	-	-	0.005	-	-	0.006	-	-	0.03	-	-
Field Measurements																													
Temperature	C	3.55	14.48	4.22	17.04	16.47	8.94	8.94	0.7	21.4	14.8	15.8	15.4	5.66	20	18.1	16.1	14.8	17.8	11.4	23.2	17.9	7.7	12.8	15.3	6.5	-	-	-
pH	pH Units	6.22	5.87	6.2	5.11	5.85	5.53	5.53	4.95	6.77	5.24	7.3	5.25	4.27	6.17	4.99	5.09	5.78	7.61	5.22	6.1	6.73	5.55	5.83	6.09	6.03	-	-	-
Conductivity	uS/cm	75	57	60	67	33	38	38	24.5	116.8	178.3	62.8	77.3	13	80	53.9	0.07	0.067	67	34.5	87.9	124	33.7	45.3	48.6	41.4	-	-	-
Oxidation Reduction Potential	mV	267.8	148.7	217	164.3	177.3	-134	-134	101	213.1	181.4	330	269.6	250.4	200.2	172.5	182.7	100.6	34.2	212.8	77.8	166.9	157.1	147.5	127.7	226	-	-	-
Dissolved Oxygen	mg/L	6.22	9.07	7.93	6.35	7.4	60.3	60.3	13.26	8.92	4.64	6.9	1.76	17.29	5.61	4.73	65.8	7.59	6.26	5.47	5.22	3.49	11.36	11.59	7.39	17.05	-	-	-

Notes:

PWQO — Provincial Water Quality Objectives - "Water Management Policies Guidelines Provincial Water Quality Objectives", dated July 1994, revised February 1999

APV — Aquatic Protection Values

CWQG — Canadian Water Quality Guidelines

Exceeds PWQO

Exceeds APV

Exceeds CWQG

RDL — Reportable Detection Limit

NA — Not Applicable - Criteria evaluated as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.

Units — All Units in mg/L Unless Otherwise Noted.

TABLE 14
Surface Water Quality Results - SW2
McGarry Waste Disposal Site
Township of McGarry, Ontario

Parameter	Units	Sample Designation Sample Collection Date (dd/mmm/yy) SW2 (17U [illegible] m E 5332341 m N)																								PWQO	APV	CWQG
		25-Oct-16	29-May-17	2-Nov-17	23-May-18	3-Aug-18	4-Oct-18	9-May-19	25-Jul-19	23-Sep-19	11-Jun-20	25-Aug-20	29-Oct-20	3-Jun-21	5-Aug-21	21-Oct-21	25-May-22	3-Aug-22	27-Sep-22	30-May-23	1-Aug-23	18-Oct-23	15-May-24	23-Jul-24	16-Oct-24			
pH	pH Units	5.89	6.60	6.28	5.83	6.96	6.09	6.2	6.66	6.53	6.4	6.6	6.17	7.09	6.62	6.63	6.82	7.09	6.25	6.01	NO SAMPLE	6.37	7.3	7.24	6.71	6.5 - 8.5	6.5 - 8.5	6.0 - 9.0
BOD	mg/L		<5	<5	<5	25	<5	<2.0	<3.0	7.3	2.2	<3.0	<3.0	< 4	<4	< 4	< 4	< 4	< 4	< 4		< 4	< 4	< 4	< 4	-	-	-
Electrical Conductivity	uS/cm	67	61	58	64	152	67	16.1	152	144	60	48.8	54.3	120	77	78	83	95	54	13		54	65	86	63	-	-	-
Total Dissolved Solids	mg/L	72	84	62	62	110	66	35	120	126	42	55	55	91	83	109	80	80	68	40		34	37	131	60	-	-	-
Total Suspended Solids	mg/L		<10	<10	<10	84	14	40.8	3.3	7.5	5.7	9	<3.0	16	134	13	37	28	3	110		3	3	6	6	-	-	-
Alkalinity (as CaCO3)	mg/L	<5	5	<5	<5	16	<5	<10	15	16	5.8	<10	<10	13	7	8	5	41	4	< 2		5	30	14	6	-	-	-
Total Hardness (as CaCO3)	mg/L	12.2		-	-	-	-	-	-	-	-	-	-	-	14	12.1	-	40.5	8.6	-		10.4	-	22.4	11.9	-	-	-
Fluoride	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Chloride	mg/L	-	16.7	10.4	19.4	27.5	18.9	<0.50	36.5	28	8.27	6.02	9.28		19	17	24	5	13	< 1		14	4	22	16	-	180	128
Nitrate as N	mg/L	<0.05	<0.05	0.08	<0.05	<0.05	0.15	0.024	0.061	0.027	0.035	0.094	0.076	< 0.06	<0.06	< 0.03	< 0.06	0.48	< 0.06	< 0.06		< 0.06	< 0.06	0.06	< 0.06	-	-	2.9
Nitrite as N	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	< 0.03	<0.03	< 0.06	< 0.03	< 0.03	< 0.03	< 0.03		< 0.03	< 0.03	< 0.03	< 0.03	-	-	0.06
Bromide	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-			
Sulphate	mg/L	3.78	3.49	2.99	3.9	2	2.34	2.48	5.27	4.66	2	0.9	3.01	< 2	<20	< 20	< 2	< 2	< 2	< 2		< 2	< 2	< 2	< 2	-	100	-
Ortho phosphate as P	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Ammonia as N	mg/L	<0.02	<0.02	<0.02	<0.02	0.09	<0.02	0.012	0.042	0.018	0.029	0.055	<0.010	< 0.04	<0.04	0.04	< 0.04	0.05	< 0.04	0.07		< 0.04	< 0.04	0.08	< 0.1	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.54	0.24	1.17	0.27	1.82	0.6	0.29	0.45	1.34	0.92	1.11	0.41	-	0.31	0.42	0.23	0.62	0.38	0.5		0.60	0.39	0.48	0.35	-	-	-
Total Phosphorous	mg/L	0.03	<0.02	0.05	0.04	0.1	0.03	0.0459	0.0362	0.08	0.0392		0.0132	-	0.042	0.080	0.015	0.116	0.013	0.03		0.015	0.02	0.027	0.015	0.03	-	-
Chemical Oxygen Demand	mg/L	36	28	54	11	-	38	47	45	64	42	57	38	33	42	30	11	30	40	33		30	28	28	33	-	-	-
Dissolved Organic Carbon	mg/L	-		-	-	-	-	15.2	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Phenols	mg/L	<0.001	<0.001	<0.001	0.001	0.002	0.003	0.0027	0.0063	<0.0010	0.0091	0.0052	0.0018	< 0.001	<0.001	0.002	< 0.001	0.002	0.002	< 0.001		0.002	0.003	0.003	< 0.001	0.001	0.04	0.004
Calcium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	3.91	3.39	-	10.80	2.34	-		2.89	-	6.03	3.24	-	-	-
Magnesium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	1.04	0.882	-	3.420	0.680	-		0.894	-	1.79	0.914	-	-	-
Sodium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	9.47	10.4	-	5.5	7.8	-		7.64	-	12.3	9.25	-	-	-
Potassium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Tannins and Lignins	mg phenol/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Aluminum	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Antimony	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Arsenic	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	0.0007	-	-	0.00117	-	-	0.0017	-	-	0.0009	-	-	0.0005		-	0.0006	-	-	0.1	0.15	-
Barium	mg/L	0.009	0.008	0.008	0.007	-	-	0.00612	-		0.00731	-	-	0.0136	-	-	0.0055	-	-	0.00145		-	0.00705	-	-	-	2.3	-
Beryllium	mg/L	-		-	-	-	-	-	-	-		-	-	-	-	-	-	-	-			-	-	-	-	-	-	-
Boron	mg/L	<0.010	<0.010	<0.010	0.021	-	-	<0.010	-	-	<0.010	-	-	0.006	-	-	0.002	-	-	0.003		-	< 0.002	-	-	0.2	3.55	1.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	-	-	0.000068	-	-	0.0000439	-	-		-	-	0.000036	-	-	0.000077		-	0.000024	-	-	0.0002	0.00021	0.000017
Chromium	mg/L	<0.003	<0.003	<0.003	<0.003	-	-	0.00289	-	-	0.00151	-	-	0.00161	-	-	0.00092	-	-	0.00113		-	0.00132	-	-	-	0.064	-
Cobalt	mg/L	-		-	-	-	-	-	-	-		-	-		-	-	-	-	-			-	-	-	-			
Copper	mg/L	0.003	<0.002	0.002	0.002	-	-	0.0021	-	-	0.0024	-	-	0.0036	-	-	0.0022	-	-	0.0023		-	0.002	-	-	0.005	0.0069	-
Iron	mg/L	0.577	0.278	0.616	0.304	2.07	0.636	0.806	1.05	1.04	0.876	-	0.546	1.29	1.52	1.33	0.43	1.18	0.79	0.067		0.847	0.367	1.3	0.553	0.3	1	-
Lead	mg/L	<0.001	<0.001	<0.001	<0.001	-	-	0.00137	-	-	0.000434	-	-	0.00058	-	-	0.00032	-	-	0.00022		-	0.00017	-	-	0.005	0.002	-
Manganese	mg/L	-		-	-	-	-	0.00808	-	-	-	-	-	-	0.0552	0.101	-	-	0.017	-		-	-	-	-	-	-	-
Molybdenum	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Nickel	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Selenium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Silver	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Strontium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Thallium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Titanium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Vanadium	mg/L	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-
Zinc	mg/L	0.017	0.008	0.01	<0.005	-	-	0.0072	-	-	0.008	-	-	0.009	-	-	0.006	-	-	0.011		-	0.003	-	-	0.03	-	-
Field Measurements																												
Temperature	C	3.64	12.98	4.11	17.87	18.58	10.8	0.5	15.4	17.1	16.5	17.6	4.98	16.4	17.2	16.5	11.6	17.4	11.4	14.6	-	8.9	11.7	15.3	8.1	-	-	-
pH	pH Units	6.3	6.22	6.35	5.32	6.15	5.94	5.39	6.83	6.4	7.54	5.29	5.64	6.78	5.83	6.62	5.78	6.38	5.48	5.61	-	7.91	6.09	6.30	6.87	-	-	-
Conductivity	uS/cm	69	82	80	74	118	89	8.5	142.7	136.7	50.9	43.7	35	118.3	86.2	0.065	0.099	85.5	41.7	34.1	-	38	53	78	45.8	-	-	-
Oxidation Reduction Potential	mV	259.4	127.1	204	153.5	174.3	-104	260	209.5	-6.7	321.2	316.6	297.7	190	190	101.3	164	56.9	195	21.2	-	170.4	149.8	176	164.6	-	-	-
Dissolved Oxygen	mg/L	10.82	9.52	7.83	10.41	2.35	101.4	11.83	6.52	5.1	7.77	4.82	19.06	2.82	4.52	63.6	7.56	6.18	5.73	12.1	-	12.23	12.1	6.83	12.86	-	-	-

Notes:

PWQO	Provincial Water Quality Objectives - "Water Management Policies Guidelines Provincial Water Quality Objectives", dated July 1994, revised February 1999
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
BOLD	Exceeds PWQO
Italic	Exceeds APV
Underline	Exceeds CWQG
RDL	Reportable Detection Limit
NA	Not Applicable - Criteria excluded as the parameter is based on operational guidelines (OG) as defined as Operational Guidelines for filtration processes are performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.
Units	All Units in mg/L Unless Otherwise Noted.

APPENDIX V

Photographic Log

	MW1
	MW1

MW2

MW2

MW3

MW3

	**MW4**
	**MW4**

MW5

MW5

	**MW7**
	**MW7**

MW8

MW8