

# 10 (j)



# 2023 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

March 11, 2024

Pinchin File: 304108.002



**Issued to:** Township of McGarry  
**issued on:** March 11, 2024  
**Pinchin file:** 304108.002  
**Issuing Office:** Sudbury, ON  
**Primary Pinchin Contact:** Meagan Bradley, B.A.

---

**Author:** Meagan Bradley, B.A.  
Project Manager  
705.521.0560  
[mbradley@pinchin.com](mailto:mbradley@pinchin.com)

**Reviewer:** Tim McBride, B.Sc., P.Geo., QP<sub>ESA</sub>  
Practice Specialist – Hydrogeology  
Director, Northern Ontario  
705.521.0560  
[tmcbride@pinchin.com](mailto:tmcbride@pinchin.com)



**TABLE OF CONTENTS**

1.0	INTRODUCTION.....	1
1.1	Location.....	1
1.1.1	Site Survey and Aerial Photography.....	1
1.2	Ownership and Key Personnel.....	1
1.3	Description and Development of the Site.....	2
1.4	Site Document Review.....	3
1.5	Monitoring and Reporting Program Objectives and Requirements.....	5
1.6	Assumptions and Limitations.....	5
2.0	PHYSICAL SETTING.....	7
2.1	Geology and Hydrogeology.....	7
2.2	Surface Water Features.....	7
3.0	HISTORICAL DOCUMENT REVIEW.....	8
4.0	METHODOLOGY.....	17
4.1	Scope of Work.....	17
4.2	Groundwater Monitoring Well Locations.....	19
4.3	Surface Water Monitoring Locations.....	20
4.4	Monitoring Frequency.....	21
4.5	Monitoring Parameters.....	21
4.5.1	Groundwater Monitoring Parameters.....	21
4.5.2	Surface Water Monitoring Parameters.....	22
4.6	Monitoring Procedures and Methods.....	22
4.6.1	Standard Operating Procedures.....	22
4.6.2	Groundwater Monitoring Activities.....	22
4.6.3	Surface Water Monitoring Activities.....	23
4.6.4	Groundwater and Surface Water Field Measurements.....	24
4.6.5	Record Keeping and Field Notes.....	25
4.7	Quality Assurance for Sampling and Analysis.....	26
4.8	Data Quality Evaluation.....	27
5.0	ASSESSMENT, INTERPRETATION, AND DISCUSSION.....	28
5.1	Groundwater Quality Monitoring.....	28
5.1.1	The Ontario Drinking Water Quality Standards (ODWQS).....	28
5.1.2	The Reasonable Use Criteria Assessment (RUC).....	29
5.2	Groundwater Results.....	30
5.2.1	Background Water Quality Evaluation.....	31
5.2.2	Leachate Source Quality Evaluation.....	31
5.2.3	Cross Gradient Water Quality Evaluation.....	32
5.2.4	Trigger Well Water Quality Evaluation.....	33
5.3	Groundwater Field Measurement Results.....	33
5.4	Surface Water Quality Monitoring.....	33
5.4.1	The Provincial Water Quality Objectives (PWQO).....	33
5.4.2	Aquatic Protection Values (APV).....	34
5.4.3	Canadian Water Quality Guidelines (CWQG).....	34
5.5	Surface Water Results.....	34
5.6	Surface Water Field Measurement Results.....	35
5.7	Groundwater Flow Interpretation.....	36



5.8	Leachate Characterization .....	36
5.9	Contamination Attenuation Zone .....	37
5.10	Adequacy of the Monitoring Program .....	37
5.11	Monitoring Well Network Efficiency .....	37
	5.11.1 Background Monitoring Well Efficiency .....	38
5.12	Supplemental Monitoring: Sediment, Benthic and/or Toxicity Monitoring .....	38
5.13	Assessment of the Need for Implementation of Contingency Measures .....	38
5.14	Waste Disposal Site Gas Impacts .....	38
5.15	Effectiveness of Engineered Controls .....	38
5.16	Controls System Monitoring .....	38
5.17	QA/QC Results .....	39
6.0	CONCLUSIONS .....	40
7.0	RECOMMENDATIONS .....	42
8.0	MONITORING AND SCREENING CHECKLIST .....	42
9.0	DISCLAIMER .....	42

## APPENDICES

APPENDIX I	Figures
APPENDIX II	Certificate of Approval
APPENDIX III	Borehole Logs
APPENDIX IV	Summary Tables
APPENDIX V	Photographic Log
APPENDIX VI	Laboratory Certificates of Analysis
APPENDIX VII	MECP Checklist



## FIGURES

Figure 1	Key Map
Figure 2	Surface and Groundwater Sampling Locations
Figure 3	Inferred Groundwater Contour Plan – Spring 2023
Figure 4	Inferred Groundwater Contour Plan – Summer 2023
Figure 5	Inferred Groundwater Contour Plan – Fall 2023

## TABLES

Table 1	Groundwater Monitoring Location Data
Table 2	Groundwater Quality Results – MW1
Table 3	Groundwater Quality Results – MW2
Table 4	Groundwater Quality Results – MW3
Table 5	Groundwater Quality Results – MW4
Table 6	Groundwater Quality Results – MW5
Table 7	Groundwater Quality Results – MW6
Table 8	Groundwater Quality Results – MW7
Table 9	Groundwater Quality Results – MW8
Table 10	2023 Reasonable Use Criteria Assessment
Table 11	Surface Water Quality Results – Ditch
Table 12	Surface Water Quality Results – Pond
Table 13	Surface Water Quality Results – SW1
Table 14	Surface Water Quality Results – SW2



## 1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by the Township of McGarry (Client) to conduct the 2023 Annual Monitoring Program for the McGarry Waste Disposal Site (Site) property 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 2023 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 2023. 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 1983). Landfill coordinates were obtained from Google Earth.

The Site is located approximately 4 kilometres (km) east of Virginiatown, Ontario, along the Quebec and Ontario border. Access to the Site is by 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 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 Township of McGarry. The 2023 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<sub>ESA</sub>  
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 was prepared by Heathwood Engineering Associated Limited. The Site is operated under Provisional Certificate of Approval (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 as an action item a request that the Township update their Site Plan and their Operational and Maintenance Plan. The inspection report indicated that these requests had been made previously. In 1998 or early 1999, the Township retained Hatch to update their Site Design and Operations Plan (D&O Plan). The final Site Design and Operations Plan was issued on August 12, 1999. It is Pinchin's understanding that the Hatch 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 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 interpretation, it was recommended that the Township investigate mitigation measures, including expanding the CAZ with additional downgradient lands and to replace 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 MW-1 with MW-8 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 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. As a result, the work completed 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 2016 to 2020 Annual Monitoring Programs and Reports;
- Completion of a monitoring well elevation survey;
- Completion of a Design and Operations 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, 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, 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, dated August 12, 1999 (the 1999 Hatch Design and Operations 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, 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, 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, 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, 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 Lefrancois, 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, 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, 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, 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, dated March 22, 2022 (the 2021 Pinchin Monitoring Report); and
- Report entitled "2022 Annual Monitoring Report, McGarry Waste Disposal Site, Township of McGarry, Ontario" prepared for the Township of McGarry by Pinchin, dated February 27, 2023 (the 2022 Pinchin Monitoring Report).

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 Ministry of Environment and Climate Change (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) and was limited to the immediate area surrounding the Site. 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 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 the glacier. The quaternary geology of the Site is mapped as 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 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. The landfill area is located in the drainage area of a tributary to Milky Creek. Pit development and sand extraction has resulted in a flat, level site 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 and silty sand. Borehole logs depicting the soil 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. In addition, 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 end of the Site. Based on field observations conducted in 1998, direct off-site surface water drainage into the Milky Creek drainage area was not located. The surface waters that collect in the low-lying area are likely re-infiltrating into the groundwater at the Site.

Based on the 1999 Hatch Design and Operations Plan, a surface water ditch was excavated in the spring of 1999 to drain standing water from the western toe to the west.

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 was required 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 the surface water monitoring program in 2017 to include upstream and downstream locations within Milky Creek, located west of the Site. These sampling locations were included in the sampling events going forward.

### **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 Design and Operations Plan, the 2013 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 2022 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 Design and Operations 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 Operation and Maintenance Manual was to include a groundwater monitoring program for the Site.

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 of groundwater samples and submission for chemical testing including metals, anions and general chemistry parameters. Submission of a sample of leachate impacted groundwater for volatile organic compounds (VOC) analysis;
- Collection of surface water sample of runoff from the Site and submission for chemical testing, including 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 flows toward the middle of the Site, from the north and south and is inferred to flow westward from there towards Milky Creek.

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

#### The 1999 Hatch Design and Operations Plan

The 1999 Hatch Design and Operations Plan was completed to update the Site Design and Operations Plan published for the Site on January 4, 1999. In particular, the report provided a revised site capacity estimate which equated to approximately 19 years. In addition, the 1999 Hatch Design and Operations Plan noted a waste fill area located at the left when entering 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.

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;
- Although the impacted wells are within the established attenuation zone area of the landfill, it does not acknowledge that some wells are located immediately adjacent to the site boundary. The downgradient wells MW2 and MW7 are impacted by leachate. Based on the proximity of these wells to the site boundary, the leachate is migrating beyond the established attenuation zone area of the landfill;
- Based on off-Site leachate impacts, Thomas Guo recommended that the proponent needs to immediately investigate mitigation options. 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 should include a plan for achieving compliance in the next annual monitoring report;
- The consultant is asked to 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 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 consisted of measuring and sampling groundwater from seven (7) previously installed monitoring wells on Site. 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 show a general declining trend in most of the tested parameters in recent years. In addition, the concentrations of these parameters in the boundary wells are much lower and fairly stable indicating that attenuation is taking place within the landfill boundaries;
- In 2014, groundwater quality at all down-gradient 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 has ensured that the concentrations of these metals are reduced to acceptable levels as groundwater exits the property;
- Background groundwater quality at MW1 indicates stable trends with generally low parameter concentrations, but concentrations of pH, alkalinity and hardness continue to fall below the Ontario Drinking Water Quality Standards (ODWQS). This was correlated to naturally occurring up-gradient sources of organic nitrogen, decaying organic matter and lack of naturally occurring carbonate minerals;
- Monitoring well MW8 was installed on August 5, 2014, to replace monitoring well MW6 that was observed to be dry on multiple sampling events. Several RUC exceedances occurred in MW8 including organic nitrogen, pH, DOC, aluminum, iron and manganese;
- Most of the monitoring wells, except leachate well MW4, showed levels of pH below the acceptable range of values for the Site and concentrations of organic nitrogen slightly higher than the RUC allowable limits. This was noted to be a reflection of groundwater quality entering the Site which does not meet the ODWQS for these parameters;
- Previous investigations included the sampling for VOCs during the summer sampling event; however, no VOCs were sampled during the 2014 sampling program;
- 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 tend 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 are more likely due to the influence of





landfill leachate. In addition, exceedances of the RUC allowable limit for organic nitrogen are likely the result of impact from leachate and the presence of some local influences;

- The leachate impacted wells are within the established attenuation zone area of the landfill, and present results do not suggest the site is operating outside the originally proposed design objectives as a natural attenuation site; and
- A surface water sample was collected twice from the ditch located near MW3. Previous investigations noted PWQO exceedances at this location for various metals. It was noted that surface water samples are 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 metals 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 has been established to flow northwest north and MW1 is located close to the site boundary northeast of the site, replacing this well with a new well (MW8) is recommended in the future events; and
- It was recommended that the monitoring and sampling program continue to be conducted in spring, summer and fall.

In summary, the 2014 A&A Monitoring Report noted that the Site is having only a slight impact on downgradient water quality. Although groundwater impairment is evident at the leachate source well MW4, which indicates higher values for conductivity, TDS and dissolved constituents, the natural attenuation and buffering capacity of the soil has been sufficient to restore the groundwater quality to near background levels at the downgradient boundary.

Furthermore, 2014 A&A Report indicated that the 2014 results suggest that the Site is still operating within the originally proposed design objectives as a natural attenuation site, and additional lands should be acquired in order to provide 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 measuring and sampling groundwater from seven previously installed monitoring wells on Site, as well as the collection of surface water samples from the "ditch".



Based on the 2015 results obtained from the existing groundwater monitoring wells, Pinchin did not identify any significant landfill related impacts at the Site. Concentrations of pH, alkalinity and total hardness observed at downgradient monitoring locations MW2 and MW7 were reported to be likely 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 observed at the leachate monitoring well MW4 and the newly installed background well MW8 (located southeast of the Site) appeared to be attenuating within close proximity to the Site as concentrations of such parameters were observed to be below the ODWQS at monitors MW1, MW2, MW3, MW5 and MW7.

In 2015, elevated concentrations of DOC, aluminum and lead were observed at the surface water sampling location "ditch" during the spring 2015 sampling event. This surface water sampling location is located within the landfill confines. Considering there was no downgradient surface water sampling location established at the Site, it was Pinchin's opinion that there was inconclusive evidence to suggest significant concentrations of landfill related contaminants were being observed at 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 cause 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;
- Pinchin recommends completing an elevation survey 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 2013 Thomas Guo Memo, further investigation is required regarding the elevated concentrations of metals observed at the surface water sampling location. Pinchin recommends establishing an up gradient and downgradient surface water sampling locations to identify potential downgradient surface water impacts; and
- It is Pinchin's opinion that the monitoring frequency should be reduced to twice annually (early spring and late fall).

#### The 2016 Pinchin Monitoring Report

Based on the results of the 2016 Pinchin Monitoring Report, it was concluded that the historical groundwater quality data observed during previous investigations at MW8 appeared to identify leachate impacted groundwater at this location. This was reportedly likely due to its close proximity to the waste area or a radial groundwater flow pattern at the Site. However, groundwater quality south of the Site at MW8 was not assessed during the 2016 monitoring program. As such, Pinchin recommended locating monitoring well MW8 or replacing it in a new location to help delineate potential impacts migrating south of the Site.

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 within close proximity of the waste area. However, Pinchin recommended that future groundwater elevation measurements are collected to accurately determine the groundwater flow direction and help 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 2013 Thomas Guo Memo, further investigation is 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;



- Pinchin recommended completing a monitoring well elevation survey in the spring of 2017 to confirm the groundwater flow direction at the Site and ensure the inclusion of monitoring well MW8; and
- It was Pinchin's opinion that the monitoring frequency should remain reduced to 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 Design and Operations 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 available capacity remaining at 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 is completed every 20 years to re-evaluate the operations, environmental impact and life expectancy of the Site at that time.

#### The 2018 MECP Memo

Based on the information provided in the Environmental Peer Review and Operations Evaluation report and the 2015 and 2016 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 and ensure 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 revise the waste capacity of the site. Consideration should also be given to conduct a waste capacity assessment at the site.

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

It was also recommended that the Site be reviewed by an MECP surface water specialist as further investigation is required regarding elevated metal concentrations.

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

Based on Pinchin's review of the analytical data set collected throughout 2017 to 2022, monitoring wells MW1, MW2, MW3, MW5 and MW7 were not being influenced by landfilling activities. It appeared that landfill leachate is naturally attenuating within close 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 and MW7. Further investigation is required to confirm or refute the presence of potential landfill leachate migrating south of the Site in the vicinity of MW8. All exceedances of the RUC Guideline B-7 are 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 surface water impacts are not occurring at the downstream surface water receptors.

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 cause 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;
- The monitoring frequency should consist of tri-annual sampling, spring (May-June), mid-summer (August-September) and late fall (October-November) 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; and



- Groundwater quality south of the Site was assessed during the 2017 to 2022 monitoring programs. During the monitoring events, MW8 was observed to be in good condition and installed/repared in accordance with O.Reg. 903. It is recommended that this monitoring location continue to be sampled during future monitoring events.

#### 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 2023 Annual Monitoring Report has been developed based on an assessment of the ODWQS, MECP Guideline B-7, PWQO, APV and CWQG and will meet the minimum reporting requirements specified in the site-specific CofA and MECP Landfill Standards. It should be noted that contrary to previous monitoring programs completed at the Site, the 2017 Monitoring Programs only included two monitoring events completed by Pinchin on May 20 (spring) and November 2 (fall), 2017. It should also be noted that during the 2018 through 2023 monitoring events, all of the groundwater and surface water locations were monitored in the spring, summer and fall.

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 2023 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 and 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 and 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 2023 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

Eight overburden groundwater monitoring wells (MW1 through MW8) have historically been utilized at the Site intended to serve as reference points for retrieving water quality across the landfill:

- Monitoring well MW1 was installed in June 1999 and located along the northeast boundary of the Site. MW1 was intended to represent background groundwater quality;
- Monitoring well MW2 was installed in June 1999 and located along the north boundary of the Site. MW2 was intended to represent upgradient groundwater quality;
- Monitoring well MW3 was installed in June 1999 and located along the west portion of the Site. MW3 was intended to represent downgradient groundwater quality;
- Monitoring well MW4 was installed in June 1999 and located centrally within the waste fill area of the Site. MW4 was intended to represent "worst-case" leachate groundwater quality;
- Monitoring well MW5 was installed on May 22, 2004, and is located within the central-east portion of the Site. MW5 was intended to represent cross-gradient groundwater quality;
- Monitoring well MW6 was installed on May 22, 2004, and was reportedly located along the south boundary of the Site. MW6 was intended to represent downgradient groundwater quality. Monitoring well MW6 has not been located for several monitoring periods and is assumed to have been destroyed;
- Monitoring well MW7 was installed on May 22, 2004, and is located along the northwest boundary of the Site. MW7 was intended to represent downgradient groundwater quality; and
- Monitoring well MW8 was installed on August 5, 2014, and is located along the south boundary of the Site. MW8 was intended to represent background groundwater quality as a replacement monitoring well for MW6 (which was routinely observed to be dry). However, several exceedances of the ODWQS and Guideline B-7 have been quantified at this location; further monitoring is required to determine if MW8 is impacted by landfill leachate migrating south of the Site. Pinchin was retained to repair monitoring well MW8 in accordance with O.Reg 903 during the spring 2018 monitoring event..

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 2023 monitoring period. The condition of each of the groundwater monitoring well locations was inspected at the time of each of the 2023 sampling events. 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 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 would serve as an effect barrier to vertical migration or preferential pathway for water infiltration. 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 2023 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 from the Site, in particular the ponded water observed south of the Site and the ditch area during the spring monitoring event, 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. However, monitoring stagnant water conditions presents challenges with respect to the interpretations of trends as stagnant water is often not representative of the 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.

As part of the 2023 Annual Monitoring Program, Pinchin continued the surface water evaluation which included the surface water sampling locations established in 2016. These locations included the upstream (SW1) and downstream (SW2) monitoring locations, as well as the “ditch” and “pond” locations. It should be noted that SW2 was not sampled by Pinchin during the summer sampling event due to an error in the field program.

The following provides a summary of the surface water sample locations included in the 2023 monitoring program:

- Surface water sample “Ditch” is located in the vicinity of MW3, immediately west of the Site. This sampling location has been monitored during previous investigations and has been included in the 2023 monitoring program;

- Surface water sample "Pond" was located within the central portion of the landfill. This location was observed to be dry during each of the sampling events conducted in 2023;
- Surface water sample "SW1" was collected during the spring, summer and fall of 2023 sampling events. This surface water sample was located within Milky Creek, approximately 400 m upstream and north of the Site; and
- Surface water sample "SW2" was collected during the spring, summer and fall of 2023 sampling event. This surface water sample was located within Milky Creek, approximately 700 m downstream and southwest of the Site.

The following table provides a summary of the surface water sampling locations included in the 2023 monitoring program. 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	UTM NAD 83	Approximate Proximity to the Waste Area
Ditch	17 U 609,750 m E, 5,332,109 m N	Immediately west of Site.
SW1	17 U 609,654 m E, 5,332,801 m N	Milky Creek, upstream of Site.
SW2	17U 609,850 m E, 5,332,369 m N	Milky Creek, downstream of Site.
Pond	17U 610,083 m E, 5,332,341 m N	Within close proximity to the waste area.

#### 4.4 Monitoring Frequency

Groundwater and surface water quality monitoring at the Site was completed three times annually by Pinchin during 2023, on May 30 (spring), August 1 (summer) and October 18 (fall) of 2023. The results of inspection and monitoring are to be reported annually to the MECP by March 31 of the following year.

#### 4.5 Monitoring Parameters

##### 4.5.1 Groundwater Monitoring Parameters

During the spring 2023 monitoring events, 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 2023 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 were also measured for the following parameters: temperature, pH, conductivity, oxidation reduction potential (ORP) and dissolved oxygen.



#### 4.5.2 *Surface Water Monitoring Parameters*

During the spring 2023 monitoring events, surface water samples were submitted for laboratory analysis of the parameters listed in Column 3 of Schedule 5 of the MECP Landfill Standards, whereas summer and fall 2023 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 were also measured for the following parameters: temperature, pH, conductivity, ORP and dissolved oxygen.

### **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 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 (HDPE) or low-density polyethylene (LDPE) 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 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 up-gradient 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 down-stream locations working up-stream 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 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 (CALA) and is accredited by the Standards Council of Canada (SCC) for specified environmental analyses. 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 contaminants 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 (“Bq/L”). 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 Nellie Lake WDS and 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 2023 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 contaminants 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 downgradient compliance



monitoring wells (MW3, MW5, MW7 and MW8) as these monitors are located downgradient of the waste areas and 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 concluded the following:

*“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 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.”*

Based on the results of the 2013 monitoring events, the 2014 Thomas Guo Memo recommended that since it has been established that the groundwater is flowing north-northwest and MW1 is located close to the Site boundary, replacing this well with a new background well is recommended. It was noted that the new monitoring well should be located 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 background concentrations, as well as slightly elevated DOC and nitrate concentrations were observed.

Based on 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.



As a result of the information provided above, it is Pinchin's opinion that groundwater quality observed at MW1 continues to reflect unimpacted groundwater quality; and therefore, 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 2023 monitoring program, concentrations of concentrations of alkalinity during each of the sampling were observed below the acceptable range specified by the ODWQS. Low pH values have also been observed at MW1 during previous monitoring events. These concentrations are interpreted to be representative of background groundwater quality conditions at the Site.

##### **Monitoring Well MW2**

Monitoring well MW2 was installed on June 1, 1999, and located along the northwest boundary of the Site. During the 2023 monitoring program, concentrations of alkalinity (low - all events) were observed below the acceptable range specified by the ODWQS. Water quality observed at MW2 is generally similar to concentrations at MW1.

#### 5.2.2 Leachate Source Quality Evaluation

##### **Monitoring Well MW4**

Monitoring well MW4 was installed on June 1, 1999, and located centrally within the waste fill area of the Site. During the 2023 monitoring program, concentrations of TDS (all events), DOC (all events), alkalinity (high - fall), arsenic (spring), iron (all events) and manganese (spring) were found to exceed the ODWQS, indicating a measurable impact from the landfill leachate. As a result, the water quality at this location is interpreted to be representative of the 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 2023 monitoring program, all parameters analyzed at MW3 met the applicable ODWQS criteria with the exception of alkalinity (low – all events) and pH (low – summer and fall) that were observed outside the range specified by the ODWQS. In addition, pH (summer and fall), iron (summer) and manganese (spring) exceeded the Guideline B-7 Criteria.

pH, iron and manganese are either aesthetic objectives or operational guidelines set by the ODWQS and are not considered to be a significant human health or environmental concern originating from the Site. Historical concentrations of manganese at this location show considerable variation throughout the dataset and should be confirmed during future monitoring events.

#### **Monitoring Well MW6**

Monitoring well MW6 was installed on May 22, 2004, and is located along the south boundary of the Site. During the 2023 sampling events, MW6 could not be located and was assumed to be destroyed. Similar to the 2016-2022 efforts, groundwater samples were not collected at this location during the 2023 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 2023 monitoring program, all parameters analyzed for at MW7 satisfied the ODWQS with the exception of alkalinity (low – spring and summer) which was observed to exceed the values specified by the ODWQS. Iron (summer) also exceeded the Guideline B-7 Criteria.

Iron is an aesthetic objective set by the ODWQS and is not considered to be a significant human health or environmental concern originating from the Site.

#### **Monitoring Well MW8**

Monitoring well MW8 was installed on August 5, 2014, and repaired by Pinchin during the spring 2018 monitoring event. MW8 is located along the south boundary of the Site and at the time was intended to represent background groundwater quality as a replacement monitoring well for MW6 (which was routinely observed to be dry). During the 2023 monitoring program, concentrations of pH (low - all events) and alkalinity (low - all events) did not meet the ODWQS. In addition, pH (low - all events) exceeded the Guideline B-7 Criteria.



#### 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 and is most representative of the groundwater quality at the downgradient property boundary. During the 2023 monitoring program, all parameters analyzed at MW5 satisfied the ODWQS with the exception of alkalinity that was observed to be below the range specified by the ODWQS (similar to background). No exceedances of the Guideline B-7 criteria were identified at MW5 during the spring, summer and fall monitoring events of 2023.

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. The concentrations of nitrate which exceeded the Guideline B-7 values in 2020 at monitoring well MW3 were observed to be below the Guideline B-7 values in 2021, 2022 and 2023, and are confirmed to be anomalous based on these subsequent sampling results. 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 30, August 1 and October 18, 2023, 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 in summer and fall events which is an indicator of stagnant anaerobic conditions and possibly impact from leachate generated from the landfill.

### **5.4 Surface Water Quality Monitoring**

#### *5.4.1 The Provincial Water Quality Objectives (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 stated 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 (APV)*

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 2023 monitoring program, Pinchin collected surface water samples from each of the established monitoring locations with the exception of Pond which was observed to be dry. In addition, SW2 was not sampled by Pinchin during the summer sampling event due to an error in the field (i.e. a sample was collected in the incorrect location). 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 Site. During the 2023 monitoring period, pH (low - summer and fall events), phosphorus (all events), phenols (summer and fall events) and iron (summer and fall events) did not satisfy the PWQO. In addition, pH (summer and fall events) and iron (summer and fall) were observed to exceed the levels outlined within the APV. pH (spring and fall), phenols (summer) and cadmium (spring event) were observed to be above the CWQG.

### **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 2023 monitoring period, pH (low – spring and fall), phosphorus (summer event) and iron (all events) exceeded the PWQO. In addition, pH (all events) and iron (summer) were observed to exceed the levels outlined within the APV. pH (low – fall) and cadmium (spring event) were observed to exceed the CWQG.

### **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 2023 monitoring period, concentrations of pH (low – spring and fall events), phenols (fall event) and iron (fall event) were observed to exceed the PWQO. In addition, pH (low – spring and fall) exceeded the APV and cadmium (spring event) exceeded the CWQG.

It is Pinchin’s opinion that low pH concentrations and elevated iron, phenols, cadmium and total phosphorus concentrations are likely naturally occurring elements within the watershed system and are not landfill related impacts. Based on Pinchin’s review of the surface water analytical data set, it appears that surface water impacts are not 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.

However, based on Pinchin's review of the analytical data provided for these monitoring wells, it is Pinchin's opinion that the groundwater quality in this vicinity is not being influenced by landfilling activities at this time. Furthermore, historical groundwater quality south of the waste area represented by available analytical data collected from monitoring well MW8 was previously interpreted to be indicative of anthropogenic impacts. However, based on more recent groundwater elevations contours and groundwater quality for MW8, groundwater at this location is not interpreted to be impacted by landfilling activities at this time.

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

## **5.8 Leachate Characterization**

A review of the 2023 groundwater quality data set indicates leachate impacts observed at monitoring well MW4 characterized by elevated levels of alkalinity, TDS, DOC, sodium, conductivity, iron and manganese which is consistent with previous investigations. These results are expected at this location considering the close proximity of MW4 to the waste area. It is Pinchin's opinion that groundwater quality observed at this location is considered to be worst-case "source" landfill leachate that can be used to identify leachate constituents.

A review of the 2023 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. Alkalinity and pH are operating guidelines for drinking water systems specified by the ODWQS and are not considered an environmental concern. It is Pinchin's opinion that low concentrations of pH and alkalinity are likely naturally occurring conditions within the unconfined groundwater unit.



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 close 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. Further investigation is required to confirm or refute the presence of potential landfill leachate migrating south of the Site in the vicinity of MW8 although this seems unlikely given observed groundwater elevations, flow direction and distance from the waste deposits.

### **5.9 Contamination Attenuation Zone**

A Contaminant Attenuation Zone (CAZ) has not been established for the Site. Future investigations should involve the development of a CAZ for this Site.

### **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. This should continue until the appropriate background well, groundwater contour (flow direction) and confirmation of achievable RUC at the property line can be established. Further, it is recommended that the monitoring well network be further evaluated for adequacy and determine if there is a need to establish additional monitoring wells and/or decommission existing monitoring wells.

### **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 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 would serve as an effect barrier to vertical migration or preferential pathway for water infiltration.



#### *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 2023 monitoring program completed by Pinchin.

#### **5.13 Assessment of the Need for Implementation of Contingency Measures**

There are 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 Design and Operations 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 2023 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 2023 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 (11° Celsius).

Groundwater duplicate sample pair were collected from the Site during each of the spring (MW4), summer (MW7) and fall (MW7) 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%) with the exception of Total Kjeldahl Nitrogen at MW4 (spring).

The analytical laboratory employed to perform the laboratory analyses (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.



## 6.0 CONCLUSIONS

Based on the work completed, the following is a summary of the activities and findings of the 2023 water quality monitoring program:

- Groundwater and surface water samples were collected from the existing monitoring well network on May 30, August 1 and October 18, 2023;
- Based on depth to groundwater measurements collected during the 2023 monitoring events and the previously conducted survey during the 2017 through 2022 sampling events, the groundwater flow has been interpreted to be in a radial pattern appearing to converge towards monitoring well MW5 located within the low-lying, central portion of the Site;
- All groundwater and surface water samples were submitted for laboratory analysis of parameters identified in the previous monitoring reports. The groundwater quality was assessed based on the ODWQS and Guideline B-7 monitoring program. Surface water quality was assessed based on the PWOQ, APV and CWQG;
- Leachate impacts were observed at monitoring well MW4, characterized by elevated levels of alkalinity, TDS, DOC, conductivity, sodium, iron and manganese. These results are expected at this location considering the close proximity of MW4 to the waste area. It is Pinchin's opinion that groundwater quality observed at this location is considered to be worst-case "source" landfill leachate that can be used to identify leachate constituents;
- Groundwater quality observed at monitoring wells MW1, MW2, MW3, MW5, MW7 and MW8 is characterized by low concentrations of pH and alkalinity often below the acceptable range as specified in the ODWQS. Alkalinity and pH are operating guidelines for drinking water systems specified by the ODWQS and are not considered an environmental concern at this time. It is Pinchin's opinion that low concentrations of pH and alkalinity are likely naturally occurring conditions within the unconfined groundwater unit and not indicative of a landfill derived impact;
- All reported concentrations in the downgradient groundwater monitors (MW3, MW5, MW7 and MW8) submitted for analysis satisfied the applicable Guideline B-7 criteria for all parameters analyzed with the exception the following:
  - pH (low) at MW3 and MW8;
  - Iron at MW3 and MW7; and
  - Manganese at MW3.



- 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, SW1 and SW2;
  - Total phosphorous at Ditch and SW1;
  - Phenols at Ditch and SW2;
  - Iron at Ditch, SW1 and SW2; and
  - Cadmium 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 close 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. Further investigation is required to confirm or refute the presence of potential landfill leachate migrating south of the Site in the vicinity of MW8.

Based on the 2023 results obtained from the existing groundwater monitoring wells, Pinchin has not identified any significant human health or ecological landfill related impacts northwest of the Site. All exceedances of the RUC Guideline B-7 are related to operational guidelines or aesthetic objectives 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 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. This should continue until the appropriate background well, groundwater contour (flow direction) and confirmation of achievable RUC at the property line can be established;
- The analysis of volatile organic compounds (VOC's) in the groundwater samples during the spring monitoring events can be removed from the program (with the exception of the source well) as these parameters have been consistently quantified as non-detectable at all locations including the source well, MW4;
- The well casings for monitoring wells MW3 and MW4 should be modified to allow for closing and locking to ensure the contaminants do not enter the well. In addition, the surficial seal for MW8 should be repaired to ensure that the bentonite seal in annular space is protected and does not result in a pathway for surface contaminants to impact the aquifer; and
- A CAZ should be developed for the Site now that the groundwater flow direction has been confirmed.

## 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.

\\pinchin.com\tsud\Job\304000s\0304108.000 TWPOFMCGARRY,McGarry,EDR,LNDFL,3yrMon\0304108.002 TWPOFMCGARRY,2023AMRMcGarry,EDR,Ld\Deliverables\Reports\0304108.002 2023 AMR McGarry WDS Twp of McGarry docTemplate Master Report for Phase II ESA - Stage 2 PSI, EDR, January 16, 2015



**APPENDIX I**  
**Figures**



**LEGEND**

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

LEGEND IS OUR DEPENDENT  
 THIS MAY ALTER  
 INTERPRETATION.



2023  
 ANNUAL MONITORING  
 REPORT

TOWNSHIP OF MCGARRY

MCGARRY WASTE  
 DISPOSAL SITE, ONTARIO

SURFACE AND GROUNDWATER  
 SAMPLING LOCATIONS

PROJECT NUMBER	304108-002
AS SHOWN	
PERFORMED BY	NJ
DATE	MARCH 2024
FOURTH NUMBER	2





**LEGEND**

- SITE BOUNDARY
- GROUNDWATER MONITORING WELL
- MONITORING WELL ELEVATION
- ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- GROUNDWATER FLOW DIRECTION METERS ABOVE SEA LEVEL

**LEGEND IS COLOUR CORRELATED MONITORING DATA ALTER INTERPRETATION**

**PINCHIN**

**PROJECT NAME**  
2023 ANNUAL MONITORING REPORT

**CITY**  
TOWNSHIP OF MCGARRY

**PROJECT NUMBER**  
304106-002

**DATE**  
MARCH 2024

**PROJECT NUMBER**  
304106-002

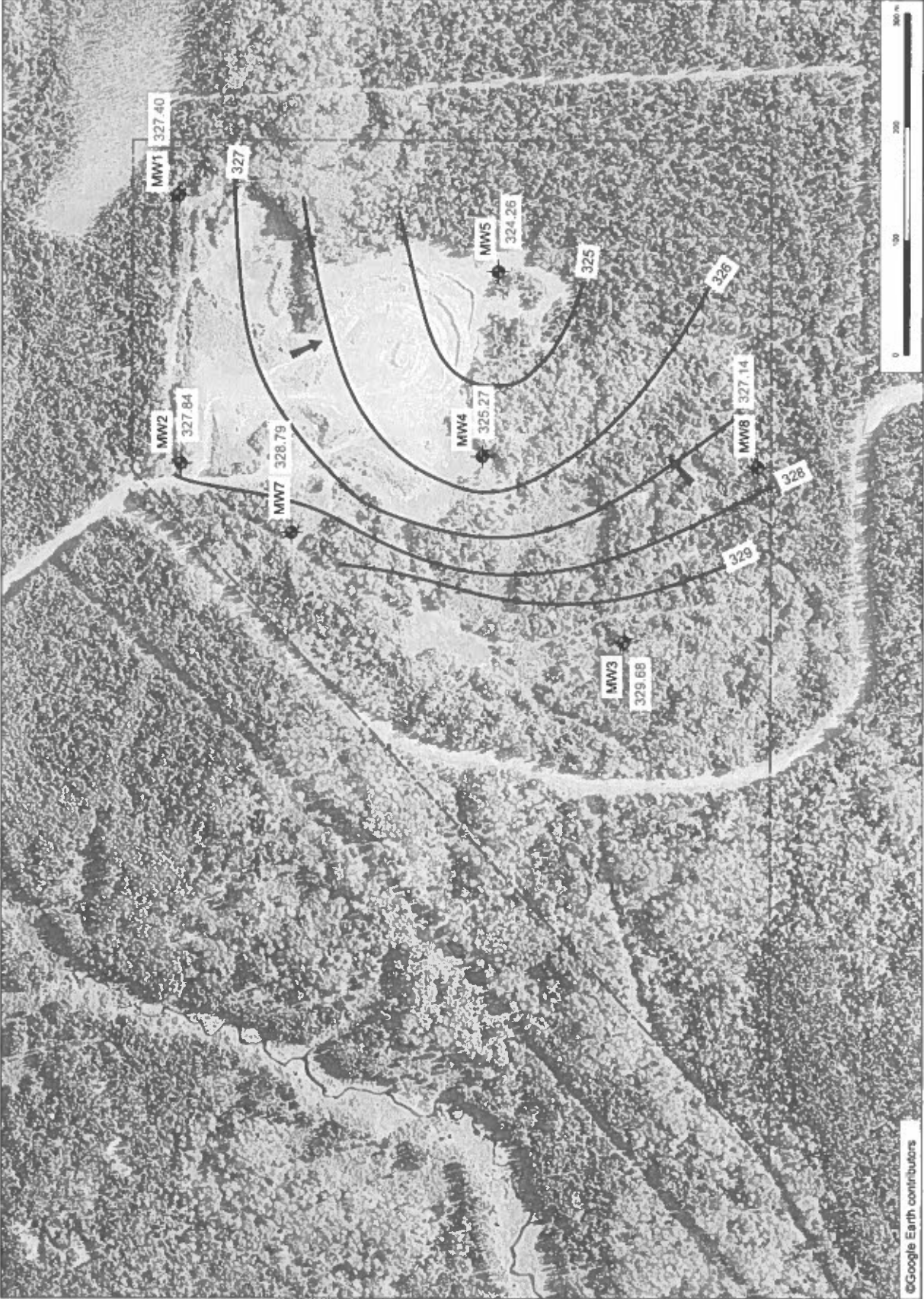
**DATE**  
MARCH 2024

**PROJECT NUMBER**  
304106-002

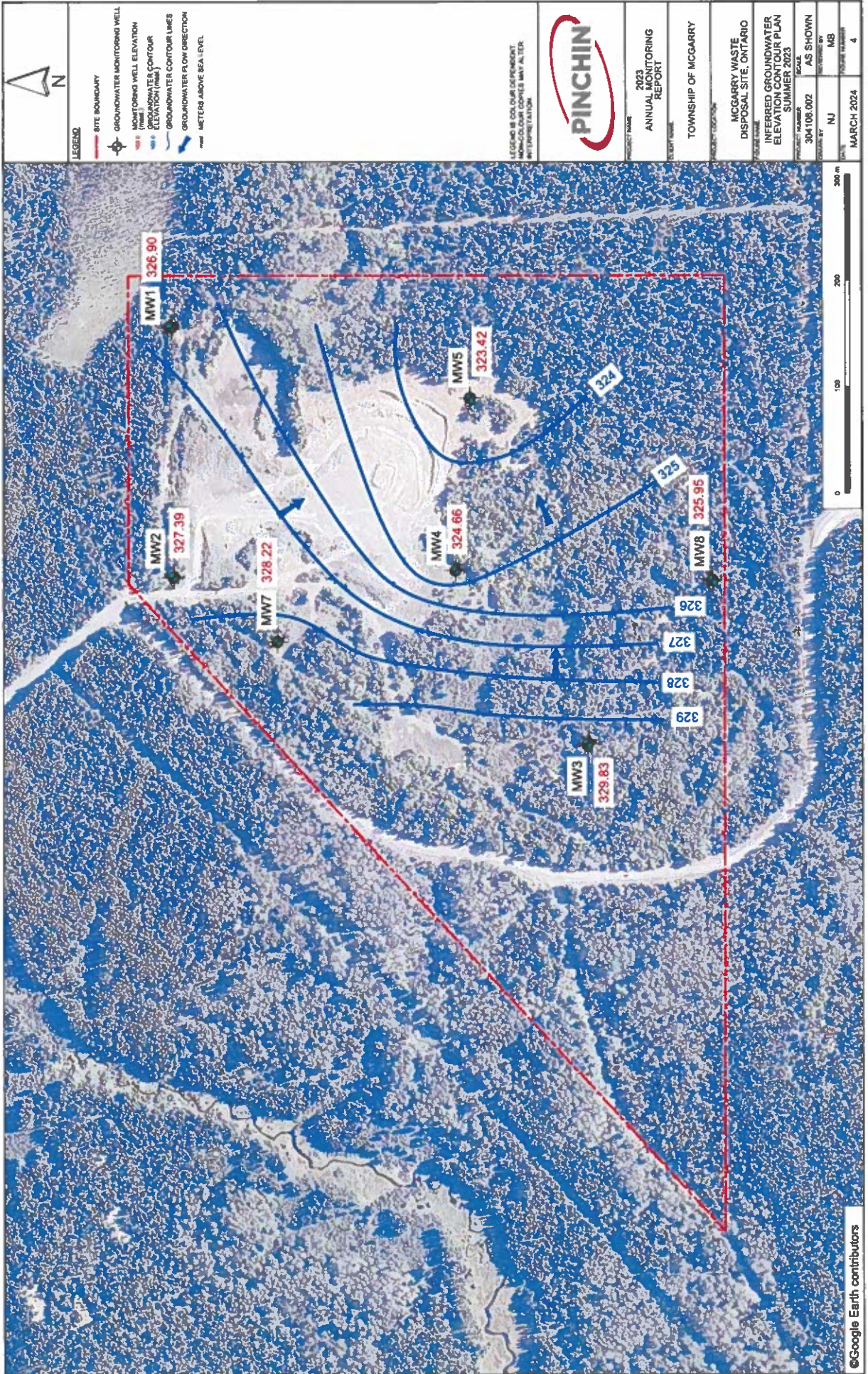
**DATE**  
MARCH 2024

**PROJECT NUMBER**  
304106-002

**DATE**  
MARCH 2024











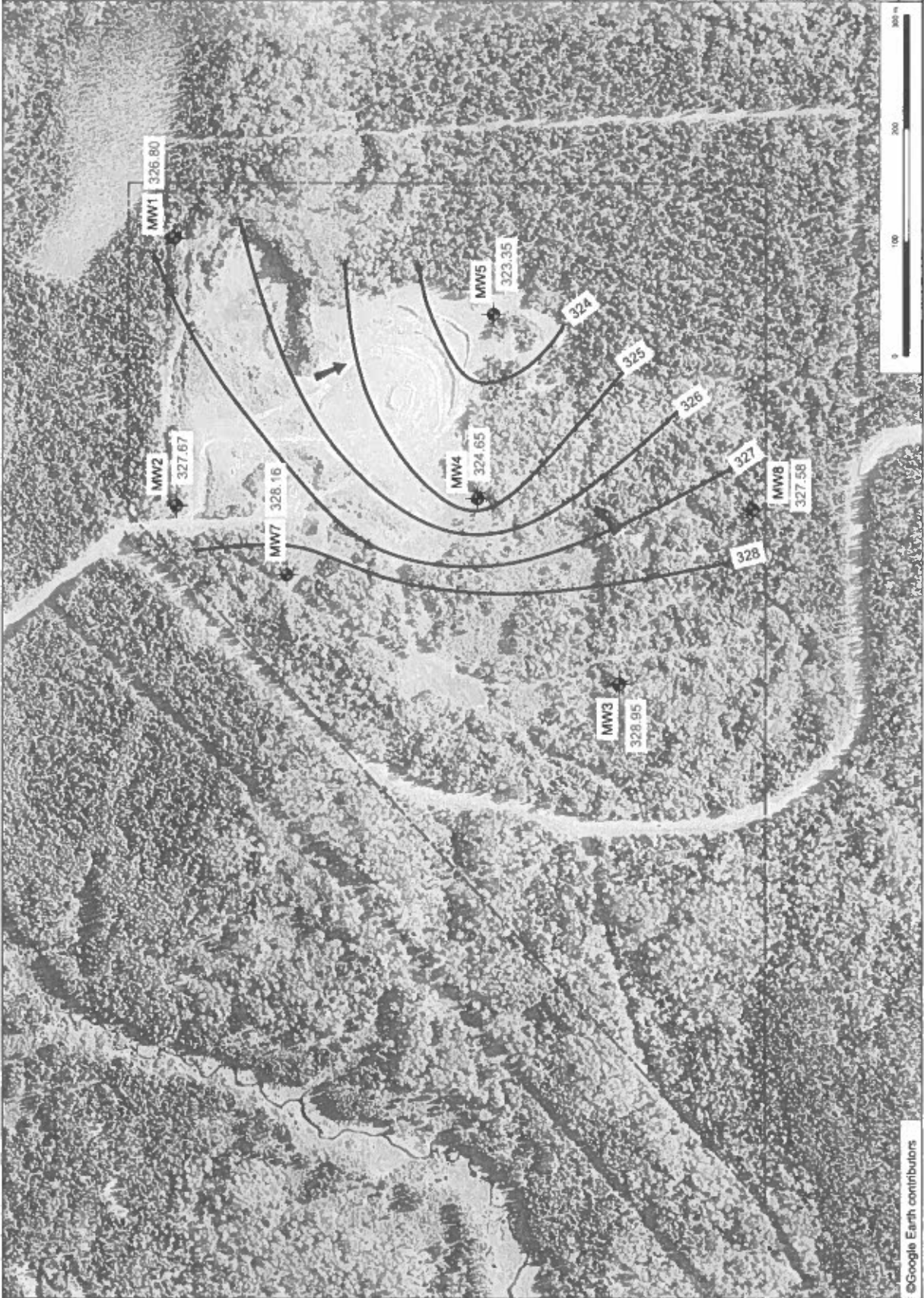
**LEGEND**


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

LEGEND IS COLOUR DEPENDENT  
NON-COLOUR COPIES MAY BE IN  
INTERPRETATION



PROJECT NAME	2023 ANNUAL MONITORING REPORT
TOWN	TOWNSHIP OF MCGARRY
PROJECT LOCATION	MCGARRY WASTE DISPOSAL SITE, ONTARIO
REPORT DATE	FALL 2023
PROJECT NUMBER	AS SHOWN
DATE	AS SHOWN
ISSUED BY	MB
DATE	MARCH 2024
ISSUE NUMBER	5



<b>Name:</b>	Tim McBride		
<b>Seal:</b>	Add Image		
<b>Signature:</b>	 <p>Digitally signed by Tim McBride  DN: PostalCode=15N7W5, O=Pinchin Ltd., STREET=2470 Millroy, Ct., Sudobury, ON CA, CN=Tim McBride, Email=timc@pinchin.com  Reason: I am the author of this document  Date: 2023.02.24 14:57:31-05'00'  Font PDF Editor Version: 12.1.0</p>	<b>Date:</b>	9-Mar-2024
<b>CEP Contact Information:</b>	Tim McBride, B.Sc., P.Geo., QPESA		
<b>Company:</b>	Pinchin Ltd.		
<b>Address:</b>	662 Falconbridge Unit 3, Sudbury ON P3A 4S4		
<b>Telephone No.:</b>	705.521.0560	<b>Fax No. :</b>	705.521.1309
<b>E-mail Address:</b>	tmcbride@pinchin.com		
<b>Co-signers for additional expertise provided:</b>			
<b>Signature:</b>		<b>Date:</b>	Select Date
<b>Signature:</b>		<b>Date:</b>	Select Date

<b>Report Submission Frequency</b>	<input checked="" type="radio"/> <b>Annual</b> <input type="radio"/> <b>Other</b>	Specify (Type Here):
<b>The site is:</b>	<input checked="" type="radio"/> <b>Active</b> <input type="radio"/> <b>Inactive</b> <input type="radio"/> <b>Closed</b>	
<b>If closed, specify C of A, control or authorizing document closure date:</b>		Select Date
<b>Has the nature of the operations at the site changed during this monitoring period?</b>	<input type="radio"/> <b>Yes</b> <input checked="" type="radio"/> <b>No</b>	
<b>If yes, provide details:</b>	Type Here	
<b>Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i. e. exceeded the LEL for methane)</b>	<input type="radio"/> <b>Yes</b> <input checked="" type="radio"/> <b>No</b>	

## Groundwater WDS Verification:

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

### Sampling and Monitoring Program Status:

<p>1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p>	<p>MW3 - Casing has sunk.</p> <p>MW4 - Riser sticks up to a height that prevents the casing lid from closing.</p> <p>MW8 - Surficial concrete seal at the base appears to be compromised.</p>
<p>2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):</p>	<p><input type="radio"/> Yes</p> <p><input checked="" type="radio"/> No</p> <p><input type="radio"/> Not Applicable</p>	<p>If no, list exceptions below or attach information.</p>


Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
MW6	Could not be located	All 2023 sampling events
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date



<b>3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.</b>		<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable
<b>b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:</b>		<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable
<b>Groundwater Sampling Location</b>		<b>Description/Explanation for change (change in name or location, additions, deletions)</b>
<b>Date</b>		
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
<b>4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):</b>		<input type="radio"/> Yes <input checked="" type="radio"/> No
		Spring groundwater samples above recommended temperature of 10 degrees Celsius.

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

<p>5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.</p>	<p><input type="radio"/> Yes <input checked="" type="radio"/> No</p>	<p>CAZ should be developed for the Site once the groundwater flow direction is confirmed.</p>	
<p>6) The site meets compliance and assessment criteria.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list and explain exceptions (Type Here):</p>	
<p>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, list exceptions and explain reason for increase/change (Type Here):</p>	
<p>1) Is one or more of the following risk reduction practices in place at the site:</p> <p>(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or</p> <p>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</p> <p>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</p> <p><i>i.</i> The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</p> <p><i>ii.</i> Seasonal and annual water levels and water quality fluctuations are well understood.</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>Note which practice(s):</p>	<p><input type="checkbox"/> (a) <input type="checkbox"/> (b) <input checked="" type="checkbox"/> (c)</p>
<p>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</p>	<p><input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable</p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):</p>	

<b>Name:</b>	Tim McBride		
<b>Seal:</b>	Add Image		
<b>Signature:</b>	 <p>Digitally signed by Tim McBride  DN: PostalCode=LSN7W5, O=Pinchin Ltd., STREET=2470 Milltown Dr., S, Ontario, C=CA, CN=Tim McBride, Email=timc@pinchin.com  Reason: I am the author of the document.  Location:  Date: 2023.02.24 14:57:31-0500'  Foxit PDF Editor Version: 12.1.0</p>	<b>Date:</b>	9-Mar-2024
<b>CEP Contact Information:</b>	Tim McBride, B.Sc., P.Geo., QPESA		
<b>Company:</b>	Pinchin Ltd.		
<b>Address:</b>	662 Falconbridge Unit 3, Sudbury ON P3A 4S4		
<b>Telephone No.:</b>	705.521.0560	<b>Fax No. :</b>	705.521.1309
<b>E-mail Address:</b>	tmcbride@pinchin.com		
<b>Co-signers for additional expertise provided:</b>			
<b>Signature:</b>		<b>Date:</b>	Select Date
<b>Signature:</b>		<b>Date:</b>	Select Date

## Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

9-Mar-2024

## Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

<p><input type="radio"/> No changes to the monitoring program are recommended</p> <p><input checked="" type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	<p>Remove VOC analysis for all wells with the exception of the source well (MW4). Should VOCs be detected in MW4, the analysis of these parameters can be re-introduced to the program.</p> <p>Conduct minor well repairs to maintain the integrity of the network.</p>
<p><input checked="" type="radio"/> No Changes to site design and operation are recommended</p> <p><input type="radio"/> The following change(s) to the site design and operation is/are recommended:</p>	<p>Type Here</p>

<p>3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.</p>	<p><input checked="" type="radio"/> Yes  <input type="radio"/> No  <input type="radio"/> Not Applicable</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------

<p>b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:</p>	<p><input type="radio"/> Yes  <input checked="" type="radio"/> No  <input type="radio"/> Not Applicable</p>	<p>If no, specify below or provide details in an attachment.</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Pond	Dry	All 2023 events
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

<p>4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):</p>	<p><input type="radio"/> Yes  <input checked="" type="radio"/> No</p>	<p>Spring surface water samples were above the recommended temperature of 10 degrees Celsius.</p>
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------

## Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Milky Creek
Distance(s)	Milky Creek is located approximately 500 m west of the Site.

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

### Sampling and Monitoring Program Status:

<p>1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:</p>	<p><input checked="" type="radio"/> Yes <input type="radio"/> No</p>	<p>If no, identify issues (Type Here):</p>
<p>2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):</p>	<p><input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not applicable (No C of A, authorizing / control document applies)</p>	<p>If no, specify below or provide details in an attachment.</p>

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

<b>CEP Signature</b>	<p>Digitally signed by Tim McBride  DN: PostalCode=L5N7W5, O=Pinchin Ltd., STREET=2470 Milltower  Ct., S=Ontario, C=CA, CN=Tim McBride, E=tmcbride@pinchin.com  Reason: I am the author of this document  Location:  Date: 2023.02.24 14:58:18-05'00'  Foxit PDF Editor Version: 12.1.0</p> <p><b>Tim McBride</b></p>	
<b>Relevant Discipline</b>	Hydrogeology	
<b>Date:</b>	9-Mar-2024	
<b>CEP Contact Information:</b>	Tim McBride	
<b>Company:</b>	Pinchin Ltd.	
<b>Address:</b>	662 Falconbridge Road, Unit 3, Sudbury ON P3A 4S4	
<b>Telephone No.:</b>	705.521.0560	
<b>Fax No.:</b>	705.521.1309	
<b>E-mail Address:</b>	tmcbride@pinchin.com	
<b>Save As</b>		<b>Print Form</b>

## Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

9-Mar-2024

## Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

No Changes to the monitoring program are recommended

Type Here

The following change(s) to the monitoring program is/are recommended:

No changes to the site design and operation are recommended

Type Here

The following change(s) to the site design and operation is/are recommended:



<p><b>7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.</b></p>	<p><input checked="" type="radio"/> <b>Yes</b></p> <p><input type="radio"/> <b>No</b></p>	<p>If no, list parameters and stations that is outside the expected range. Identify whether parameter concentrations show an increasing trend or are within a high historical range (Type Here)</p>
<p><b>8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):</b></p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> <b>Not Known</b></p> <p><input type="radio"/> Not Applicable</p>	<p>If yes, provide details and whether remedial measures are necessary (Type Here)</p>
<p><b>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</b></p>	<p><input type="radio"/> Yes</p> <p><input type="radio"/> No</p> <p><input checked="" type="radio"/> <b>Not Applicable</b></p>	<p>If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)</p>

## Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):

- Yes  
 No

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
pH	PWQO APV CWQG	SW2
Phenols	PWQO	SW2
Iron	PWQO	SW2
Cadmium	APV	SW2
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	<input checked="" type="radio"/> Yes <input type="radio"/> No	Naturally elevated at background location.

## Appendix D-Monitoring and Screening Checklist

### General Information and Instructions

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

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

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

**Definition of Groundwater CEP:**

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

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

**Definition of Surface water CEP:**

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

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

<b>Monitoring Report and Site Information</b>	
<b>Waste Disposal Site Name</b>	McGarry WDS
<b>Location (e.g. street address, lot, concession)</b>	The Site is located approximately 4 kilometres (km) east of Virginiatown, Ontario, along the Quebec and Ontario border. Access to the Site is by a gravel road that extends off Raven Mountain Road, south of Highway 66.
<b>GPS Location (taken within the property boundary at front gate/ front entry)</b>	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 1983).
<b>Municipality</b>	Township of McGarry
<b>Client and/or Site Owner</b>	Township of McGarry
<b>Monitoring Period (Year)</b>	2023
This Monitoring Report is being submitted under the following:	
<b>Certificate of Approval No.:</b>	A572402
<b>Director's Order No.:</b>	Type Here
<b>Provincial Officer's Order No.:</b>	Type Here
<b>Other:</b>	Type Here

## LEGEND

## FOOTNOTES

**NSS** Insufficient sample for analysis.  
**RL** Reporting Limit.  
↑ Reporting limit raised.  
↓ Reporting limit lowered.  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm).

The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Reproduction of this analytical report in full or in part is prohibited.

This report supersedes all previous versions.

– End of Analytical Report –



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakeland 185 Concession St. Lakeland, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com (4)  
 SGS Environmental Services - London 657 Consum Court, London, ON N6E 2S8 Phone: 519-872-4500 Toll Free: 877-848-8060 Fax: 519-872-0361 Web: www.ca.sgs.com (4)

#### Laboratory Information Section

Received Date (mm/dd/yyyy): **OCT 20 2023** LAB LIMS #: **0915360**  
 Received Time (After Hours Only): \_\_\_\_\_ Temperature Upon Receipt (°C): **8X3**

#### Billing & Reporting Information

Invoice/Receipt to (3):  
 Company: Pinchin  
 Attention: Meagan Bradley  
 Address: 662 Falconbridge Rd, Unit 3  
 Sudbury, ON  
 P3A 4S4  
 Email: mbradley@pinchin.com  
 Quote #: 2022 330  
 Attached Parameter List:  YES  NO  
 Turnaround Time  
 Is \*Rush Turnaround Time Required?  YES  NO  
 Specify: \_\_\_\_\_  
 \* Rush TA Requests Require Lab Approval  
 Project Name/Number: 304108 002-McGarry Landfill GW P.O. #: \_\_\_\_\_

#### Client Information/Report To:

Company Name: \_\_\_\_\_ Phone Number: 705-521-0560  
 Contact Name: \_\_\_\_\_ Fax Number: \_\_\_\_\_  
 Address: \_\_\_\_\_ E-mail: \_\_\_\_\_  
 Copy to: \_\_\_\_\_

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)						
				Field Filtered	Field Temp (°C)	Field pH	GW Package Col#2 (sum & Fall)			
MW1	10/18/23	3 PM	8	Y			X			
MW2			8	Y			X			
MW3			8	Y			X			
MW4			8	Y			X			
MW5			8	Y			X			
<del>MW6</del>							X			
MW7			8	Y			X			
MW8		6 PM	8	Y			X			
GW DUP			8	Y			X			

Sampled By (1): (Name) **Jenny + Emily** (Signature) \_\_\_\_\_ Date: **10/18/23** (mm/dd/yy)  
 Relinquished by (2): (Name) **Jenny + Emily** (Signature) \_\_\_\_\_ Date: **10/18/23** (mm/dd/yy)

Note: (1) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. (4) Completion of work may require the subcontracting of samples between the London and Lakeland laboratories.  
 This document is issued by the Company under its General Conditions of Service accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm). (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

**334343852813 RTW**  
 11 " 21



# FINAL REPORT

CA15360-OCT23 R1

## QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicates		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Low
Total Suspended Solids	EWL0601-OCT23	mg/L	2	< 2	4	10	94	90	110	NA	NA	NA
Total Suspended Solids	EWL0606-OCT23	mg/L	2	< 2	1	10	109	90	110	NA	NA	NA
Total Suspended Solids	EWL0610-OCT23	mg/L	2	< 2	0	10	93	90	110	NA	NA	NA
Total Suspended Solids	EWL0619-OCT23	mg/L	2	< 2	2	10	95	90	110	NA	NA	NA

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multi-element Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multi-element scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte



# FINAL REPORT

CA15360-OCT23 R1

## QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-ENV/EM1-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Units (%)	Low	High	Spike Recovery (%)	Recovery Units (%)
Total Suspended Solids	EWL0601-OCT23	mg/L	2	< 2	4	10	94	90	110	NA		
Total Suspended Solids	EWL0606-OCT23	mg/L	2	< 2	1	10	109	90	110	NA		
Total Suspended Solids	EWL0610-OCT23	mg/L	2	< 2	0	10	93	90	110	NA		
Total Suspended Solids	EWL0619-OCT23	mg/L	2	< 2	2	10	95	90	110	NA		

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the matrix spike recovery increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.



# FINAL REPORT

CA15360-OCT23 R1

## QC SUMMARY

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)	Low
Conductivity	EWL0597-OCT23	uS/cm	2	< 2	1	20	101	90	110	NA	NA	NA	NA
Conductivity	EWL0623-OCT23	uS/cm	2	< 2	1	20	100	90	110	NA	NA	NA	NA
Conductivity	EWL0722-OCT23	uS/cm	2	< 2	1	20	98	90	110	NA	NA	NA	NA

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)	Low
Barium (dissolved)	EMS0215-OCT23	mg/L	0.00008	<0.00008	2	20	103	90	110	106	70	130	130
Boron (dissolved)	EMS0215-OCT23	mg/L	0.002	<0.002	11	20	107	90	110	97	70	130	130
Calcium (dissolved)	EMS0215-OCT23	mg/L	0.01	<0.01	1	20	98	90	110	100	70	130	130
Iron (dissolved)	EMS0215-OCT23	mg/L	0.007	<0.007	0	20	98	90	110	100	70	130	130
Magnesium (dissolved)	EMS0215-OCT23	mg/L	0.001	<0.001	1	20	97	90	110	93	70	130	130
Sodium (dissolved)	EMS0215-OCT23	mg/L	0.01	<0.01	0	20	104	90	110	91	70	130	130





# FINAL REPORT

CA15360-OCT23 R1

## QC SUMMARY

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery (%)	Limits	Spike Recovery (%)	Recovery (%)	Limits
Conductivity	EWL0597-OCT23	uS/cm	2	< 2	1	20	101	90	110	NA		
Conductivity	EWL0623-OCT23	uS/cm	2	< 2	1	20	100	90	110	NA		
Conductivity	EWL0722-OCT23	uS/cm	2	< 2	1	20	98	90	110	NA		

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-ENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery (%)	Limits	Spike Recovery (%)	Recovery (%)	Limits
Barium (dissolved)	EMS0215-OCT23	mg/L	0.00008	<0.00008	2	20	103	90	110	106	70	130
Boron (dissolved)	EMS0215-OCT23	mg/L	0.002	<0.002	11	20	107	90	110	97	70	130
Calcium (dissolved)	EMS0215-OCT23	mg/L	0.01	<0.01	1	20	98	90	110	100	70	130
Iron (dissolved)	EMS0215-OCT23	mg/L	0.007	<0.007	0	20	98	90	110	100	70	130
Magnesium (dissolved)	EMS0215-OCT23	mg/L	0.001	<0.001	1	20	97	90	110	93	70	130
Sodium (dissolved)	EMS0215-OCT23	mg/L	0.01	<0.01	0	20	104	90	110	91	70	130



# FINAL REPORT

CA15360-OCT23 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)	Low
Alkalinity	EWL0597-OCT23	mg/L as CaCO3	2	< 2	0	20	106	80	120	NA	NA	NA	NA
Alkalinity	EWL0623-OCT23	mg/L as CaCO3	2	< 2	0	20	102	80	120	NA	NA	NA	NA
Alkalinity	EWL0722-OCT23	mg/L as CaCO3	2	< 2	0	20	100	80	120	NA	NA	NA	NA

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)
Ammonia+Ammonium (N)	SKA0225-OCT23	mg/L	0.04	<0.04	ND	10	100	90	110	99	75	125



# FINAL REPORT

CA15360-OCT23 R1

## QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Chloride	DIO5022-NOV23	mg/L	1	<1	ND	20	104	80	120	107	75	125
					ND	20	105	80	120	112	75	125
Sulphate	DIO5022-NOV23	mg/L	2	<2	ND	20	105	80	120	112	75	125
					ND	20	105	80	120	112	75	125

Anions by IC

Method: EPA300/MA300-Ion1.3 | Internal ref.: ME-CA-IENVIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Nitrate (as N)	DIO0687-OCT23	mg/L	0.06	<0.06	0	20	100	90	110	104	75	125
					0	20	100	90	110	104	75	125

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Biochemical Oxygen Demand (BOD5)	BOD0048-OCT23	mg/L	2	<2	21	30	94	70	130	90	70	130
					21	30	94	70	130	90	70	130



# FINAL REPORT

CA15360-OCT23 R1

Client: Pinchin Ltd  
 Project: 304108.002-McGarry Landfill GW  
 Project Manager: Meagan Bradley  
 Samplers: Jenny & Emily

## MATRIX: WATER

L1 = ODWS\_AO\_OG / WATER / ... Table 4 - Drinking Water - Reg O.169.03  
 L2 = ODWS\_MAC / WATER / ... Table 1.2 and 3 - Drinking Water - Reg O.169.03

Parameter	Units	RL	L1	L2	Sample Number	Sample Name	Sample Matrix	Sample Date	7	8	9	10	11	12	13	14		
pH	No unit	0.05	8.5			MW1	Ground Water	18/10/2023	Result	6.56	6.60	6.26	7.96	7.15	7.04	5.82	6.81	
Chloride	mg/L	1	250			MW2	Ground Water	18/10/2023	Result	3	6	<1	3	<1	<1	<1	<1	<1
						MW3	Ground Water	18/10/2023	Result									
						MW4	Ground Water	18/10/2023	Result									
						MW5	Ground Water	18/10/2023	Result									
						MW6	Ground Water	18/10/2023	Result									
						MW7	Ground Water	18/10/2023	Result									
						MW8	Ground Water	18/10/2023	Result									
						MW9	Ground Water	18/10/2023	Result									
						MW10	Ground Water	18/10/2023	Result									
						MW11	Ground Water	18/10/2023	Result									
						MW12	Ground Water	18/10/2023	Result									
						MW13	Ground Water	18/10/2023	Result									
						MW14	Ground Water	18/10/2023	Result									
						MW15	Ground Water	18/10/2023	Result									
						MW16	Ground Water	18/10/2023	Result									
						MW17	Ground Water	18/10/2023	Result									
						MW18	Ground Water	18/10/2023	Result									
						MW19	Ground Water	18/10/2023	Result									
						MW20	Ground Water	18/10/2023	Result									
						MW21	Ground Water	18/10/2023	Result									
						MW22	Ground Water	18/10/2023	Result									
						MW23	Ground Water	18/10/2023	Result									
						MW24	Ground Water	18/10/2023	Result									
						MW25	Ground Water	18/10/2023	Result									
						MW26	Ground Water	18/10/2023	Result									
						MW27	Ground Water	18/10/2023	Result									
						MW28	Ground Water	18/10/2023	Result									
						MW29	Ground Water	18/10/2023	Result									
						MW30	Ground Water	18/10/2023	Result									
						MW31	Ground Water	18/10/2023	Result									
						MW32	Ground Water	18/10/2023	Result									
						MW33	Ground Water	18/10/2023	Result									
						MW34	Ground Water	18/10/2023	Result									
						MW35	Ground Water	18/10/2023	Result									
						MW36	Ground Water	18/10/2023	Result									
						MW37	Ground Water	18/10/2023	Result									
						MW38	Ground Water	18/10/2023	Result									
						MW39	Ground Water	18/10/2023	Result									
						MW40	Ground Water	18/10/2023	Result									
						MW41	Ground Water	18/10/2023	Result									
						MW42	Ground Water	18/10/2023	Result									
						MW43	Ground Water	18/10/2023	Result									
						MW44	Ground Water	18/10/2023	Result									
						MW45	Ground Water	18/10/2023	Result									
						MW46	Ground Water	18/10/2023	Result									
						MW47	Ground Water	18/10/2023	Result									
						MW48	Ground Water	18/10/2023	Result									
						MW49	Ground Water	18/10/2023	Result									
						MW50	Ground Water	18/10/2023	Result									
						MW51	Ground Water	18/10/2023	Result									
						MW52	Ground Water	18/10/2023	Result									
						MW53	Ground Water	18/10/2023	Result									
						MW54	Ground Water	18/10/2023	Result									
						MW55	Ground Water	18/10/2023	Result									
						MW56	Ground Water	18/10/2023	Result									
						MW57	Ground Water	18/10/2023	Result									
						MW58	Ground Water	18/10/2023	Result									
						MW59	Ground Water	18/10/2023	Result									
						MW60	Ground Water	18/10/2023	Result									
						MW61	Ground Water	18/10/2023	Result									
						MW62	Ground Water	18/10/2023	Result									
						MW63	Ground Water	18/10/2023	Result									
						MW64	Ground Water	18/10/2023	Result									
						MW65	Ground Water	18/10/2023	Result									
						MW66	Ground Water	18/10/2023	Result									
						MW67	Ground Water	18/10/2023	Result									
						MW68	Ground Water	18/10/2023	Result									
						MW69	Ground Water	18/10/2023	Result									
						MW70	Ground Water	18/10/2023	Result									
						MW71	Ground Water	18/10/2023	Result									
						MW72	Ground Water	18/10/2023	Result									
						MW73	Ground Water	18/10/2023	Result									
						MW74	Ground Water	18/10/2023	Result									
						MW75	Ground Water	18/10/2023	Result									
						MW76	Ground Water	18/10/2023	Result									
						MW77	Ground Water	18/10/2023	Result									
						MW78	Ground Water	18/10/2023	Result									
						MW79	Ground Water	18/10/2023	Result									
						MW80	Ground Water	18/10/2023	Result									
						MW81	Ground Water	18/10/2023	Result									
						MW82	Ground Water	18/10/2023	Result									
						MW83	Ground Water	18/10/2023	Result									
						MW84	Ground Water	18/10/2023	Result									
						MW85	Ground Water	18/10/2023	Result									
						MW86	Ground Water	18/10/2023	Result									
						MW87	Ground Water	18/10/2023	Result									
						MW88	Ground Water	18/10/2023	Result									
						MW89	Ground Water	18/10/2023	Result									
						MW90	Ground Water	18/10/2023	Result									
						MW91	Ground Water	18/10/2023	Result									
						MW92	Ground Water	18/10/2023	Result									
						MW93	Ground Water	18/10/2023	Result									
						MW94	Ground Water	18/10/2023	Result									
						MW95	Ground Water	18/10/2023	Result									
						MW96	Ground Water	18/10/2023	Result									
						MW97	Ground Water											

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG /	ODWS_MAC /
				WATER / - - Table 4	WATER / - - Table
				- Drinking Water -	1,2 and 3 -
				Reg O.169_03	Drinking Water -
					Reg O.169_03
				L1	L2

MW4

Alkalinity	SM 2320	mg/L as CaCO3	552	500
Total Dissolved Solids	SM 2540C	mg/L	714	500
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	54.7	0.3
Dissolved Organic Carbon	SM 5310	mg/L	6	5

TABLE OF CONTENTS

---

First Page.....	1
Index.....	2
Results.....	3-4
Exceedance Summary.....	5
QC Summary.....	6-11
Legend.....	12
Annexes.....	13



# FINAL REPORT

CA15360-OCT23 R1

Client: Pinchin Ltd

Project: 304108.002-McGarry Landfill GW

Project Manager: Meagan Bradley

Samplers: Jenny & Emily

## MATRIX: WATER

L1 = ODWS AO\_OG / WATER / ... Table 4 - Drinking Water - Reg O 169 03  
 L2 = ODWS\_MAC / WATER / ... Table 1.2 and 3 - Drinking Water - Reg O 169 03

Parameter	Units	RL	L1	L2	Sample Number	7	8	9	10	11	12	13	14
					Sample Name	MW1	MW2	MW3	MW4	MW5	MW7	MW8	GW DUP
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023	18/10/2023
						Result	Result	Result	Result	Result	Result	Result	Result
<b>General Chemistry</b>													
Biochemical Oxygen Demand (BOD5)	mg/L	2				< 41	< 41	< 41	< 41	< 41	< 41	< 41	< 41
Total Suspended Solids	mg/L	2				23100	25300	1020	93	143	14	135	12
Alkalinity	mg/L as CaCO3	2	500			10	26	8	552	17	33	2	32
Conductivity	uS/cm	2				26	65	22	1120	59	62	22	60
Total Dissolved Solids	mg/L	30	500			—	—	< 30	714	34	51	< 30	40
Total Dissolved Solids	mg/L	30	500			100	80	—	—	—	—	—	—
Chemical Oxygen Demand	mg/L	8				< 8	< 8	< 8	20	< 8	< 8	< 8	< 8
Ammonia-Ammonium (N)	as N mg/L	0.04				0.05	0.04	0.05	1.46	< 0.04	0.06	0.05	0.04
Dissolved Organic Carbon	mg/L	1	5			< 1	1	1	8	1	1	3	1
<b>Metals and Inorganics</b>													
Sulphate	mg/L	2	500			7	5	2	120	7	< 2	3	< 2
Nitrate (as N)	as N mg/L	0.06		10		0.16	< 0.06	0.13	< 0.06	< 0.06	< 0.06	0.62	< 0.06
Barium (dissolved)	mg/L	0.0008		1		0.00100	0.00188	0.0107	0.0898	0.00068	0.00242	0.0130	0.00227
Boron (dissolved)	mg/L	0.002		5		< 0.002	0.003	0.015	3.27	0.008	0.005	0.035	0.003
Calcium (dissolved)	mg/L	0.01				2.65	4.91	1.98	204	5.38	9.15	1.11	9.17
Iron (dissolved)	mg/L	0.007	0.3			0.014	< 0.007	0.008	54.7	< 0.007	0.079	0.044	0.073
Magnesium (dissolved)	mg/L	0.001				0.671	1.45	0.414	34.7	1.72	1.55	0.362	1.48
Sodium (dissolved)	mg/L	0.01	200	20		1.51	4.10	1.06	14.5	1.51	0.87	1.85	0.86



**FINAL REPORT**

**CA15360-OCT23 R1**

**304108.002-McGarry Landfill GW**

Prepared for

**Pinchin Ltd**



**First Page**

CLIENT DETAILS		LABORATORY DETAILS	
Client	Pinchin Ltd	Project Specialist	Brad Moore Hon. B.Sc
Address	662 Falconbridge Rd, Unit 3, Sudbury Canada, P3A 4S4 Phone: 705-521-0560. Fax:	Laboratory	SGS Canada Inc.
Contact	Meagan Bradley	Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-521-0560	Telephone	705-652-2143
Facsimile		Facsimile	705-652-6365
Email	mbradley@pinchin.com	Email	brad.moore@sgs.com
Project	304108.002-McGarry Landfill GW	SGS Reference	CA15360-OCT23
Order Number		Received	10/20/2023
Samples	Ground Water (8)	Approved	11/10/2023
		Report Number	CA15360-OCT23 R1
		Date Reported	11/10/2023

**COMMENTS**

Temperature of Sample upon Receipt: 8 degrees C  
 Cooling Agent Present: Yes  
 Custody Seal Present: Yes  
  
 Chain of Custody Number: NA

**SIGNATORIES**

Brad Moore Hon. B.Sc



**LEGEND**

**FOOTNOTES**

**NSS** Insufficient sample for analysis.  
**RL** Reporting Limit  
     ↑ Reporting limit raised.  
     ↓ Reporting limit lowered.  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm).

The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Reproduction of this analytical report in full or in part is prohibited.

This report supersedes all previous versions.

-- End of Analytical Report --





# FINAL REPORT

CA15359-OCT23 R1

## QC SUMMARY

### Phenols by SFA

Method: SM 5530B-D | Internal ref.: ME-CA-IENV/SFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrb Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
4AAP-Phenolics	SKA0198-OCT23	mg/L	0.001	<0.001	ND	10	103	80	120	94	75	125

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrb Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)	
Total Dissolved Solids	EWL0689-OCT23	mg/L	30	<30	5	20	98	80	120	NA	NA

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrb Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)	
Total Suspended Solids	EWL0610-OCT23	mg/L	2	<2	0	10	93	90	110	NA	NA
Total Suspended Solids	EWL0619-OCT23	mg/L	2	<2	2	10	95	90	110	NA	NA



# FINAL REPORT

CA15359-OCT23 R1

## QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-HENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Total Kjeldahl Nitrogen (N)	SKA0221-OCT23	mg/L	0.05	<0.05	1	10	101	90	110	90	75	125

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.



# FINAL REPORT

CA15359-OCT23 R1

## QC SUMMARY

### Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spikes Blank		Matrix Spikes / Ref.			
					RPD	AC (%)	Spikes Recovery (%)	Recovery Limits (%)	Spikes Recovery (%)	Recovery Limits (%)		
Biochemical Oxygen Demand (BOD5)	BOD0048-OCT23	mg/L	2	< 2	21	30	94	70	130	90	70	130

### Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spikes Blank		Matrix Spikes / Ref.			
					RPD	AC (%)	Spikes Recovery (%)	Recovery Limits (%)	Spikes Recovery (%)	Recovery Limits (%)		
Chemical Oxygen Demand	EWL0609-OCT23	mg/L	8	< 8	2	20	102	80	120	97	75	125
Chemical Oxygen Demand	EWL0611-OCT23	mg/L	8	< 8	ND	20	108	80	120	106	75	125

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spikes Blank		Matrix Spikes / Ref.		
					RPD	AC (%)	Spikes Recovery (%)	Recovery Limits (%)	Spikes Recovery (%)	Recovery Limits (%)	
Conductivity	EWL0697-OCT23	uS/cm	2	< 2	1	20	101	90	110	NA	NA



# FINAL REPORT

CA15359-OCT23 R1

## QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CAJENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)
Calcium (total)	EMS0220-OCT23	mg/L	0.01	<0.01	0	20	96	90	110	100	70	130
Iron (total)	EMS0220-OCT23	mg/L	0.007	<0.007	0	20	97	90	110	100	70	130
Magnesium (total)	EMS0220-OCT23	mg/L	0.001	<0.001	4	20	100	90	110	91	70	130
Sodium (total)	EMS0220-OCT23	mg/L	0.01	<0.01	1	20	108	90	110	103	70	130
Phosphorus (total)	EMS0220-OCT23	mg/L	0.003	<0.003	5	20	92	90	110	NV	70	130

pH

Method: SM 4500 | Internal ref.: ME-CAJENVIEW-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)
pH	EWL0597-OCT23	No unit	0.05	NA	0	0	100	NA	NA	NA	NA	NA



# FINAL REPORT

CA15359-OCT23 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicates		LCS/Spike Blank		Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)	
Alkalinity	EWL0597-OCT23	mg/L as CaCO3	2	< 2	0	20	106	80	120	NA	
								Low	High	Low	High

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicates		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Ammonia+Ammonium (N)	SKA0240-OCT23	mg/L	0.04	<0.04	0	10	100	90	110	96	75	125
Ammonia+Ammonium (N)	SKA0249-OCT23	mg/L	0.04	<0.04	ND	10	101	90	110	84	75	125
								Low	High	Low	High	





# FINAL REPORT

CA15359-OCT23 R1

## QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA1ENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)
Chloride	DIO5022-NOV23	mg/L	1	<1	ND	20	104	80	120	107	75	125
Sulfate	DIO5022-NOV23	mg/L	2	<2	ND	20	105	80	120	112	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA1ENVIEWL-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)
Nitrite (as N)	DIO0687-OCT23	mg/L	0.03	<0.03	ND	20	101	90	110	102	75	125
Nitrate (as N)	DIO0687-OCT23	mg/L	0.06	<0.06	0	20	100	90	110	104	75	125



# FINAL REPORT

CA15359-OCT23 R1

Client: Pinchin Ltd  
Project: 304108.002 McGarry Landfill SW  
Project Manager: Meagan Bradley  
Samplers: Jenny & Emily

## MATRIX: WATER

L1 = ODWS\_AO\_OG / WATER / ... Table 4 - Drinking Water - Reg O.169.03  
L2 = ODWS\_MAC / WATER / ... Table 1,2 and 3 - Drinking Water - Reg O.169.03

Sample Number	6	7	8
Sample Name	SW1	SW2	Ditch
Sample Matrix	Surface Water	Surface Water	Surface Water
Sample Date	18/10/2023	18/10/2023	18/10/2023
Parameter	L1	L2	Result
Units	RL	RL	Result
pH	0.05	8.5	5.95
Chloride	1	250	12
4AAP-Phenolics	0.001		0.001
			6.37
			14
			< 1
			0.002
			0.003

### Other (ORP)

### Phenolics

EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO_OG / WATER / - - Table 4 - Drinking Water - Reg O.169_03	ODWS_MAC / WATER / - - Table 1,2 and 3 - Drinking Water - Reg O.169_03
				L1	L2
SW1					
Iron	SM 3030/EPA 200.8	mg/L	0.456	0.3	
SW2					
Iron	SM 3030/EPA 200.8	mg/L	0.547	0.3	
Ditch					
Iron	SM 3030/EPA 200.8	mg/L	1.15	0.3	



TABLE OF CONTENTS

---

First Page.....	1
Index.....	2
Results.....	3-4
Exceedance Summary.....	5
QC Summary.....	6-11
Legend.....	12
Annexes.....	13



# FINAL REPORT

CA15359-OCT23 R1

Client: Pinchin Ltd  
Project: 304108.002 McGarry Landfill SW  
Project Manager: Meagan Bradley  
Samplers: Jenny & Emily

## MATRIX: WATER

Sample Number	6	7	8
Sample Name	SW1	SW2	Ditch
Sample Matrix	Surface Water	Surface Water	Surface Water
Sample Date	18/10/2023	18/10/2023	18/10/2023

## General Chemistry

Parameter	Units	RL	L1	L2	Result	Result	Result	
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †	< 4 †	< 4 †	
Total Suspended Solids	mg/L	2			< 2	3	5	
Alkalinity	mg/L as CaCO3	2	500		3	5	4	
Conductivity	uS/cm	2			50	54	17	
Total Dissolved Solids	mg/L	30	500		37	34	< 30	
Chemical Oxygen Demand	mg/L	8			33	30	36	
Ammonia+Ammonium (N)	as N mg/L	0.04			< 0.04	< 0.04	< 0.04	
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.43	0.50	0.67	
<b>Metals and Inorganics</b>								
Sulphate	mg/L	2	500		< 2	< 2	< 2	
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	< 0.06	0.22	
Hardness	mg/L as CaCO3	0.05	100		7.7	10.4	7.3	
Calcium (total)	mg/L	0.01			2.03	2.69	1.79	
Magnesium (total)	mg/L	0.001			0.635	0.894	0.696	
Sodium (total)	mg/L	0.01	200	20	7.61	7.64	0.32	
Iron (total)	mg/L	0.007	0.3		0.456	0.547	1.15	
Phosphorus (total)	mg/L	0.003			0.011	0.015	0.047	

**SGS**



## FINAL REPORT

CA15359-OCT23 R1

304108.002 McGarry Landfill SW

Prepared for

**Pinchin Ltd**

**First Page**

CLIENT DETAILS		LABORATORY DETAILS	
Client	Pinchin Ltd	Project Specialist	Brad Moore Hon. B.Sc
Address	662 Falconbridge Rd, Unit 3, Sudbury Canada, P3A 4S4 Phone: 705-521-0560. Fax:	Laboratory	SGS Canada Inc.
Contact	Meagan Bradley	Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-521-0560	Telephone	705-652-2143
Facsimile		Facsimile	705-652-6365
Email	mbradley@Pinchin.com	Email	brad.moore@sgs.com
Project	304108.002 McGarry Landfill SW	SGS Reference	CA15359-OCT23
Order Number		Received	10/20/2023
Samples	Surface Water (3)	Approved	11/10/2023
		Report Number	CA15359-OCT23 R1
		Date Reported	11/10/2023

**COMMENTS**

Temperature of Sample upon Receipt: 7 degrees C

**SIGNATORIES**

Brad Moore Hon. B.Sc



LEGEND

FOOTNOTES

**NSS** Insufficient sample for analysis.  
**RL** Reporting Limit  
     ↑ Reporting limit raised.  
     ↓ Reporting limit lowered.  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm).

The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Reproduction of this analytical report in full or in part is prohibited.

This report supersedes all previous versions.

-- End of Analytical Report --







# FINAL REPORT

CA15434-AUG23 R1

## QC SUMMARY

### Phenols by SFA

Method: SM 5630B-D | Internal ref.: ME-CA-IENVISFA-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
4AAP-Phenolics	SKA0064-AUG23	mg/L	0.001	<0.001	ND	10	103	80	120	88	75	125
4AAP-Phenolics	SKA0077-AUG23	mg/L	0.001	<0.001	ND	10	98	80	120	101	75	125

### Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-IENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Total Dissolved Solids	EWL0093-AUG23	mg/L	30	<30	0	20	110	80	120	NA	NA	NA

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Total Suspended Solids	EWL0133-AUG23	mg/L	2	<2	1	10	98	90	110	NA	NA	NA



# FINAL REPORT

CA15434-AUG23 R1

## QC SUMMARY

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-FENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicates		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Recovery Limits (%)
Total Kjeldahl Nitrogen (N)	SKA0080-AUG23	mg/L	0.05	<0.05	1	10	97	90	110	100	75	125

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

**Multielement Scan Qualifier** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.



# FINAL REPORT

CA15434-AUG23 R1

## QC SUMMARY

### Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Biochemical Oxygen Demand (BOD5)	BOD009-AUG23	mg/L	2	< 2	7	30	94	70	130	92	70	130

### Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Chemical Oxygen Demand	EWL0100-AUG23	mg/L	8	< 8	4	20	100	80	120	104	75	125

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Conductivity	EWL0107-AUG23	uS/cm	2	< 2	2	20	99	90	110	NA	NA	NA



# FINAL REPORT

CA15434-AUG23 R1

## QC SUMMARY

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-ENV/SPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicates		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery/Limits (%)	Spike Recovery (%)	Recovery/Limits (%)		
Calcium (total)	EMS0034-AUG23	mg/L	0.01	<0.01	0	20	100	90	110	102	70	130
Iron (total)	EMS0034-AUG23	mg/L	0.007	<0.007	10	20	99	90	110	NV	70	130
Magnesium (total)	EMS0034-AUG23	mg/L	0.001	<0.001	4	20	101	90	110	87	70	130
Sodium (total)	EMS0034-AUG23	mg/L	0.01	<0.01	3	20	96	90	110	107	70	130
Phosphorus (total)	EMS0034-AUG23	mg/L	0.003	<0.003	9	20	100	90	110	NV	70	130

pH

Method: SM 4500 | Internal ref.: ME-CA-ENV/EWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicates		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery/Limits (%)	Spike Recovery (%)	Recovery/Limits (%)		
pH	EWL0107-AUG23	No unit	0.05	NA	0	0	100	Low	High	NA	Low	High



# FINAL REPORT

CA15434-AUG23 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-008

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)	
Alkalinity	EWL0107-AUG23	mg/L as CaCO3	2	2	0	20	102	80	120	NA	
								Low	High	Low	High

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENISFA-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Ammonia+Ammonium (N)	SKA0089-AUG23	mg/L	0.04	<0.04	ND	10	101	90	110	91	75	125
								Low	High	Low	High	



# FINAL REPORT

CA15434-AUG23 R1

## QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-FENVLEM-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery/Limits (%)	Spike Recovery (%)	Recovery/Limits (%)		
Chloride	D105024-AUG23	mg/L	1	<1	0	20	100	80	120	91	75	125
	D105024-AUG23	mg/L	2	<2	3	20	104	80	120	104	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-FENVIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery/Limits (%)	Spike Recovery (%)	Recovery/Limits (%)		
Nitrite (as N)	D100124-AUG23	mg/L	0.03	<0.03	ND	20	97	90	110	98	75	125
Nitrate (as N)	D100124-AUG23	mg/L	0.06	<0.06	0	20	96	90	110	93	75	125



# FINAL REPORT

CA15434-AUG23 R1

Client: Finchin Ltd  
Project: 304108.002-McGarry Landfill SW  
Project Manager: Meagan Bradley  
Samplers: Sarah Burke

## MATRIX: WATER

Parameter	Units	RL	Sample Number	Result	Sample Name	Sample Matrix	Sample Date	Result
			6		SW1	Surface Water	01/08/2023	
			7		Ditch	Surface Water	01/08/2023	
<b>General Chemistry</b>								
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 :				19
Total Suspended Solids	mg/L	2		39				62
Alkalinity	mg/L as CaCO3	2		26				4
Conductivity	uS/cm	2		136				25
Total Dissolved Solids	mg/L	30		149				<30
Chemical Oxygen Demand	mg/L	8		49				69
Ammonia+Ammonium (N)	as N mg/L	0.04		0.18				0.06
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		0.59				1.09
<b>Metals and Inorganics</b>								
Sulphate	mg/L	2		< 2				< 2
Nitrite (as N)	as N mg/L	0.03		< 0.03				< 0.03
Nitrate (as N)	as N mg/L	0.06		< 0.06				< 0.06
Hardness	mg/L as CaCO3	0.05		31.4				5.1
Calcium (total)	mg/L	0.01		9.25				1.28
Sodium (total)	mg/L	0.01		15.7				0.76
Magnesium (total)	mg/L	0.001		2.01				0.466
Iron (total)	mg/L	0.007		4.17				2.39
Phosphorus (total)	mg/L	0.003		0.041				0.246





# FINAL REPORT

CA15434-AUG23 R1

Client: Pinchin Ltd  
Project: 304108.002-McGarry Landfill SW  
Project Manager: Meagan Bradley  
Samplers: Sarah Burke

## MATRIX: WATER

Parameter	Units	RL	Sample Number	6	7
Other (ORP)					
pH	No unit	0.05	Sample Name	SW1	Ditch
Chloride	mg/L	1	Sample Matrix	Surface Water	Surface Water
			Sample Date	01/08/2023	01/08/2023
				Result	Result
Phenols					
4AAP-Phenolics	mg/L	0.001		< 0.001	0.005

**First Page**

**CLIENT DETAILS**

Client **Pinchin Ltd**

Address **662 Falconbridge Rd, Unit 3, Sudbury  
Canada, P3A 4S4  
Phone: 705-521-0560. Fax:**

Contact **Meagan Bradley**

Telephone **705-521-0560**

Facsimile

Email **mbradley@Pinchin.com**

Project **304108.002-McGarry Landfill SW**

Order Number

Samples **Surface Water (2)**

**LABORATORY DETAILS**

Project Specialist **Maarit Wolfe, Hon.B.Sc**

Laboratory **SGS Canada Inc.**

Address **185 Concession St., Lakefield ON, K0L 2H0**

Telephone **705-652-2000**

Facsimile **705-652-6365**

Email **Maarit.Wolfe@sgs.com**

SGS Reference **CA15434-AUG23**

Received **08/03/2023**

Approved **08/11/2023**

Report Number **CA15434-AUG23 R1**

Date Reported **08/11/2023**

**COMMENTS**

Temperature of Sample upon Receipt: 6 degrees C

**SIGNATORIES**

Maarit Wolfe, Hon.B.Sc



TABLE OF CONTENTS

---

First Page.....	1
Index.....	2
Results.....	3-4
QC Summary.....	5-10
Legend.....	11
Annexes.....	12



### Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com (4)

SGS Environmental Services - London: 857 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0381 Web: www.ca.sgs.com (4)

#### Laboratory Information Section

Received Date (mm/dd/yyyy): AUG 03, 2023  
Received Time (After Hours Only):

LAB LIMS #: Aug 15432  
Temperature Upon Receipt (°C): 6, 6, 5

#### Billing & Reporting Information

Invoice/Receipt to (3):

Company:	Pinchin	Quote #:	2022 330
Attention:	Meagan Bradley	Attached Parameter List:	<input type="checkbox"/> YES <input type="checkbox"/> NO
Address:	862 Falconbridge Rd, Unit 3 Sudbury, ON P3A 4S4	Turnaround Time	Is *Rush Turnaround Time Required? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
Email:	mbradley@pinchin.com	Specify:	* Rush TA Requests Require Lab Approval

Project Name/Number: 304108.002-MoGarry Landfill GW P.O. #:

#### Client Information/Report To:

Company Name:	<u>Same as above.</u>	Phone Number:	705-521-0560
Contact Name:		Fax Number:	
Address:		E-mail:	
Copy to:			

#### Sample Information

Sample Identifier	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)					
				Field Filtered	Field Temp (°C)	Field pH	GW Package Col#1 (Spring)	GW-VOG's Col#1	
MW1	08/01/23	4-6	000	Y			X	X	
MW2	↓	↓	000	Y			X	X	
MW3	↓	↓	000	Y			X	X	
MW4	↓	↓	000	Y			X	X	
MW5	↓	↓	000	Y			X	X	
MW7	↓	↓	000	Y			X	X	
MW8	↓	↓	000	Y			X	X	
GW DUP	↓	↓	000	Y			X	X	

Sampled By (1): (Name) <u>Sarah Burke</u>	(Signature) <u>Sarah Burke</u>	Date: <u>08/02/23</u> (mm/dd/yy)
Relinquished by (2): (Name) <u>Sarah Burke</u>	(Signature) <u>Sarah Burke</u>	Date: <u>08/02/23</u> (mm/dd/yy)

Notes: (1) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. (4) Completion of work may require the subcontracting of samples between the London and Lakefield laboratories.  
This document is issued by the Company under its General Conditions of Service accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm). (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

**SGS**



## **FINAL REPORT**

**CA15434-AUG23 R1**

**304108.002-McGarry Landfill SW**

Prepared for

**Pinchin Ltd**



# FINAL REPORT

CA15432-AUG23 R1

## QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicates		LCS/Spike Blank				Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High	Spike Recovery (%)	Low	High
Total Suspended Solids	EWL0133-AUG23	mg/L	2	< 2	1	10	98	90	110	90	110	NA	NA
Total Suspended Solids	EWL0135-AUG23	mg/L	2	< 2	8	10	92	90	110	90	110	NA	NA
Total Suspended Solids	EWL0136-AUG23	mg/L	2	< 2	3	10	107	90	110	90	110	NA	NA

**Method Blank:** a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

**Duplicate:** Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

**LCS/Spike Blank:** Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

**Reference Material:** a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

## LEGEND

## FOOTNOTES

**NSS** Insufficient sample for analysis  
**RL** Reporting Limit  
↑ Reporting limit raised.  
↓ Reporting limit lowered  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

\*Temperature Upon Receipt\* is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV 1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm).

The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Reproduction of this analytical report in full or in part is prohibited.

This report supersedes all previous versions.

– End of Analytical Report –



# FINAL REPORT

CA15432-AUG23 R1

## QC SUMMARY

### Conductivity

Method: SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)
Conductivity	EML0107-AUG23	uS/cm	2	< 2	2	20	99	90	110	NA

### Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)
Barium (dissolved)	EMS0031-AUG23	mg/L	0.00002	<0.00008	3	20	95	90	110	70
Boron (dissolved)	EMS0031-AUG23	mg/L	0.002	<0.002	0	20	96	90	110	70
Calcium (dissolved)	EMS0031-AUG23	mg/L	0.01	<0.01	1	20	104	90	110	70
Iron (dissolved)	EMS0031-AUG23	mg/L	0.007	<0.007	19	20	103	90	110	70
Magnesium (dissolved)	EMS0031-AUG23	mg/L	0.001	<0.001	1	20	104	90	110	70
Sodium (dissolved)	EMS0031-AUG23	mg/L	0.01	<0.01	1	20	102	90	110	70





# FINAL REPORT

CA15432-AUG23 R1

## QC SUMMARY

pH

Method: SM 4500 | Internal ref.: ME-CA-ENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		Spikes Recovery (%)	LCS/Spike Blank Recovery Limits (%)		Spike Recovery (%)	Matrix Spike / Ref. Recovery Limits (%)	
					RPD	AC (%)		Low	High		Low	High
pH	EWL0107-AUG23	No unit	0.05	N/A	0	0	100	Low	High	N/A	Low	High

## Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-ENVIEWL-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		Spikes Recovery (%)	LCS/Spike Blank Recovery Limits (%)		Spike Recovery (%)	Matrix Spike / Ref. Recovery Limits (%)	
					RPD	AC (%)		Low	High		Low	High
Total Dissolved Solids	EWL0093-AUG23	mg/L	30	<30	0	20	110	Low	High	N/A	Low	High



# FINAL REPORT

CA15432-AUG23 R1

## QC SUMMARY

Anions by discrete analyzer

Method: US EPA 325.2 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-026

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Chloride	DIO5025-AUG23	mg/L	1	<1	0	20	100	80	120	92	75	125
Sulphate	DIO5025-AUG23	mg/L	2	<2	2	20	103	80	120	106	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Nitrite (as N)	DIO0125-AUG23	mg/L	0.03	<0.03	0	20	98	90	110	101	75	125
Nitrate (as N)	DIO0125-AUG23	mg/L	0.06	<0.06	0	20	97	90	110	102	75	125



# FINAL REPORT

CA15432-AUG23 R1

## QC SUMMARY

Biochemical Oxygen Demand

Method: SM 5210 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)
Biochemical Oxygen Demand (BOD5)	BOD0009-AUG23	mg/L	2	< 2	7	30	94	70 - 130	92	70 - 130

Carbon by SFA

Method: SM 5310 | Internal ref.: ME-CA-IENVISFA-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)
Dissolved Organic Carbon	SKA0063-AUG23	mg/L	1	< 1	ND	20	107	90 - 110	106	75 - 125

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-009

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.	
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)
Chemical Oxygen Demand	EWL0100-AUG23	mg/L	8	< 8	4	20	100	80 - 120	104	75 - 125
Chemical Oxygen Demand	EWL0125-AUG23	mg/L	8	< 8	ND	20	96	80 - 120	86	75 - 125





# FINAL REPORT

CA15432-AUG23 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-IENVISFALAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.				
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High		
Alkalinity	EWL0107-AUG23	mg/L as CaCO3	2	2	0	20	102	80	120	N/A				

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFALAK-AN-007

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.				
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)	Low	High		
Ammonia+Ammonium (N)	SKA0079-AUG23	mg/L	0.04	<0.04	0	10	100	90	110	97				

TABLE OF CONTENTS

---

First Page.....	1
Index.....	2
Results.....	3-4
QC Summary.....	5-10
Legend.....	11
Annexes.....	12



# FINAL REPORT

CA15432-AUG23 R1

Client: Pinchin Ltd  
 Project: 304108.002 - McGarry Landfill GW  
 Project Manager: Meagan Bradley  
 Samplers: Sarah Burke

## MATRIX: WATER

Parameter	Units	RL	Sample Number	7	8	9	10	11	12	13	14
General Chemistry			Sample Name	MW1	MW2	MW3	MW4	MW5	MW7	MW8	GW DUP
			Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
			Sample Date	01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023	01/08/2023
			Result	Result	Result	Result	Result	Result	Result	Result	Result
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 41	< 41	6	< 41	< 41	< 41	< 41	< 41
Total Suspended Solids	mg/L	2		673000	2210	821	102	93	5	171	7
Alkalinity	mg/L as CaCO3	2		10	22	8	480	15	24	< 2	25
Conductivity	uS/cm	2		25	59	25	1100	48	48	25	52
Total Dissolved Solids	mg/L	30		197	60	34	840	< 30	57	< 30	< 30
Chemical Oxygen Demand	mg/L	8		13	< 8	9	34	< 8	< 8	18	< 8
Ammonia-Ammonium (N)	as N mg/L	0.04		0.06	< 0.04	< 0.04	1.41	< 0.04	0.04	0.04	< 0.04
Dissolved Organic Carbon	mg/L	1		< 1	1	1	8	1	< 1	2	1
<b>Metals and Inorganics</b>											
Sulphate	mg/L	2		10	5	2	150	6	< 2	2	< 2
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		< 0.06	< 0.06	0.15	< 0.06	< 0.06	< 0.06	1.75	< 0.06
Barium (dissolved)	mg/L	0.0002		0.00057	0.00156	0.00978	0.0819	0.00049	0.00200	0.0127	0.00174
Boron (dissolved)	mg/L	0.002		< 0.002	0.002	0.003	3.44	0.005	0.004	0.002	0.004
Calcium (dissolved)	mg/L	0.01		2.61	5.35	2.19	194	5.04	7.78	1.53	7.45
Iron (dissolved)	mg/L	0.007		0.233	0.148	0.295	38.9	< 0.007	1.13	0.014	0.215
Magnesium (dissolved)	mg/L	0.001		0.587	1.28	0.446	28.6	1.22	1.12	0.468	1.04
Sodium (dissolved)	mg/L	0.01		1.26	4.21	1.16	16.6	1.31	1.12	1.09	0.70

**SGS**



## FINAL REPORT

CA15432-AUG23 R1

304108.002 - McGarry Landfill GW

Prepared for

**Pinchin Ltd**



**First Page**

**CLIENT DETAILS**

Client **Pinchin Ltd**

Address **662 Falconbridge Rd, Unit 3, Sudbury  
Canada, P3A 4S4  
Phone: 705-521-0560. Fax:**

Contact **Meagan Bradley**

Telephone **705-521-0560**

Facsimile

Email **mbradley@pinchin.com**

Project **304108.002 - McGarry Landfill GW**

Order Number

Samples **Ground Water (8)**

**LABORATORY DETAILS**

Project Specialist **Maarit Wolfe, Hon.B.Sc**

Laboratory **SGS Canada Inc.**

Address **185 Concession St., Lakefield ON, K0L 2H0**

Telephone **705-652-2000**

Facsimile **705-652-6365**

Email **Maarit.Wolfe@sgs.com**

SGS Reference **CA15432-AUG23**

Received **08/03/2023**

Approved **08/11/2023**

Report Number **CA15432-AUG23 R1**

Date Reported **08/11/2023**

**COMMENTS**

Temperature of Sample upon Receipt: 6 degrees C  
Cooling Agent Present: Yes  
Custody Seal Present: Yes

Chain of Custody Number: NA

**SIGNATORIES**

Maarit Wolfe, Hon.B.Sc



**LEGEND****FOOTNOTES**

**NSS** Insufficient sample for analysis.  
**RL** Reporting Limit.  
↑ Reporting limit raised.  
↓ Reporting limit lowered.  
**NA** The sample was not analysed for this analyte  
**ND** Non Detect

Results relate only to the sample tested.

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.

"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at [http://www.sgs.com/terms\\_and\\_conditions.htm](http://www.sgs.com/terms_and_conditions.htm).

The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Reproduction of this analytical report in full or in part is prohibited.

This report supersedes all previous versions.

-- End of Analytical Report --



Request for Laboratory Services and CHAIN OF CUSTODY (General)

SGS Environmental Services - Lakeside 185 Concession St., Lakeside, ON N0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7656 Fax: 705-652-6365 Web: www.ca.sgs.com (4)
SGS Environmental Services - London 657 Concession Court, London, ON N6E 2S8 Phone: 519-672-4500 Toll Free: 877-648-8060 Fax: 519-672-0361 Web: www.ca.sgs.com (4)

Laboratory Information Section

Received Date (mm/dd/yyyy): JUN 12 2023 LAB LIMS #: CA 5490 Jim 23
Received Time (After Hours Only): Temperature Upon Receipt (°C): 11x3

Billing & Reporting Information

Invoice/Receipt to (3): Company: Pinchin Attention: Meagan Bradley Address: 662 Falconbridge Rd, Unit 3 Sudbury, ON P3A 4S4 Email: mbradley@pinchin.com
Quote #: 2022 330 Attached Parameter List: [ ] YES [ ] NO Turnaround Time: Is "Rush Turnaround Time Required?" [ ] YES [X] NO
Project Name/Number: 304108 002 McGarry Landfill SW P.O. #: \* Rush TA Requests Require Lab Approval

Client Information/Report To:

Company Name: Pinchin Phone Number: 705-521-0560
Contact Name: Meagan Bradley Fax Number:
Address: E-mail:
Copy to:

Sample Information

Table with columns: Sample Identifier, Date Sampled (mm/dd/yy), Time Sampled, # of Bottles, Analysis Requested (Field Filtered, Field Temp (°C), Field pH, SW Package Col#3 (Spring)). Rows include SW1, SW2, Ditch, Pond.

Sampled By (1): (Name) Sarah Burke (Signature) Sarah Burke Date: 05.31.23 (mm/dd/yy)
Relinquished by (2): (Name) Sarah Burke (Signature) Sarah Burke Date: 05.31.23 (mm/dd/yy)

Note: (1) Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection, handling and transportation of samples. (2) Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). (3) Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request. (4) Completion of work may require the subcontracting of samples between the London and Lakeside laboratories.
This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms\_and\_conditions.htm (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

1/2 Coolers

930 J PP



# FINAL REPORT

CA15490-JUN23 R1

## QC SUMMARY

### Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-IENVIEWL-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)	
Total Suspended Solids	EWL0097-JUN23	mg/L	2	< 2	0	10	97	90	110	NA	
								Low	High	Low	High

### Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-IENVISFA-LAK-AN-002

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank		Matrix Spike / Ref.			
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)	Spike Recovery (%)	Recovery Limits (%)		
Total Kjeldahl Nitrogen (N)	SKA0057-JUN23	mg/L	0.05	<0.05	ND	10	94	90	110	81	75	125
								Low	High	Low	High	



# FINAL REPORT

CA15490-JUN23 R1

## QC SUMMARY

**Method Blank:** a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

**Duplicate:** Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

**LCS/Spike Blank:** Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

**Matrix Spike:** A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

**Reference Material:** a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

**RL:** Reporting limit

**RPD:** Relative percent difference

**AC:** Acceptance criteria

**Multielement Scan Qualifier:** as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

**Duplicate Qualifier:** for duplicates as the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.  
**Matrix Spike Qualifier:** for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.