



# 2021 Annual Monitoring Report

Croft Waste Disposal Site  
Magnetawan, Ontario

Prepared for:

**Municipality of Magnetawan**

4304 Highway 520  
Magnetawan, ON P0A 1P0

March 25, 2022

Pinchin File: 225335.006



**2021 Annual Monitoring Report**

Croft Waste Disposal Site, Magnetawan, Ontario  
Municipality of Magnetawan

March 25, 2022  
Pinchin File: 225335.006

**Issued to:** Municipality of Magnetawan  
**Contact:** Clerk-Administrator  
**Issued on:** March 25, 2022  
**Pinchin file:** 225335.006  
**Issuing Office:** Sudbury, ON  
**Primary Pinchin Contact:** Tim McBride

---

Author: \_\_\_\_\_  
Meagan Bradley, B.A.  
Project Technologist  
705.521.0560  
[mbradley@pinchin.com](mailto:mbradley@pinchin.com)

Reviewer: \_\_\_\_\_  
Tim McBride, B.Sc., P. Geo., QP<sub>ESA</sub>  
Director, Landfill & Municipal Services  
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 .....	2
1.3	Description and Development of the Site .....	2
1.3.1	Site Document Review.....	2
1.4	Monitoring and Reporting Program Objectives and Requirements .....	3
1.5	Assumptions and Limitations.....	3
2.0	PHYSICAL SETTING .....	5
2.1	Geology and Hydrogeology .....	5
2.2	Surface Water Features .....	6
2.3	Historical Data .....	6
2.3.1	Historical Groundwater Data.....	6
2.3.2	Historical Surface Water Data.....	6
3.0	METHODOLOGY .....	7
3.1	Scope of Work .....	7
3.2	Groundwater Monitoring Well Locations .....	8
3.3	Surface Water Monitoring Locations .....	10
3.4	Monitoring Frequency.....	11
3.5	Monitoring Parameters .....	11
3.5.1	Groundwater Monitoring Parameters.....	11
3.5.2	Surface Water Monitoring Parameters .....	11
3.6	Monitoring Procedures and Methods .....	11
3.6.1	Standard Operating Procedures .....	11
3.6.2	Groundwater Monitoring Activities .....	11
3.6.3	Surface Water Monitoring Activities .....	12
3.6.4	Groundwater and Surface Water Field Measurements .....	13
3.6.5	Record Keeping and Field Notes .....	15
3.7	Quality Assurance for Sampling and Analysis.....	15
3.8	Data Quality Evaluation .....	16
4.0	ASSESSMENT, INTERPRETATION AND DISCUSSION.....	17
4.1	Groundwater Quality Monitoring.....	17
4.1.1	The Reasonable Use Criteria Assessment (RUC).....	17
4.1.2	The Ontario Drinking Water Quality Standards (ODWQS).....	18
4.2	Groundwater Results.....	19
4.2.1	Background Water Quality Evaluation .....	20
4.2.2	Leachate Source Quality Evaluation.....	20
4.2.3	Immediately Downgradient Water Quality Evaluation.....	20
4.2.4	Downgradient Water Quality Evaluation .....	21
4.3	Groundwater Trend Analysis .....	24
4.4	Groundwater Field Measurement Results .....	25
4.5	Surface Water Quality Monitoring.....	25
4.5.1	The Provincial Water Quality Objectives (PWQO).....	25
4.5.2	Aquatic Protection Values (APV) .....	26
4.5.3	Canadian Water Quality Guidelines (CWQG).....	26
4.6	Surface Water Results.....	26



4.7	Surface Water Trend Analysis.....	27
4.8	Surface Water Field Measurement Results.....	28
4.9	Groundwater Flow Interpretation .....	28
4.10	Leachate Characterization.....	28
4.11	Contaminant Attenuation Zone .....	29
4.12	Adequacy of the Monitoring Program .....	29
4.12.1	Monitoring Well Network Efficiency.....	29
4.12.2	Background Monitoring Well Efficiency .....	30
4.13	Supplemental Monitoring: Sediment, Benthic and/or Toxicity Monitoring .....	30
4.14	Assessment of the Need for Implementation of Contingency Measures .....	30
4.15	Waste Disposal Site Gas Impacts .....	30
4.16	Effectiveness of Engineered Controls .....	30
4.17	Control Systems Monitoring .....	30
4.18	QA/QC Results .....	31
5.0	CONCLUSIONS .....	32
6.0	RECOMMENDATIONS .....	34
7.0	MONITORING AND SCREENING CHECKLIST .....	35
8.0	DISCLAIMER .....	35

## APPENDICES

APPENDIX I	Figures
APPENDIX II	Borehole Logs
APPENDIX III	Summary Tables
APPENDIX IV	Photographic Log
APPENDIX V	Laboratory Certificates of Analysis
APPENDIX VI	Groundwater Trend Analysis
APPENDIX VII	Surface Water Trend Analysis
APPENDIX VIII	Monitoring and Screening Checklist





## **FIGURES**

Figure 1 – Key Map

Figure 2 – Site Plan

Figure 3 – Groundwater and Surface Water Locations

Figure 4 – Inferred Groundwater Contours – Spring 2021

Figure 5 – Inferred Groundwater Contours – Fall 2021

## **TABLES**

Table 1 – Groundwater Monitoring Well Data

Table 2 – Surface Water Monitoring Data

Table 3 – Groundwater Quality Results – BH1

Table 4 – Groundwater Quality Results – BH8

Table 5 – Groundwater Quality Results – BH9

Table 6 – Groundwater Quality Results – BH10

Table 7 – Groundwater Quality Results – BH11

Table 8 – Groundwater Quality Results – DP7

Table 9 – Groundwater Quality Results – BH12

Table 10– Groundwater Quality Results – BH13

Table 11 – Groundwater Quality Results – BH14

Table 12 – Reasonable Use Criteria Assessment – Spring 2021

Table 13 – Reasonable Use Criteria Assessment – Fall 2021

Table 14 – Surface Water Quality Results – SW1

Table 15 – Surface Water Quality Results – SW2

Table 16 – Surface Water Quality Results – SW3

Table 17 – Groundwater Duplicate Data

Table 18 – Surface Water Duplicate Data



## **1.0 INTRODUCTION**

Pinchin Ltd. (Pinchin) was retained by the Corporation of the Municipality of Magnetawan (Client) to prepare the 2021 annual groundwater and surface water monitoring report for the Croft Waste Disposal Site (the Site). The following report provides a detailed evaluation and summary of the 2021 monitoring data and was completed to constitute the 2021 Annual Monitoring Report. This document includes, but is not limited to, a summary of historical geochemical data, a review/evaluation of the historical and current geochemical data (as well as groundwater flow), and a summary of geochemical trends.

The purpose of completing the monitoring program was to assess the hydraulic media for contaminants of concern as a compliance requirement under the Site Certificate of Approval (CofA) Number **A7034002** and the applicable regulatory requirements during the spring and fall of 2021. 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 property is located in Lot 26, Concession 11, within the Municipality of Magnetawan, District of Parry Sound, Ontario and is located approximately 12 kilometres (km) east-northeast of the Township of Magnetawan, Ontario. The Site is situated in an undeveloped area and the visibility of landfilling activities is limited from the adjacent roadway due to mature tree growth. The Site location is indicated on Figure 1 (all Figures are provided in Appendix I).

The Site is located at Universal Transverse Mercator (UTM) coordinates Zone 17U, 593,659 meters (m) Easting and 5,058,398 m Northing (North American Datum 1983). Landfill coordinates were obtained using a Global Positioning System and are accurate within 10 m.

#### **1.1.1 Site Survey and Aerial Photography**

At the time of preparation of this report, previous survey information of the Site and existing monitoring well elevations were provided to Pinchin for review. The available top of casing monitoring well elevation data obtained from the previous survey have been used in the following sections of this report to calculate groundwater elevation contours.

A topographic survey of the Site was completed in 2019 using an Unmanned Aerial Vehicle (UAV) in conjunction with the spring 2019 monitoring event completed by Pinchin for the purpose of creating an accurate aerial image of the Site, while also capturing the current Site topographic conditions.



## **1.2 Ownership and Key Personnel**

The Site is owned and operated by the Corporation of the Municipality of Magnetawan, located in Magnetawan, Ontario. The project was completed for the following representative on behalf of the Municipality:

Kerstin Vroom, Clerk/CAO  
Municipality of Magnetawan Government Office  
4304 Highway #520  
Magnetawan, ON P0A 1P0

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., Q.P.<sup>ESA</sup>  
Pinchin Ltd.  
662 Falconbridge Road, Unit #3  
Sudbury, ON P3A 4S4

## **1.3 Description and Development of the Site**

The Site is operated as a domestic landfill for municipal and non-hazardous, solid, industrial and commercial wastes to be utilized by residences of the area. The Site was approved with a total fill area of 2.5 hectares (ha) within a 33.7 ha property. A road with a locked gate is located east of the Site which provides access to the Site from the west side of 25<sup>th</sup> and 26<sup>th</sup> Side Road, approximately 1 km north of the intersection of 25<sup>th</sup> and 26<sup>th</sup> Side Road and Highway 520.

The active landfilling area is currently located within the northern portion of the Site. A site capacity survey was completed by D.M. Wills on November 1, 2018 which resulted in an estimated remaining capacity of approximately 23,565 cubic metres (m<sup>3</sup>) and an approximate remaining life expectancy of 39 years.

A map illustrating the site features is provided as Figure 2.

### **1.3.1 Site Document Review**

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

- Report entitled "2018 Annual Monitoring Report, Croft Waste Disposal Site, Magnetawan, Ontario" completed by D.M. Wills Associates Limited for the Corporation of the Municipality of Magnetawan dated March 2019 (the 2018 D.M. Wills Monitoring Report);



- Report entitled “*2019 Annual Monitoring Report, Croft Waste Disposal Site, Magnetawan, Ontario*” completed by Pinchin Ltd. for the Municipality of Magnetawan dated December 12, 2019 (the 2019 Pinchin Monitoring Report);
- Report entitled “*Aquifer Instrumentation Memo, Croft Waste Disposal Site, Magnetawan, Ontario*” completed by Pinchin Ltd. for the Municipality of Magnetawan dated June 16, 2020; and
- Report entitled “*2020 Annual Monitoring Report, Croft Waste Disposal Site, Magnetawan, Ontario*” completed by Pinchin Ltd. for the Municipality of Magnetawan dated February 2, 2020 (the 2020 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 this report is referenced in pertinent sections throughout this document.

#### **1.4 Monitoring and Reporting Program Objectives and Requirements**

The site specific CofA for the Site was not provided to Pinchin for review at the time of this monitoring period. The monitoring and reporting completed by Pinchin has been generally developed based on the Ministry of Environment, Conservation and Parks (MECP) document entitled “*Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document*” dated November 2010, as well as the Client’s request for 2021 monitoring and annual reporting.

#### **1.5 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, and as such, previous reports have been relied on for information where required.

The scope of the monitoring activities was limited to the parameters listed in the 2018 D.M. Wills Monitoring Report and the 2019 and 2020 Pinchin Monitoring Reports for groundwater and surface water 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 and time and budgetary limitations described in our 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 the conclusions in this report 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, are 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**

The Site is located in an area of low relief with numerous small shallow lakes and wetlands interspersed within forested lands dominated by black spruce and poplar. According to previous annual monitoring reports for the Site, the Ontario Geological Survey mapping indicates that the regional geology near the Site is dominated by Precambrian bedrock with local areas of very thin overburden and sand pockets. The underlying Precambrian bedrock is of gneissic composition with very little weathering and lies within the Ahmic Domain of the Central Gneiss Belt. According to the report, mapping indicates the presence of a glaciocustrine sand deposit in the vicinity of the Site, as well as a historical sand pit that operated in the area which is likely where the landfill was developed.

To the north of the Site, bedrock outcrops at surface and rises gradually in elevation toward the north, defining a minor east-west trending ridge approximately 50 m north of the Site. To the east of the Site, the bedrock gradually dips southward from the east-west trending ridge. To the south and west of the Site, the shallow bedrock is inferred to define a minor northwest trending bedrock ridge. Previous intrusive investigations also indicate that the overburden in this area appeared to be thin and was composed of sandy silt till and sand.

Based on the borehole logs for the monitoring wells and drive points at the Site, the subsoil conditions beneath the Site consist of sand and sandy silt till overlying gneissic bedrock. Borehole logs for the monitoring wells on-Site are provided in Appendix II, with the exception of the borehole log for BH1. No other borehole logs were provided to Pinchin for review.

Static water levels were recorded by Pinchin in all of the accessible wells for each of the 2021 groundwater monitoring events. Water levels were measured prior to purging and developing in preparation for sampling, to ensure the water levels are representative of static conditions. Tables that summarize the spring and fall 2021 groundwater elevations, as measured by Pinchin personnel, are presented in Table 1 (all tables are provided in Appendix III).

In general, the static groundwater levels exist within 4 m of surface for most wells, with the deepest depth to water (1.94 metres below ground surface (mbgs)) recorded at BH-13, located northeast of the Site, during the fall monitoring event. Groundwater movement at the Site has been established (by water level contouring), as being directed in a northerly direction, with the highest groundwater elevations recorded at



BH1 and the lowest at DP-7. In addition, there appears to be a radial influence on the groundwater table associated with the apparent groundwater mounding within the above grade waste deposits.

## **2.2 Surface Water Features**

An unnamed tributary to Ahmic Lake is located to the south of the Site, where surface water monitoring location SW1 is located. Love Lake is located approximately 500 m northeast of the Site, where surface water monitoring location SW2 is located to monitor overland flow into the lake from the north side of the Site. A third surface water monitoring location, SW3, is situated in a pool of water along the northwest edge of the landfill footprint to characterize surface water run-off originating within the landfill footprint.

## **2.3 Historical Data**

Pinchin reviewed the 2018 D.M. Wills Annual Monitoring Report and the 2019 and 2020 Pinchin Annual Monitoring Reports to evaluate historical data and groundwater and surface water quality conditions. No other water quality data from the existing monitoring well network was available to review as part of this monitoring program.

### *2.3.1 Historical Groundwater Data*

Monitoring well BH1 was determined to be located upgradient of the waste deposits and has historically been used to monitor background water quality at the Site. Based on the results of the 2019 and 2020 Reports, moderate leachate effects are present immediately downgradient of the landfill along the limit of waste as measured at wells BH10 and BH11 (which both quantified Guideline B-7 exceedances in 2020 for chloride, sodium, boron, total dissolved solids and alkalinity). The results also indicated that well BH9 may also be experiencing minor leachate effects for multiple parameters which were interpreted to be attenuating with further distance from the Site. The furthest downgradient well, BH8, was interpreted to be only slightly affected by landfill leachate. It was noted that significant distance to the downgradient (northern) property boundary exists to allow for additional natural attenuation.

Additional well installations were recommended to further characterize the groundwater at the Site in the downgradient directions and closer to the property boundary. It was recommended that one well be located directly north of the proposed limit of the waste and one further downgradient from BH10 and BH11 in the east-northeast.

### *2.3.2 Historical Surface Water Data*

A review of the 2019 and 2020 surface water quality results identified slight leachate effects at the downgradient surface water location SW2. These effects were interpreted to be minor and to potentially be mostly attributed to naturally elevated parameters of iron, aluminum, phenols, total phosphorous and cobalt.

### 3.0 METHODOLOGY

#### 3.1 Scope of Work

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

- Mobilization to the Site during the spring and fall of 2021 and collection of groundwater and surface water samples from the existing well network and surface water monitoring locations;
- Submission of the groundwater and surface water samples to an accredited analytical laboratory for analysis of the chemical parameters specified by the client; and
- Preparation of a report outlining the 2021 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;
- 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 MECPE 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);
- Ontario Regulation 903 R.R.O. 1990 "*Wells*", under the Ontario Water Resources Act;
- 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; and
- Canadian Council of Ministers of the Environment (CCME) document entitled “Canadian Water Quality Guidelines” (Table 3-1 – Summary Guidelines for Freshwater Aquatic Life) dated November 2008.

### **3.2 Groundwater Monitoring Well Locations**

Historically, the original groundwater monitoring well network for the Site was established in 2003 and consisted of seven shallow overburden wells (BH1, BH2, BH3, BH4, BH5, BH6 and BH7). Monitoring wells BH2, BH3, BH5, BH6 and BH7 were found to be destroyed, prior to 2016. Additional monitoring wells (BH8, BH9, BH10 and BH11) and drive point monitors (DP6, DP7, DP8 and DP9) were installed in June 2015 to replace the destroyed wells. In the spring of 2017, monitoring well BH4 and drive point monitor DP6 were also found to be destroyed due to landfilling operations at the Site.

The configuration of the existing monitoring well network was interpreted to be sufficient to monitor the performance of the landfill, however, was deemed to be overly conservative as a measure of compliance, as these wells were being utilized for the evaluation of the Site versus the MECP Guideline B-7 procedure, which is applicable at the downgradient property line. As a result, the installation of three additional bedrock monitoring wells (BH12, BH13 and BH14) was recommended in the 2019 Pinchin Annual Monitoring Report, in order to allow for further characterization of groundwater quality downgradient of the Site in the north and east directions. The installation of these additional monitoring wells was completed on April 22, 2020. The details of the well installations are included in the Pinchin Aquifer Instrumentation Memo, dated June 16, 2020. Borehole logs for each of the three newly installed wells are included within Appendix II.

The current groundwater monitoring well network at the Site consists of eight bedrock groundwater monitoring wells (BH1, BH8, BH9, BH10, BH11, BH12, BH13 and BH14) and three drive point monitors (DP7, DP8 and DP9). The locations of all the monitoring wells included in the current monitoring program are illustrated on Figure 3. Detailed locations with coordinates in NAD 83 and the available monitoring well elevations for top of casing are provided in Table 1.

All groundwater monitoring wells were sampled during the spring and fall 2021 sampling events, with the exception of DP7, DP8 and DP9 in the spring and fall, due to these driven point wells having insufficient volume to sample at the time of the monitoring events.

The following table presents a summary of the well construction details and respective on-Site positions of the groundwater monitoring network, based on the borehole logs provided in Appendix II. Construction details for monitoring well BH1 are unknown, as Pinchin was not provided the borehole log for this well to review at the time of preparation of this report. All wells were inspected and found to be in good condition. No wells displayed evidence of a condition non-compliant with Ontario Regulation 903. A photographic log of all groundwater monitoring wells is provided in Appendix IV.

Well ID	Condition	Total Depth (mbgs)	Screened Interval (mbgs)	Screened Interval (masl)	Unit Screened
BH1	Good	Unknown			
BH8	Good	5.72	1.2 – 5.7	290.4 – 285.9	Gneissic bedrock
BH9	Good	3.89	0.8 – 3.9	288.4 – 285.6	Sand and Gneissic bedrock
BH10	Good	4.06	0.9 – 4.1	290.0 – 286.8	Sand and Gneissic bedrock
BH11	Good	4.39	0.9 – 4.4	289.9 – 286.4	Gneissic bedrock
DP7	Okay	1.72	1.0 – 1.7	288.3 – 287.6	Sandy silt till
DP8	Okay	1.41	0.7 – 1.4	289.8 – 289.1	Sand
DP9	Okay	1.27	0.5 – 1.3	289.5 – 288.7	Sand
BH12	Good	6.10	3.0 - 6.0	285.9 – 282.9	Gneissic bedrock
BH13	Good	6.10	3.0 - 6.0	287.8 – 281.8	Gneissic bedrock
BH14	Good	6.10	3.0 - 6.0	286.4 – 283.4	Gneissic bedrock

The following table illustrates the location of each of the monitoring wells with respect to its rationale in the annual monitoring program.

Monitoring Well ID	Location	Rationale
BH1	Southwest of the Site	Background
BH8	Northwest of the Site	Downgradient
BH9	Immediately northwest of the Site	Downgradient
BH10	Immediately east of the Site	Immediately Downgradient

Monitoring Well ID	Location	Rationale
BH11	Immediately northeast of the Site	Immediately Downgradient
DP7	Northwest of the Site	Downgradient
DP8	East of the Site	Downgradient
DP9	East of the Site	Downgradient
BH12	North of the Site	Downgradient
BH13	Northeast of the Site	Downgradient
BH14	Northeast of the Site	Downgradient

### 3.3 Surface Water Monitoring Locations

The Site has three historical points for surface water monitoring, SW1 through SW3. All surface water monitoring locations were monitored during the spring and fall 2021 sampling events. The following table illustrates the location of each of the surface water monitoring locations with respect to its rationale in the annual monitoring program.

Monitoring Well ID	Location	Rationale
SW1	Stream to the south of the Site, at culvert on west side of 25 <sup>th</sup> and 26 <sup>th</sup> Side Road North.	Upstream Monitoring Location
SW2	Love Lake, north of the Site.	Downstream Monitoring Location
SW3	Pool of water at northwest corner of the Site.	Source Monitoring Location

The locations of the surface water monitoring locations are illustrated on Figure 3. Details regarding the surface water monitoring locations are provided in Table 2. Photos of all surface water monitoring locations are provided in Appendix IV.

### **3.4 Monitoring Frequency**

As per previous annual monitoring events, groundwater and surface water was sampled twice annually by Pinchin during 2020, in the spring and fall. Groundwater and surface water sampling events occurred on the following dates:

- Spring – May 12, 2021; and
- Fall – October 7, 2021.

### **3.5 Monitoring Parameters**

#### *3.5.1 Groundwater Monitoring Parameters*

Groundwater samples were submitted for laboratory analysis of the parameters listed in the previous monitoring reports. At the time of sample collection, field readings for the following parameters were measured: temperature, pH, conductivity, oxidation reduction potential (ORP) and dissolved oxygen (DO).

#### *3.5.2 Surface Water Monitoring Parameters*

Surface water samples were submitted for laboratory analysis of the parameters listed in the previous monitoring reports. At the time of the surface water sample collection, field readings for the following parameters were measured: temperature, pH, conductivity, ORP and DO.

### **3.6 Monitoring Procedures and Methods**

#### *3.6.1 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.

#### *3.6.2 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 local Sudbury office to the Site to complete the sampling program;
- Static groundwater levels were collected using a Solinst<sup>tm</sup> water level tape. Measurements were collected from the top of riser pipe;

- 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) 3/8" tubing and a Waterra™ inertial footvalve system. The HDPE 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 HDPE 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 the previous monitoring reports. 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.

### 3.6.3 *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 local Sudbury office to the Site;
- All field activities at each monitoring location were initiated at down-stream locations working up-stream to avoid sediment disturbance and influencing sample integrity;

- 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);
- 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 event at the pre-determined monitoring locations for parameters listed in the previous monitoring reports. Sample results were compared to the applicable PWQO criteria.

#### 3.6.4 *Groundwater and Surface Water Field Measurements*

Prior to sampling groundwater in the wells, Pinchin monitored groundwater depth using a Solinst™ 30-metre electronic water level meter. The water level tape is calibrated in 1.0 mm increments. Reproducibility of the depth measurements is generally within 2.0 mm or less.

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 2021 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, sulfate 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 can 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.

Field parameter data collected at the groundwater and surface water monitoring locations are provided in Appendix III.

### 3.6.5 Record Keeping and Field Notes

Field notes were collected during the 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.

## 3.7 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 and surface water samples were collected during the spring 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.

### **3.8 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.

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.

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.

## **4.0 ASSESSMENT, INTERPRETATION AND DISCUSSION**

### **4.1 Groundwater Quality Monitoring**

#### *4.1.1 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<sub>m</sub>) 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 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 contaminant 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.

#### 4.1.2 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 ("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 Site 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 Guideline B-7 were used in assessing the groundwater results obtained during the 2021 monitoring program.

## **4.2 Groundwater Results**

The following discussion of parameters documents the groundwater quality in comparison to the calculated reasonable use criteria as per Guideline B-7. The reasonable criteria are MECP's groundwater management strategy for mitigating the effect of contamination on properties adjacent to its source. It establishes procedures for determining what constitutes the reasonable use of groundwater on a property adjacent to sources of contaminants and establishes limits on the discharge of contaminants from landfills which have a potential to migrate hydraulically downgradient and off-site and impair the current and future groundwater use at downgradient properties. To implement Guideline B-7, groundwater samples collected from downgradient monitoring wells have been compared to the calculated RUC values ( $C_m$ ).

Monitoring well BH1 is located potentially hydraulically upgradient of the Site and has been used to estimate the background water quality coming onto the Site. An average of the historical results from BH1 has been applied as the source of background water quality for the Guideline B-7 calculations.

The analytical data for each well in comparison to the applicable regulatory criteria is provided in Tables 3 through 11. An evaluation of the RUC criteria in comparison to the downgradient compliance wells is provided in Tables 12 and 13 for the spring and fall events, respectively. Copies of the laboratory analytical reports are presented in Appendix V. 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.

#### *4.2.1 Background Water Quality Evaluation*

##### ***Monitoring Well BH1***

Background water quality observed southwest of the waste fill area at BH1 did not identify elevated levels of common landfill-related contaminant parameters such as conductivity, total dissolved solids (TDS), chloride, sulphate, calcium, sodium, potassium or nitrate. During the spring and fall sampling events, concentrations of hardness (low), dissolved organic carbon (DOC), iron, manganese and aluminum were quantified above the recommended levels specified in the ODWQS while concentrations of pH (low) and turbidity were quantified above the recommended levels specified in the ODWQS during only the spring sampling event. These parameters are either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site.

#### *4.2.2 Leachate Source Quality Evaluation*

No groundwater monitoring wells in the existing monitoring well network are situated within the active landfill area to evaluate the source leachate quality.

#### *4.2.3 Immediately Downgradient Water Quality Evaluation*

##### ***Monitoring Well BH10***

In comparison to background water quality, groundwater observed immediately east of the waste fill area at BH10 was observed to have higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, sodium, potassium and nitrate, indicating temperate impacts from the landfill, which is consistent with historical observations at this location. It is expected that the groundwater at this location is impacted with minor amounts of landfill leachate considering its close proximity to the active fill zone. Elevated hardness (high), alkalinity (high), TDS, DOC, chloride, sodium, boron and manganese concentrations were identified at BH10 that exceeded both the ODWQS and/or the Guideline B-7 criteria. Hardness, alkalinity, TDS, DOC, chloride, sodium, turbidity, and manganese are either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, elevated concentrations of DOC, manganese and turbidity are also quantified at the background monitoring location and therefore are not considered to be landfill derived.

Nitrate (a health-related parameter) was quantified in the fall of 2019 at BH10 to be in exceedance of both the ODWQS and the Guideline B-7. Concentrations of nitrate observed at this location fluctuate

considerably throughout the historical monitoring record and have returned to levels within the ODWQS during the 2021 monitoring events.

#### ***Monitoring Well BH11***

In comparison to background water quality, groundwater observed immediately northeast of the Site at BH11 was observed to have higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, sodium, potassium, and nitrate, indicating temperate impacts from the landfill, which is consistent with historical observations at this location. It is expected that the groundwater at this location is impacted with minor amounts of landfill leachate considering its close proximity to the active fill zone. Elevated hardness (high), alkalinity (high), TDS, DOC, nitrate, chloride, sodium, boron, turbidity, manganese and aluminum concentrations were identified at BH11 that exceeded both the ODWQS and/or the Guideline B-7 criteria. Hardness, alkalinity, TDS, DOC, chloride, sodium, turbidity, manganese and aluminum are either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and is not considered to be a significant environmental concern originating from the Site.

Furthermore, elevated concentrations of DOC, iron, manganese, aluminum and turbidity are also quantified at the background monitoring location and therefore are not considered to be landfill derived.

Boron (a health-related parameter) was quantified to be in exceedance of the Guideline B-7 criteria during the spring and fall of 2021 at BH11. This concentration is consistent with the historical monitoring record at this location.

#### ***4.2.4 Downgradient Water Quality Evaluation***

##### ***Monitoring Well BH8***

In comparison to background water quality, groundwater observed northwest of the Site was observed to have generally similar concentrations of conductivity, alkalinity, TDS, nitrate, chloride, sulphate, calcium, sodium and potassium, indicating little to no impacts from the landfill, which is consistent with historical observations at this location. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone. Depressed hardness (low) and alkalinity (low), with elevated aluminum and turbidity concentrations were identified at BH8 that exceeded the ODWQS. Concentrations of alkalinity (low) quantified during the spring of 2021 exceeded the Guideline B-7 criteria. Alkalinity is an operational guideline for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, elevated concentrations of all of these parameters are also quantified at the background monitoring location and therefore are not considered to be landfill derived.



### ***Monitoring Well BH9***

In comparison to background water quality, groundwater observed northwest of the Site at BH9 was observed to have slightly higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, calcium, sodium and potassium, indicating minor impacts from the landfill, which is consistent with historical observations at this location. These elevated concentrations are also observed to attenuate to concentrations similar to background conditions at the further downgradient monitoring location, BH8. Elevated hardness (high), DOC, manganese, iron, aluminum and turbidity concentrations were identified at BH9 that exceeded the ODWQS. No concentrations exceeded the Guideline B-7 criteria. These parameters are either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, elevated concentrations of these parameters (with the exception of high hardness) are also quantified at the background monitoring location and therefore are not considered to be landfill derived.

### ***Drive Point Monitor DP7***

Similar to both sampling efforts in 2020, drive point monitoring location DP7, located northwest of the Site, was observed to have insufficient groundwater volume to sample at the time of sampling for both the spring and fall 2021 monitoring events.

During 2019, water quality at this location was observed to have generally similar concentrations of conductivity, alkalinity, TDS, nitrate, chloride, sulphate, calcium, sodium, and potassium in comparison to background, indicating little to no impacts from the landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone.

### ***Drive Point Monitor DP8***

Drive point monitoring location DP8, located east of the Site, was observed to have insufficient groundwater volume to sample at the time of sampling for both the spring and fall 2021 monitoring events.

### ***Drive Point Monitor DP9***

Drive point monitoring location DP9, located east of the Site, was observed to have insufficient groundwater volume to sample at the time of sampling for both the spring and fall 2021 monitoring events.

### ***Monitoring Well BH12***

Groundwater monitoring well BH12 was installed in April 2020, in order to characterize downgradient water quality to the north of the Site. In comparison to background water quality, groundwater observed at monitoring well BH12 was observed to have generally similar concentrations of conductivity, alkalinity,



TDS, nitrate, chloride, sulphate, calcium, sodium and potassium, indicating very minor impacts from the landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone. Depressed hardness (low), with elevated iron, manganese and turbidity concentrations were identified at BH12 that exceeded the ODWQS. These parameters are all either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, similar concentrations of all of these parameters are also quantified at the background monitoring location and therefore are not considered to be landfill derived. No exceedances of the Guideline B-7 were quantified at this location.

Further monitoring events are required to establish a scientifically defensible database at this monitoring location before this interpretation can be confirmed.

#### ***Monitoring Well BH13***

Groundwater monitoring well BH13 was installed in April 2020, in order to characterize downgradient water quality to the northeast of the Site, further downgradient from wells BH10 and BH11 which have quantified temperate leachate impacts. In comparison to background water quality, groundwater observed at monitoring well BH13 was observed to have generally similar concentrations of conductivity, alkalinity, TDS, nitrate, chloride, sulphate, calcium, sodium and potassium, indicating very minor impacts from the landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone. Depressed hardness (low), with elevated manganese, turbidity, iron and aluminum concentrations were identified at BH13 that exceeded the ODWQS. These parameters are all either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, similar concentrations of all of these parameters are also quantified at the background monitoring location and therefore are not considered to be landfill derived. No exceedances of the Guideline B-7 were quantified at this location.

Further monitoring events are required to establish a scientifically defensible database at this monitoring location before this interpretation can be confirmed.

#### ***Monitoring Well BH14***

Groundwater monitoring well BH14 was installed in April 2020, in order to further characterize downgradient water quality to the northeast of the Site, closer to the property boundary. In comparison to background water quality, groundwater observed at monitoring well BH14 was observed to have slightly higher concentrations of conductivity, alkalinity, TDS, chloride, sulphate, calcium and sodium, indicating minor impacts from the landfill. It is interpreted that natural attenuation of the landfill leachate is occurring with distance from the active fill zone, as these concentrations are significantly reduced in comparison to



those quantified at BH11. Elevated hardness (high), DOC, iron, manganese, turbidity and aluminum concentrations were identified at BH14 that exceeded the ODWQS. These parameters are all either operational guidelines or aesthetic objectives for drinking water systems set by the ODWQS and are not considered to be a significant environmental concern originating from the Site. Furthermore, elevated concentrations of all of these parameters, except for hardness, are also quantified at the background monitoring location and therefore are not considered to be landfill derived. No exceedances of the Guideline B-7 were quantified at this location.

Further monitoring events are required to establish a scientifically defensible database at this monitoring location before this interpretation can be confirmed.

In summary, the current 2021 groundwater monitoring data indicates 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.

#### **4.3 Groundwater Trend Analysis**

A hydrograph was developed to identify any changes in the historical and current groundwater elevation data over time for each of the wells. A series of time versus concentration graphs were also developed to evaluate the concentrations of several select landfill indicator parameters (including alkalinity, chloride, dissolved organic carbon, pH, total dissolved solids, nitrate, aluminum and copper) at each monitoring well for the Site. Current and historical groundwater quality data was utilized to identify any apparent trends or inconsistencies in the water quality within the monitoring well network. The groundwater trend analysis graphs are provided in Appendix VI.

The groundwater elevations displayed on the hydrograph indicate generally stable elevations with respect to time at all monitoring well locations, with the exception of BH8 which produced a water elevation lower than the historical record during the fall of 2019. This groundwater elevation has returned to stabilized conditions during the 2020 and 2021 monitoring events.

In general, the landfill indicator parameters are demonstrating fairly stable trends with respect to time at all monitoring well locations, with some exceptions. Concentrations of alkalinity are generally stable, with all concentrations quantified inside of the ODWQS limits except for BH8 which was lower and BH10 and BH11 which are higher than the limits. Alkalinity concentrations at BH11 are demonstrating an increasing trend. Concentrations of chloride, DOC, pH, TDS and copper are all generally stable, except for well BH11 which is demonstrating an increasing trend for these parameters. Chloride and TDS concentrations at BH10 have also been demonstrating an increasing trend. Concentrations of nitrate are generally stable, with the exception of BH10 and BH11 which are not demonstrating any apparent trends.

Aluminum concentrations are stable with the exception of BH1 and BH11 which are not demonstrating any apparent trends.

Concentrations of chloride and TDS quantified at BH10 and nitrate at BH10 and BH11 in the fall of 2019 and 2021 were significantly higher than the historical record at these locations and are interpreted to be anomalous. During the 2021 monitoring period, TDS concentrations have decreased slightly, but are still relatively high in comparison to the historical data sets. The nitrate concentrations have returned to levels consistent with the historical data sets. Further confirmation of these concentrations is required during future monitoring events.

Further monitoring investigations are required to confirm the trends observed during this monitoring period. Concentrations of all parameters quantified at newly installed wells BH12, BH13 and BH14 generally appear to be stable, with the exception of aluminum at BH12; however, additional sampling events are required at these locations before a detailed trend analysis can be completed.

#### **4.4 Groundwater Field Measurement Results**

On May 12 and October 7, 2021 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 3 through 11.

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.

#### **4.5 Surface Water Quality Monitoring**

##### **4.5.1 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”.

#### *4.5.2 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.

#### *4.5.3 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.

### **4.6 Surface Water Results**

Pinchin collected surface water samples from all surface water monitoring locations during the spring and fall monitoring events in 2021. Surface water samples were collected to monitor the surface water for contaminants of concern as a compliance requirement. A summary of water quality monitoring data relative to the regulatory standards is presented in the attached Tables 14 through 16. Copies of the laboratory analytical reports are presented in Appendix V.

Surface water monitoring location SW1, located within the creek to the south of the Site at the culvert on 25<sup>th</sup> and 26<sup>th</sup> Side Road, is considered representative of background water quality conditions and is characterized by naturally elevated concentrations of pH (low), phenols, iron, phosphorus, aluminum and cobalt. These parameter concentrations exceeded the PWQO and/or APV and/or the CWQG during the 2020 sampling events, which is consistent with the observations at this location throughout the historical monitoring record. Additional PWQO/APV exceedances were quantified for zinc during the fall and spring 2021 monitoring events and an additional CWQG/APV exceedance was quantified for chloride during the fall and spring events. Exceedances of the APV have consistently been quantified throughout the historic database at this location for potassium.

Surface water monitoring location SW3, located in the pool of water at the northwest edge of the waste deposits, is considered to be representative of source surface water quality at the Site. Minor leachate impacts are observed at this location, with PWQO and/or APV and/or CWQG exceedances quantified in 2021 for nitrite, phenols, iron, total phosphorus, boron, chromium, cobalt and copper.

These impacts are interpreted to improve with distance from the landfill, as lower concentrations are quantified at the downgradient monitoring location, SW2. PWQO and/or APV and/or CWQG exceedances at downgradient surface water monitoring location SW2 include pH (low), iron and aluminum. These elevated concentrations are not interpreted to be landfill derived as exceedances of these parameters were also quantified at the background monitoring location (SW1) indicating that they are naturally elevated.

Concentrations of nitrite at SW3 and of chromium and selenium at all locations were quantified below the laboratory RDL; however, the laboratory RDL for these parameters are higher than the respective CWQG standards. Therefore, these concentrations are inconclusive of CWQG exceedances.

Based on a review of the current and historic aluminum concentrations in comparison to total suspended solids (TSS), it is possible that the quantified aluminum concentrations are biased high due to a potential interference with TSS. To reduce the TSS concentrations in the samples and thereby minimize the potential interference of TSS, the PWQO requires that samples analyzed for aluminum be free of any clay. In the future, the component of the samples identified for the analysis of aluminum should be filtered prior to analysis, in order to provide a clay free sample (as per the requirements of the PWQO).

#### **4.7 Surface Water Trend Analysis**

A series of time versus concentration graphs were developed to evaluate the concentrations of several select landfill indicator parameters (including alkalinity, chloride, dissolved organic carbon, pH, total dissolved solids, nitrate, aluminum, and copper) at each surface water monitoring location for the Site. Current and historical surface water quality data was utilized to identify any apparent trends or inconsistencies in the water quality at the Site. The surface water time versus concentration graphs are provided in Appendix VII.

In general, the landfill indicator parameters are demonstrating stable trends with respect to time at all surface water monitoring locations, with some exceptions. Concentrations of alkalinity, DOC, TDS, and nitrate are generally stable except for SW3 which has not demonstrated an apparent trend.

Concentrations of chloride are increasing at SW1 and SW3. Concentrations of pH and aluminum do not appear to be indicative of an apparent trend; SW1 and SW2 consistently below the PWQO range.

Concentrations of aluminum are generally stable at SW3 and SW2 but appear to be demonstrating an increasing trend at SW1.

Further monitoring investigations are required to confirm the trends observed during this monitoring period.

#### **4.8 Surface Water Field Measurement Results**

On May 12 and October 7, 2021, 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 14 through 16.

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. Surface water flow measurements were not obtained, however, each of the monitoring locations were observed to be stagnant at the time of the 2021 sampling events.

#### **4.9 Groundwater Flow Interpretation**

The hydraulic flow vector was historically estimated to range to the north. The groundwater flow direction may be influenced by seasonal variations in the amount of precipitation, by aquifer heterogeneity and the deposited fill material at the Site. Groundwater level trends indicate seasonal fluctuations in the depth to groundwater which is consistent with seasonal fluctuations in precipitation events. The depth to groundwater measurement results are presented in Table 1.

During the spring monitoring event on May 12, 2021, the depth to groundwater was observed to range from 0.08 metres above the ground surface (mbgs) at BH10 to 1.68 mbgs at BH8. During the fall monitoring event on October 7, 2021, the depth to groundwater was observed to range from 0.02 mbgs at BH10 to 1.94 mbgs at BH13.

Accurate triangulation of the water table elevations was undertaken for the 2021 sampling events using the available monitoring well system and the survey elevation data. The inferred groundwater contours for both the spring and fall events are presented on Figures 4 and 5, respectively. The presentation of the groundwater contours and the associated inferred groundwater flow direction for the 2021 sampling events, as illustrated on Figures 4 and 5, indicates that groundwater flows radially at the Site, directed towards the west, north and east.

#### **4.10 Leachate Characterization**

The Site is an operating landfill with minor operational or maintenance being overseen by the Client. The Site does not have a leachate collection system whereby leachate quality monitoring and characterization is being completed. Currently, there is no groundwater monitoring well included in the existing monitoring well network at the Site that is situated within the active landfill area or which is considered representative



of source leachate water quality. Therefore, leachate at the Site cannot be characterized at the time of preparation of this report.

#### **4.11 Contaminant Attenuation Zone**

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

#### **4.12 Adequacy of the Monitoring Program**

At this time there is currently no formal monitoring program for the Site. Pinchin recommends continuation of sampling the groundwater and surface water two times per year (spring and fall) to establish any notable trends or impacts emanating from the landfill. The results of inspection and monitoring will be reported annually to the MECP. After that time, and with the establishment of baseline data/source data leachate concentrations, a review of all data will then be used to establish the expected level of impact and the need and scope for long term monitoring.

During these sampling and reporting events, it is recommended that the monitoring well network be evaluated for adequacy and determine if there is a need for additional monitoring locations.

##### *4.12.1 Monitoring Well Network Efficiency*

Additional well installations were completed in April 2020 to supplement the existing groundwater monitoring well network at the Croft Waste Disposal Site. These additional wells (BH12, BH13 and BH14) were installed downgradient of the Site to the north and northwest to allow for further water quality characterization in all downgradient directions and closer to the property boundary. Pinchin concludes that the current groundwater monitoring well network is considered adequate for evaluating the Croft Waste Disposal Site geological and hydrogeological characteristics downgradient of the Site.

It is recommended that the drive point well locations DP7, DP8 and DP9 be removed from the sampling program for the Croft Waste Disposal Site as these locations have consistently been found to have insufficient volume to sample. It is recommended that these wells should be retained as water level only monitoring locations to supplement the groundwater elevation monitoring for the Site; however, the drive point monitors should be equipped with appropriate lockable caps to ensure representative water level data is obtained.

The groundwater quality observed in monitoring well BH1 appears to have minor derived impacts and as such, has been used within this report for assessing the Site's water quality data to Guideline B-7 RUC (i.e. background well).

#### *4.12.2 Background Monitoring Well Efficiency*

Based on a review of the groundwater contaminant data from BH1, as well as the assumed groundwater flow direction, monitoring well BH1 has been identified as a best-case background location. A review of the dataset (as provided on Table 3) from BH1 did not identify elevated levels of common landfill-related contaminant parameters, with the exception of hardness and alkalinity which are naturally lower than the ODWQS and DOC which is naturally elevated. At this time, monitoring well BH1 is considered adequate for monitoring background groundwater quality.

#### **4.13 Supplemental Monitoring: Sediment, Benthic and/or Toxicity Monitoring**

No supplemental monitoring was completed as part of the 2021 monitoring program completed by Pinchin.

#### **4.14 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.

#### **4.15 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.

#### **4.16 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 CofA. 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 2021 monitoring events no significant damage or concerns were noted.

#### **4.17 Control Systems 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 2021 monitoring program.



#### 4.18 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.

Two groundwater duplicate sample pairs and one surface water duplicate sample pair were collected from the Site during the spring and fall sampling events and submitted for laboratory analysis of the full suite of analytical parameters. All duplicate data for 2021 are provided in Tables 17 and 18 for groundwater and surface water, respectively.

The following table summarizes the duplicate pairs for 2021:

Sampling Event	Duplicate Sample ID	Original Sample ID
Spring	GW DUP	BH12
	SW DUP	SW2
Fall	GW DUP	BH114
	SW DUP	SW2

The calculated RPDs for the original and field duplicate groundwater sample has been compared to the performance standards considered acceptable by Pinchin (i.e. 50%). Each of the calculated groundwater RPDs met the corresponding performance standard, with the exception of turbidity for the spring groundwater duplicate and aluminum, boron and titanium in the fall groundwater duplicate. Each of the calculated surface water RPDs met the corresponding performance standard, with the exception of aluminum, boron, chromium and titanium in the fall surface water duplicate.

Upon review of the QA/QC results for spring 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.

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.

## **5.0 CONCLUSIONS**

Based on the work completed, the following is a summary of the activities and findings of the 2020 water quality monitoring program:

- Groundwater samples were collected from all monitoring wells at the Site on May 12 and October 7, 2021, with the exception of DP7, DP8 and DP9 in the spring and fall due to the insufficient sample volume at the time of sampling. All groundwater 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;
- Surface water samples were collected from all monitoring locations on May 12 and October 7, 2021. All surface water samples were submitted for laboratory analysis of parameters identified in the previous monitoring reports. Surface water quality was assessed based on the PWQO, APV and CWQG;
- During the spring monitoring event on May 12, 2021, the depth to groundwater was observed to range from 0.08 mbgs at BH10 to 1.68 mbgs at BH8. During the fall monitoring event on October 7, 2021, the depth to groundwater was observed to range from 0.02 mbgs at BH10 to 1.94 mbgs at BH13. Groundwater flow at the Site is interpreted to flow radially, directed towards the west, north and east;
- All reported concentrations in the groundwater samples submitted for analysis satisfied the respective ODWQS parameters with the exception the following:
  - Hardness (high) at BH9, BH10, BH11, BH12, BH13 and BH14;
  - Hardness (low) at BH1;
  - Chloride at BH10;
  - DOC at BH1, BH9, BH10, BH11 and BH14;

- Manganese at BH1, BH9, BH10, BH11, BH12, BH13 and BH14;
- Turbidity at BH1, BH8, BH9, BH11, BH12, BH13 and BH14;
- Iron at BH1, BH9, BH11, BH12, BH13 and BH14;
- Aluminum at BH1, BH8, BH9, BH11, BH12, BH13 and BH14;
- Alkalinity (high) at BH11;
- Alkalinity (low) at BH8;
- TDS at BH10 and BH11;
- Chloride at BH10;
- Sodium at BH11; and
- pH (low) at BH1 and BH8.
- All reported concentrations in the groundwater samples collected from the downgradient monitoring wells met the applicable Guideline B-7 criteria for all parameters analyzed, with the exception of the following:
  - TDS at BH10 and BH11 during the spring and fall;
  - Chloride at BH10 and BH11 during the spring and fall;
  - Sodium at BH10 and BH11 during the spring and fall;
  - Boron at BH11 during the spring and fall;
  - Alkalinity (low) at BH8 during the spring and fall; and
  - Alkalinity (high) at BH10 and BH11 during the spring and fall;
- The current 2021 groundwater monitoring data indicates 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 concentrations in the surface water samples submitted for analysis satisfied the respective PWQO, APV and/or CWQG parameters, with the exception of the following:
  - pH (low) at SW1 and SW2;
  - Chloride at SW1;
  - Nitrite at SW3;
  - Phenols at SW1 and SW3;



- Iron at all locations;
- Chromium at SW3;
- Aluminum at SW1 and SW2;
- Cobalt at all SW1 and SW3;
- Total phosphorous at SW1 and SW3;
- Zinc at SW1;
- Copper at SW3; and
- Boron at SW3.

Based on the results obtained from the existing groundwater monitoring wells and surface water monitoring locations, Pinchin has not identified any significant landfill related impacts at the Site. Elevated concentration parameters within the groundwater samples analyzed at the furthest downgradient monitoring locations (i.e. BH8, BH9, BH12, BH13 and BH14) are likely attributed to either naturally occurring conditions within the shallow unconfined aquifer on-site or from temperate impacts from leachate sourced from the waste deposits at the Site. All exceedances of the Guideline B-7 RUC are related to operational guidelines and/or aesthetic objectives associated with drinking water systems set by the ODWQS and are not considered to be an immediate significant human health or environmental concern originating from the Site, with the exception of boron which is a health-related parameter. The elevated concentrations of boron are only quantified in the eastern downgradient well BH11 which is located in close proximity to the waste deposits. These concentrations are interpreted to attenuate with further distance from the Site. In summary, the current 2021 groundwater monitoring data indicates 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.

## **6.0 RECOMMENDATIONS**

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

- Continue with routine monitoring of all the available groundwater monitoring wells and surface water monitoring locations. Groundwater and surface water monitoring shall be completed with analyses for the parameters identified in the historical monitoring record. It is recommended that groundwater and surface water monitoring be completed during the spring and late fall to generate a baseline data set, to evaluate trends, and to determine the need and scope of a long-term monitoring program for the Site.

Considering the dataset completed thus far, it is Pinchin's opinion that sampling should continue in 2022 before the adequacy of the monitoring program can be fully evaluated;

- The Client should continue to ensure that the requirements as specified in the CofA are complied with;
- In the future, the component of the surface water samples identified for the analysis of aluminum should be filtered prior to analysis, in order to provide a clay free sample (as per the requirements of the PWQO); and
- It is recommended that the drive point well locations DP7, DP8 and DP9 be removed from the sampling program as these locations have consistently been found to have insufficient volume to sample. It is recommended that these wells should be retained as water level only monitoring locations to supplement the groundwater elevation monitoring for the Site; however, the drive point monitors should be equipped with appropriate lockable caps to ensure representative water level data is obtained.

## **7.0 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 VIII.

## **8.0 DISCLAIMER**

This Water Quality Monitoring Program was performed for the Corporation of the Municipality of Magnetawan (Client) in order to investigate the environmental condition of the groundwater and surface water at the Croft 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 Water Quality Monitoring Program does not quantify 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 Water Quality Monitoring Program 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 Water Quality Monitoring Program 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, are 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.

\\pin-sud-fs01\job\225000s\0225335.000 magnetawan,chapmansite,edr,landfill\0225335.006 magnetawan,chapmansite,edr,amr,2021\deliverables\reports\croft\225335.006  
2021 annual monitoring report croft wds magnetawa.doc

Template: Groundwater Monitoring Template – Oil and Gas, EDR, May 28, 2019

**APPENDIX I**  
**Figures**



	PROJECT NAME: 2021 ANNUAL MONITORING REPORT					
	CLIENT NAME: THE MUNICIPALITY OF MAGNETAWAN					
	PROJECT LOCATION: CROFT WASTE DISPOSAL SITE, MAGNETAWAN, ONTARIO					
	FIGURE NAME: KEY MAP					FIGURE NUMBER
PROJECT NUMBER: 225335.006		SCALE: 1:100,000	DRAWN BY: DM	REVIEWED BY: MB	DATE: MARCH 2022	1





- LEGEND
- PROPOSED LIMIT OF WASTE
  - 30m BUFFER
  - UAV IMAGE

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



PROJECT NAME:  
2021 ANNUAL MONITORING  
REPORT

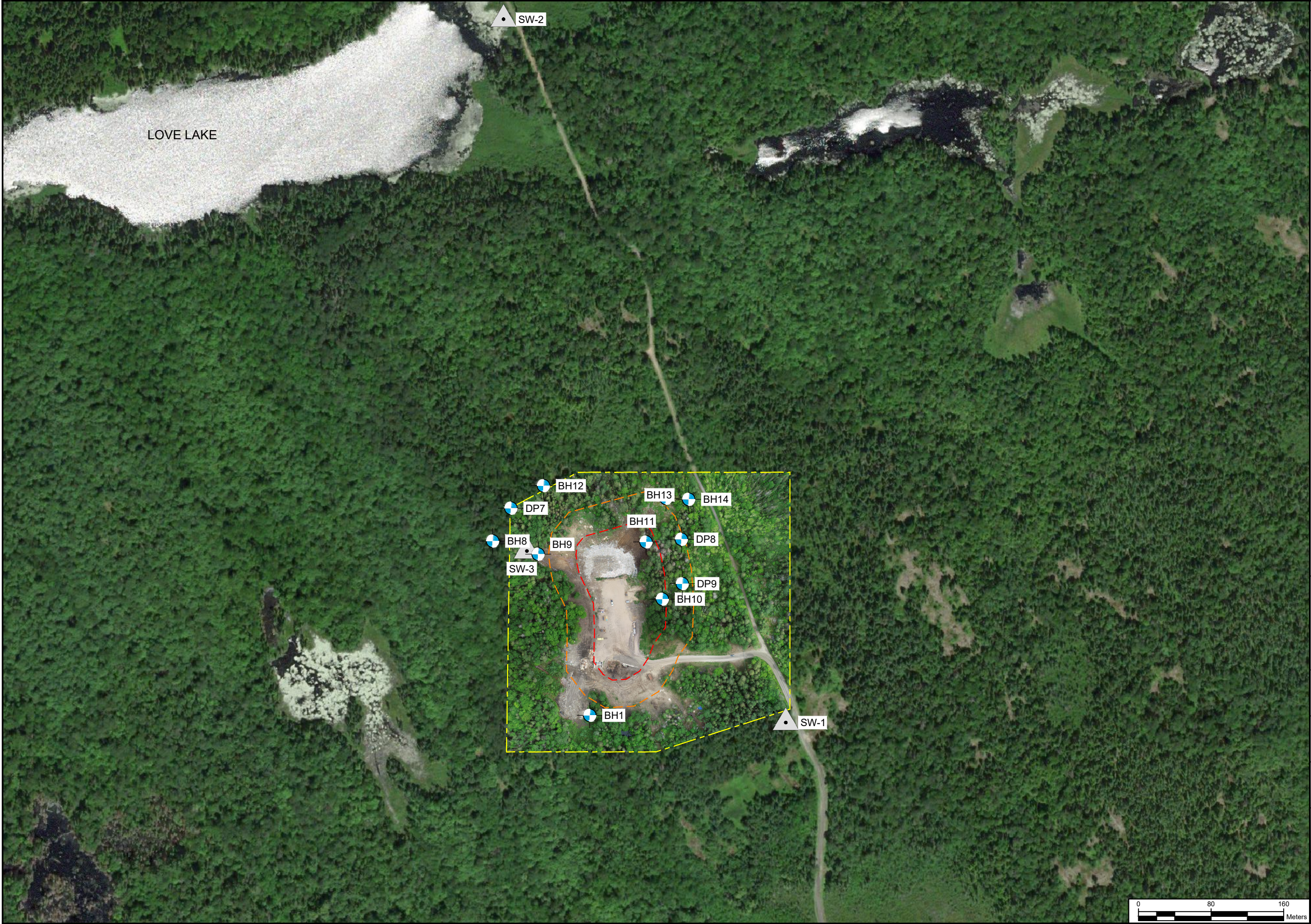
CLIENT NAME:  
THE MUNICIPALITY OF  
MAGNETAWAN

PROJECT LOCATION:  
CROFT WASTE DISPOSAL SITE,  
MAGNETAWAN, ONTARIO

FIGURE NAME:  
SITE PLAN

PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 2





- LEGEND
- PROPOSED LIMIT OF WASTE
  - 30m BUFFER
  - UAV IMAGE
  - MONITORING WELL
  - SURFACE WATER WELL

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



PROJECT NAME:  
2021 ANNUAL MONITORING  
REPORT

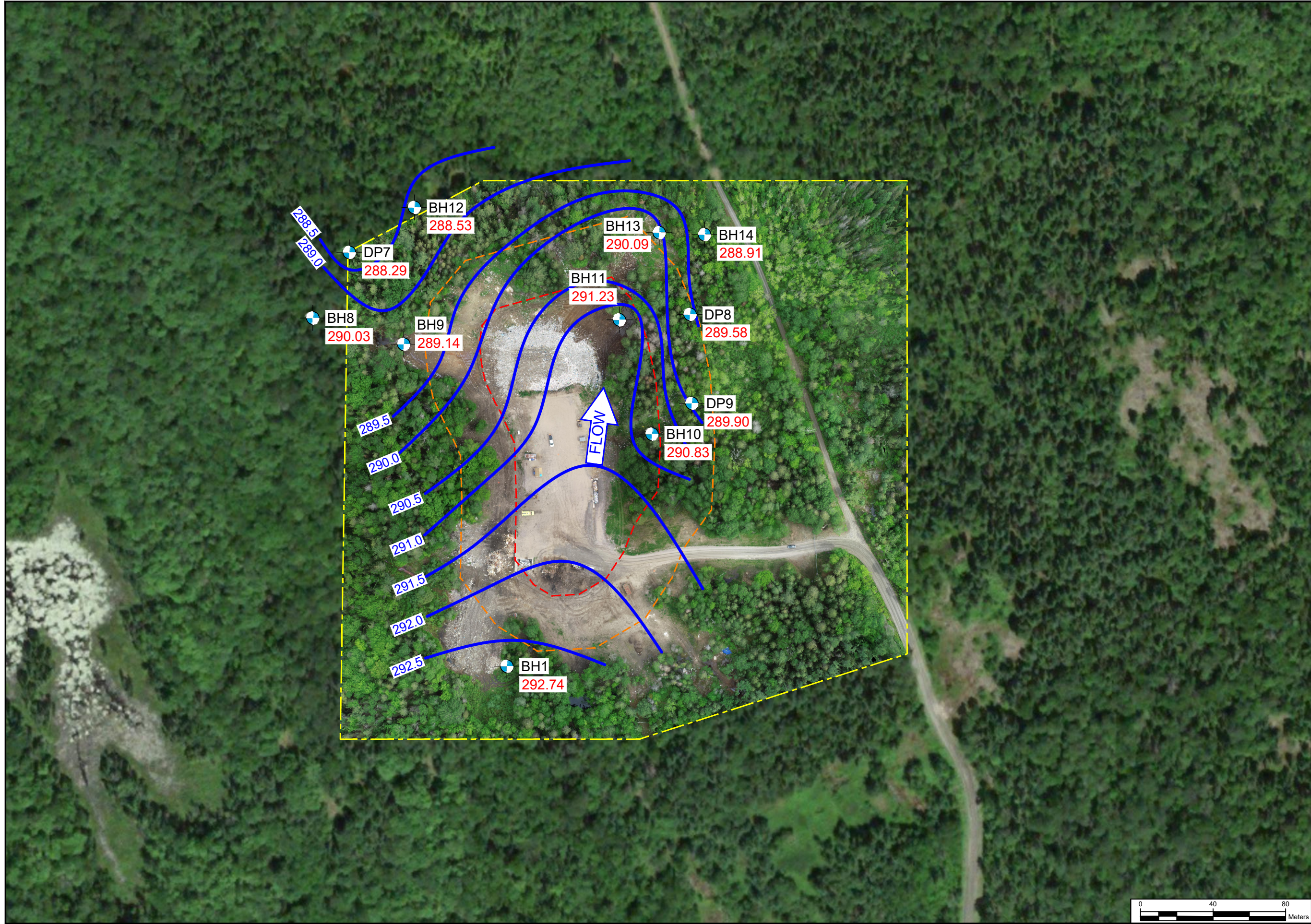
CLIENT NAME:  
THE MUNICIPALITY OF  
MAGNETAWAN

PROJECT LOCATION:  
CROFT WASTE DISPOSAL SITE,  
MAGNETAWAN, ONTARIO

FIGURE NAME:  
MONITORING LOCATIONS

PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 3





- LEGEND
- PROPOSED LIMIT OF WASTE
  - 30m BUFFER
  - UAV IMAGE
  - MONITORING WELL
  - BOREHOLE ELEVATION (masl.)
  - GROUNDWATER CONTOUR ELEVATION (masl.)
  - GROUNDWATER CONTOUR LINES
  - GROUNDWATER FLOW DIRECTION

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



PROJECT NAME: 2021 ANNUAL MONITORING REPORT	
CLIENT NAME: THE MUNICIPALITY OF MAGNETAWAN	
PROJECT LOCATION: CROFT WASTE DISPOSAL SITE, MAGNETAWAN, ONTARIO	
FIGURE NAME: GROUNDWATER CONTOUR PLAN - SPRING 2021	
PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 4





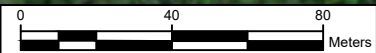


- LEGEND
- PROPOSED LIMIT OF WASTE
  - 30m BUFFER
  - UAV IMAGE
  - MONITORING WELL
  - BOREHOLE ELEVATION (masl.)
  - GROUNDWATER CONTOUR ELEVATION (masl.)
  - GROUNDWATER CONTOUR LINES
  - GROUNDWATER FLOW DIRECTION

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





PROJECT NAME: 2021 ANNUAL MONITORING REPORT	
CLIENT NAME: THE MUNICIPALITY OF MAGNETAWAN	
PROJECT LOCATION: CROFT WASTE DISPOSAL SITE, MAGNETAWAN, ONTARIO	
FIGURE NAME: GROUNDWATER CONTOUR PLAN - FALL 2021	
PROJECT NUMBER: 225335.006	SCALE: AS SHOWN
DRAWN BY: DM	REVIEWED BY: MB
DATE: MARCH 2022	FIGURE NUMBER: 5




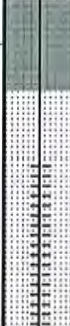


**APPENDIX II**  
**Borehole Logs**



<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 60336434	<b>BOREHOLE:</b> DP7 1 of 1
Subsurface Investigation	<b>Northing:</b> N/A	<b>DATE:</b> June 9, 2015
Croft Landfill	<b>Easting:</b> N/A	<b>LOGGED BY</b> TLC/SRB
<b>Client:</b> Township of Magnetawan	<b>Methodology:</b> Hand Auger	<b>GROUND ELEV</b> 289.30 m ASL
	<b>Contractor:</b> N/A	

DEPTH (m) (mASL)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY				RQD					
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	RECOVERY (%)				RQD (%)			
											25	50	75	100	25	50	75	100
0.3		<u>TOPSOIL</u> Dark brown to black, silty topsoil, trace to some sand, occasional rootlets, moist becoming saturated below about 0.2 m.		1	X	GS												
289.0				2	X	GS												
0.5				3	X	GS												
288.8		<u>SAND</u> Brown to grey fine to medium sand, trace fine gravel, trace silt, saturated. -Changing to a silty fine sand with occasional fine gravel and cobbles below about 0.4 m.		4	X	GS												
1		<u>SANDY SILT TILL</u> Brown to grey silty sand to sandy silt till, brown oxidation observed, trace fine gravel, moist to wet, dense. -Hand auger refusal in dense till at about 0.8 m																
1.7																		
287.6		Borehole terminated at 1.72 m in assumed till due to drive point refusal on assumed bedrock.																

<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 60336434	<b>BOREHOLE:</b> DP8 1 of 1
Subsurface Investigation Croft Landfill <b>Client:</b> Township of Magnetawan	<b>Northing:</b> N/A <b>Easting:</b> N/A <b>Methodology:</b> Hand Auger <b>Contractor:</b> N/A	<b>DATE:</b> June 9, 2015 <b>LOGGED BY</b> TLC/SRB <b>GROUND ELEV</b> 290.54 m ASL

DEPTH (m) (mASL)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE				RECOVERY (%)				RQD (%)						
				NUMBER	INTERVAL	TYPE	N VALUE									WATER %	REC %	RQD %
								25	50	75	100	25	50	75	100			
0.2		<b>TOPSOIL</b> Dark brown to black, silty topsoil, trace to some sand, occasional rootlets, moist.		1	X	GS												
290.3				2	X	GS												
				3	X	GS												
				4	X	GS												
				5	X	GS												
				6	X	GS												
				7	X	GS												
1.4		<b>SAND</b> Brown to grey fine to medium sand, trace fine gravel, trace silt, wet. -Becoming saturated below about 0.4 m. -Changing to a silty fine sand with trace fine gravel below about 0.5 m. -Hand auger refusal in dense soil at about 0.9 m																
289.1		Borehole terminated at 1.41 m in assumed silty sand due to drive point refusal on assumed bedrock.																

<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 60336434	<b>BOREHOLE:</b> DP9 1 of 1
Subsurface Investigation Croft Landfill <b>Client:</b> Township of Magnetawan	<b>Northing:</b> N/A <b>Easting:</b> N/A <b>Methodology:</b> Hand Auger <b>Contractor:</b> N/A	<b>DATE:</b> June 9, 2015 <b>LOGGED BY</b> TLC/SRB <b>GROUND ELEV</b> 289.97 m ASL

DEPTH (m) (mASL)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY				RQD					
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	RECOVERY (%)				RQD (%)			
											25	50	75	100	25	50	75	100
0.2 289.8		<b>TOPSOIL</b> Dark brown to black, silty topsoil, trace to some sand, occasional rootlets, saturated.		1	X	GS												
				2	X	GS												
				3	X	GS												
				4	X	GS												
				5	X	GS												
				6	X	GS												
1.3 288.7		Borehole terminated at 1.27 m in assumed silty fine sand.																



<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 60336434	<b>BOREHOLE:</b> BH8 1 of 1
Subsurface Investigation Croft Landfill <b>Client:</b> Township of Magnetawan	<b>Northing:</b> N/A <b>Easting:</b> N/A <b>Methodology:</b> Auger/Coring <b>Contractor:</b> pontil drilling	<b>DATE:</b> June 22, 2015 <b>LOGGED BY</b> SRB <b>GROUND ELEV</b> 291.63 m ASL























DEPTH (m) (mASL)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE						RECOVERY				RQD				
				NUMBER	INTERVAL	TYPE	N VALUE	WATER %	REC %	RQD %	(%)				(%)			
											25	50	75	100	25	50	75	100
0.2 291.5		<u>TOPSOIL</u> Dark brown, silty topsoil, trace to some sand, trace rootlets, moist.		1		SS	9											
		<u>SAND</u> Brown fine to medium sand, trace coarse sand and fine to medium gravel, moist.		2		SS	8/ 0.23m											
1.0 290.6	1	<u>GNEISSIC BEDROCK</u> Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive.		3		HQ			100	100								
				4		HQ			100	100								
	2																	
				5		HQ			100	100								
	3			6		HQ			100	92								
	4																	
				7		HQ			100	92								
	5																	
5.7 285.9		Borehole terminated at 5.72 m in Gniessic Bedrock.																



<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 60336434	<b>BOREHOLE:</b> BH9 1 of 1
Subsurface Investigation Croft Landfill <b>Client:</b> Township of Magnetawan	<b>Northing:</b> N/A <b>Easting:</b> N/A <b>Methodology:</b> Auger/Coring <b>Contractor:</b> pontil drilling	<b>DATE:</b> June 22, 2015 <b>LOGGED BY</b> SRB <b>GROUND ELEV</b> 289.52 m ASL

DEPTH (m) (mASL)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY				RQD					
				NUMBER	INTERVAL	TYPE	N VALUE	% WATER	% REC	% RQD	(%)				(%)			
											25	50	75	100	25	50	75	100
		<b>SAND</b> Brown fine to medium sand, some fine gravel, wet. -0.15 m layer of brown to grey silty fine sand, trace gravel at about 0.2 m.		1		SS	4											
1		-0.15 m layer of medium to coarse sand, some gravel, saturated, at bedrock contact.		2		SS	31											
1.4 288.2		<b>GNEISSIC BEDROCK</b> Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive.		3		HQ			100	100				■				▲
2				4		HQ			100	100				■				▲
3				5		HQ			100	100				■				▲
3.9 285.6		Borehole terminated at 3.89 m in Gniessic Bedrock.																

<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 60336434	<b>BOREHOLE:</b> BH10 1 of 1
Subsurface Investigation Croft Landfill <b>Client:</b> Township of Magnetawan	<b>Northing:</b> N/A <b>Easting:</b> N/A <b>Methodology:</b> Auger/Coring <b>Contractor:</b> pontil drilling	<b>DATE:</b> June 23, 2015 <b>LOGGED BY</b> SRB <b>GROUND ELEV</b> 290.87 m ASL

DEPTH (m) (mASL)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY				RQD						
				NUMBER	INTERVAL	TYPE	N	VALUE	% WATER	% REC	% RQD	(%)				(%)			
												25	50	75	100	25	50	75	100
0.2 290.7		<b>TOPSOIL</b> Dark brown, silty topsoil, trace to some sand, trace rootlets, moist.		1		SS	0												
		<b>SAND</b> Brown silty sand, trace fine gravel, moist.																	
1		-Becoming fine sand and saturated below about 0.76 m -Changing to a fine to medium sand below about 0.9 m.		2		SS	23												
																			
				3		SS	21												
2																			
2.1 288.7		<b>GNEISSIC BEDROCK</b> Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive.		4		HQ				100									
				5		HQ				100									
3																			
				6		HQ				100									
4.1 286.8		Borehole terminated at 4.06 m in Gniessic Bedrock.																	



<b>BOREHOLE LOG</b>	<b>PROJECT:</b> 60336434	<b>BOREHOLE:</b> BH11 1 of 1
Subsurface Investigation	<b>Northing:</b> N/A	<b>DATE:</b> June 24, 2015
Croft Landfill	<b>Easting:</b> N/A	<b>LOGGED BY</b> JNB
<b>Client:</b> Township of Magnetawan	<b>Methodology:</b> Auger/Coring <b>Contractor:</b> pontil drilling	<b>GROUND ELEV</b> 290.74 m ASL

DEPTH (m) (mASL)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE					RECOVERY				RQD					
				NUMBER	INTERVAL	TYPE	N VALUE	WATER %	REC %	RQD %	RECOVERY (%)				RQD (%)			
											25	50	75	100	25	50	75	100
		<u>GNEISSIC BEDROCK</u> Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive.		1		HQ			100									
1																		
2				2		HQ			100									
3				3		HQ			100									
4																		
4.4 286.4		Borehole terminated at 4.39 m in Gniessic Bedrock.																



# Log of Borehole: BH12

Project #: 225335.005

Logged By: TG

Project: Groundwater Monitoring Well Installation

Client: The Corporation of the Municipality of Magnetawan

Location: Croft Waste Disposal Site, Magnetawan, Ontario

Drill Date: April 21, 2020

Sheet: 1 of 1

SUBSURFACE PROFILE					SAMPLE			
Depth	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
ft m								
0 0		Ground Surface	0.00					
1 1		<b>Gneissic Bedrock</b> Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive			100	RC1		
2 2								
3 1								
4 1								
5 2								
6 2								
7 2					100	RC2		
8 2								
9 3								
10 3								
11 3								
12 4					100	RC3		
13 4								
14 4								
15 5								
16 5								
17 5					100	RC4		
18 5								
19 6								
20 6			-6.10					
21 6		End of Borehole						
22 7								
23 7								
24 7								
25 7								

Contractor: Marathon Underground Constructors Corporation

Grade Elevation: 288.896 mREL

Drilling Method: HQ Diamond Core Bit

Top of Casing Elevation: 289.866 mREL

Well Casing Size: 5.08 cm

UTM Coordinates: 17T 593608mE 5058582 mN



# Log of Borehole: BH13

Project #: 225335.005

Logged By: TG

Project: Groundwater Monitoring Well Installation

Client: The Corporation of the Municipality of Magnetawan

Location: Croft Waste Disposal Site, Magnetawan, Ontario

Drill Date: April 22, 2020

Sheet: 1 of 1

SUBSURFACE PROFILE					SAMPLE			
Depth	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
ft m								
0 0		Ground Surface	0.00					
1 1		<b>Gneissic Bedrock</b> Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive			100	RC1		
2 2								
3 1								
4 1								
5 2								
6 2								
7 2					100	RC2		
8 2								
9 3								
10 3								
11 3								
12 4					100	RC3		
13 4								
14 4								
15 5								
16 5								
17 5					100	RC4		
18 5								
19 6								
20 6			-6.10					
21 6		End of Borehole						
22 7								
23 7								
24 7								
25 7								

Contractor: Marathon Underground Constructors Corporation

Grade Elevation: 290.821 mREL

Drilling Method: HQ Diamond Core Bit

Top of Casing Elevation: 291.566 mREL

Well Casing Size: 5.08 cm

UTM Coordinates: 17T 593714 mE 5058508 mN



# Log of Borehole: BH14

Project #: 225335.005

Logged By: TG

Project: Groundwater Monitoring Well Installation

Client: The Corporation of the Municipality of Magnetawan

Location: Croft Waste Disposal Site, Magnetawan, Ontario

Drill Date: April 22, 2020

Sheet: 1 of 1

SUBSURFACE PROFILE					SAMPLE			
Depth	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
ft m								
0 0		Ground Surface	0.00					
1 1		<b>Gneissic Bedrock</b> Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineralization, massive						
2 2								
3 1								
4 1								
5 2								
6 2								
7 2								
8 2								
9 3								
10 3								
11 3								
12 4								
13 4								
14 4								
15 5								
16 5								
17 5								
18 5								
19 6								
20 6			-6.10					
21 6		End of Borehole						
22 7								
23 7								
24 7								
25 7								

Contractor: Marathon Underground Constructors Corporation

Grade Elevation: 289.416 mREL

Drilling Method: HQ Diamond Core Bit

Top of Casing Elevation: 290.259 mREL

Well Casing Size: 5.08 cm

UTM Coordinates: 17T 593733 mE 5058558 mN

**APPENDIX III**  
**Summary Tables**

TABLE 1  
Groundwater Monitoring Location Data  
Croft Waste Disposal Site  
Magnetawan , Ontario

Well ID Number	Date (dd/mm/yyyy)	Ground Surface Elevation (masl)	TOC Elevation (masl)	Height of TOC from Ground Surface (m)	Water Level Measurement from TOC (m)	Total Well Depth from TOC (m)	Depth to Groundwater (mbgs)	Calculated Water Level Elevation (masl)	UTM Coordinates			Comments
									Zone	Northing (m)	Easting (m)	
BH1	8-May-14	NA	293.82		0.93			292.89	17T	5058316	593651	
	30-Oct-14				0.91			292.91				
	9-Jun-15											
	22-Jun-15											
	23-Jun-15											
	6-Aug-15				1.78			292.04				
	22-Oct-15											
	13-Oct-16				1.66			292.16				
	18-May-17				0.97			292.85				
	25-Oct-17				0.92			292.90				
	2-May-18				0.84			292.98				
	17-Oct-18				1.06			292.76				
	11-Jun-19			0.72	0.95	4.34	0.23	292.87				
	25-Sep-19			0.65	1.42	4.29	0.77	292.40				
	2-Jun-20			0.65	1.12	4.29	0.47	292.70				
	1-Oct-20			0.66	1.02	3.47	0.36	292.80				Orange, odour.
	12-May-21			0.72	1.08	4.40	0.36	292.74				
	7-Oct-21			0.72	0.97	4.38	0.25	292.85				
BH8	8-May-14	291.63	292.47						17T	5058508	593544	
	30-Oct-14											
	9-Jun-15											
	22-Jun-15				2.24			290.23				
	23-Jun-15											
	6-Aug-15				4.04			288.43				
	22-Oct-15				4.55			287.92				
	13-Oct-16				4.20			288.27				
	18-May-17				2.36			290.11				
	25-Oct-17				2.43			290.04				
	2-May-18				1.69			290.78				
	17-Oct-18				2.90			289.57				
	11-Jun-19			0.83	2.59	6.52	1.76	289.88				
	25-Sep-19			0.75	3.95	6.45	3.20	288.52				Partial sample
	2-Jun-20			0.76	2.75	6.54	1.99	289.72				Purged dry.
	1-Oct-20			0.84	2.79	6.41	1.95	289.68				
	12-May-21			0.82	2.44	6.51	1.62	290.03				Purged dry.
	7-Oct-21			0.82	2.35	6.51	1.53	290.12				Purged dry.
BH9	8-May-14	289.52	290.44						17T	5058495	593597	
	30-Oct-14											
	9-Jun-15											
	22-Jun-15				1.84			288.60				
	23-Jun-15											
	6-Aug-15				1.98			288.46				
	22-Oct-15				1.83			288.61				
	13-Oct-16				1.79			288.65				
	18-May-17				1.18			289.26				
	25-Oct-17				1.18			289.26				
	2-May-18				0.95			289.49				
	17-Oct-18				1.41			289.03				
	11-Jun-19			0.99	1.10	4.61	0.11	289.34				
	25-Sep-19			0.93	1.42	4.62	0.49	289.02				
	2-Jun-20			1.00	1.33	4.70	0.33	289.11				Purged dry.
	1-Oct-20			0.81	1.27	4.60	0.46	289.17				
	12-May-21			0.80	1.3	4.64	0.5	289.14				
	7-Oct-21			0.80	1.12	4.67	0.32	289.32				Purged dry.
BH10	8-May-14	290.87	291.83						17T	5058444	593731	
	30-Oct-14											
	9-Jun-15											
	22-Jun-15											
	23-Jun-15				1.13			290.70				
	6-Aug-15				1.74			290.09				
	22-Oct-15				2.22			289.61				
	13-Oct-16				1.23			290.60				
	18-May-17				0.86			290.97				
	25-Oct-17				0.80			291.03				
	2-May-18				0.79			291.04				
	17-Oct-18				0.95			290.88				
	11-Jun-19			0.86	0.93	4.92	0.07	290.90				
	25-Sep-19			0.83	1.19	4.83	0.36	290.64				
	2-Jun-20			0.83	1.00	4.91	0.17	290.83				
	1-Oct-20			0.92	0.88	4.87	-0.04	290.95				
	12-May-21			0.92	1	4.88	0.08	290.83				
	7-Oct-21			0.92	0.9	4.87	-0.02	290.93				
BH11	8-May-14	290.74	292.61						17T	5059507	593713	
	30-Oct-14											
	9-Jun-15											
	22-Jun-15											
	23-Jun-15											
	6-Aug-15				2.41			290.20				
	22-Oct-15				2.46			290.15				
	13-Oct-16				1.95			290.68				
	18-May-17				1.23			291.38				
	25-Oct-17				1.01			291.60				
	2-May-18				0.91			291.70				
	17-Oct-18				1.10			291.51				
	11-Jun-19			0.74	1.07	4.81	0.33	291.54				
	25-Sep-19			0.66	1.19	4.72	0.53	291.42				
	2-Jun-20			0.66	1.50	4.72	0.84	291.11				
	1-Oct-20			0.75	1.08	4.82	0.33	291.53				
	12-May-21			0.75	1.38	4.82	0.63	291.23				
	7-Oct-21			0.75	1.25	4.82	0.50	291.36				
DP-7	8-May-14	289.30	289.77						17T	5058495	593597	
	30-Oct-14											
	9-Jun-15											
	22-Jun-15											
	23-Jun-15											
	6-Aug-15				2.41			290.20				
	22-Oct-15				2.46			290.15				
	13-Oct-16				1.95			290.68				
	18-May-17				1.23			291.38				
	25-Oct-17				1.01			291.60				
	2-May-18				0.91			291.70				
	17-Oct-18				1.10			291.51				
	11-Jun-19			0.74	1.07	4.81	0.33	291.54				
	25-Sep-19			0.66	1.19	4.72	0.53	291.42				
	2-Jun-20			0.66	1.50	4.72	0.84	291.11				
	1-Oct-20			0.75	1.08	4.82	0.33	291.53				
	12-May-21			0.75	1.38	4.82	0.63	291.23				
	7-Oct-21			0.75	1.25	4.82	0.50	291.36				
DP-8	8-May-14	290.54	291.06						17T	5058510	593752	
	30-Oct-14											
	9-Jun-15											
	22-Jun-15											
	23-Jun-15											



<b>TABLE 2</b> <b>Surface Water Monitoring Location Data</b> <b>Croft Waste Disposal Site</b> <b>Magnetawan, Ontario</b>				
<b>Surface Water Monitoring Location</b>	<b>UTM Coordinates</b>			<b>Comments</b>
	<b>Zone</b>	<b>Easting (m)</b>	<b>Northing (m)</b>	
SW1	17T	593867	5058308	Stagnant
SW2	17T	593556	5059083	Flowing
SW3	17T	593597	5058495	No Flow

TABLE 3  
Groundwater Quality Results - BH-1  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (mm/dd/yyyy)													
		BH1													
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	
pH Lab	pH Units	6.55	NA	6	6.3	6.2	6.2	6.1	6.67	6.54	6.64	6.33	6.41	7.10	6.5-8.5
Conductivity	uS/cm	92		596	96	97	68	134	57	146	101	189	89	192	-
Hardness	mg/L	34		185	16	25	19	33	17.2	32	20.7	59	30.5	50.1	80-100
Total Dissolved Solids	mg/L	126		416	114	78	46	128	76	90	76	120	94	240	500
Alkalinity	mg/L	32		55	26	38	25	38	24	39	36	74	38	59	30-500
Chloride	mg/L	7.9		54	5	5	5	7	1.9	5.34	2.8	12.7	3.0	11.0	250
Sodium	mg/L	1.2		30	5.61	6.32	3.33	5.23	3.9	7.55	4.7	7.3	5.8	9.1	200
Calcium	mg/L	9.9		63.1	5.42	8.24	6.11	10.5	5.5	9.62	6.4	18.1	9.8	15.3	-
Magnesium	mg/L	2.3		6.75	0.699	1.12	0.859	1.62	0.86	1.84	1.13	3.36	1.48	2.88	-
Potassium	mg/L	1.4		2.95	1.16	1.79	1.09	1.5	1.2	1.82	1.3	2.2	1.5	2.1	-
Sulphate	mg/L	<1		154	5	154	1	19	2.1	10.2	2.4	18.0	4.0	<20	500
Ammonia	mg/L	<0.05		0.09	0.12	0.23	0.08	0.08	0.4	0.21	0.2	0.1	0.1	0.1	-
Nitrate as N	mg/L	<0.1		<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05	<0.05	< 0.03	0.53	10
Nitrite as N	mg/L	<0.01		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.06	<0.03	1
Total Kjeldahl Nitrogen	mg/L	0.47		0.7	1.8	1.1	0.4	1.4	0.77	0.68	0.53	0.72	0.40	0.42	-
Phenolics	mg/L	<0.001		<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	< 0.002	<0.002	-
Dissolved Organic Carbon	mg/L	7.2		13.3	16.1	15.8	8.2	17.5	10.6	8.5	10.0	15.6	12.0	13.0	5
Chemical Oxygen Demand	mg/L	76		62	108	63	27	74	28	31	32	<5	27	33	-
Iron	mg/L	8.5		16.7	1.49	4.94	2.29	8.76	4.35	7.32	5.48	13.9	5.18	10.4	0.3
Manganese	mg/L	1.5		4.1	0.579	0.611	0.45	0.819	0.46	0.86	0.53	1.40	0.95	1.17	0.05
Phosphorus	mg/L	0.7		0.1	0.8	0.29	0.06	0.27	0.22	0.06	0.02	0.06	0.06	<0.03	-
Orthophosphate	mg/L										<0.10			-	-
Turbidity	NTU	60		94.1	507	158	22.9	118	58.4	44.2	22.4	8.1	5.5	3.3	5
Total Suspended Solids	mg/L	140		142	822	422	56	181	150	61	37	27	133	40	-
BOD	mg/L	<2		2	<20	6	<2	3	<5	<5	<5	3	< 4	<4	-
Anion Sum		0.869		5.84	0.74	0.96	0.66	1.35						-	-
Cation Sum		1.13		5.09	0.6	0.82	0.55	0.92						-	-
Ion Balance	%			-6.9			-9.6	N/A						-	-
Silver	mg/L	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	< 0.00005	<0.00005	-
Aluminum	mg/L	0.53		0.199	0.253	0.321	0.311	0.883	0.537	0.44	0.50	0.83	0.40	0.46	0.1
Antimony	mg/L	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	< 0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001		<0.001	<0.001	0.001	0.001	0.004	<0.003	<0.003	<0.001	0.007	0.0014	0.0021	0.010
Barium	mg/L	0.033		0.192	0.025	0.032	0.013	0.045	0.024	0.04	0.023	0.059	0.033	0.051	1
Beryllium	mg/L	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.000069	0.000124	-
Bismuth	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	0.00002	0.00003	-
Boron	mg/L	<0.01		0.202	0.014	0.015	0.025	0.026	0.017	0.03	0.014	0.045	0.024	0.059	5
Cadmium	mg/L	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	< 0.000003	0.000009	0.005
Chromium	mg/L	<0.005		0.003	<0.001	0.001	<0.001	0.002	<0.003	<0.003	<0.002	0.003	0.00161	0.00166	0.05
Cobalt	mg/L	0.031		0.0686	0.0071	0.0087	0.0044	0.0105	0.005	0.01	0.005	0.016	0.008	0.012	-
Copper	mg/L	0.0087		0.0016	0.0027	0.0031	0.0023	0.0059	0.007	0.01	0.003	0.005	0.003	0.003	1
Molybdenum	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00019	0.00034	-
Nickel	mg/L	0.0019		0.004	<0.001	0.001	<0.001	0.003	<0.003	<0.003	<0.003	<0.003	0.0012	0.0011	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.0002	<0.10	<0.10		<0.10	< 0.03	-	-
Lead	mg/L	0.00094		0.0002	0.0005	0.0005	0.0002	0.0016	0.001	0.002	0.0008	0.002	0.00062	0.00089	0.01
Selenium	mg/L	<0.002		<0.001	<0.0001	0.002	0.002	0.006	<0.004	<0.004	<0.001	0.001	0.00019	0.00026	0.05
Sillicon	mg/L	7.4		5.05	3.13	4.05	2.52	3.6	3.22	5.90	3.43	4.96	3.76	5	-
Tin	mg/L	<0.001		<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.05	<0.002	<0.002	< 0.00006	<0.00006	-
Strontium	mg/L	0.06		0.068	0.019	0.048	0.035	0.06	0.031	<0.002	0.033	0.092	0.056	0.077	-
Titanium	mg/L	0.14		0.009	0.027	0.034	0.025	0.072	0.056	0.08	0.035	0.125	0.0434	0.0572	-
Uranium	mg/L	0.002		0.0012	0.0008	0.0007	0.0005	0.0014	<0.002	<0.002	0.001	0.002	0.001	0.001	0.02
Vanadium	mg/L	0.0057		0.0071	0.0023	0.0027	0.0023	0.0077	0.004	0.01	0.004	0.007	0.00384	0.00452	-
Zinc	mg/L	<0.005		<0.005	<0.005	<0.005	<0.005	0.02	<0.005	0.03	<0.005	<0.005	< 0.002	0.006	5
Field Measurements															
Temperature	oC	4.91	-	5.22	6.37	6.24	8.08	6.45	10.3	13.1	9.2	11.62	6.42	12.1	-
pH	pH Units	-	-	-	-	-	-	-	6.4	5.4	5.4	5.9	15.9	6.7	6.5-8.5
Coductivity	uS/cm	6.55	-	786	-	-	0.08	0.19	78.40	118.50	116.70	143.00	69.00	1290.00	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	145.3	176.5	170.6	98	53.5	27	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.21	1.18	1.15	7.44	1.42	1.35	-

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 4  
Groundwater Quality Results - BH-8  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (mm/dd/yyyy)													
		BH-8													
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	
pH Lab	pH Units	7.87	7.62	7.2	6.7	7	6.4	6.7	6.62	6.72	6.57	6.21	6.59	6.93	6.5-8.5
Conductivity	uS/cm	450	200	124	88	103	68	94	35	70	51	51	39	60	-
Hardness	mg/L	190	62	39	18	20	10	27	9.8	22.8	13.5	18.9	11.1	9.2	80-100
Total Dissolved Solids	mg/L	298	158	118	110	80	42	58	50	68	44	32	< 30	46	500
Alkalinity	mg/L	180	86	48	31	34	18	28	11	23	12	27	9	16	30-500
Chloride	mg/L	16	3.5	1	<0.001	<0.1	<1	<1	0.5	0.4	0.5	0.4	2	<1	250
Sodium	mg/L	9.9	1.9	2.7	8.35	7.9	7.37	3.36	2.8	2.5	1.8	1.9	3.25	4.26	200
Calcium	mg/L	53	17	11.3	5.8	6.28	2.97	7.39	2.9	6.2	4.0	5.4	3.26	2.76	-
Magnesium	mg/L	15	5.1	2.59	0.926	1.06	0.533	2.1	0.7	1.8	0.9	1.3	0.709	0.563	-
Potassium	mg/L	12	5.6	3.14	1.42	1.65	0.888	2.02	0.8	1.70	0.8	1.32	0.735	0.556	-
Sulphate	mg/L	31	8.6	10	0.014	17	12	17	5.1	8.8	6.8	7.1	5	10	500.0
Ammonia	mg/L	0.11	<0.05	0.05	0.01	0.05	0.01	0.01	0.11	<0.02	<0.02	<0.02	< 0.04	<0.04	-
Nitrate as N	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	0.1	<0.05	0.06	0.07	<0.05	< 0.03	0.23	10
Nitrite as N	mg/L	0.032	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	<0.03	1
Total Kjeldahl Nitrogen	mg/L	0.25	<0.2	0.3	0.4	0.3	0.4	0.2	0.36	0.86	0.28	0.19	0.13	0.15	-
Phenolics	mg/L	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	0.001	<0.001	< 0.002	<0.002	-
Dissolved Organic Carbon	mg/L	3	1.5	3.4	5	9.7	3.9	58	2.6	3.1	3.3	3.5	4	4	5
Chemical Oxygen Demand	mg/L	120	14	127	59	109	54	37	<5	12	8	<5	11	8	-
Iron	mg/L	<0.1	0.39	<0.1	<0.1	<0.1	<0.1	<0.1	0.05	<0.010	0.06	0.030	0.082	0.095	0.3
Manganese	mg/L	0.1	0.12	0.055	0.926	0.027	0.01	0.03	0.01	0.02	0.01	0.01	0.0080	0.0066	0.05
Phosphorus	mg/L	9.2	0.61	0.68	0.22	0.53	0.26	0.2	0.13	0.21	0.32	0.13	0.10	0.19	-
Orthophosphate	mg/L										<0.10			-	-
Turbidity	NTU	4100	220	900	225	451	195	304	162	192	150	119	21.6	17.0	5
Total Suspended Solids	mg/L	4200	1100	932	272	584	297	234	154	227	198	274	26	152	-
BOD	mg/L	2	<2	ND (20)	<2	<20	<2	<2	<5	<5	<5	<2	< 4	<4	-
Anion Sum		4.64	1.99	1.2	0.94	1.05	0.65	0.95						-	-
Cation Sum		4.6	1.48	0.99	0.76	0.79	0.54	0.75						-	-
Ion Balance	%	0.44	NC	-9.6			-9							-	-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	< 0.00005	<0.00005	-
Aluminum	mg/L	0.031	0.0064	0.046	0.142	0.094	0.167	0.042	0.101	0.065	0.076	0.056	0.119	0.163	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	< 0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.001	<0.001	< 0.0002	0.0004	0.010
Barium	mg/L	0.1	0.082	0.053	0.022	0.032	0.009	0.035	0.019	0.033	0.020	0.024	0.0161	0.0151	1.00
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.000013	0.000028	-
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.00001	<0.00001	-
Boron	mg/L	0.027	<0.01	0.012	<0.01	<0.01	0.044	<0.01	<0.010	<0.010	<0.010	<0.010	0.025	0.009	5
Cadmium	mg/L	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0008	<0.001	<0.001	<0.0001	<0.0001	0.000026	0.000028	0.005
Chromium	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.002	<0.002	0.00037	0.00026	0.05
Cobalt	mg/L	<0.0005	0.00065	0.0007	0.0007	0.0012	0.0008	0.0013	<0.001	0.001	0.001	0.002	0.00092	0.00124	-
Copper	mg/L	<0.001	<0.001	0.0019	0.0277	0.0179	0.0222	0.00068	0.011	0.008	0.01	0.013	0.0139	0.0238	1
Molybdenum	mg/L	0.013	0.0015	0.0011	0.0039	0.0011	0.0017	0.0005	<0.002	<0.002	<0.002	<0.002	0.00055	0.00066	-
Nickel	mg/L	0.019	0.0032	0.004	0.011	0.01	0.006	0.007	0.005	0.006	0.006	0.008	0.0044	0.0050	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.2	<0.10	<0.10		<0.10	0.04	-	-
Lead	mg/L	<0.0005	<0.0005	<0.0001	0.0001	0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0005	<0.0005	0.00014	0.00015	0.01
Selenium	mg/L	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.004	<0.004	<0.001	<0.001	0.00006	0.00008	0.05
Sillicon	mg/L	5.3	5.6	4.71	2.96	4.15	2.95	3.49	3.17	4.42	2.85	4.3	3.02	3.57	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.026	<0.002	<0.002	0.00007	<0.00006	-
Strontium	mg/L	0.16	0.056	0.039	0.029	0.025	0.014	0.03	0.015	<0.002	0.015	0.022	0.0147	0.0151	-
Titanium	mg/L	<0.005	<0.005	<0.005	0.007	<0.005	0.005	<0.005	0.005	0.003	0.005	<0.002	0.00466	0.00437	-
Uranium	mg/L	0.0022	0.00017	0.0001	0.0002	0.0002	0.0001	0.0002	<0.002	<0.002	<0.0005	<0.0005	0.000252	0.000210	0.02
Vanadium	mg/L	0.00074	<0.0005	0.002	0.0009	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00036	0.00029	-
Zinc	mg/L	<0.005	0.0088	0.01	0.088		0.018	0.031	0.017	0.032	0.021	0.031	0.017	0.015	5
Field Measurements															
Temperature	oC	-	-	-	-	-	-	-	11.3	Partial sample,	7	10.7	8.4	11.5	-
pH	pH Units	6.91	5.37	6.43	7.45	7.38	7.8	7.78	6.8	no field chem	5.42	5.8	4.91	6.62	-
Coductivity	uS/cm	368	179	114	-	-	0.1	0.11	43.3	-	42.1	38	28	34	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	111	-	105.5	353.4	194.1	64.2	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	12.4	-	8.74	10.29	8.69	6.38	-

Notes:

Ontario Drinking Water Quality Standards"

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

**TABLE 5**  
**Groundwater Quality Results - BH-9**  
**Croft Waste Disposal Site**  
**Magnetawan, Ontario**

[illegible]

Notes:

Ontario Drinking Water Quality Standards<sup>1</sup>

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

<b>BOLD</b>	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted

TABLE 6  
Groundwater Quality Results - BH-10  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (mm/dd/yyyy)													
		BH-10													
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/107/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	
pH Lab	pH Units	7.47	7.46	7.4	7.2	7.5	7.1	7.3	7.81	7.6	7.67	7.62	7.2	7.92	6.5-8.5
Conductivity	uS/cm	1900	2100	1980	1.48	2010	1440	1210	1790	2680	2430	1880	2190	2300	-
Hardness	mg/L	550	610	607	513	627	426	328	507	630	563	531	659	553	80-100
Total Dissolved Solids	mg/L	1090	1130	1170	970	1190	730	656	954	1540	1280	1240	1440	1420	500
Alkalinity	mg/L	670	640	573	487	695	522	496	508	372	527	559	448	383	30-500
Chloride	mg/L	170	180	219	185	289	143	104	246	462	381	395	400	480	250
Sodium	mg/L	120	120	164	84.8	107	66.5	71.8	129	182.0	144	159	156	191	200
Calcium	mg/L	170	190	192	177	200	136	107	169	214.0	178	170	216	181	-
Magnesium	mg/L	30	33	30.8	17.2	31.1	21.3	14.5	20.6	23.30	28.7	25.9	29.1	24.3	-
Potassium	mg/L	85	93	78.2	54.7	76.7	49.7	39.8	46.2	50.9	57.2	57.1	57	52.3	-
Sulphate	mg/L	49	45	82	67	46	37	42	68.6	53	27.6	24.5	20	25	500.0
Ammonia	mg/L	24	24	8.69	8	23.5	17.3	7.43	11.7	7.82	16.3	13.4	16.7	11.2	-
Nitrate as N	mg/L	0.97	14.9	15.2	0.7	1.1	<0.1	0.2	<0.5	22.6	1.8	<0.5	< 0.03	1.31	10
Nitrite as N	mg/L	0.08	0.406	1.44	<0.05	<0.05	<0.05	0.33	<0.5	<1.0	<1.0	<0.5	0.91	<0.3	1
Total Kjeldahl Nitrogen	mg/L	28	25	11.8	10	25.5	16.2	8.8	12.6	8.2	18.1	15.4	19.6	12.3	-
Phenolics	mg/L	<0.001	<0.001	0.009	<0.001	0.009	<0.001	<0.001	0.001	0.002	0.003	0.003	< 0.002	0.005	-
Dissolved Organic Carbon	mg/L	32	34	33.3	18.1	32	21.3	19.5	20.4	16	22.4	25.4	18	18	5
Chemical Oxygen Demand	mg/L	670	91	145	67	95	81	87	51	49	61	45	48	52	-
Iron	mg/L	7.1	0.27	<0.1	<0.1	<0.1	<0.1	<0.1	0.064	<0.010	0.031	0.049	0.023	0.019	0.3
Manganese	mg/L	3.1	2.5	0.973	0.922	5.72	6.12	4.02	2.88	4.34	2.14	2.02	3.10	2.34	0.05
Phosphorus	mg/L	4.4	0.12	0.2	0.05	0.05	0.09	0.14	0.08	0.36	<0.02	0.06	0.08	<0.03	-
Orthophosphate	mg/L										<2.0			-	-
Turbidity	NTU	1600	28	147	22.9	34.6	101	175	6.6	31.0	60.8	9.1	1.5	1.84	5
Total Suspended Solids	mg/L	5800	380	516	123	90	228	312	328	132	115	43	47	53	-
BOD	mg/L	<2	<2	23	<2	3	4	4	<5	<5	<5	<2	4	<4	-
Anion Sum		19.4	20	20.4	16.4	23.1	15.2	13.8						-	-
Cation Sum		20.1	21.7	21.2	15.3	19.1	12.7	10.7						-	-
Ion Balance	%	1.7	4.09	1.9	-3.3	-9.4	-9.2	-12.5						-	-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	< 0.00005	<0.00005	-
Aluminum	mg/L	0.071	0.046	0.038	0.024	0.033	0.031	0.045	0.04	0.032	0.048	0.036	0.028	0.026	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	< 0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001	<0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.001	<0.001	0.0008	0.0025	0.010
Barium	mg/L	0.3	0.33	0.276	0.183	0.262	0.122	0.146	0.225	0.279	0.276	0.236	0.29	0.243	1.00
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.00001	0.000015	-
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.00001	<0.00001	-
Boron	mg/L	1.8	2.1	2.05	1.09	1.4	0.577	1.2	1.16	1.28	1.29	1.47	1.05	1.11	5
Cadmium	mg/L	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	0.000075	0.000061	0.005
Chromium	mg/L	<0.005	<0.005	0.049	0.003	0.002	0.001	0.002	<0.003	<0.003	<0.002	<0.002	0.00146	0.00125	0.05
Cobalt	mg/L	0.0096	0.0064	0.0032	0.0021	0.0044	0.0031	0.0028	0.004	0.0040	0.0025	0.0023	0.0033	0.00283	-
Copper	mg/L	0.0056	0.08	0.0366	0.0148	0.0179	0.0141	0.0168	0.007	0.0100	0.01	0.007	0.0077	0.0076	1
Molybdenum	mg/L	0.0061	0.0065	0.0019	0.0012	0.0017	0.0014	0.0019	<0.002	<0.002	<0.002	<0.002	0.0012	0.00116	-
Nickel	mg/L	0.012	0.043	0.012	0.007	0.005	0.004	0.004	<0.003	0.006	0.003	<0.003	0.0024	0.0021	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.0002	<1.0	<2.0		<1.0	< 0.03	-	-
Lead	mg/L	<0.0005	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.001	<0.001	<0.0005	<0.0005	< 0.00009	<0.00009	0.01
Selenium	mg/L	<0.002	<0.002	0.004	0.003	<0.001	<0.001	<0.001	<0.004	0.006	<0.001	0.001	0.00026	0.00024	0.05
Sillicon	mg/L	5.3	4.7	4.37	3.92	4.7	3.89	3.24	4.44	4.66	3.67	3.89	5.11	4.95	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	1.06	<0.002	<0.002	0.00011	0.00009	-
Strontium	mg/L	0.8	0.85	0.943	0.628	0.95	0.614	0.503	0.793	<0.002	0.783	0.601	1.01	0.8	-
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.002	<0.002	0.005	0.00127	0.00077	-
Uranium	mg/L	0.0081	0.011	0.0083	0.0057	0.0072	0.0043	0.0046	0.007	0.0050	0.005	0.004	0.00487	0.00347	0.02
Vanadium	mg/L	<0.0005	0.0005	0.0131	0.0012	0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00041	0.00041	-
Zinc	mg/L	0.012	0.036	0.021	0.023	0.012	0.008	0.013	<0.005	0.006	<0.005	<0.005	0.003	0.005	5
Field Measurements															
Temperature	oC	-	-	-	-	-	-	-	11.7	13.5	8.3	11.83	8.83	13.2	-
pH	pH Units	6.25	6.43	5.71	6.88	6.86	7.18	7.28	6.49	6.58	6.88	6.61	6.46	6.47	6.5-8.5
Coductivity	uS/cm	1715	1481	1913	-	-	1.52	1.24	1935	2120	2184	1521	1456	1850	-
Oxidation Reduction Potentia	mV	-	-	-	-	-	-	-	129.1	134.9	50.7	126	64.3	109.7	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.61	4.25	5.44	7.29	17.77	0.87	-

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

<b>BOLD</b>	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 7  
Groundwater Quality Results - BH-11  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation													ODWQS
		Sample Collection Date (mm/dd/yyyy)													
		BH-11													
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/18	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	
pH Lab	pH Units	6.81	6.97	5	5.2	6.2	6.3	6.4	7.32	7.32	7.36	7.41	7.75	7.81	6.5-8.5
Conductivity	uS/cm	550	600	1590	1130	1500	1880	825	1730	1620	2530	1420	2540	1390	-
Hardness	mg/L	140	190	171	77	211	250	140	245	225	411	237	367	210	80-100
Total Dissolved Solids	mg/L	340	330	928	700	926	1010	466	1000	828	1300	836	1400	627	500
Alkalinity	mg/L	50	82	7	18	79	498	58	439	294	542	484	872	380	30-500
Chloride	mg/L	63	67	286	242	275	168	67	200	123	237	178	230	150	250
Sodium	mg/L	41	30	215	160	192	187	63.4	184	136	209	150	233	147	200
Calcium	mg/L	40	58	52.4	22.9	33.1	59.7	32.6	65.3	64.6	119.0	68.5	104.0	61.5	-
Magnesium	mg/L	8.8	11	9.75	4.93	31.3	24.6	14.3	19.90	15.5	27.70	15.90	26.40	13.80	-
Potassium	mg/L	5.6	4.9	39	22.2	79.4	59.7	29.1	67.90	56.5	82.30	55.20	91.90	61.00	-
Sulphate	mg/L	86	91	258	165	243	213	194	115	83.7	118	85	68	59	500.0
Ammonia	mg/L	<0.05	0.06	6.37	4.55	17.5	48	3.58	32.30	28.40	29.90	26.20	53.10	34.10	-
Nitrate as N	mg/L	4.58	2.06	18.5	1.6	3.2	0.1	8.7	<0.5	42.0	36.6	<0.25	< 0.3	12.1	10
Nitrite as N	mg/L	0.031	0.019	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.25	<1.0	<0.25	< 0.06	0.24	1
Total Kjeldahl Nitrogen	mg/L	0.85	0.6	8.4	6.7	22.8	44.9	5	41.5	32.80	38.4	30.3	70	37.1	-
Phenolics	mg/L	<0.001	<0.001	0.013	<0.001	0.011	0.011	<0.001	0.005	0.006	0.009	0.004	0.006	0.002	-
Dissolved Organic Carbon	mg/L	4.8	3.8	23.1	20.8	40.6	90.2	8.5	78.3	58.8	75.2	109.0	108.0	54.0	5
Chemical Oxygen Demand	mg/L	32	23	98	114	129	266	54	224	152	192	200	244	139	-
Iron	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	0.78	<0.1	1.42	0.079	0.126	0.719	5.68	0.231	0.3
Manganese	mg/L	0.39	0.38	6.1	2.1	5.68	5.03	2.09	3.23	1.88	3.74	2.11	4.69	1.81	0.05
Phosphorus	mg/L	0.98	1	0.2	0.19	0.08	0.21	0.02	0.10	0.07	0.03	0.14	0.06	0.04	-
Orthophosphate	mg/L										<2.0			-	-
Turbidity	NTU	1100	270	713	64.4	139	119	29.1	88.4	41.7	18.4	44.6	30.3	8.7	5
Total Suspended Solids	mg/L	600	1600	846	170	216	345	50	164	103	62	65	40	53	-
BOD	mg/L	<2	<2	ND (12)	<20	<20	<20	<2	<5	<5	<5	3	20	<4	-
Anion Sum		4.9	5.58	14.9	10.7	14.6	19.1	7						-	-
Cation Sum		4.69	5.24	13.8	9.07	14.6	14.7	6.3						-	-
Ion Balance	%	2.15	3.1	-3.8	-8.3	<0.1	-13.1	-9.9						-	-
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.002	<0.002	<0.0001	<0.0001	0.00009	<0.00005	-
Aluminum	mg/L	0.13	0.1	1.9	2.07	0.036	0.563	0.18	0.459	0.236	0.226	0.754	0.451	0.236	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.003	<0.003	<0.001	<0.001	< 0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.003	<0.003	<0.001	<0.001	0.0019	0.0009	0.010
Barium	mg/L	0.12	0.11	0.093	207	0.269	0.053	0.034	0.106	0.067	0.129	0.154	0.158	0.074	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.0008	0.0006	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	0.000074	0.000043	-
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.00001	<0.00001	-
Boron	mg/L	0.48	0.37	2.32	1.1	1.44	1.63	1.71	3.15	2.41	2.72	2.63	2.65	1.88	5
Cadmium	mg/L	0.00031	0.00018	0.0005	0.0009	<0.001	0.0004	0.0002	<0.001	<0.001	0.0002	0.0003	0.000279	0.000111	0.005
Chromium	mg/L	<0.005	<0.005	0.016	0.003	0.002	0.004	0.001	0.005	0.004	0.003	0.004	0.00528	0.00283	0.05
Cobalt	mg/L	0.00062	<0.0005	0.0444	0.0167	0.0044	0.0374	0.0039	0.021	0.006	0.0096	0.0069	0.0318	0.00727	-
Copper	mg/L	0.0041	0.0044	0.0137	0.0064	0.0174	0.0114	0.004	0.012	0.024	0.011	0.018	0.006	0.013	1
Molybdenum	mg/L	0.001	0.0032	<0.0005	<0.0005	0.0017	0.0016	0.0005	<0.002	0.004	0.003	0.004	0.00419	0.00527	-
Nickel	mg/L	0.0056	0.0021	0.012	0.011	0.005	0.011	0.003	0.007	0.007	0.008	0.007	0.0124	0.0066	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.2	<1.0	<0.50		<0.50	< 0.03	-	-
Lead	mg/L	<0.0005	<0.0005	0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0005	<0.0005	0.00013	<0.00009	0.01
Selenium	mg/L	<0.002	<0.002	0.001	<0.001	<0.001	0.004	0.002	<0.004	<0.004	<0.001	0.003	0.00172	0.00107	0.05
Sillicon	mg/L	5.3	5.7	4.42	3.42	4.76	1.32	1.24	2	1	2	2	2	1	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.127	<0.002	<0.002	0.00024	0.00014	-
Strontium	mg/L	0.16	0.21	0.057	0.089	0.956	0.136	0.084	0.177	<0.002	0.272	0.175	0.268	0.140	-
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	0.006	0.005	<0.002	0.021	0.01066	0.00447	-
Uranium	mg/L	0.0015	0.0034	0.0024	0.0012	0.0072	0.0034	0.0006	0.006	0.003	0.0075	0.0052	0.00783	0.00448	0.02
Vanadium	mg/L	<0.0005	<0.0005	0.0038	0.0015	0.0005	0.0009	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00283	0.00058	-
Zinc	mg/L	0.0059	0.0076	0.022	0.062	0.007	0.024	0.009	0.010	0.012	0.005	0.008	0.010	0.004	5
Field Measurements															
Temperature	oC	-	-	-	-	-	-	-	11.1	15	10.9	13.07	8.27	14.4	-
pH	pH Units	6.01	5.22	5.43	5.09	5.85	6.8	8.06	6.6	6.3	6.6	6.5	6.3	6.4	6.5-8.5
Coductivity	uS/cm	473	233	1475	-	-	1.35	0.85	1972	1305	2289	1139	1650	1170	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	129.2	83.7	120.7	172	38.7	97.4	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.96	1.26	1.8	6.47	2.96	0.9	-

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 8  
Groundwater Quality Results - DP-7  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation Sample Collection Date (mm/dd/yyyy) DP-7											ODWQS
		08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021	
		DRY	DRY	DRY	DRY	DRY	6.49	6.71	Insufficient	Insufficient	Insufficient	Water	
pH Lab	pH Units						41	122	volume	volume	volume	level	-
Conductivity	uS/cm						15.2	48	for sample	for sample	for sample	only	80-100
Hardness	mg/L						114	78					500
Total Dissolved Solids	mg/L						9	36					30-500
Alkalinity	mg/L						2.06	0.6					250
Chloride	mg/L						1.68	2.8					200
Sodium	mg/L						4.6	13.5					-
Calcium	mg/L						0.90	3.47					-
Magnesium	mg/L						0.16	0.27					-
Potassium	mg/L						7.5	15.9					500
Sulphate	mg/L						0.48	<0.02					-
Ammonia	mg/L						0.06	0.07					10
Nitrate as N	mg/L						<0.05	<0.05					1
Nitrite as N	mg/L						1.14	1.69					-
Total Kjeldahl Nitrogen	mg/L						0.004	0.001					-
Phenolics	mg/L						8.5	5.3					5
Dissolved Organic Carbon	mg/L						33	156					-
Chemical Oxygen Demand	mg/L						7.26	0.342					0.3
Iron	mg/L						0.549	0.082					0.05
Manganese	mg/L						0.54	3.78					-
Phosphorus	mg/L												-
Orthophosphate	mg/L						1100	6240					5
Turbidity	NTU						7060	3780					-
Total Suspended Solids	mg/L						7	<5					-
BOD	mg/L												-
Anion Sum													-
Cation Sum													-
Ion Balance	%												-
Silver	mg/L						<0.002	<0.002					-
Aluminum	mg/L						0.325	0.392					0.1
Antimony	mg/L						<0.003	<0.003					0.006
Arsenic	mg/L						<0.003	<0.003					0.010
Barium	mg/L						0.011	0.010					1
Beryllium	mg/L						<0.001	<0.001					-
Bismuth	mg/L						<0.002	<0.002					-
Boron	mg/L						0.129	0.086					5
Cadmium	mg/L						<0.001	<0.001					0.005
Chromium	mg/L						<0.003	<0.003					0.05
Cobalt	mg/L						0.004	<0.001					-
Copper	mg/L						<0.003	<0.003					1
Molybdenum	mg/L						<0.002	<0.002					-
Nickel	mg/L						0.004	<0.003					-
Phosphate	mg/L						<0.10	<0.10					-
Lead	mg/L						<0.001	<0.001					0.01
Selenium	mg/L						<0.004	<0.004					0.05
Sillicon	mg/L						4.36	5.43					-
Tin	mg/L						<0.002	0.056					-
Strontium	mg/L						0.031	<0.002					-
Titanium	mg/L						0.004	0.014					-
Uranium	mg/L						<0.002	<0.002					0.02
Vanadium	mg/L						0.004	0.004					-
Zinc	mg/L						0.013	0.008					5
Field Measurements													
Temperature	oC						13.1	14.8					-
pH	pH Units						6.48	6.33					6.5-8.5
Coductivity	uS/cm						82.9	76.7					-
Oxidation Reduction Potentia	mV						149.3	113.5					-
Dissolved Oxygen	mg/L						7.75	7.31					-

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.



TABLE 9  
Groundwater Quality Results - BH-12  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation				ODWQS
		Sample Collection Date (mm/dd/yyyy)				
		BH-12				
		06/2/2020	10/1/2020	5/12/2021	10/7/2021	
pH Lab	pH Units	7.09	6.70	7.35	7.65	6.5-8.5
Conductivity	uS/cm	266	205	152	182	-
Hardness	mg/L	91.9	80.9	61.9	78.5	80-100
Total Dissolved Solids	mg/L	134	116	97	147	500
Alkalinity	mg/L	92	97	56	70	30-500
Chloride	mg/L	6	9	4	9	250
Sodium	mg/L	15	12	5	6	200
Calcium	mg/L	30.9	27.6	20.9	27.3	-
Magnesium	mg/L	3.59	2.92	2.36	2.50	-
Potassium	mg/L	7.87	3.00	1.30	1.60	-
Sulphate	mg/L	12	17	8	9	500.0
Ammonia	mg/L	0.25	0.11	0.08	0.08	-
Nitrate as N	mg/L	<0.05	0.1	< 0.03	0.1	10
Nitrite as N	mg/L	<0.05	<0.05	< 0.06	<0.03	1
Total Kjeldahl Nitrogen	mg/L	0.45	0.3	0.17	0.1	-
Phenolics	mg/L	0.001	<0.001	< 0.002	<0.002	-
Dissolved Organic Carbon	mg/L	4.7	4.9	4.0	4.0	5
Chemical Oxygen Demand	mg/L	10	<5	10	9	-
Iron	mg/L	1.91	3.8	1.56	1.19	0.3
Manganese	mg/L	1.18	0.42	0.38	0.38	0.05
Phosphorus	mg/L	0.43	0.80	0.24	0.06	-
Orthophosphate	mg/L	<0.10			-	-
Turbidity	NTU	406	550	107	11	5
Total Suspended Solids	mg/L	316	1500	931	153	-
BOD	mg/L	<5	<2	< 10	<4	-
Anion Sum					-	-
Cation Sum					-	-
Ion Balance	%				-	-
Silver	mg/L	<0.0001	<0.0001	< 0.00005	<0.00005	-
Aluminum	mg/L	0.117	1.340	0.054	0.038	0.1
Antimony	mg/L	<0.001	<0.001	< 0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001	0.002	0.0007	0.0009	0.010
Barium	mg/L	0.067	0.057	0.044	0.048	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.000043	0.000045	-
Bismuth	mg/L	<0.002	<0.002	< 0.00001	<0.00001	-
Boron	mg/L	0.16	0.07	0.05	0.08	5
Cadmium	mg/L	<0.0001	<0.0001	0.000006	0.000014	0.005
Chromium	mg/L	<0.002	<0.002	0.00029	0.00023	0.05
Cobalt	mg/L	0.0008	<0.0005	0.00009	0.000106	-
Copper	mg/L	<0.001	0.002	< 0.0002	0.001	1
Molybdenum	mg/L	0.005	<0.002	0.00088	0.00104	-
Nickel	mg/L	<0.003	<0.003	0.0003	0.0003	-
Phosphate	mg/L		<0.10	0.11	-	-
Lead	mg/L	<0.0005	0.0008	< 0.00009	<0.00009	0.01
Selenium	mg/L	<0.001	<0.001	< 0.00004	<0.00004	0.05
Sillicon	mg/L	5	8	6	6	-
Tin	mg/L	<0.002	<0.002	< 0.00006	<0.00006	-
Strontium	mg/L	0.089	0.096	0.105	0.124	-
Titanium	mg/L	0.004	0.144	0.00083	0.000109	-
Uranium	mg/L	0.0012	0.0007	0.000193	0.000191	0.02
Vanadium	mg/L	<0.002	<0.002	0.00037	0.00034	-
Zinc	mg/L	<0.005	0.012	< 0.002	0.003	5
Field Measurements						
Temperature	oC	7.8	11.3	6.65	13.4	-
pH	pH Units	6.7	6.6	6.1	6.3	6.5-8.5
Coductivity	uS/cm	272	158	76	154	-
Oxidation Reduction Potential	mV	108.7	61.1	86	29.4	-
Dissolved Oxygen	mg/L	1.15	7.55	5.05	1.06	-

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.



TABLE 10  
Groundwater Quality Results - BH-13  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation				ODWQS
		Sample Collection Date (mm/dd/yyyy)				
		BH-13				
		06/2/2020	10/1/2020	5/12/2021	10/7/2021	
pH Lab	pH Units	7.32	6.74	7.42	7.41	6.5-8.5
Conductivity	uS/cm	291	206	90	130	-
Hardness	mg/L	103	108	43	50.5	80-100
Total Dissolved Solids	mg/L	178	114	60	120	500
Alkalinity	mg/L	106	116	35	55	30-500
Chloride	mg/L	14	7	3	6	250
Sodium	mg/L	9	3	1	2	200
Calcium	mg/L	32.9	36.3	14.5	16.9	-
Magnesium	mg/L	5.17	4.21	1.65	2.00	-
Potassium	mg/L	5.82	2.45	0.95	1.47	-
Sulphate	mg/L	2	3	4	4	500.0
Ammonia	mg/L	0.08	0.48	0.04	0.37	-
Nitrate as N	mg/L	<0.05	<0.05	< 0.03	<0.06	10
Nitrite as N	mg/L	<0.05	<0.05	< 0.06	<0.03	1
Total Kjeldahl Nitrogen	mg/L	2.52	0.92	0.17	0.56	-
Phenolics	mg/L	0.006	0.002	< 0.002	<0.002	-
Dissolved Organic Carbon	mg/L	27.8	5.6	4.0	5.0	5
Chemical Oxygen Demand	mg/L	221	18	11	19	-
Iron	mg/L	7.29	2.26	0.245	1.48	0.3
Manganese	mg/L	0.695	0.515	0.184	0.212	0.05
Phosphorus	mg/L	31.90	8.74	0.90	3.46	-
Orthophosphate	mg/L	<0.10			-	-
Turbidity	NTU	28700	23200	42	43	5
Total Suspended Solids	mg/L	39600	18600	1360	10300	-
BOD	mg/L	35	2	< 10	<4	-
Anion Sum					-	-
Cation Sum					-	-
Ion Balance	%				-	-
Silver	mg/L	<0.0001	<0.0001	< 0.00005	0.00024	-
Aluminum	mg/L	0.134	0.070	0.084	0.502	0.1
Antimony	mg/L	<0.001	<0.001	< 0.0009	<0.0009	0.006
Arsenic	mg/L	<0.001	<0.001	0.0008	0.0011	0.010
Barium	mg/L	0.041	0.054	0.037	0.048	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.000043	0.000145	-
Bismuth	mg/L	<0.002	<0.002	< 0.00001	<0.00001	-
Boron	mg/L	0.05	0.03	0.01	0.04	5
Cadmium	mg/L	<0.0001	<0.0001	0.00005	0.000042	0.005
Chromium	mg/L	<0.002	<0.002	0.00033	0.00047	0.05
Cobalt	mg/L	0.0009	<0.0005	0.00026	0.000362	-
Copper	mg/L	<0.001	<0.001	0.003	0.005	1
Molybdenum	mg/L	0.006	<0.002	0.00041	0.0003	-
Nickel	mg/L	<0.003	<0.003	0.0009	0.0008	-
Phosphate	mg/L		<0.10	0.19	-	-
Lead	mg/L	<0.0005	<0.0005	< 0.00009	0.00045	0.01
Selenium	mg/L	<0.001	<0.001	0.00008	0.00011	0.05
Sillicon	mg/L	5.6	5.6	3.6	4.4	-
Tin	mg/L	<0.002	<0.002	< 0.00006	0.00006	-
Strontium	mg/L	0.087	0.062	0.034	0.035	-
Titanium	mg/L	<0.002	0.002	0.00153	0.0448	-
Uranium	mg/L	0.002	0.0013	0.00365	0.00296	0.02
Vanadium	mg/L	<0.002	<0.002	0.0006	0.00171	-
Zinc	mg/L	<0.005	<0.005	0.006	0.008	5
Field Measurements						
Temperature	oC	7.9	11.93	8.5	15	-
pH	pH Units	6.3	6.8	5.8	6.0	6.5-8.5
Coductivity	uS/cm	287	171	63	102	-
Oxidation Reduction Potential	mV	259	83.1	111.4	83	-
Dissolved Oxygen	mg/L	3.43	7.45	2.89	14.7	-

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 11  
Groundwater Quality Results - BH-14  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation				ODWQS
		Sample Collection Date (mm/dd/yyyy)				
		BH-14				
		06/2/2020	10/1/2020	5/12/2021	10/7/2021	
pH Lab	pH Units	7.01	6.69	7.67	7.63	6.5-8.5
Conductivity	uS/cm	472	408	406	305	-
Hardness	mg/L	106	130	135	106	80-100
Total Dissolved Solids	mg/L	288	256	306	207	500
Alkalinity	mg/L	67	118	86	84	30-500
Chloride	mg/L	87	73	56	41	250
Sodium	mg/L	31	27	14	11	200
Calcium	mg/L	31.3	39.8	41.0	33.4	-
Magnesium	mg/L	6.84	7.49	7.88	5.42	-
Potassium	mg/L	8.35	6.14	3.66	3.50	-
Sulphate	mg/L	4	7	19	17	500.0
Ammonia	mg/L	0.02	0.29	0.36	0.29	-
Nitrate as N	mg/L	<0.05	<0.05	< 0.03	<0.06	10
Nitrite as N	mg/L	<0.05	<0.05	< 0.06	<0.03	1
Total Kjeldahl Nitrogen	mg/L	0.98	0.96	0.5	0.46	-
Phenolics	mg/L	0.003	<0.001	< 0.002	<0.002	-
Dissolved Organic Carbon	mg/L	24.8	23.4	16.0	4.0	5
Chemical Oxygen Demand	mg/L	75	35	42	22	-
Iron	mg/L	3.77	4.35	4.52	2.87	0.3
Manganese	mg/L	1.19	1.12	1.31	0.75	0.05
Phosphorus	mg/L	4.98	7.38	5.69	1.73	-
Orthophosphate	mg/L	<0.10			-	-
Turbidity	NTU	5920	6190	226	180	5
Total Suspended Solids	mg/L	8970	4150	11400	710	-
BOD	mg/L	32	8	5	<4	-
Anion Sum					-	-
Cation Sum					-	-
Ion Balance	%				-	-
Silver	mg/L	<0.0001	<0.0001	< 0.00005	<0.00005	-
Aluminum	mg/L	0.144	0.083	0.207	0.051	0.1
Antimony	mg/L	<0.001	<0.001	< 0.0009	<0.0009	0.006
Arsenic	mg/L	0.002	0.002	0.0006	0.0005	0.010
Barium	mg/L	0.103	0.109	0.093	0.061	1.00
Beryllium	mg/L	<0.0005	<0.0005	0.000091	0.000056	-
Bismuth	mg/L	<0.002	<0.002	< 0.00001	<0.00001	-
Boron	mg/L	0.22	0.17	0.08	0.11	5
Cadmium	mg/L	<0.0001	<0.0001	< 0.000003	<0.000003	0.005
Chromium	mg/L	<0.002	<0.002	0.00043	0.00019	0.05
Cobalt	mg/L	0.0019	0.0016	0.00104	0.000525	-
Copper	mg/L	<0.001	0.001	0.001	0.000	1
Molybdenum	mg/L	<0.002	<0.002	0.00015	0.00044	-
Nickel	mg/L	0.007	<0.003	0.0008	0.0004	-
Phosphate	mg/L		<0.10	0.42	-	-
Lead	mg/L	<0.0005	<0.0005	< 0.00009	<0.00009	0.01
Selenium	mg/L	<0.001	0.012	0.00012	0.00006	0.05
Sillicon	mg/L	4	8	11	9	-
Tin	mg/L	<0.002	<0.002	0.00007	<0.00006	-
Strontium	mg/L	0.161	0.154	0.209	0.144	-
Titanium	mg/L	<0.002	<0.002	0.00745	0.00156	-
Uranium	mg/L	0.0006	<0.0005	0.000581	0.000499	0.02
Vanadium	mg/L	<0.002	<0.002	0.00141	0.0007	-
Zinc	mg/L	<0.005	<0.005	0.002	0.003	5
Field Measurements						
Temperature	oC	7.7	12.7	7.03	15.2	-
pH	pH Units	6.4	6.3	16.1	6.6	6.5-8.5
Coductivity	uS/cm	442	332	243	270	-
Oxidation Reduction Potential	mV	46.2	55.3	27.9	-25.2	-
Dissolved Oxygen	mg/L	1.12	6.95	3.84	0.69	-

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 “Ontario Drinking Water Quality Standards” under the Safe Drinking Water Act”, dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines”, dated June 2003.

BOLD	Exceeds ODWQS
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

**TABLE 12**  
**B-7 Guideline Calculations - Spring 2021**  
**Croft Waste Disposal Site**  
**Magnetawan, Ontario**

Parameter	Units	Sample Designation							ODWQS	Guideline B-7 Calculation			
		Sample Collection Date (dd/mm/yyyy)								Cm = Cb + x (Cr - Cb)			
		BH8	BH9	BH10	BH11	BH-12	BH-13	BH-14		Cb	x	Cr	Cm
		5/12/2021	5/12/2021	5/12/2021	5/12/2021	5/12/2021	5/12/2021	5/12/2021					
Chloride	mg/L	2.0	18.0	400	230	4	3	56	250	5.9	0.5	250	127.9
Sulphate	mg/L	5	9	20	68	8	4	19	500	9.83	0.5	500	254.9
Sodium	mg/L	3	11	156	233	5	1	14	200	6	0.5	200	103.2
Boron	mg/L	0.025	0.23	1.05	2.65	0.05	0.01	0.08	5	0.03	0.25	5	1.27
Nitrate	mg/L	< 0.03	< 0.03	< 0.03	< 0.3	< 0.03	< 0.03	< 0.03	10	0.04	0.25	10	2.53
Alkalinity	mg/L	9	99	448	872	56	35	86	30-500	37	0.5	30-500	33.53 - 268.5
Dissolved Organic Carbon	mg/L	4	19	18	108	4	4	16	5	12	0.5	5	NC
Total Dissolved Solids	mg/L	< 30	194	1440	1400	97	60	306	500	102	0.5	500	301.2
Iron	mg/L	0.1	13.6	0.023	5.680	1.56	0.25	4.52	0.3	5.61	0.5	0.3	NC
Manganese	mg/L	0.008	1.27	3.1	4.69	0.382	0.184	1.31	0.05	0.826	0.5	0.05	NC

Notes:

Ontario Drinking Water Quality Standards\*

Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

<b>BOLD</b>	Exceeds Cm value.
INSV	Insufficient volume to allow for sampling
NC	Not Calculated due to the background concentration being in exceedance of the ODWQS.
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration - average of valid sampling rounds at BH1
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

**TABLE 13**  
**B-7 Guideline Calculations - Fall 2021**  
**Croft Waste Disposal Site**  
**Magnetawan, Ontario**

Parameter	Units								ODWQS	Guideline B-7 Calculation Cm = Cb + x (Cr - Cb)			
		BH8	BH9	BH10	BH11	BH-12	BH-13	BH-14		Cb	x	Cr	Cm
		10/7/2021	10/7/2021	10/7/2021	10/7/2021	10/7/2021	10/7/2021	10/7/2021					
Chloride	mg/L	0.5	36.0	480	150	9	6	41	250	5.9	0.5	250	127.9
Sulphate	mg/L	10	< 20	25	59	9	4	17	500	9.83	0.5	500	254.9
Sodium	mg/L	4	25	191	147	6	2	11	200	6	0.5	200	103.2
Boron	mg/L	0.009	0.46	1.11	1.88	0.08	0.04	0.11	5	0.03	0.25	5	1.27
Nitrate	mg/L	0.015	< 0.03	0.15	0.2	0.02	0.02	0.02	10	0.04	0.25	10	2.53
Alkalinity	mg/L	16	156	383	380	70	55	84	30-500	37	0.5	30-500	33.53 - 268.5
Dissolved Organic Car	mg/L	4	22	18	54	4	5	4	5	12	0.5	5	NC
Total Dissolved Solids	mg/L	46.0	287	1420	827	147	120	207	500	102	0.5	500	301.2
Iron	mg/L	0.1	16.5	0.019	0.231	1.19	1.48	2.87	0.3	5.61	0.5	0.3	NC
Manganese	mg/L	0.00663	1.62	2.34	1.81	0.377	0.212	0.749	0.05	0.826	0.5	0.05	NC

Notes:  
 Ontario Drinking Water Quality Standards\* Ontario Regulation 169/03 "Ontario Drinking Water Quality Standards" under the Safe Drinking Water Act", dated 2002, and "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines", dated June 2003.

<b>BOLD</b>	Exceeds Cm value.
INSV	Insufficient volume to allow for sampling
NC	Not Calculated due to the background concentration being in exceedance of the ODWQS.
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.
Cb	Background Concentration - average of valid sampling rounds at BH1
Cr	Maximum Acceptable Contaminant Concentration
x	Reduction Constant
Cm	Maximum Off-Site Acceptable Contaminant Concentration

TABLE 14  
Surface Water Quality Results - SW-1  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation															PWQO	CWQG
		Sample Collection Date (mm/dd/yyyy)																
		SW-1																
		04/08/2014	10/30/2014	05/13/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021		
pH Lab	pH units	6.21	6.02	6.01	6.44	6.3	6.2	6.1	5.8	5.4	4	5	DRY	5	4	4	6.5-8.5	6.5-9.0
Conductivity	uS/cm	23	23	27	400	186	27	45	20	72	478	89		676	780	635		
Hardness	mg/L	10	11	11	150	56	12	22	7	27	80	22		158	221	213		
Total Dissolved Solids	mg/L	42	76	48	270	184	154	84	24	84	432	80		418	449	480		
Alkalinity	mg/L	5.5	5.9	3.8	7.8	12	7	10	6	7	<5	<5		<5	< 2	<2		
Chloride	mg/L	<1	<1	3	100	41	2	5	1	10	149	17		231	260	240	120	
Sodium	mg/L	0.63	0.65	0.9	6.6	3.7	1.44	0.885	0.781	1.18	14	3		23	27	33		
Calcium	mg/L	3.3	3.6	3	32	14.9	3.96	6.41	2.1	7.99	32	5		38	58	52		
Magnesium	mg/L	0.52	0.59	0.47	13	4.53	0.58	1.33	0.394	1.76	14	2		15	19	20		
Potassium	mg/L	0.27	0.31	0.38	6.5	1.23	0.34	1.47	0.468	1.37	2	1		2	3	2		
Sulphate	mg/L	<1	<1	<1	15	2	1	<1	2	6	4	3		3	< 2	<2		
Ammonia	mg/L	<0.05	<0.05	<0.05	0.058	0.06	0.01	<0.01	0.02	0.05	0.18	0.15		<0.02	< 0.04	<0.04		
Nitrate as N	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05	<0.05		<0.10	< 0.06	0	13	
Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.10	< 0.03	<0.03	0.06	
Total Kjeldahl Nitrogen	mg/L	1	0.55	0.49	0.67	0.8	0.6	0.9	0.3	1	0.41	2		0.45	0.14	0.35		
Phenolics	mg/L	<0.001	0.0049	<0.001	<0.001	0.009	<0.001	0.006	<0.001	<0.001	0.001	0.01		0.003	0.002	0.004	0.001	0.004
Dissolved Organic Carbon	mg/L	13	21	16	14	24.1	16.3	27.5	7.6	44.8	4	12		10	2	4		
Chemical Oxygen Demand	mg/L	27	56	47	38	81	55	77	28	85	8	37		20	13	30		
Iron	mg/L	0.12	0.29	0.15	0.65	0.981	0.167	0.888	0.2	0.794	2	0.42		6	5	10	0.3	0.3
Manganese	mg/L	0.0094	0.028	0.019	0.23	0.038	0.072	0.152	0.022	0.079	1	0.10		1	1	2		
Phosphorus	mg/L	0.01	0.009	0.008	0.026	<0.01	<0.01	0.03	<0.01	0.04	0.04	0.05		0.02	< 0.03	0.04	0.03	
Orthophosphate	mg/L	<0.01	<0.01	<0.01	<0.01						<0.10					-		
Turbidity	NTU	0.2	0.3	0.4	2.5	1.5	0.7	1.4	2.1	0.9	6	3		5		-		
Total Suspended Solids	mg/L	<10	<10	<1	<10	4	<2	4	2	<2	38	<10		10	8	63		
BOD	mg/L	<2	2	<2	<2	<12			<2	<2	<5	<5		<5	< 4	<4		
Anion Sum		0.109	0.117	0.175	3.28	1.41	0.23	0.35	0.19	0.54						-		
Cation Sum		0.272	0.281	0.339	3.58	1.31	0.32	0.51	0.18	0.63						-		
Ion Balance	%	NC	NC	NC	4.34	-3.9			-1.5	8.1						-		
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	1.18	<0.0001	<0.0001		<0.0001	< 0.00005	<0.00005	0.0001	0.00025
Aluminum	mg/L	0.26	0.34	0.26	0.22	0.167	0.228	0.265	0.133	0.375	0.72	0.28		1.42	1.20	0.53	0.075	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001		<0.001	< 0.0009	<0.0009	0.02	
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003		<0.003	< 0.0002	0	0.1	0.005
Barium	mg/L	0.012	0.013	0.012	0.17	0.055	0.017	0.02	0.005	0.028	0.088	0.023		0.106	0.152	0.133		
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	0	0	1.1	
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002		<0.002	< 0.00001	0		
Boron	mg/L	<0.01	<0.01	<0.01	0.015	<0.05	0.049	<0.01	0.011	<0.01	<0.010	0.093		0	0	0	0.2	1.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	0.0001		0.0002	0.0002	0.0004	0.0002	0.00026
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	0.001	<0.003	<0.003		<0.003	0	0	0.0089	0.001
Cobalt	mg/L	<0.0005	<0.0005	<0.0005	0.0023	<0.0025	0.0013	0.0022	<0.0005	0.0013	0.007	0.001		0.013	0.011	0.012	0.0009	
Copper	mg/L	0.0018	<0.001	0.0012	0.0017	<0.0025	0.0016	<0.0005	0.0009	0.0025	0.001	0.003		0.002	0.001	0.001	0.005	0.004
Molybdenum	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002		<0.002	< 0.00004	0	0.04	0.073
Nickel	mg/L	0.0017	0.0025	0.002	0.0025	<0.005	0.002	0.002	<0.001	0.004	0.003	<0.003		0.006	0.006	0.005	0.025	0.15
Phosphate	mg/L					<0.0002	<0.2	<0.0002	<0.0002	<0.2		<0.10		<0.20	0	-		
Lead	mg/L	0.00055	0.00066	0.00071	<0.0005	<0.0005	0.0007	0.0005	0.0001	0.0008	<0.001	<0.001		<0.001	0	0	0.005	0.01
Selenium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.005	<0.001	<0.001	<0.001	<0.001	<0.004	<0.004		<0.004	< 0.00004	<0.00004	0.1	0.001
Sillicon	mg/L	0.77	3.3	0.94	1.7	1.54	0.856	3.27	1.99	1.8	2	2		4	3	4		
Tin	mg/L	<0.001	<0.001	<0.001	<0.001	<0.025	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002		<0.002	< 0.00006	0		
Strontium	mg/L	0.017	0.017	0.016	0.24	0.124	0.014	0.045	0.013	0.059	0.31	0.07		0.38	0.69	0.60		
Titanium	mg/L	<0.005	<0.005	<0.005	0.017	<0.025	<0.005	0.006	<0.005	0.006	0.00	0.01		0.00	0.01	0.01		
Uranium	mg/L	0.00017	<0.0001	<0.0001	0.00012	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002		<0.002	0	0	0.005	0.02
Vanadium	mg/L	<0.0005	<0.0005	<0.0005	0.00058	<0.0025	0.0005	<0.0005	<0.0005	0.0007	<0.002	<0.002		<0.002	0	0	0.006	
Zinc	mg/L	0.0061	0.016	0.0066	0.02	<0.025	0.012	0.013	0.009	0.021	0.12	0.05		0.09	0.16	0.06	0.03	0.093
Field Measurements																		
Temperature	oC										14.7	15.6		12.66	10.92	15.9		
pH	pH Units	7.36	6.92	6.53	6.25	6.45	5.81		7.37	6.64	6.9	4.5		4.5	16.2	5.2		
Coductivity	uS/cm	41	21	19.2	303	1975			0.03	0.08	772	83		550	683	800		
Oxidation Reduction Potential	mV										174.9	226.3		276.5	172.7	191		
Dissolved Oxygen	mg/L										1.26	3.6		9.62	8.37	1.57		

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
<b>BOLD</b>	Exceeds PWQO
<u>UNDERLINED</u>	Exceeds CWQG
SHADED ONLY	RDL exceeds the standard
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 15 Surface Water Quality Results - SW-2 Croft Waste Disposal Site Magnetawan, Ontario																		
Parameter	Units	Sample Designation															PWQO	CWQG
		Sample Collection Date (mm/dd/yyyy)																
		SW-2																
		05/08/2014	10/30/14	05/13/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/2018	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021		
pH Lab	pH units	5.79	5.83	5.88	6.6	6.6	4.1	5.6	5.9	6	5.82	5.16	6.98	6.66	6.80	5.82	6.5-8.5	6.5-9.0
Conductivity	uS/cm	15	18	15	32	27	45	16	13	19	21	33	32	23	25	17		
Hardness	mg/L	4.3	5.2	5	13	7	5	5	3	7	4	11.3	8.1	9.5	8.4	7		
Total Dissolved Solids	mg/L	24	52	<10	26	34	132	16	14	20	42	94	36	<20	< 30	<30		
Alkalinity	mg/L	1.2	2.1	1.8	9.3	9	<5	<5	<5	6	<5	<5	5	13	7	3		
Chloride	mg/L	<1	1	1	<1	1	<1	<1	1	<1	2.05	0.6	0.86	0.9	2.0	<1		120
Sodium	mg/L	0.8	1.1	0.89	0.85	1	0.711	0.706	0.811	0.701	1.7	1.1	1.1	1.0	1.1	4.4		
Calcium	mg/L	1.2	1.6	1.3	3.2	2.74	1.51	1.36	0.798	2.03	1.6	3.0	2.4	2.8	2.6	2.1		
Magnesium	mg/L	0.3	0.43	0.34	1.1	<1	0.085	0.368	0.211	0.442	0.40	0.93	0.50	0.59	0.49	0.44		
Potassium	mg/L	0.24	0.38	0.39	0.88	<0.5	0.357	0.521	0.398	0.309	0.33	0.71	0.62	0.58	0.49	0.86		
Sulphate	mg/L	2	<1	<1	<1	3	3	<1	1	2	0.7	3.9	2.9	1.9	< 2	<2		
Ammonia	mg/L	0.059	<0.05	<0.05	<0.05	0.04	0.02	0.02	0.03	0.03	0.14	0.18	<0.02	0.03	< 0.04	<0.04		
Nitrate as N	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	1.8	<0.1	<0.1	<0.1	<0.05	0.10	<0.05	<0.05	< 0.06	0.40		13
Nitrite as N	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	< 0.03	<0.03		0.06
Total Kjeldahl Nitrogen	mg/L		0.42	0.44	<0.5	0.3	0.9	0.5	0.4	0.5	1.07	1.67	0.45	0.62	0.27	0.37		
Phenolics	mg/L	<0.001	0.0043		<0.001	0.002	<0.001	0.004	<0.001	<0.001	0.002	0.012	0.002	<0.001	< 0.001	<0.001	0.001	0.004
Dissolved Organic Carbon	mg/L	6.4	13	11	10	6.4	14.7	12.7	4.5	16.6	11.8	38.3	6.7	11.0	7.0	13.0		
Chemical Oxygen Demand	mg/L	15	35	26	28	36	63	30	19	21	44	125	21	7	25	33		
Iron	mg/L	0.38	1	1	2.5	0.738	0.632	1.09	0.364	0.596	1.31	2.73	0.451	1.25	0.711	1.11	0.3	0.3
Manganese	mg/L	0.034	0.046	0.049	0.31	0.032	0.085	0.055	0.035	0.041	0.122	0.305	0.077	0.076	0.052	0.056		
Phosphorus	mg/L	0.006	0.013	0.017	0.027	<0.01	0.05	0.04	0.01	0.02	0.07	0.15	<0.02	<0.02	< 0.03	0.02	0.03	
Orthophosphate	mg/L	<0.01	<0.01	<0.01	<0.01						<0.10		<0.10			-		
Turbidity	NTU	0.4	1.2	1.2	5	1.1	8.6	2.4	2.2	1.9	8.1	9.2	1.0	1.5		-		
Total Suspended Solids	mg/L	17	<10	1	<10	3	15	2	7	<2	26	<10	<10	<10	3	5		
BOD	mg/L	<2	<2	<2	<2	<2		<2	<2	<2	<5	<5	<5	13	< 4	<4		
Anion Sum		0.056	0.081	0.077	0.186	0.28	0.21	0.13	0.14	0.2						-		
Cation Sum		0.167	0.201	0.191	0.379	0.21	0.14	0.14	0.1	0.18						-		
Ion Balance	%	NC	NC	NC	NC	-13.6				-6.2						-		
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	< 0.00005	<0.00005	0.0001	0.00025
Aluminum	mg/L	0.18	0.3	0.25	0.13	0.037	0.192	0.216	0.005	0.135	0.176	0.577	0.063	0.087	0.067	0.303	0.075	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	< 0.0009	<0.0009	0.02	
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	< 0.0002	<0.0002	0.1	0.01
Barium	mg/L	0.008	0.0091	0.0087	0.01	0.008	0.012	0.009	0.003	0.009	0.012	0.030	0.008	0.012	0.008	0.011		
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.000015	0.000028	1.1	
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	< 0.00001	0.00001		
Boron	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	0.023	<0.01	0.011	<0.01	0.012	<0.010	<0.010	0.019	0.010	0.008	0.2	1.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0004	0.000025	0.00003	0.0002	0.00026
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	0.00034	0.0004	0.0089	0.001
Cobalt	mg/L	<0.0005	<0.0005	<0.0005	0.0011	<0.0025	0.0007	0.0005	<0.0005	<0.0005	0.0009	0.0028	<0.0005	<0.0005	0.000241	0.000357	0.0009	
Copper	mg/L	<0.001	<0.001	<0.001	<0.001	0.0143	0.0008	<0.0005	<0.0005	0.0008	<0.001	0.003	<0.001	0.002	0.001	0.001	0.005	0.004
Molybdenum	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.00026	<0.0004	0.04	0.073
Nickel	mg/L	0.0012	0.001	<0.001	<0.001	<0.005	0.001	<0.001	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003	0.001	0.001	0.025	0.15
Phosphate	mg/L					<0.0002	<0.0002	<0.0002	<0.2	<0.2		<0.10		<0.10	0.012	-		
Lead	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	0.0003	0.0002	0.0001	0.0002	<0.001	0.001	<0.001	<0.001	0.00024	0.00036	0.005	0.01
Selenium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.005	<0.001	<0.0001	<0.001	<0.001	<0.004	<0.004	<0.004	<0.004	0.00007	0.00007	0.1	0.001
Sillicon	mg/L	0.6	2.1	0.59	3.1	<0.05	0.306	2.15	1.14	1.27	0.45	4.6	0.91	2.02	1.04	1.75		
Tin	mg/L	<0.001	<0.001	<0.001	<0.001	<0.025	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	0.00013	0.0003		
Strontium	mg/L	0.0086	0.011	0.0092	0.022	<0.05	0.014	0.014	<0.01	0.016	0.011	0.025	0.015	0.019	0.016	0.016		
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	0.003	0.008	<0.002	0.002	0.00183	0.00423		
Uranium	mg/L	0.00012	<0.0001	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002	0.000036	0.000063	0.005	0.02
Vanadium	mg/L	<0.0005	<0.0005	0.00058	0.00082	<0.0025	0.0005	<0.0005	<0.0005	<0.0005	<0.002	0.002	<0.002	<0.002	0.00029	0.0006	0.006	
Zinc	mg/L	0.0075	0.0085	0.0069	<0.005	<0.025	0.022	0.008	0.007	0.01	0.012	0.021	<0.005	0.008	0.010	0.008	0.03	0.09
Field Measurements																		
Temperature	oC	9.2	6.1	13.1	7.69	17.6	21.4			7.3	17.8	14.4	17.6	14.76	13.63	16.9		
pH	pH Units	5.95	7	9.26	6.68	7.03	6.03		6.52	7.1	6.8	4.5	7.1	6.2	16.2	6.9		
Coductivity	uS/cm	34	1044	13	46	6.6	4.1	5.6	5.9	6	251	30.1	28	22.0	16.0	23.0		
Oxidation Reduction Potentia	mV										139.5	205.9	141.8	129.6	119	34.4		
Dissolved Oxygen	mg/L	6.86	4.4	8.17	7.36						2.73	1.57	6.27	9.62	8.98	5.31		

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
<b>BOLD</b>	Exceeds PWQO
<u>UNDERLINED</u>	Exceeds CWQG
SHADED ONLY	RDL exceeds the standard
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.



TABLE 16  
Surface Water Quality Results - SW-3  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	Sample Designation													PWQO	CWQG
		Sample Collection Date (mm/dd/yyyy)														
		SW-3														
		05/08/2014	10/30/2014	05/13/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	06/11/2019	09/25/2019	06/2/2020	10/1/2020	5/12/2021	10/7/2021		
pH Lab	pH units	7.73	7.09	6.38	7.59	7.9	DRY	DRY	7.54	7.41	No Sample	8.15	8.12	7.47	6.5-8.5	6.5-9.0
Conductivity	uS/cm	820	510	210	1400	2060			193	241		901	617.00	687.00		
Hardness	mg/L	250	170	77	410	460			64.7	56.7		309.0	208.00	273.00		
Total Dissolved Solids	mg/L	552	276	158	820	1380			112	124		536	403.00	420.00		
Alkalinity	mg/L	190	120	17	190	657			78	69		444	204.00	267.00		
Chloride	mg/L	49	34	9	160	242			6.38	14.20		61.50	50.00	53.00		120
Sodium	mg/L	60	31	8	99	227			7.49	14.90		62.32	47.30	58.20		
Calcium	mg/L	83	55	22	120	146			25.90	18.90		101.58	67.70	88.80		
Magnesium	mg/L	11	8.6	3.3	17	23.1			2.69	2.31		13.45	9.56	12.50		
Potassium	mg/L	33	13	3.3	33	66.7			4.77	9.13		29.6	23.70	28.30		
Sulphate	mg/L	110	73	58	160	159			6.96	6.96		17.00	18.00	27.00		
Ammonia	mg/L	4.6	1.1	0.48	0.1	4.54			0.05	0.66		14.30	0.60	1.95		
Nitrate as N	mg/L	4.57	1.22	0.31	11.3	3.7			0.10	0.40		1.40	9.12	9.73		13
Nitrite as N	mg/L	0.171	0.045	<0.01	0.12	<0.05			<0.05	0.08		<0.25	0.46	0.62		0.06
Total Kjeldahl Nitrogen	mg/L	6.9	2	0.93	1.6	9			1.22	1.52		17.40	1.74	2.52		
Phenolics	mg/L	0.0027	0.0053	<0.001	0.0017	0.029			0.003	0.008		0.003	0.003	0.002	0.001	0.004
Dissolved Organic Carbon	mg/L	30	17	7.1	30	90.2			13.7	11.2		40.4	25.00	27.00		
Chemical Oxygen Demand	mg/L	81	47	16	80	270			44	53		75	85.00	62.00		
Iron	mg/L	0.76	2.4	0.21	0.16	0.854			1.35	1.65		1.04	0.56	0.79	0.3	0.3
Manganese	mg/L	0.067	0.18	0.042	0.25	1.07			0.351	0.138		0.479	0.00	0.09		
Phosphorus	mg/L	0.052	0.062	0.014	0.045	0.17			0.06	0.21		0.04	< 0.03	0.05	0.03	
Orthophosphate	mg/L	<0.01	<0.01	<0.01	<0.01				<0.10					-		
Turbidity	NTU	49	1.5	0.6	2.4	8.1			15.7	71		7.2		-		
Total Suspended Solids	mg/L	160	<10	1	<10	19			16	52		<10	16.00	8.00		
BOD	mg/L	3	<2	<2	<2	32			<5	<5		444	< 4	4.00		
Anion Sum		7.92	4.99	1.83	12.6	23.5								-		
Cation Sum		8.83	5.1	2.1	13.9	20.8								-		
Ion Balance	%	5.4	1.1	NC	4.85	-6.2								-		
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0005			<0.0001	<0.0001		<0.0001	< 0.00005	<0.00005	0.0001	0.00025
Aluminum	mg/L	0.81	0.08	0.087	0.073	0.038			0.032	0.062		0.035	0.05	0.02	0.075	0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025			<0.001	<0.001		<0.001	< 0.0009	<0.0009	0.02	
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005			<0.003	<0.003		<0.003	0.0008	0.0012	0.1	0.01
Barium	mg/L	0.077	0.063	0.052	0.11	0.119			0.026	0.029		0.040	0.03	0.05		
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025			<0.0005	<0.0005		<0.0005	0.000013	0.000032	1.1	
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005			<0.002	<0.002		<0.002	0.000050	0.000010		
Boron	mg/L	1	0.51	0.15	1	2.29			0.219	0.471		1.42	1.27	1.16	0.2	1.5
Cadmium	mg/L	0.00014	<0.0001	<0.0001	0.0002	<0.0005			<0.0001	<0.0001		<0.0001	0.00002	0.00006	0.0002	0.00026
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005			<0.003	<0.003		<0.003	0.001	0.003	0.0089	0.001
Cobalt	mg/L	0.0012	0.0012	<0.0005	0.0016	0.005			0.0012	0.001		0.001	0.001	0.001	0.0009	
Copper	mg/L	0.0071	0.0018	<0.001	0.0062	0.008			0.004	0.008		0.005	0.004	0.01	0.005	0.004
Molybdenum	mg/L	0.001	<0.0005	<0.0005	0.0014	0.0035			<0.002	<0.002		<0.002	0.001	0.0004	0.04	0.073
Nickel	mg/L	0.0018	0.0017	<0.001	0.0025	0.01			<0.003	<0.003		<0.003	0.002	0.0022	0.025	0.15
Phosphate	mg/L					<0.0002				<0.10		<0.50	0.06			
Lead	mg/L	0.0013	<0.0005	<0.0005	<0.0005	0.0005			0.001	0.003		<0.001	0.00038	0.00227	0.005	0.01
Selenium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.005			<0.004	<0.004		<0.004	0.00019	0.00017	0.1	0.001
Silicon	mg/L	2.3	3	2.2	1.4	1.04			0.99	1.01		2.48	0.36	2.36		
Tin	mg/L	<0.001	<0.001	<0.001	<0.001	<0.025			<0.002	<0.002		<0.002	0.00	0.00		
Strontium	mg/L	0.3	0.19	0.084	0.38	0.523			0.095	0.076		0.317	0.28	0.36		
Titanium	mg/L	0.047	<0.005	<0.005	<0.005	<0.025			0.013	0.038		0.008	0.01	0.04		
Uranium	mg/L	0.0026	0.00072	0.00011	0.0018	0.0059			<0.002	<0.002		<0.002	0.000541	0.000559	0.005	0.02
Vanadium	mg/L	0.0017	<0.0005	<0.0005	0.00068	<0.0025			<0.002	0.002		<0.002	0.000510	0.001540	0.006	
Zinc	mg/L	0.0082	<0.005	<0.005	0.009	0.055			0.009	0.013		<0.005	0.004000	0.012000	0.03	0.09
Field Measurements																
Temperature	oC	16	6.7	14.1	8.2	18.9			19.2	16.5		11.68	18.78	15.80		
pH	pH Units	7.68	6.67	6.43	5.33	6.73			7.1	7.33		7.86	8.15	7.26		
Coductivity	uS/cm	249	15	490	860	179			215.1	6.25		772	512.00	154.00		
Oxidation Reduction Potential	mV								116.3	112.6		297.7	126.10	29.40		
Dissolved Oxygen	mg/L	5.05	11.12	6.56	4.98				6.05	6.43		17.01	11.28	1.06		

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
<b>BOLD</b>	Exceeds PWQO
<i>ITALICS</i>	Exceeds APV
<u>UNDERLINED</u>	Exceeds CWQG
SHADED ONLY	RDL exceeds the standard
INSV	Insufficient volume to allow for sampling
NC	Not Calculated
CNL	Could Not Locate
LS	Limited Sample
Units	All Units in mg/L Unless Otherwise Noted.

TABLE 17  
Groundwater Duplicate Data  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	RDL	PQL	12-May-21			7-Oct-21		
				BH-12	GW DUP	Relative Percent Difference (%)	BH14	GW DUP	Relative Percent Difference (%)
pH Lab	pH Units	NA		7.35	7.66	4.13	7.63	7.75	1.56
Conductivity	uS/cm	2	10	152	153	0.66	305	303	0.66
Hardness	mg/L	0.5	2.5	62	60	2.45	106	104	1.90
Total Dissolved Solids	mg/L	20	100	97	114	16.11	207	320	42.88
Alkalinity	mg/L	5	25	56	57	1.77	84	82	2.41
Chloride	mg/L	0.10	0.5	4	5	22.22	41	41	0.00
Sodium	mg/L	0.05	0.25	4.66	4.56	2.17	11	10.8	0.00
Calcium	mg/L	0.05	0.25	20.9	20.4	2.42	33.4	32.8	1.81
Magnesium	mg/L	0.05	0.25	2.36	2.28	3.45	5.42	5.48	1.10
Potassium	mg/L	0.05	0.25	1.3	1.28	1.55	3.50	3.49	0.29
Sulphate	mg/L	0.10	0.5	8	11	31.58	17	16	6.06
Ammonia	mg/L	0.02	0.1	0.08	0.07	13.33	0.29	0.29	0.00
Nitrate as N	mg/L	0.05	0.25	< 0.03	< 0.03	NC	<0.06	<0.06	NC
Nitrite as N	mg/L	0.05	0.25	< 0.06	< 0.06	NC	<0.03	<0.03	NC
Total Kjeldahl Nitrogen	mg/L	0.10	0.5	0.17	0.17	0.00	0.46	0.43	6.74
Phenolics	mg/L	0.001	0.005	< 0.002	< 0.002	NC	<0.002	<0.002	NC
Dissolved Organic Carbon	mg/L	0.5	2.5	4	4	0.00	4.0	4	0.00
Chemical Oxygen Demand	mg/L	5	25	10	9	10.53	22	22	0.00
Iron	mg/L	0.010	0.05	1.56	1.53	1.94	2.87	2.88	0.35
Manganese	mg/L	0.002	0.01	0.382	0.382	0.00	0.75	0.74	1.21
Phosphorus	mg/L	0.02	0.1	0.24	0.36	40.00	1.73	1.73	0.00
Turbidity	NTU	0.5	2.5	107	56.1	62.42	180	159	12.39
Total Suspended Solids	mg/L	10	50	931	1010	8.14	710	1080	41.34
BOD	mg/L	5	25	< 10	4	NC	<4	<4	NC
Silver	mg/L	0.002	0.01	< 0.00005	< 0.00005	NC	<0.00005	<0.00005	NC
Aluminum	mg/L	0.004	0.02	0.054	0.057	5.41	0.051	0.142	94.30
Antimony	mg/L	0.003	0.015	< 0.0009	< 0.0009	NC	<0.0009	<0.0009	NC
Arsenic	mg/L	0.003	0.015	0.0007	0.0007	0.00	0.0005	0.0005	0.00
Barium	mg/L	0.002	0.01	0.0437	0.0435	0.46	0.061	0.063	3.23
Beryllium	mg/L	0.001	0.005	0.000043	0.000032	29.33	0.000056	0.000068	19.35
Bismuth	mg/L	0.002	0.01	< 0.00001	< 0.00001	NC	<0.00001	<0.00001	NC
Boron	mg/L	0.010	0.05	0.048	0.051	6.06	0.11	0.064	53.71
Cadmium	mg/L	0.001	0.005	0.000006	0.000003	NC	<0.000003	<0.000003	NC
Chromium	mg/L	0.003	0.015	0.00029	0.00032	9.84	0.00019	0.00022	14.63
Cobalt	mg/L	0.001	0.005	0.00009	0.000109	19.10	0.000525	0.000552	5.01
Copper	mg/L	0.003	0.015	< 0.0002	< 0.0002	NC	0.000	0.0004	0.00
Molybdenum	mg/L	0.002	0.01	0.00088	0.00092	4.44	0.00044	0.00051	14.74
Nickel	mg/L	0.003	0.015	0.0003	0.0003	0.00	0.0004	0.0004	0.00
Phosphate	mg/L	0.10	0.5	0.11	0.07	44.44	-	-	-
Lead	mg/L	0.001	0.005	< 0.00009	< 0.00009	NC	<0.00009	<0.00009	NC
Selenium	mg/L	0.004	0.02	< 0.00004	< 0.00004	NC	0.00006	0.00007	15.38
Sillicon	mg/L	0.05	0.25	5.76	5.56	3.53	9	9.53	10.38
Tin	mg/L	0.002	0.01	< 0.00006	0.00006	NC	<0.00006	<0.00006	NC
Strontium	mg/L	0.005	0.025	0.105	0.103	1.92	0.144	0.141	2.11
Titanium	mg/L	0.002	0.01	0.00083	0.00102	20.54	0.00156	0.00589	116.24
Uranium	mg/L	0.002	0.01	0.000193	0.000179	7.53	0.000499	0.000737	38.51
Vanadium	mg/L	0.002	0.01	0.00037	0.0004	7.79	0.0007	0.00091	26.09
Zinc	mg/L	0.005	0.025	< 0.002	< 0.002	NC	0.003	0.003	0.00

Notes:

NC	Not calculable due to one or more of the concentrations being quantified over the reasonable detection limit (RDL) or the practical quantification limit (PQL).
BOLD	Bolded and shaded entries indicates that the relative percent difference (RPD) exceeds the industry standard of 50%.

TABLE 18  
Surface Water Duplicate Data  
Croft Waste Disposal Site  
Magnetawan, Ontario

Parameter	Units	RDL	PQL	12-May-21			7-Oct-21		
				SW2	SW DUP	Relative Percent Difference (%)	SW2	SW DUP	Relative Percent Difference (%)
pH Lab	pH units	NA		6.8	6.79	0.15	5.82	5.94	2.04
Conductivity	uS/cm	2	10	25	23	8.33	17	20	16.22
Hardness	mg/L	0.5	2.5	8.40	8.30	1.20	7	7.20	2.82
Total Dissolved Solids	mg/L	20	100	< 30	34	NC	<30	34	NC
Alkalinity	mg/L	5	25	7	6	15.38	3	3	0.00
Chloride	mg/L	0.50	2.5	2	1	NC	<1	<1	NC
Sodium	mg/L	0.05	0.25	1.05	0.98	6.90	4.4	3.78	14.71
Calcium	mg/L	0.05	0.25	2.58	2.54	1.56	2.1	2.16	4.74
Magnesium	mg/L	0.05	0.25	0.485	0.481	0.83	0.44	0.43	2.98
Potassium	mg/L	0.05	0.25	0.492	0.373	27.51	0.86	0.773	11.12
Sulphate	mg/L	0.10	0.5	< 2	< 2	NC	<2	<2	NC
Ammonia	mg/L	0.02	0.1	< 0.04	< 0.04	NC	<0.04	0.07	NC
Nitrate as N	mg/L	0.05	0.25	< 0.06	< 0.06	NC	0.40	<0.06	NC
Nitrite as N	mg/L	0.05	0.25	< 0.03	< 0.03	NC	<0.03	<0.03	NC
Total Kjeldahl Nitrogen	mg/L	0.10	0.5	0.27	0.31	13.79	0.37	0.4	7.79
Phenolics	mg/L	0.001	0.005	< 0.001	0.001	NC	<0.001	0.001	NC
Dissolved Organic Carbon	mg/L	0.5	2.5	7	7	0.00	13.0	16	20.69
Chemical Oxygen Demand	mg/L	5	25	25	20	22.22	33	33	0.00
Iron	mg/L	0.010	0.05	0.711	0.69	3.00	1.11	0.992	11.23
Manganese	mg/L	0.002	0.01	0.0522	0.0482	7.97	0.056	0.056	0.90
Phosphorus	mg/L	0.02	0.1	< 0.03	< 0.03	NC	0.02	0.015	46.15
Orthophosphate	mg/L	0.10	0.5	-	-	NC	-	-	-
Turbidity	NTU	0.5	2.5	-	-	NC	-	-	-
Total Suspended Solids	mg/L	10	50	3	3	0.00	5	5	0.00
BOD	mg/L	5	25	< 4	< 4	NC	<4	<4	NC
Silver	mg/L	0.0001	0.0005	< 0.00005	< 0.00005	NC	<0.00005	<0.00005	NC
Aluminum	mg/L	0.004	0.02	0.067	0.067	0.00	0.303	0.158	62.91
Antimony	mg/L	0.001	0.005	< 0.0009	< 0.0009	NC	<0.0009	<0.0009	NC
Arsenic	mg/L	0.003	0.015	< 0.0002	0.0002	NC	<0.0002	0.0004	NC
Barium	mg/L	0.002	0.01	0.0079	0.00854	7.79	0.011	0.0106	0.94
Beryllium	mg/L	0.0005	0.0025	0.000015	0.000018	18.18	0.000028	0.00003	6.90
Bismuth	mg/L	0.002	0.01	< 0.00001	< 0.00001	NC	0.00001	<0.0001	NC
Boron	mg/L	0.010	0.05	0.01	0.014	33.33	0.008	0.082	164.44
Cadmium	mg/L	0.0001	0.0005	0.000025	0.000024	4.08	0.00003	0.000036	18.18
Chromium	mg/L	0.003	0.015	0.00034	0.00047	32.10	0.0004	0.00078	64.41
Cobalt	mg/L	0.0005	0.0025	0.000241	0.000225	6.87	0.000357	0.000333	6.96
Copper	mg/L	0.001	0.005	0.0009	0.0007	25.00	0.001	0.0007	0.00
Molybdenum	mg/L	0.002	0.01	0.00026	< 0.00004	NC	<0.00004	<0.00004	NC
Nickel	mg/L	0.003	0.015	0.0007	0.0006	15.38	0.001	0.0012	28.57
Lead	mg/L	0.001	0.005	0.00024	0.00019	23.26	0.00036	0.00041	12.99
Selenium	mg/L	0.004	0.02	0.00007	0.00006	15.38	0.00007	0.00005	33.33
Sillicon	mg/L	0.05	0.25	1.04	1.06	1.90	1.75	1.76	0.57
Tin	mg/L	0.002	0.01	0.00013	< 0.00006	NC	0.0003	0.00032	6.45
Strontium	mg/L	0.005	0.025	0.0162	0.016	1.24	0.016	0.0168	2.41
Titanium	mg/L	0.002	0.01	0.00183	0.00204	10.85	0.00423	0.00252	50.67
Uranium	mg/L	0.002	0.01	0.000036	0.000036	0.00	0.000063	0.000059	6.56
Vanadium	mg/L	0.002	0.01	0.00029	0.0003	3.39	0.0006	0.00044	30.77
Zinc	mg/L	0.005	0.025	0.01	0.005	NC	0.008	0.025	NC

Notes:

NC	Not calculable due to one or more of the concentrations being quantified over the reasonable detection limit (RDL) or the practical quantification limit (PQL).
<b>BOLD</b>	Bolded and shaded entries indicates that the relative percent difference (RPD) exceeds the industry standard of 50%.

**APPENDIX IV**  
**Photographic Log**



	 A photograph of a yellow, rectangular monitoring post standing in a wooded area. The post is made of metal and has a padlock attached to it. The surrounding area is filled with green foliage and trees.		<b>BH1</b>
--	--	--	------------

	 A photograph of a yellow, rectangular monitoring post standing in a wooded area. The post is partially obscured by dense green foliage and trees. The surrounding area is filled with green foliage and trees.		<b>BH1</b>
--	--	--	------------



		<b>BH8</b>
--	--	------------

		<b>BH8</b>
--	---	------------









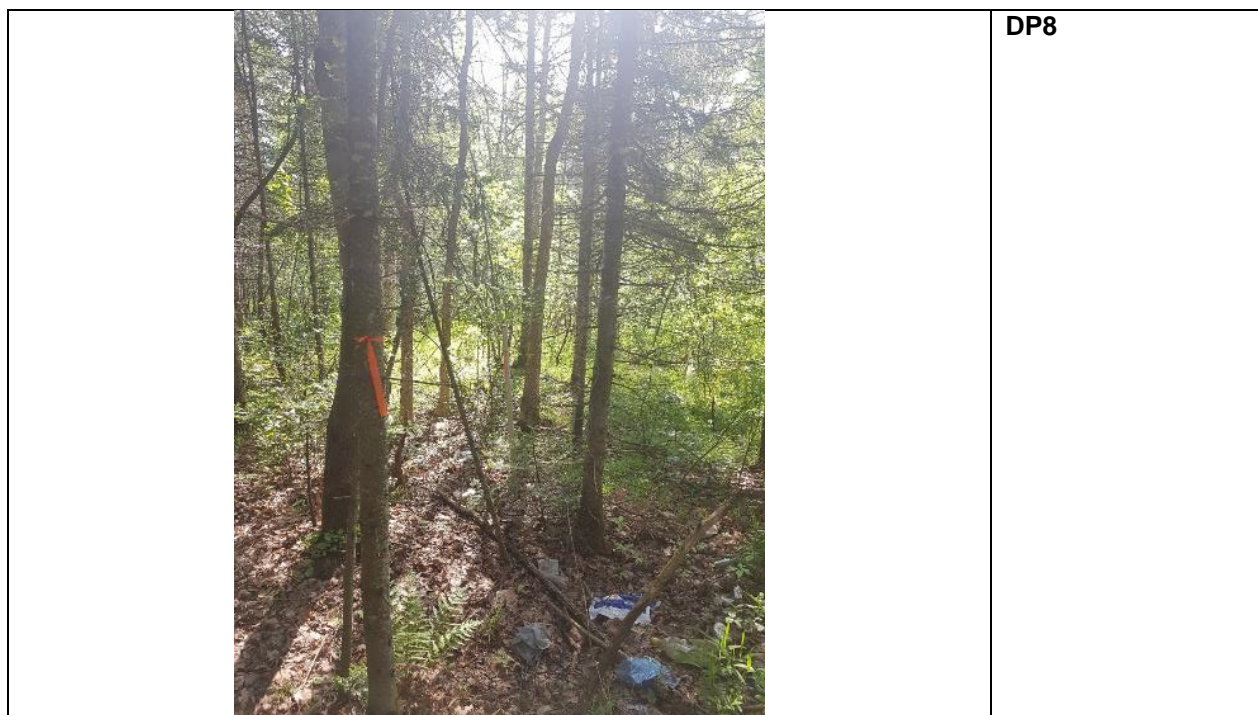





		<b>DP7</b>
--	---	------------

		<b>DP7</b>
--	---	------------

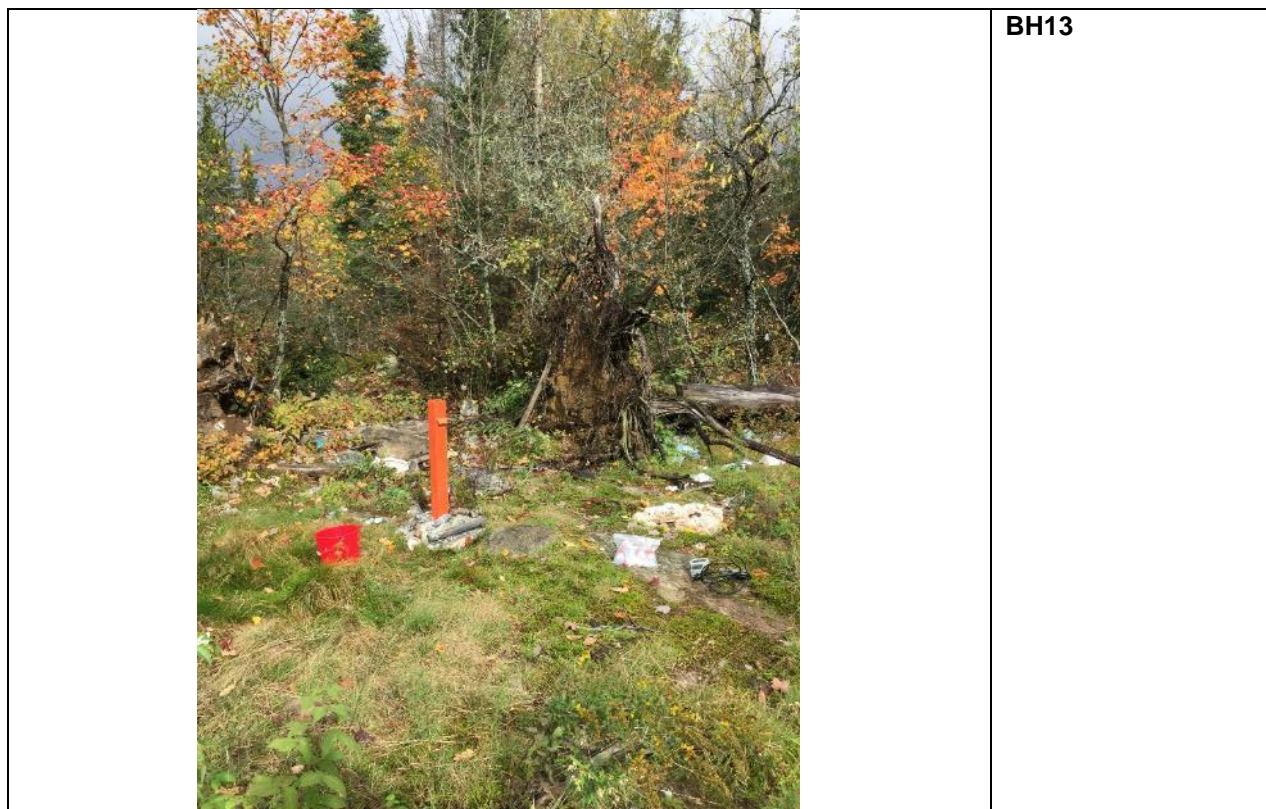




		<b>BH12</b>
--	--	-------------

		<b>BH12</b>
--	---	-------------















			<b>SW3</b>
--	--	--	------------

**APPENDIX V**  
**Laboratory Certificates of Analysis**



## FINAL REPORT

CA14735-MAY21 R1

Prepared for

**Pinchin Ltd**



## First Page

### CLIENT DETAILS

Client Pinchin Ltd

Address 957 Cambrian Heights Drive, Suite 203  
Sudbury, ON  
P3C 5S5, Canada

Contact James Howatt

Telephone 705-521-0560

Facsimile

Email jhowatt@Pinchin.com

Project

Order Number

Samples Ground Water (9)

### LABORATORY DETAILS

Project Specialist Chris Sullivan, B.Sc., C.Chem

Laboratory SGS Canada Inc.

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

Telephone 705-652-2111

Facsimile 705-652-6365

Email chris.sullivan@sgs.com

SGS Reference CA14735-MAY21

Received 05/13/2021

Approved 06/04/2021

Report Number CA14735-MAY21 R1

Date Reported 06/04/2021

### COMMENTS

Raise RL for NO2 on #11 due to matrix interference

### SIGNATORIES

Chris Sullivan, B.Sc., C.Chem

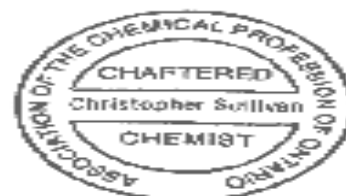





TABLE OF CONTENTS

---

First Page..... 1

Index..... 2

Results..... 3-9

Exceedance Summary..... 10-11

QC Summary..... 12-23

Legend..... 24

Annexes..... 25



# FINAL REPORT

CA14735-MAY21 R1

Client: Pinchin Ltd

Project:

Project Manager: James Howatt

Samplers: Alana Valle

## PACKAGE: Acid Rock Drainage (WATER)

L1 = ODWS\_AO / 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	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
-----------	-------	----	----	----	--------	--------	--------	--------	--------	--------	--------	--------

### Acid Rock Drainage

pH Check <2	pH	0.05			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
-------------	----	------	--	--	------	------	------	------	------	------	------	------

### General Chemistry

Temperature Upon Receipt	°C	0			12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †	< 4 †	4	4	20			5
Prep BOD	Prep	no			44334	44334	44334	44334	44335	44335	44335	44335
Biochemical Oxygen Demand (BOD5)	mg/L	2							< 10 †	< 10 †		
Prep BOD	Prep	no							44341	44341		
Total Suspended Solids	mg/L	2			133	26	244	47	40	931	1360	11400
Alkalinity	mg/L as CaCO3	2			38	9	99	448	872	56	35	86
Conductivity	uS/cm	2			89	39	268	2190	2540	152	90	406
Total Dissolved Solids	mg/L	30	500		94	< 30	194	1440	1400	97	60	306
Chemical Oxygen Demand	mg/L	8			27	11	63	48	244	10	11	42
Turbidity	NTU	0.10	5	1	5.49	21.6	54.7	1.50	30.3	107	41.7	226
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.40	0.13	1.99	19.6	70.0	0.17	0.17	0.50
Ammonia+Ammonium (N)	as N mg/L	0.04			0.06	< 0.04	1.18	16.7	53.1	0.08	0.04	0.36
Dissolved Organic Carbon	mg/L	1	5		12	4	19	18	108	4	4	16
Phosphorus (total reactive)	mg/L	0.03			< 0.03	0.04	0.07	< 0.03	< 0.03	0.11	0.19	0.42
Ion Ratio	none	-9999			1.4	1.02	1.36	1.09	0.93	1.14	1.11	1.02
Total Dissolved Solids (calculated)	mg/L	-9999			48	20	142	1148	1277	75	46	193
Conductivity (calculated)	uS/cm	-9999			111	35	315	2163	2440	150	92	373
Langeliers Index 4° C	@ 4° C	-9999			-2.92	-3.77	-1.38	0.16	0.69	-1.49	-1.76	-0.74
Saturation pH 4°C	pHs @ 4°C	-9999			9.33	10.4	8.38	7.04	7.06	8.84	9.18	8.41



# FINAL REPORT

CA14735-MAY21 R1

Client: Pinchin Ltd

Project:

Project Manager: James Howatt

Samplers: Alana Valle

## PACKAGE: Metals and Inorganics (WATER)

L1 = ODWS\_AO / 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	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics												
Phosphorus (total)	mg/L	0.03			0.06	0.10	0.06	0.08	0.06	0.24	0.90	5.69
Sulphate	mg/L	2	500		4	5	9	20	68	8	4	19
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.03	< 0.3†	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06	0.14	< 0.06	0.91	< 0.06	< 0.06	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05			30.5	11.1	107	659	367	61.9	43.0	135
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00009	< 0.00005	< 0.00005	< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.404	0.119	0.136	0.028	0.451	0.054	0.084	0.207
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0014	< 0.0002	0.0009	0.0008	0.0019	0.0007	0.0008	0.0006
Barium (dissolved)	mg/L	0.00002		1	0.0325	0.0161	0.0474	0.290	0.158	0.0437	0.0367	0.0928
Beryllium (dissolved)	mg/L	0.00000			0.000069	0.000013	0.000020	0.000010	0.000074	0.000043	0.000043	0.000091
		7										
Boron (dissolved)	mg/L	0.002		5	0.024	0.025	0.226	1.05	2.65	0.048	0.014	0.078
Bismuth (dissolved)	mg/L	0.00001			0.00002	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (dissolved)	mg/L	0.01			9.77	3.26	36.1	216	104	20.9	14.5	41.0
Cadmium (dissolved)	mg/L	0.00000		0.005	< 0.000003	0.000026	0.000016	0.000075	0.000279	0.000006	0.000050	< 0.000003
		3										
Cobalt (dissolved)	mg/L	0.00000			0.00780	0.00092	0.00980	0.00330	0.0318	0.00009	0.00026	0.00104
		4										
Chromium (dissolved)	mg/L	0.00008		0.05	0.00161	0.00037	0.00166	0.00146	0.00528	0.00029	0.00033	0.00043
Copper (dissolved)	mg/L	0.0002		1	0.0033	0.0139	0.0009	0.0077	0.0064	< 0.0002	0.0033	0.0009
Iron (dissolved)	mg/L	0.007		0.3	5.18	0.082	13.6	0.023	5.68	1.56	0.245	4.52
Potassium (dissolved)	mg/L	0.009			1.47	0.735	4.41	57.0	91.9	1.30	0.952	3.66
Magnesium (dissolved)	mg/L	0.001			1.48	0.709	4.12	29.1	26.4	2.36	1.65	7.88



# FINAL REPORT

CA14735-MAY21 R1

Client: Pinchin Ltd

Project:

Project Manager: James Howatt

Samplers: Alana Valle

## PACKAGE: Metals and Inorganics (WATER)

L1 = ODWS\_AO / 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	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
-----------	-------	----	----	----	--------	--------	--------	--------	--------	--------	--------	--------

## Metals and Inorganics (continued)

Manganese (dissolved)	mg/L	0.00001	0.05		0.954	0.0080	1.27	3.10	4.69	0.382	0.184	1.31
Molybdenum (dissolved)	mg/L	0.00004			0.00019	0.00055	0.00094	0.00120	0.00419	0.00088	0.00041	0.00015
Sodium (dissolved)	mg/L	0.01	200	20	5.76	3.25	10.9	156	233	4.66	1.11	13.5
Nickel (dissolved)	mg/L	0.0001			0.0012	0.0044	0.0017	0.0024	0.0124	0.0003	0.0009	0.0008
Lead (dissolved)	mg/L	0.00009		0.01	0.00062	0.00014	0.00009	< 0.00009	0.00013	< 0.00009	< 0.00009	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00019	0.00006	0.00019	0.00026	0.00172	< 0.00004	0.00008	0.00012
Silicon (dissolved)	mg/L	0.02			3.76	3.02	2.90	5.11	2.24	5.76	3.60	10.6
Strontium (dissolved)	mg/L	0.00002			0.0560	0.0147	0.128	1.01	0.268	0.105	0.0336	0.209
Tin (dissolved)	mg/L	0.00006			< 0.00006	0.00007	< 0.00006	0.00011	0.00024	< 0.00006	< 0.00006	0.00007
Titanium (dissolved)	mg/L	0.00005			0.0434	0.00466	0.00312	0.00127	0.01066	0.00083	0.00153	0.00745
Vanadium (dissolved)	mg/L	0.00001			0.00384	0.00036	0.00219	0.00041	0.00283	0.00037	0.00060	0.00141
Uranium (dissolved)	mg/L	0.00000 2		0.02	0.00100	0.000252	0.000392	0.00487	0.00783	0.000193	0.00365	0.000581
Zinc (dissolved)	mg/L	0.002	5		< 0.002	0.017	0.005	0.003	0.010	< 0.002	0.006	0.002
Anion Sum	meq/L	-9999			1.3	0.35	3.63	22.6	23.5	1.6	0.97	3.76
Cation sum	meq/L	-9999			0.93	0.34	2.67	20.66	25.31	1.4	0.87	3.71
Ion Ratio	none	-9999			16.59	1.21	15.23	4.48	-3.72	6.57	5.36	0.76



# FINAL REPORT

CA14735-MAY21 R1

**Client:** Pinchin Ltd

**Project:**

**Project Manager:** James Howatt

**Samplers:** Alana Valle

## PACKAGE: Other (ORP) (WATER)

L1 = ODWS\_AO / 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	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021	12/05/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Other (ORP)												
pH	No unit	0.05			6.41	6.59	7.00	7.20	7.75	7.35	7.42	7.67
Chloride	mg/L	1	250		3	2	18	400	230	4	3	56

## Phenols

4AAP-Phenolics	mg/L	0.002			< 0.002	< 0.002	< 0.002	< 0.002	0.006	< 0.002	< 0.002	< 0.002
----------------	------	-------	--	--	---------	---------	---------	---------	-------	---------	---------	---------

## PACKAGE: Acid Rock Drainage (WATER)

L1 = ODWS\_AO / 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	15
Sample Name	GW DUP
Sample Matrix	Ground Water
Sample Date	12/05/2021

Parameter	Units	RL	L1	L2	Result
Acid Rock Drainage					
pH Check <2	pH	0.05			1.00

## General Chemistry

Temperature Upon Receipt	°C	0			12.0
Biochemical Oxygen Demand (BOD5)	mg/L	2			4
Prep BOD	Prep	no			44335
Total Suspended Solids	mg/L	2			1010
Alkalinity	mg/L as CaCO3	2			57
Conductivity	uS/cm	2			153
Total Dissolved Solids	mg/L	30	500		114
Chemical Oxygen Demand	mg/L	8			9
Turbidity	NTU	0.10	5	1	56.1





# FINAL REPORT

CA14735-MAY21 R1

**Client:** Pinchin Ltd

**Project:**

**Project Manager:** James Howatt

**Samplers:** Alana Valle

PACKAGE: **General Chemistry (WATER)**

**Sample Number** 15  
**Sample Name** GW DUP  
**Sample Matrix** Ground Water  
**Sample Date** 12/05/2021

L1 = ODWS\_AO / 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	Result
<b>General Chemistry (continued)</b>					
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.17
Ammonia+Ammonium (N)	as N mg/L	0.04			0.07
Dissolved Organic Carbon	mg/L	1	5		4
Phosphorus (total reactive)	mg/L	0.03			0.07
Ion Ratio	none	-9999			1.03
Total Dissolved Solids (calculated)	mg/L	-9999			79
Conductivity (calculated)	uS/cm	-9999			154
Langeliers Index 4° C	@ 4° C	-9999			-1.19
Saturation pH 4°C	pHs @ 4°C	-9999			8.85

## Metals and Inorganics

Phosphorus (total)	mg/L	0.03			0.36
Sulphate	mg/L	2	500		11
Nitrite (as N)	as N mg/L	0.03		1	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05			60.4
Silver (dissolved)	mg/L	0.00005			< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.057
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0007
Barium (dissolved)	mg/L	0.00002		1	0.0435
Beryllium (dissolved)	mg/L	0.00000 7			0.000032
Boron (dissolved)	mg/L	0.002		5	0.051



# FINAL REPORT

CA14735-MAY21 R1

**Client:** Pinchin Ltd

**Project:**

**Project Manager:** James Howatt

**Samplers:** Alana Valle

PACKAGE: **Metals and Inorganics (WATER)**

**Sample Number** 15

**Sample Name** GW DUP

**Sample Matrix** Ground Water

**Sample Date** 12/05/2021

L1 = ODWS\_AO / 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	Result
<b>Metals and Inorganics (continued)</b>					
Bismuth (dissolved)	mg/L	0.00001			< 0.00001
Calcium (dissolved)	mg/L	0.01			20.4
Cadmium (dissolved)	mg/L	0.000003		0.005	0.000003
Cobalt (dissolved)	mg/L	0.000004			0.000109
Chromium (dissolved)	mg/L	0.00008		0.05	0.00032
Copper (dissolved)	mg/L	0.0002	1		< 0.0002
Iron (dissolved)	mg/L	0.007	0.3		1.53
Potassium (dissolved)	mg/L	0.009			1.28
Magnesium (dissolved)	mg/L	0.001			2.28
Manganese (dissolved)	mg/L	0.00001	0.05		0.382
Molybdenum (dissolved)	mg/L	0.00004			0.00092
Sodium (dissolved)	mg/L	0.01	200	20	4.56
Nickel (dissolved)	mg/L	0.0001			0.0003
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	< 0.00004
Silicon (dissolved)	mg/L	0.02			5.56
Strontium (dissolved)	mg/L	0.00002			0.103
Tin (dissolved)	mg/L	0.00006			0.00006
Titanium (dissolved)	mg/L	0.00005			0.00102
Vanadium (dissolved)	mg/L	0.00001			0.00040



# FINAL REPORT

CA14735-MAY21 R1

**Client:** Pinchin Ltd

**Project:**

**Project Manager:** James Howatt

**Samplers:** Alana Valle

PACKAGE: **Metals and Inorganics (WATER)**

**Sample Number** 15

**Sample Name** GW DUP

**Sample Matrix** Ground Water

**Sample Date** 12/05/2021

L1 = ODWS\_AO / 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	Result
<b>Metals and Inorganics (continued)</b>					
Uranium (dissolved)	mg/L	0.00000 2		0.02	0.000179
Zinc (dissolved)	mg/L	0.002	5		< 0.002
Anion Sum	meq/L	-9999			1.56
Cation sum	meq/L	-9999			1.51
Ion Ratio	none	-9999			1.61

## Other (ORP)

pH	No unit	0.05			7.66
Chloride	mg/L	1	250		5

## Phenols

4AAP-Phenolics	mg/L	0.002			< 0.002
----------------	------	-------	--	--	---------

## EXCEEDANCE SUMMARY

Parameter	Method	Units	Result	ODWS_AO / 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

## BH1

Turbidity	SM 2130	NTU	5.49	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	5.18	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.954	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	12	5	

## BH8

Turbidity	SM 2130	NTU	21.6	5	1
-----------	---------	-----	------	---	---

## BH9

Turbidity	SM 2130	NTU	54.7	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	13.6	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.27	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	19	5	

## BH10

Turbidity	SM 2130	NTU	1.50		1
Total Dissolved Solids	SM 2540C	mg/L	1440	500	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	3.10	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	156		20
Dissolved Organic Carbon	SM 5310	mg/L	18	5	
Chloride	US EPA 325.2	mg/L	400	250	

## BH11

Turbidity	SM 2130	NTU	30.3	5	1
Total Dissolved Solids	SM 2540C	mg/L	1400	500	
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	5.68	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	4.69	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	233	200	20
Dissolved Organic Carbon	SM 5310	mg/L	108	5	

## BH12

Turbidity	SM 2130	NTU	107	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.56	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.382	0.05	

## BH13

Turbidity	SM 2130	NTU	41.7	5	1
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.184	0.05	

## BH14

Turbidity	SM 2130	NTU	226	5	1
-----------	---------	-----	-----	---	---





EXCEEDANCE SUMMARY

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

BH14 (continued)

Iron (dissolved)	SM 3030/EPA 200.8	mg/L	4.52	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	1.31	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	16	5	

GW DUP

Turbidity	SM 2130	NTU	56.1	5	1
Iron (dissolved)	SM 3030/EPA 200.8	mg/L	1.53	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	mg/L	0.382	0.05	



# FINAL REPORT

CA14735-MAY21 R1

## QC SUMMARY

### Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-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 (%)	
								Low	High		Low	High
Alkalinity	EWL0353-MAY21	mg/L as CaCO3	2	< 2	29	20	96	80	120	NA		
Alkalinity	EWL0375-MAY21	mg/L as CaCO3	2	< 2	6	20	102	80	120	NA		

### Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-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 (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0183-MAY21	mg/L	0.04	<0.04	1	10	95	90	110	88	75	125
Ammonia+Ammonium (N)	SKA0201-MAY21	mg/L	0.04	<0.04	ND	10	100	90	110	99	75	125
Ammonia+Ammonium (N)	SKA0206-MAY21	mg/L	0.04	<0.04	ND	10	95	90	110	96	75	125
Ammonia+Ammonium (N)	SKA0219-MAY21	mg/L	0.04	<0.04	1	10	97	90	110	NV	75	125
Ammonia+Ammonium (N)	SKA0225-MAY21	mg/L	0.04	<0.04	ND	10	99	90	110	91	75	125



# FINAL REPORT

CA14735-MAY21 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 (%)	
								Low	High		Low	High
Chloride	DIO5060-MAY21	mg/L	1	<1	2	20	98	80	120	91	75	125
Sulphate	DIO5060-MAY21	mg/L	2	<2	ND	20	93	80	120	88	75	125
Chloride	DIO5065-MAY21	mg/L	1	<1	0	20	107	80	120	95	75	125
Sulphate	DIO5065-MAY21	mg/L	2	<2	13	20	102	80	120	91	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-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 (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0330-MAY21	mg/L	0.03	<0.03	ND	20	100	80	120	102	75	125
Nitrate (as N)	DIO0330-MAY21	mg/L	0.06	<0.06	ND	20	101	80	120	103	75	125
Nitrite (as N)	DIO0360-MAY21	mg/L	0.03	<0.03	ND	20	97	80	120	100	75	125
Nitrate (as N)	DIO0360-MAY21	mg/L	0.06	<0.06	0	20	102	80	120	102	75	125



# FINAL REPORT

CA14735-MAY21 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 (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0044-MAY21	mg/L	2	< 2	3	30	106	70	130	NV	70	130
Biochemical Oxygen Demand (BOD5)	BOD0046-MAY21	mg/L	2	< 2	4	30	100	70	130	NV	70	130
Biochemical Oxygen Demand (BOD5)	BOD0057-MAY21	mg/L	2	< 2	5	30	113	70	130	NV	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 (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0179-MAY21	mg/L	1	<1	0	20	98	90	110	101	75	125
Dissolved Organic Carbon	SKA0194-MAY21	mg/L	1	<1	12	20	107	90	110	NV	75	125
Dissolved Organic Carbon	SKA0202-MAY21	mg/L	1	<1	8	20	96	90	110	104	75	125
Dissolved Organic Carbon	SKA0221-MAY21	mg/L	1	<1	ND	20	100	90	110	NV	75	125





FINAL REPORT

CA14735-MAY21 R1

QC SUMMARY

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 (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0335-MAY21	mg/L	8	<8	4	20	98	80	120	105	75	125
Chemical Oxygen Demand	EWL0388-MAY21	mg/L	8	<8	0	20	110	80	120	101	75	125
Chemical Oxygen Demand	EWL0396-MAY21	mg/L	8	<8	0	20	100	80	120	95	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 (%)	
								Low	High		Low	High
Conductivity	EWL0353-MAY21	uS/cm	2	< 2	1	20	99	90	110	NA		
Conductivity	EWL0375-MAY21	uS/cm	2	< 2	1	20	99	90	110	NA		



FINAL REPORT

CA14735-MAY21 R1

QC SUMMARY

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 (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0089-MAY21	mg/L	0.00005	<0.00005	ND	20	105	90	110	101	70	130
Aluminum (dissolved)	EMS0089-MAY21	mg/L	0.001	<0.001	8	20	103	90	110	103	70	130
Arsenic (dissolved)	EMS0089-MAY21	mg/L	0.0002	<0.0002	6	20	106	90	110	108	70	130
Barium (dissolved)	EMS0089-MAY21	mg/L	0.00002	<0.00002	3	20	99	90	110	118	70	130
Beryllium (dissolved)	EMS0089-MAY21	mg/L	0.000007	<0.00007	ND	20	94	90	110	99	70	130
Boron (dissolved)	EMS0089-MAY21	mg/L	0.002	<0.002	7	20	99	90	110	105	70	130
Bismuth (dissolved)	EMS0089-MAY21	mg/L	0.00001	<0.00001	ND	20	96	90	110	79	70	130
Calcium (dissolved)	EMS0089-MAY21	mg/L	0.01	<0.01	6	20	105	90	110	110	70	130
Cadmium (dissolved)	EMS0089-MAY21	mg/L	0.000003	<0.000003	ND	20	106	90	110	115	70	130
Cobalt (dissolved)	EMS0089-MAY21	mg/L	0.000004	<0.000004	3	20	101	90	110	108	70	130
Chromium (dissolved)	EMS0089-MAY21	mg/L	0.00008	<0.00008	16	20	104	90	110	118	70	130
Copper (dissolved)	EMS0089-MAY21	mg/L	0.0002	<0.0002	ND	20	103	90	110	105	70	130
Iron (dissolved)	EMS0089-MAY21	mg/L	0.007	<0.007	ND	20	101	90	110	125	70	130
Potassium (dissolved)	EMS0089-MAY21	mg/L	0.009	<0.009	11	20	106	90	110	124	70	130
Magnesium (dissolved)	EMS0089-MAY21	mg/L	0.001	<0.001	2	20	100	90	110	102	70	130
Manganese (dissolved)	EMS0089-MAY21	mg/L	0.00001	<0.00001	4	20	103	90	110	101	70	130
Molybdenum (dissolved)	EMS0089-MAY21	mg/L	0.00004	<0.00004	7	20	102	90	110	112	70	130
Sodium (dissolved)	EMS0089-MAY21	mg/L	0.01	<0.01	2	20	105	90	110	101	70	130
Nickel (dissolved)	EMS0089-MAY21	mg/L	0.0001	<0.0001	11	20	98	90	110	107	70	130
Lead (dissolved)	EMS0089-MAY21	mg/L	0.00009	<0.00001	13	20	109	90	110	122	70	130



# FINAL REPORT

CA14735-MAY21 R1

## QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

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 (%)	
								Low	High		Low	High
Antimony (dissolved)	EMS0089-MAY21	mg/L	0.0009	<0.0009	ND	20	100	90	110	115	70	130
Selenium (dissolved)	EMS0089-MAY21	mg/L	0.00004	<0.00004	13	20	103	90	110	127	70	130
Silicon (dissolved)	EMS0089-MAY21	mg/L	0.02	<0.02	5	20	105	90	110	NV	70	130
Tin (dissolved)	EMS0089-MAY21	mg/L	0.00006	<0.00006	5	20	102	90	110	NV	70	130
Strontium (dissolved)	EMS0089-MAY21	mg/L	0.00002	<0.00002	6	20	104	90	110	102	70	130
Titanium (dissolved)	EMS0089-MAY21	mg/L	0.00005	<0.00005	ND	20	101	90	110	NV	70	130
Uranium (dissolved)	EMS0089-MAY21	mg/L	0.000002	<0.000002	11	20	103	90	110	109	70	130
Vanadium (dissolved)	EMS0089-MAY21	mg/L	0.00001	<0.00001	5	20	103	90	110	114	70	130
Zinc (dissolved)	EMS0089-MAY21	mg/L	0.002	<0.002	ND	20	101	90	110	118	70	130
Silver (dissolved)	EMS0096-MAY21	mg/L	0.00005	<0.00005	ND	20	101	90	110	108	70	130
Aluminum (dissolved)	EMS0096-MAY21	mg/L	0.001	<0.001	ND	20	100	90	110	109	70	130
Arsenic (dissolved)	EMS0096-MAY21	mg/L	0.0002	<0.0002	1	20	107	90	110	112	70	130
Barium (dissolved)	EMS0096-MAY21	mg/L	0.00002	<0.00002	2	20	99	90	110	114	70	130
Beryllium (dissolved)	EMS0096-MAY21	mg/L	0.000007	<0.00007	3	20	93	90	110	101	70	130
Boron (dissolved)	EMS0096-MAY21	mg/L	0.002	<0.002	9	20	91	90	110	93	70	130
Bismuth (dissolved)	EMS0096-MAY21	mg/L	0.00001	<0.00001	ND	20	94	90	110	91	70	130
Calcium (dissolved)	EMS0096-MAY21	mg/L	0.01	<0.01	3	20	92	90	110	91	70	130
Cadmium (dissolved)	EMS0096-MAY21	mg/L	0.000003	<0.000003	ND	20	104	90	110	109	70	130
Cobalt (dissolved)	EMS0096-MAY21	mg/L	0.000004	<0.000004	1	20	104	90	110	106	70	130
Chromium (dissolved)	EMS0096-MAY21	mg/L	0.00008	<0.00008	8	20	106	90	110	100	70	130



# FINAL REPORT

CA14735-MAY21 R1

## QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-1ENVISPE-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 (%)	
								Low	High		Low	High
Copper (dissolved)	EMS0096-MAY21	mg/L	0.0002	<0.0002	4	20	101	90	110	74	70	130
Iron (dissolved)	EMS0096-MAY21	mg/L	0.007	<0.007	0	20	92	90	110	100	70	130
Potassium (dissolved)	EMS0096-MAY21	mg/L	0.009	<0.009	1	20	94	90	110	109	70	130
Magnesium (dissolved)	EMS0096-MAY21	mg/L	0.001	<0.001	1	20	97	90	110	84	70	130
Manganese (dissolved)	EMS0096-MAY21	mg/L	0.00001	<0.00001	2	20	106	90	110	90	70	130
Molybdenum (dissolved)	EMS0096-MAY21	mg/L	0.00004	<0.00004	2	20	95	90	110	103	70	130
Sodium (dissolved)	EMS0096-MAY21	mg/L	0.01	<0.01	1	20	96	90	110	88	70	130
Nickel (dissolved)	EMS0096-MAY21	mg/L	0.0001	<0.0001	4	20	100	90	110	107	70	130
Lead (dissolved)	EMS0096-MAY21	mg/L	0.00009	<0.00001	1	20	109	90	110	111	70	130
Antimony (dissolved)	EMS0096-MAY21	mg/L	0.0009	<0.0009	15	20	100	90	110	121	70	130
Selenium (dissolved)	EMS0096-MAY21	mg/L	0.00004	<0.00004	ND	20	105	90	110	98	70	130
Silicon (dissolved)	EMS0096-MAY21	mg/L	0.02	<0.02	1	20	99	90	110	NV	70	130
Tin (dissolved)	EMS0096-MAY21	mg/L	0.00006	<0.00006	ND	20	93	90	110	NV	70	130
Strontium (dissolved)	EMS0096-MAY21	mg/L	0.00002	<0.00002	1	20	104	90	110	85	70	130
Titanium (dissolved)	EMS0096-MAY21	mg/L	0.00005	<0.00005	1	20	93	90	110	NV	70	130
Uranium (dissolved)	EMS0096-MAY21	mg/L	0.000002	<0.000002	1	20	102	90	110	108	70	130
Vanadium (dissolved)	EMS0096-MAY21	mg/L	0.00001	<0.00001	16	20	102	90	110	106	70	130
Zinc (dissolved)	EMS0096-MAY21	mg/L	0.002	<0.002	1	20	107	90	110	87	70	130





FINAL REPORT

CA14735-MAY21 R1

QC SUMMARY

pH  
Method: SM 4500 | 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 (%)	
								Low	High		Low	High
pH	EWL0353-MAY21	No unit	0.05	NA	0		100			NA		
pH	EWL0375-MAY21	No unit	0.05	NA	1		100			NA		

Phenols by SFA  
Method: SM 5530B-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 (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0181-MAY21	mg/L	0.002	<0.002	ND	10	95	80	120	81	75	125
4AAP-Phenolics	SKA0204-MAY21	mg/L	0.002	<0.002	ND	10	101	80	120	108	75	125



FINAL REPORT

CA14735-MAY21 R1

QC SUMMARY

Phosphorus by SFA

Method: SM 4500-P J | Internal ref.: ME-CA-IENVISFA-LAK-AN-003

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		Low	High
Phosphorus (total)	SKA0176-MAY21	mg/L	0.03	<0.03	6	10	107	90	110	105	75	125
Phosphorus (total)	SKA0196-MAY21	mg/L	0.03	<0.03	3	10	98	90	110	101	75	125
Phosphorus (total)	SKA0208-MAY21	mg/L	0.03	<0.03	0	10	94	90	110	91	75	125

Reactive Phosphorus by SFA

Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-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 (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0182-MAY21	mg/L	0.03	<0.03	ND	10	96	90	110	92	75	125
Phosphorus (total reactive)	SKA0197-MAY21	mg/L	0.03	<0.03	ND	10	92	90	110	83	75	125



FINAL REPORT

CA14735-MAY21 R1

QC SUMMARY

Solids Analysis

Method: SM 2540C | Internal ref.: ME-CA-1ENVIEWL-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 (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0350-MAY21	mg/L	30	<30	ND	20	101	90	110	NA		
Total Dissolved Solids	EWL0374-MAY21	mg/L	30	<30	1	20	98	90	110	NA		

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-1ENVIEWL-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 (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0334-MAY21	mg/L	2	< 2	1	10	98	90	110	NA		
Total Suspended Solids	EWL0379-MAY21	mg/L	2	< 2	7	10	98	90	110	NA		



FINAL REPORT

CA14735-MAY21 R1

QC SUMMARY

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 (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0178-MAY21	mg/L	0.05	<0.05	ND	10	103	90	110	121	75	125
Total Kjeldahl Nitrogen (N)	SKA0185-MAY21	mg/L	0.05	<0.05	ND	10	104	90	110	95	75	125
Total Kjeldahl Nitrogen (N)	SKA0193-MAY21	mg/L	0.05	<0.05	0	10	100	90	110	91	75	125
Total Kjeldahl Nitrogen (N)	SKA0203-MAY21	mg/L	0.05	<0.05	ND	10	102	90	110	NV	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

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		Low	High
Turbidity	EWL0344-MAY21	NTU	0.10	< 0.10	0	10	99	90	110	NA		
Turbidity	EWL0366-MAY21	NTU	0.10	< 0.10	1	10	100	90	110	NA		



## 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.

## 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

Samples analysed as received. 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.

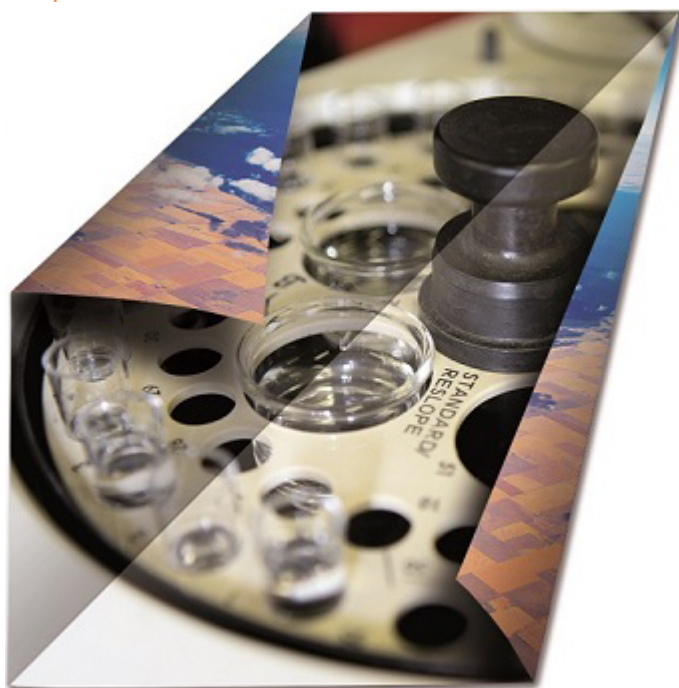
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

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. 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.

This report must not be reproduced, except in full. This report supersedes all previous versions.

-- End of Analytical Report --





## FINAL REPORT

CA15283-MAY21 R

225335.003-Croft Landfill SW

Prepared for

**Pinchin Ltd**



## First Page

### CLIENT DETAILS

Client Pinchin Ltd

Address 957 Cambrian Heights Drive, Suite 203  
Sudbury, ON  
P3C 5S5, Canada

Contact Alana Valle

Telephone 705-521-0560

Facsimile

Email avalue@Pinchin.com

Project 225335.003-Croft Landfill SW

Order Number

Samples Surface Water (4)

### LABORATORY DETAILS

Project Specialist Brad Moore Hon. B.Sc

Laboratory SGS Canada Inc.

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

Telephone 705-652-2143

Facsimile 705-652-6365

Email brad.moore@sgs.com

SGS Reference CA15283-MAY21

Received 05/14/2021

Approved 05/28/2021

Report Number CA15283-MAY21 R

Date Reported 05/28/2021

### COMMENTS

Temperature of Sample upon Receipt: 1 degrees C

Cooling Agent Present:Yes

Custody Seal Present:Yes

Chain of Custody Number:NA

### SIGNATORIES

Brad Moore Hon. B.Sc

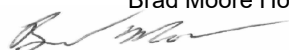




TABLE OF CONTENTS

---

First Page..... 1

Index..... 2

Results..... 3-5

Exceedance Summary..... 6

QC Summary..... 7-15

Legend..... 16

Annexes..... 17



# FINAL REPORT

CA15283-MAY21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: General Chemistry (WATER)

L1 = PWQO\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	12/05/2021	12/05/2021	12/05/2021	12/05/2021

Parameter	Units	RL	L1	Result	Result	Result	Result
General Chemistry							
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 †	< 4 †	< 4 †	< 4 †
Total Suspended Solids	mg/L	2		8	3	16	3
Colour	TCU	3		5	49	46	48
Alkalinity	mg/L as CaCO3	2		< 2	7	204	6
Conductivity	uS/cm	2		780	25	617	23
Total Dissolved Solids	mg/L	30		449	< 30	403	34
Chemical Oxygen Demand	mg/L	8		13	25	85	20
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		0.14	0.27	1.74	0.31
Ammonia+Ammonium (N)	as N mg/L	0.04		< 0.04	< 0.04	0.60	< 0.04
Dissolved Organic Carbon	mg/L	1		2	7	25	7
Phosphorus (total reactive)	mg/L	0.03		< 0.03	< 0.03	< 0.03	< 0.03

## Metals and Inorganics

Sulphate	mg/L	2		< 2	< 2	18	< 2
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03	0.46	< 0.03
Nitrate (as N)	as N mg/L	0.06		< 0.06	< 0.06	9.12	< 0.06
Hardness	mg/L as CaCO3	0.05		221	8.4	208	8.3
Silver (total)	mg/L	0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Aluminum (0.2µm)	mg/L	0.001	0.015	1.20	0.067	0.046	0.067
Arsenic (total)	mg/L	0.0002	0.005	< 0.0002	< 0.0002	0.0008	0.0002
Barium (total)	mg/L	0.00002		0.152	0.00790	0.02900	0.00854
Beryllium (total)	mg/L	0.00000	0.011	0.000173	0.000015	0.000013	0.000018
		7					



# FINAL REPORT

CA15283-MAY21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: Metals and Inorganics (WATER)

L1 = PWQO\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	12/05/2021	12/05/2021	12/05/2021	12/05/2021

Parameter	Units	RL	L1	Result	Result	Result	Result
Metals and Inorganics (continued)							
Boron (total)	mg/L	0.002	0.2	0.010	0.010	1.27	0.014
Calcium (total)	mg/L	0.01		57.5	2.58	67.7	2.54
Cadmium (total)	mg/L	0.000003	0.0001	0.000182	0.000025	0.000016	0.000024
Cobalt (total)	mg/L	0.000004	0.0009	0.0110	0.000241	0.000919	0.000225
Chromium (total)	mg/L	0.00008	0.1	0.00042	0.00034	0.00133	0.00047
Copper (total)	mg/L	0.0002	0.001	0.0006	0.0009	0.0039	0.0007
Iron (total)	mg/L	0.007	0.3	5.15	0.711	0.563	0.690
Potassium (total)	mg/L	0.009		3.04	0.492	23.7	0.373
Magnesium (total)	mg/L	0.001		18.9	0.485	9.56	0.481
Manganese (total)	mg/L	0.00001		1.07	0.0522	0.00062	0.0482
Molybdenum (total)	mg/L	0.00004	0.04	< 0.00004	0.00026	0.00053	< 0.00004
Sodium (total)	mg/L	0.01		27.2	1.05	47.3	0.98
Nickel (total)	mg/L	0.0001	0.025	0.0058	0.0007	0.0015	0.0006
Lead (total)	mg/L	0.00009	0.011 0.025	0.00056	0.00024	0.00038	0.00019
Phosphorus (total)	mg/L	0.003	0.01	0.015	0.012	0.062	0.004
Antimony (total)	mg/L	0.0009	0.02	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004	0.1	< 0.00004	0.00007	0.00019	0.00006
Strontium (total)	mg/L	0.00002		0.692	0.0162	0.275	0.0160
Zinc (total)	mg/L	0.002	0.02	0.155	0.010	0.004	0.005
Bismuth (total)	mg/L	0.00001		< 0.00001	< 0.00001	0.00005	< 0.00001
Silicon (total)	mg/L	0.02		3.17	1.04	0.36	1.06





# FINAL REPORT

CA15283-MAY21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill SW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: **Metals and Inorganics (WATER)**

L1 = PWQO\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	12/05/2021	12/05/2021	12/05/2021	12/05/2021

Parameter	Units	RL	L1	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>							
Tin (total)	mg/L	0.00006		< 0.00006	0.00013	0.00014	< 0.00006
Titanium (total)	mg/L	0.00005		0.00907	0.00183	0.00637	0.00204
Uranium (total)	mg/L	0.00000 2	0.005	0.000028	0.000036	0.000541	0.000036
Vanadium (total)	mg/L	0.00001	0.006	0.00030	0.00029	0.00051	0.00030
<b>Other (ORP)</b>							
pH	No unit	0.05	0.1 8.6	4.18	6.80	8.12	6.79
Chloride	mg/L	1		260	2	50	1
<b>Phenols</b>							
4AAP-Phenolics	mg/L	0.001	0.001	0.002	< 0.001	0.003	0.001

## EXCEEDANCE SUMMARY

				PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
Parameter	Method	Units	Result	

### SW1

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	1.20	0.015
Cadmium	SM 3030/EPA 200.8	mg/L	0.000182	0.0001
Cobalt	SM 3030/EPA 200.8	mg/L	0.0110	0.0009
Iron	SM 3030/EPA 200.8	mg/L	5.15	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.015	0.01
Zinc	SM 3030/EPA 200.8	mg/L	0.155	0.02
pH	SM 4500	No unit	4.18	0.1
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

### SW2

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.067	0.015
Iron	SM 3030/EPA 200.8	mg/L	0.711	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.012	0.01

### SW3

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.046	0.015
Boron	SM 3030/EPA 200.8	mg/L	1.27	0.2
Cobalt	SM 3030/EPA 200.8	mg/L	0.000919	0.0009
Copper	SM 3030/EPA 200.8	mg/L	0.0039	0.001
Iron	SM 3030/EPA 200.8	mg/L	0.563	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.062	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.003	0.001

### SW DUP

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.067	0.015
Iron	SM 3030/EPA 200.8	mg/L	0.690	0.3



FINAL REPORT

CA15283-MAY21 R

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-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 (%)	
								Low	High		Low	High
Alkalinity	EWL0301-MAY21	mg/L as CaCO3	2	< 2	0	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-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 (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0171-MAY21	mg/L	0.04	<0.04	ND	10	97	90	110	84	75	125



FINAL REPORT

CA15283-MAY21 R

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 (%)	
								Low	High		Low	High
Chloride	DIO5060-MAY21	mg/L	1	<1	2	20	98	80	120	91	75	125
Sulphate	DIO5060-MAY21	mg/L	2	<2	ND	20	93	80	120	88	75	125
Chloride	DIO5065-MAY21	mg/L	1	<1	0	20	107	80	120	95	75	125
Sulphate	DIO5065-MAY21	mg/L	2	<2	13	20	102	80	120	91	75	125
Chloride	DIO5081-MAY21	mg/L	1	<1	2	20	101	80	120	94	75	125
Sulphate	DIO5081-MAY21	mg/L	2	<2	0	20	104	80	120	94	75	125

Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-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 (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0319-MAY21	mg/L	0.03	<0.03	ND	20	98	80	120	100	75	125
Nitrate (as N)	DIO0319-MAY21	mg/L	0.06	<0.06	0	20	101	80	120	NV	75	125
Nitrite (as N)	DIO0341-MAY21	mg/L	0.03	<0.03	ND	20	99	80	120	102	75	125
Nitrate (as N)	DIO0341-MAY21	mg/L	0.06	<0.06	0	20	100	80	120	98	75	125
Nitrite (as N)	DIO0342-MAY21	mg/L	0.03	<0.03	ND	20	97	80	120	100	75	125
Nitrate (as N)	DIO0342-MAY21	mg/L	0.06	<0.06	1	20	101	80	120	103	75	125





FINAL REPORT

CA15283-MAY21 R

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 (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0038-MAY21	mg/L	2	< 2	19	30	88	70	130	99	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 (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0175-MAY21	mg/L	1	<1	ND	20	100	90	110	114	75	125
Dissolved Organic Carbon	SKA0202-MAY21	mg/L	1	<1	8	20	96	90	110	104	75	125



FINAL REPORT

CA15283-MAY21 R

QC SUMMARY

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-ENVIEWL-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 (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0335-MAY21	mg/L	8	<8	4	20	98	80	120	105	75	125
Chemical Oxygen Demand	EWL0336-MAY21	mg/L	8	<8	4	20	106	80	120	103	75	125

Colour

Method: SM 2120 | Internal ref.: ME-CA-ENVIEWL-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 (%)	
								Low	High		Low	High
Colour	EWL0387-MAY21	TCU	3	< 3	0	10	105	80	120	NA		

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 (%)	
								Low	High		Low	High
Conductivity	EWL0301-MAY21	uS/cm	2	2	1	20	97	90	110	NA		



FINAL REPORT

CA15283-MAY21 R

QC SUMMARY

Metals in aqueous samples - ICP-MS  
Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-1ENVISPE-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 (%)	
								Low	High		Low	High
Silver (total)	EMS0076-MAY21	mg/L	0.00005	<0.00005	ND	20	106	90	110	93	70	130
Aluminum (0.2µm)	EMS0076-MAY21	mg/L	0.001	<0.001	13	20	102	90	110	100	70	130
Arsenic (total)	EMS0076-MAY21	mg/L	0.0002	<0.0002	14	20	107	90	110	105	70	130
Barium (total)	EMS0076-MAY21	mg/L	0.00002	<0.00002	9	20	105	90	110	129	70	130
Beryllium (total)	EMS0076-MAY21	mg/L	0.000007	<0.00007	3	20	94	90	110	86	70	130
Boron (total)	EMS0076-MAY21	mg/L	0.002	<0.002	5	20	94	90	110	100	70	130
Bismuth (total)	EMS0076-MAY21	mg/L	0.00001	<0.00001	ND	20	97	90	110	81	70	130
Calcium (total)	EMS0076-MAY21	mg/L	0.01	<0.01	15	20	91	90	110	97	70	130
Cadmium (total)	EMS0076-MAY21	mg/L	0.000003	<0.000003	20	20	105	90	110	106	70	130
Cobalt (total)	EMS0076-MAY21	mg/L	0.000004	<0.000004	14	20	109	90	110	98	70	130
Chromium (total)	EMS0076-MAY21	mg/L	0.00008	<0.00008	2	20	104	90	110	87	70	130
Copper (total)	EMS0076-MAY21	mg/L	0.0002	<0.0002	2	20	106	90	110	78	70	130
Iron (total)	EMS0076-MAY21	mg/L	0.007	<0.007	13	20	99	90	110	111	70	130
Potassium (total)	EMS0076-MAY21	mg/L	0.009	<0.009	20	20	91	90	110	99	70	130
Magnesium (total)	EMS0076-MAY21	mg/L	0.001	<0.001	12	20	90	90	110	94	70	130
Manganese (total)	EMS0076-MAY21	mg/L	0.00001	<0.00001	ND	20	106	90	110	100	70	130
Molybdenum (total)	EMS0076-MAY21	mg/L	0.00004	<0.00004	5	20	95	90	110	100	70	130
Sodium (total)	EMS0076-MAY21	mg/L	0.01	<0.01	15	20	92	90	110	94	70	130
Nickel (total)	EMS0076-MAY21	mg/L	0.0001	<0.0001	20	20	104	90	110	84	70	130
Lead (total)	EMS0076-MAY21	mg/L	0.00009	<0.00001	12	20	107	90	110	92	70	130



# FINAL REPORT

CA15283-MAY21 R

## QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-1ENVISPE-LAK-AN-003

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		Low	High
Phosphorus (total)	EMS0076-MAY21	mg/L	0.003	<0.003	0	20	90	90	110	NV	70	130
Antimony (total)	EMS0076-MAY21	mg/L	0.0009	<0.0009	16	20	98	90	110	103	70	130
Selenium (total)	EMS0076-MAY21	mg/L	0.00004	<0.00004	20	20	93	90	110	99	70	130
Silicon (total)	EMS0076-MAY21	mg/L	0.02	<0.02	8	20	90	90	110	NV	70	130
Tin (total)	EMS0076-MAY21	mg/L	0.00006	<0.00006	6	20	94	90	110	NV	70	130
Strontium (total)	EMS0076-MAY21	mg/L	0.00002	<0.00002	15	20	108	90	110	82	70	130
Titanium (total)	EMS0076-MAY21	mg/L	0.00005	<0.00005	3	20	95	90	110	NV	70	130
Uranium (total)	EMS0076-MAY21	mg/L	0.000002	<0.000002	3	20	104	90	110	90	70	130
Vanadium (total)	EMS0076-MAY21	mg/L	0.00001	<0.00001	18	20	104	90	110	100	70	130
Zinc (total)	EMS0076-MAY21	mg/L	0.002	<0.002	10	20	104	90	110	94	70	130
Boron (total)	EMS0087-MAY21	mg/L	0.002	<0.002	11	20	99	90	110	105	70	130
Manganese (total)	EMS0098-MAY21	mg/L	0.00001	<0.00001	1	20	101	90	110	89	70	130



FINAL REPORT

CA15283-MAY21 R

QC SUMMARY

pH  
Method: SM 4500 | 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 (%)	
								Low	High		Low	High
pH	EWL0301-MAY21	No unit	0.05	NA	0		101			NA		

Phenols by SFA  
Method: SM 5530B-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 (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0170-MAY21	mg/L	0.001	<0.001	ND	10	95	90	110	100	75	125

Reactive Phosphorus by SFA  
Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-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 (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0182-MAY21	mg/L	0.03	<0.03	ND	10	96	90	110	92	75	125





FINAL REPORT

CA15283-MAY21 R

QC SUMMARY

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 (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0298-MAY21	mg/L	30	<30	1	20	93	90	110	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 (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0322-MAY21	mg/L	2	< 2	9	10	93	90	110	NA		

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 (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0178-MAY21	mg/L	0.05	<0.05	ND	10	103	90	110	121	75	125
Total Kjeldahl Nitrogen (N)	SKA0200-MAY21	mg/L	0.05	<0.05	0	10	96	90	110	89	75	125

## 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.

## 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

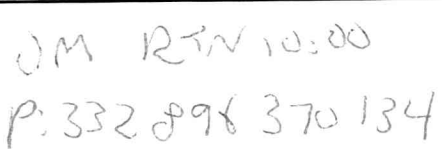
Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

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" 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. 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.

This report must not be reproduced, except in full. This report supersedes all previous versions.

-- End of Analytical Report --





## FINAL REPORT

CA15287-OCT21 R1

225335.003-Croft Landfill SW

Prepared for

**Pinchin Ltd**



## First Page

### CLIENT DETAILS

Client Pinchin Ltd

Address 957 Cambrian Heights Drive, Suite 203  
Sudbury, ON  
P3C 5S5, Canada

Contact Alana Valle

Telephone 705-521-0560

Facsimile

Email avalue@Pinchin.com

Project 225335.003-Croft Landfill SW

Order Number

Samples Surface Water (4)

### LABORATORY DETAILS

Project Specialist Brad Moore Hon. B.Sc

Laboratory SGS Canada Inc.

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

Telephone 705-652-2143

Facsimile 705-652-6365

Email brad.moore@sgs.com

SGS Reference CA15287-OCT21

Received 10/08/2021

Approved 10/18/2021

Report Number CA15287-OCT21 R1

Date Reported 10/18/2021

### 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

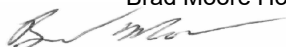




TABLE OF CONTENTS

---

First Page..... 1

Index..... 2

Results..... 3-5

Exceedance Summary..... 6

QC Summary..... 7-15

Legend..... 16

Annexes..... 17



# FINAL REPORT

CA15287-OCT21 R1

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill SW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: **General Chemistry** (WATER)

L1 = PWQO\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021

Parameter	Units	RL	L1	Result	Result	Result	Result
<b>General Chemistry</b>							
Biochemical Oxygen Demand (BOD5)	mg/L	2		< 4 †	< 4 †	4	< 4 †
Total Suspended Solids	mg/L	2		63	5	8	5
Colour	TCU	3		23	117	48	116
Alkalinity	mg/L as CaCO3	2		< 2	3	267	3
Conductivity	uS/cm	2		635	17	687	20
Total Dissolved Solids	mg/L	30		480	< 30	420	34
Chemical Oxygen Demand	mg/L	8		30	33	62	33
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05		0.35	0.37	2.52	0.40
Ammonia+Ammonium (N)	as N mg/L	0.04		< 0.04	< 0.04	1.95	0.07
Phosphorus (total reactive)	mg/L	0.03		< 0.03	< 0.03	< 0.03	< 0.03
Dissolved Organic Carbon	mg/L	1		4	13	27	16
<b>Metals and Inorganics</b>							
Sulphate	mg/L	2		< 2	< 2	27	< 2
Nitrite (as N)	as N mg/L	0.03		< 0.03	< 0.03	0.62	< 0.03
Nitrate (as N)	as N mg/L	0.06		0.08	0.40	9.73	< 0.06
Hardness	mg/L as CaCO3	0.05		213	7.0	273	7.2
Silver (total)	mg/L	0.00005	0.0001	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Aluminum (0.2µm)	mg/L	0.001	0.015	0.534	0.303	0.023	0.158
Arsenic (total)	mg/L	0.0002	0.005	0.0003	< 0.0002	0.0012	0.0004
Barium (total)	mg/L	0.00002		0.133	0.0107	0.0489	0.0106



# FINAL REPORT

CA15287-OCT21 R1

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill SW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: Metals and Inorganics (WATER)

L1 = PWQO\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021

Parameter	Units	RL	L1	Result	Result	Result	Result
Metals and Inorganics (continued)							
Beryllium (total)	mg/L	0.00000 7	0.011 1.1	0.000086	0.000028	0.000032	0.000030
Boron (total)	mg/L	0.002	0.2	0.009	0.008	1.16	0.082
Calcium (total)	mg/L	0.01		52.1	2.06	88.8	2.16
Cadmium (total)	mg/L	0.00000 3	0.0001 0.0005	0.000372	0.000030	0.000060	0.000036
Cobalt (total)	mg/L	0.00000 4	0.0009	0.0118	0.000357	0.0011	0.000333
Chromium (total)	mg/L	0.00008	0.1	0.00057	0.00040	0.00251	0.00078
Copper (total)	mg/L	0.0002	0.001 0.005	0.0014	0.0007	0.0075	0.0007
Iron (total)	mg/L	0.007	0.3	9.59	1.11	0.794	0.992
Potassium (total)	mg/L	0.009		2.47	0.864	28.3	0.773
Magnesium (total)	mg/L	0.001		20.1	0.443	12.5	0.430
Manganese (total)	mg/L	0.00001		1.52	0.0555	0.0850	0.0560
Molybdenum (total)	mg/L	0.00004	0.04	0.00005	< 0.00004	0.00036	< 0.00004
Sodium (total)	mg/L	0.01		33.1	4.38	58.2	3.78
Nickel (total)	mg/L	0.0001	0.025	0.0045	0.0009	0.0022	0.0012
Lead (total)	mg/L	0.00009	0.011 0.025	0.00049	0.00036	0.00227	0.00041
Phosphorus (total)	mg/L	0.003	0.01	0.041	0.024	0.054	0.015
Antimony (total)	mg/L	0.0009	0.02	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (total)	mg/L	0.00004	0.1	< 0.00004	0.00007	0.00017	0.00005



# FINAL REPORT

CA15287-OCT21 R1

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill SW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: **Metals and Inorganics (WATER)**

Sample Number	6	7	8	9
Sample Name	SW1	SW2	SW3	SW DUP
Sample Matrix	Surface Water	Surface Water	Surface Water	Surface Water
Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021

L1 = PWQQ\_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E

Parameter	Units	RL	L1	Result	Result	Result	Result
<b>Metals and Inorganics (continued)</b>							
Strontium (total)	mg/L	0.00002		0.601	0.0164	0.356	0.0168
Zinc (total)	mg/L	0.002	0.02	0.064	0.008	0.012	0.025
Bismuth (total)	mg/L	0.00001		0.00002	0.00001	0.00001	< 0.00001
Silicon (total)	mg/L	0.02		3.67	1.75	2.36	1.76
Tin (total)	mg/L	0.00006		0.00033	0.00030	0.00037	0.00032
Titanium (total)	mg/L	0.00005		0.00510	0.00423	0.0403	0.00252
Uranium (total)	mg/L	0.00000 2	0.005	0.000047	0.000063	0.000559	0.000059
Vanadium (total)	mg/L	0.00001	0.006	0.00090	0.00060	0.00154	0.00044
<b>Other (ORP)</b>							
pH	No unit	0.05	0.1 8.6	3.99	5.82	7.47	5.94
Chloride	mg/L	1		240	< 1	53	< 1
<b>Phenols</b>							
4AAP-Phenolics	mg/L	0.001	0.001	0.004	< 0.001	0.002	0.001



## EXCEEDANCE SUMMARY

				PWQO_L / WATER / - - Table 2 - General - July 1999 PIBS 3303E L1
Parameter	Method	Units	Result	

### SW1

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.534	0.015
Cobalt	SM 3030/EPA 200.8	mg/L	0.0118	0.0009
Iron	SM 3030/EPA 200.8	mg/L	9.59	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.041	0.01
Zinc	SM 3030/EPA 200.8	mg/L	0.064	0.02
pH	SM 4500	No unit	3.99	0.1
4AAP-Phenolics	SM 5530B-D	mg/L	0.004	0.001

### SW2

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.303	0.015
Iron	SM 3030/EPA 200.8	mg/L	1.11	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.024	0.01
pH	SM 4500	No unit	5.82	0.1

### SW3

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.023	0.015
Boron	SM 3030/EPA 200.8	mg/L	1.16	0.2
Cobalt	SM 3030/EPA 200.8	mg/L	0.0011	0.0009
Copper	SM 3030/EPA 200.8	mg/L	0.0075	0.005
Iron	SM 3030/EPA 200.8	mg/L	0.794	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.054	0.01
4AAP-Phenolics	SM 5530B-D	mg/L	0.002	0.001

### SW DUP

Aluminum (dissolved)	SM 3030/EPA 200.8	mg/L	0.158	0.015
Iron	SM 3030/EPA 200.8	mg/L	0.992	0.3
Phosphorus	SM 3030/EPA 200.8	mg/L	0.015	0.01
Zinc	SM 3030/EPA 200.8	mg/L	0.025	0.02
pH	SM 4500	No unit	5.94	0.1



FINAL REPORT

CA15287-OCT21 R1

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-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 (%)	
								Low	High		Low	High
Alkalinity	EWL0282-OCT21	mg/L as CaCO3	2	< 2	1	20	91	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-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 (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0109-OCT21	mg/L	0.04	<0.04	2	10	105	90	110	98	75	125



# FINAL REPORT

CA15287-OCT21 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 (%)	
								Low	High		Low	High
Chloride	DIO5039-OCT21	mg/L	1	<1	ND	20	101	80	120	109	75	125
Sulphate	DIO5039-OCT21	mg/L	2	<2	7	20	99	80	120	93	75	125
Sulphate	DIO5040-OCT21	mg/L	2	<2	0	20	107	80	120	95	75	125

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-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 (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0198-OCT21	mg/L	0.03	<0.03	ND	20	97	90	110	90	75	125
Nitrate (as N)	DIO0198-OCT21	mg/L	0.06	<0.06	0	20	103	90	110	108	75	125
Nitrite (as N)	DIO0200-OCT21	mg/L	0.03	<0.03	ND	20	100	90	110	104	75	125
Nitrate (as N)	DIO0200-OCT21	mg/L	0.06	<0.06	ND	20	102	90	110	105	75	125



FINAL REPORT

CA15287-OCT21 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 (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0017-OCT21	mg/L	2	< 2	8	30	99	70	130	NV	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 (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0122-OCT21	mg/L	1	<1	1	20	108	90	110	99	75	125
Dissolved Organic Carbon	SKA0142-OCT21	mg/L	1	<1	0	20	104	90	110	108	75	125



FINAL REPORT

CA15287-OCT21 R1

QC SUMMARY

Chemical Oxygen Demand

Method: HACH 8000 | Internal ref.: ME-CA-ENVIEWL-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 (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0334-OCT21	mg/L	8	<8	7	20	94	80	120	98	75	125
Chemical Oxygen Demand	EWL0365-OCT21	mg/L	8	<8	8	20	96	80	120	101	75	125

Colour

Method: SM 2120 | Internal ref.: ME-CA-ENVIEWL-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 (%)	
								Low	High		Low	High
Colour	EWL0288-OCT21	TCU	3	< 3	ND	10	100	80	120	NA		

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 (%)	
								Low	High		Low	High
Conductivity	EWL0282-OCT21	uS/cm	2	< 2	0	20	99	90	110	NA		





# FINAL REPORT

CA15287-OCT21 R1

## QC SUMMARY

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 (%)	
								Low	High		Low	High
Silver (total)	EMS0067-OCT21	mg/L	0.00005	<0.00005	ND	20	101	90	110	106	70	130
Aluminum (0.2µm)	EMS0067-OCT21	mg/L	0.001	<1	ND	20	109	90	110	119	70	130
Arsenic (total)	EMS0067-OCT21	mg/L	0.0002	<0.0002	10	20	108	90	110	101	70	130
Barium (total)	EMS0067-OCT21	mg/L	0.00002	<0.00002	7	20	95	90	110	80	70	130
Beryllium (total)	EMS0067-OCT21	mg/L	0.000007	<0.00007	ND	20	97	90	110	98	70	130
Boron (total)	EMS0067-OCT21	mg/L	0.002	<0.002	6	20	103	90	110	95	70	130
Bismuth (total)	EMS0067-OCT21	mg/L	0.00001	<0.00001	8	20	95	90	110	91	70	130
Calcium (total)	EMS0067-OCT21	mg/L	0.01	<0.01	1	20	106	90	110	107	70	130
Cadmium (total)	EMS0067-OCT21	mg/L	0.000003	<0.000003	5	20	98	90	110	96	70	130
Cobalt (total)	EMS0067-OCT21	mg/L	0.000004	<0.000004	13	20	99	90	110	98	70	130
Chromium (total)	EMS0067-OCT21	mg/L	0.00008	<0.00008	ND	20	100	90	110	114	70	130
Copper (total)	EMS0067-OCT21	mg/L	0.0002	<0.0002	7	20	96	90	110	92	70	130
Iron (total)	EMS0067-OCT21	mg/L	0.007	<0.007	11	20	94	90	110	100	70	130
Potassium (total)	EMS0067-OCT21	mg/L	0.009	<0.009	0	20	96	90	110	92	70	130
Magnesium (total)	EMS0067-OCT21	mg/L	0.001	<0.001	5	20	94	90	110	97	70	130
Manganese (total)	EMS0067-OCT21	mg/L	0.00001	<0.00001	2	20	98	90	110	90	70	130
Molybdenum (total)	EMS0067-OCT21	mg/L	0.00004	<0.00004	4	20	101	90	110	103	70	130
Sodium (total)	EMS0067-OCT21	mg/L	0.01	<0.01	4	20	95	90	110	96	70	130
Nickel (total)	EMS0067-OCT21	mg/L	0.0001	<0.0001	14	20	96	90	110	109	70	130
Lead (total)	EMS0067-OCT21	mg/L	0.00009	<0.00001	ND	20	105	90	110	106	70	130



FINAL REPORT

CA15287-OCT21 R1

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)  
Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-003

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		Low	High
Phosphorus (total)	EMS0067-OCT21	mg/L	0.003	<0.003	8	20	91	90	110	NV	70	130
Antimony (total)	EMS0067-OCT21	mg/L	0.0009	<0.0009	ND	20	107	90	110	110	70	130
Selenium (total)	EMS0067-OCT21	mg/L	0.00004	<0.00004	5	20	101	90	110	87	70	130
Silicon (total)	EMS0067-OCT21	mg/L	0.02	<0.02	1	20	100	90	110	NV	70	130
Tin (total)	EMS0067-OCT21	mg/L	0.00006	<0.00006	ND	20	97	90	110	NV	70	130
Strontium (total)	EMS0067-OCT21	mg/L	0.00002	<0.00002	3	20	93	90	110	98	70	130
Titanium (total)	EMS0067-OCT21	mg/L	0.00005	<0.00005	2	20	95	90	110	NV	70	130
Uranium (total)	EMS0067-OCT21	mg/L	0.000002	<0.000002	4	20	93	90	110	95	70	130
Vanadium (total)	EMS0067-OCT21	mg/L	0.00001	<0.00001	3	20	100	90	110	97	70	130
Zinc (total)	EMS0067-OCT21	mg/L	0.002	<0.002	ND	20	96	90	110	101	70	130

pH  
Method: SM 4500 | 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 (%)	
								Low	High		Low	High
pH	EWL0282-OCT21	No unit	0.05	NA	0		100			NA		



FINAL REPORT

CA15287-OCT21 R1

QC SUMMARY

Phenols by SFA  
Method: SM 5530B-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 (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0130-OCT21	mg/L	0.001	<0.001	ND	10	101	90	110	95	75	125

Reactive Phosphorus by SFA  
Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-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 (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0127-OCT21	mg/L	0.03	<0.03	ND	10	104	90	110	84	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 (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0302-OCT21	mg/L	30	<30	0	20	102	90	110	NA		



FINAL REPORT

CA15287-OCT21 R1

QC SUMMARY

Suspended Solids

Method: SM 2540D | Internal ref.: ME-CA-~~EN~~VIEWL-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 (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0287-OCT21	mg/L	2	< 2	2	10	101	90	110	NA		
Total Suspended Solids	EWL0292-OCT21	mg/L	2	< 2	1	10	102	90	110	NA		

Total Nitrogen

Method: SM 4500-N C/4500-NO3- F | Internal ref.: ME-CA-~~EN~~VISFA-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 (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0114-OCT21	mg/L	0.05	<0.05	ND	10	107	90	110	109	75	125
Total Kjeldahl Nitrogen (N)	SKA0139-OCT21	mg/L	0.05	<0.05	ND	10	110	90	110	101	75	125
Total Kjeldahl Nitrogen (N)	SKA0154-OCT21	mg/L	0.05	<0.05	ND	10	102	90	110	105	75	125

## 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.



## 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

Samples analysed as received. 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" 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. 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.

This report must not be reproduced, except in full. This report supersedes all previous versions.

-- End of Analytical Report --





## FINAL REPORT

CA15289-OCT21 R

225335.003-Croft Landfill GW

Prepared for

**Pinchin Ltd**

## First Page

### CLIENT DETAILS

Client Pinchin Ltd

Address 957 Cambrian Heights Drive, Suite 203  
Sudbury, ON  
P3C 5S5, Canada

Contact Alana Valle

Telephone 705-521-0560

Facsimile

Email avalue@Pinchin.com

Project 225335.003-Croft Landfill GW

Order Number

Samples Ground Water (9)

### 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 CA15289-OCT21

Received 10/08/2021

Approved 10/18/2021

Report Number CA15289-OCT21 R

Date Reported 10/18/2021

### COMMENTS

Temperature of Sample upon Receipt: 10 degrees C

Cooling Agent Present: Yes

Custody Seal Present: Yes

Chain of Custody Number: N/A

Raise RL for NO2 due to matrix interference

Raised RL for some SO4 due to sample matrix

COD spike low, results accepted based on all other QC

### SIGNATORIES

Maarit Wolfe, Hon.B.Sc





TABLE OF CONTENTS

---

First Page..... 1

Index..... 2

Results..... 3-17

Exceedance Summary..... 18-19

QC Summary..... 20-29

Legend..... 30

Annexes..... 31





# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: ODWS\_AO\_OG - General Chemistry

(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	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
-----------	-------	----	----	----	--------	--------	--------	--------	--------	--------	--------	--------

## General Chemistry

Turbidity	NTU	0.10	5	1	3.28	17.0	69.0	1.84	8.74	10.5	42.5	180
Phosphorus (total reactive)	mg/L	0.03			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.03	0.04
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †
Total Suspended Solids	mg/L	2			40	152	157	53	53	153	10300	710
Alkalinity	mg/L as CaCO3	2	500		59	16	156	383	380	70	55	84
Conductivity	uS/cm	2			192	60	439	2300	1390	182	130	305
Total Dissolved Solids	mg/L	30	500		240	46	287	1420	827	147	120	207
Chemical Oxygen Demand	mg/L	8			33	8	67	52	139	9	19	22
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.42	0.15	2.18	12.3	37.1	0.10	0.56	0.46
Ammonia+Ammonium (N)	as N mg/L	0.04			0.12	< 0.04	1.48	11.2	34.1	0.08	0.37	0.29
Dissolved Organic Carbon	mg/L	1	5		13	4	22	18	54	4	5	4



# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: ODWS\_AO\_OG - General Chemistry

(WATER)

**Sample Number** 15

**Sample Name** GW DUP

**Sample Matrix** Ground Water

**Sample Date** 07/10/2021

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	Result
General Chemistry					
Turbidity	NTU	0.10	5	1	159
Phosphorus (total reactive)	mg/L	0.03			0.03
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †
Total Suspended Solids	mg/L	2			1080
Alkalinity	mg/L as CaCO3	2	500		82
Conductivity	uS/cm	2			303
Total Dissolved Solids	mg/L	30	500		320
Chemical Oxygen Demand	mg/L	8			22
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.43
Ammonia+Ammonium (N)	as N mg/L	0.04			0.29
Dissolved Organic Carbon	mg/L	1	5		4



# FINAL REPORT

CA15289-OCT21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: ODWS\_AO\_OG - Metals and

Inorganics (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		7	8	9	10	11	12	13	14
			Sample Name		BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
			Sample Matrix		Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
			Sample Date		07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021
Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics												
Phosphorus (total)	mg/L	0.03			0.07	0.19	0.21	< 0.03	0.04	0.06	3.46	1.73
Sulphate	mg/L	2	500		< 20 †	10	< 20 †	25	59	9	4	17
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.3 †	0.24	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	0.53	0.23	0.51	1.31	12.1	0.08	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		50.1	9.21	150	553	210	78.5	50.5	106
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00005	< 0.00005	0.00024	< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.464	0.163	0.159	0.026	0.236	0.038	0.502	0.051
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0021	0.0004	0.0014	0.0025	0.0009	0.0009	0.0011	0.0005
Barium (dissolved)	mg/L	0.00002		1	0.0509	0.0151	0.0718	0.243	0.0740	0.0479	0.0476	0.0610
Beryllium (dissolved)	mg/L	0.00000			0.000124	0.000028	0.000040	0.000015	0.000043	0.000045	0.000145	0.000056
		7										
Boron (dissolved)	mg/L	0.002		5	0.059	0.009	0.460	1.11	1.88	0.083	0.038	0.111
Bismuth (dissolved)	mg/L	0.00001			0.00003	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (dissolved)	mg/L	0.01			15.3	2.76	50.6	181	61.5	27.3	16.9	33.4
Cadmium (dissolved)	mg/L	0.00000		0.005	0.000009	0.000028	0.000042	0.000061	0.000111	0.000014	0.000042	< 0.000003
		3										
Cobalt (dissolved)	mg/L	0.00000			0.0118	0.00124	0.0105	0.00283	0.00727	0.000106	0.000362	0.000525
		4										
Chromium (dissolved)	mg/L	0.00008		0.05	0.00166	0.00026	0.00197	0.00125	0.00283	0.00023	0.00047	0.00019
Copper (dissolved)	mg/L	0.0002		1	0.0033	0.0238	0.0028	0.0076	0.0125	0.0007	0.0052	0.0004
Iron (dissolved)	mg/L	0.007		0.3	10.4	0.095	16.5	0.019	0.231	1.19	1.48	2.87
Potassium (dissolved)	mg/L	0.009			2.09	0.556	6.89	52.3	61.0	1.60	1.47	3.50



FINAL REPORT

CA15289-OCT21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: ODWS\_AO\_OG - Metals and Inorganics (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		7	8	9	10	11	12	13	14
			Sample Name		BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
			Sample Matrix		Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
			Sample Date		07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021
Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics (continued)												
Magnesium (dissolved)	mg/L	0.001			2.88	0.563	5.87	24.3	13.8	2.50	2.00	5.42
Manganese (dissolved)	mg/L	0.00001	0.05		1.17	0.00663	1.62	2.34	1.81	0.377	0.212	0.749
Sodium (dissolved)	mg/L	0.01	200	20	8.09	4.26	24.5	191	147	5.84	2.11	10.8
Lead (dissolved)	mg/L	0.00009		0.01	0.00089	0.00015	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00045	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00026	0.00008	0.00027	0.00024	0.00107	< 0.00004	0.00011	0.00006
Strontium (dissolved)	mg/L	0.00002			0.0768	0.0151	0.173	0.800	0.140	0.124	0.0350	0.144
Zinc (dissolved)	mg/L	0.002	5		0.006	0.015	0.007	0.005	0.004	0.003	0.008	0.003
Molybdenum (dissolved)	mg/L	0.00004			0.00034	0.00066	0.00090	0.00116	0.00527	0.00104	0.00030	0.00044
Nickel (dissolved)	mg/L	0.0001			0.0011	0.0050	0.0028	0.0021	0.0066	0.0003	0.0008	0.0004
Silicon (dissolved)	mg/L	0.02			5.00	3.57	4.85	4.95	1.43	6.16	4.37	8.59
Tin (dissolved)	mg/L	0.00006			< 0.00006	< 0.00006	< 0.00006	0.00009	0.00014	< 0.00006	0.00006	< 0.00006
Titanium (dissolved)	mg/L	0.00005			0.0572	0.00437	0.00288	0.00077	0.00447	0.00109	0.0448	0.00156
Uranium (dissolved)	mg/L	0.00000 2		0.02	0.00145	0.000210	0.000535	0.00347	0.00448	0.000191	0.00296	0.000499
Vanadium (dissolved)	mg/L	0.00001			0.00452	0.00029	0.00304	0.00041	0.00058	0.00034	0.00171	0.00070



# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: ODWS\_AO\_OG - Metals and  
Inorganics (WATER)

**Sample Number** 15

**Sample Name** GW DUP

**Sample Matrix** Ground Water

**Sample Date** 07/10/2021

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	Result
<b>Metals and Inorganics</b>					
Phosphorus (total)	mg/L	0.03			1.73
Sulphate	mg/L	2	500		16
Nitrite (as N)	as N mg/L	0.03		1	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		104
Silver (dissolved)	mg/L	0.00005			< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.142
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0005
Barium (dissolved)	mg/L	0.00002		1	0.0630
Beryllium (dissolved)	mg/L	0.00000 7			0.000068
Boron (dissolved)	mg/L	0.002		5	0.064
Bismuth (dissolved)	mg/L	0.00001			< 0.00001
Calcium (dissolved)	mg/L	0.01			32.8
Cadmium (dissolved)	mg/L	0.00000 3		0.005	< 0.000003
Cobalt (dissolved)	mg/L	0.00000 4			0.000552
Chromium (dissolved)	mg/L	0.00008		0.05	0.00022
Copper (dissolved)	mg/L	0.0002	1		0.0004
Iron (dissolved)	mg/L	0.007	0.3		2.88
Potassium (dissolved)	mg/L	0.009			3.49





FINAL REPORT

CA15289-OCT21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: ODWS\_AO\_OG - Metals and Inorganics (WATER)

Sample Number 15

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 07/10/2021

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	Result
Metals and Inorganics (continued)					
Magnesium (dissolved)	mg/L	0.001			5.48
Manganese (dissolved)	mg/L	0.00001	0.05		0.740
Sodium (dissolved)	mg/L	0.01	200	20	10.8
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00007
Strontium (dissolved)	mg/L	0.00002			0.141
Zinc (dissolved)	mg/L	0.002	5		0.003
Molybdenum (dissolved)	mg/L	0.00004			0.00051
Nickel (dissolved)	mg/L	0.0001			0.0004
Silicon (dissolved)	mg/L	0.02			9.53
Tin (dissolved)	mg/L	0.00006			< 0.00006
Titanium (dissolved)	mg/L	0.00005			0.00589
Uranium (dissolved)	mg/L	0.000002		0.02	0.000737
Vanadium (dissolved)	mg/L	0.00001			0.00091



# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

## PACKAGE: ODWS\_AO\_OG - Other (ORP)

(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	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
pH	No unit	0.05	8.5		7.10	6.93	7.64	7.92	7.81	7.65	7.41	7.63
Chloride	mg/L	1	250		11	< 1	36	480	150	9	6	41

## PACKAGE: ODWS\_AO\_OG - Other (ORP)

(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	15
Sample Name	GW DUP
Sample Matrix	Ground Water
Sample Date	07/10/2021

Parameter	Units	RL	L1	L2	Result
pH	No unit	0.05	8.5		7.75
Chloride	mg/L	1	250		41

## PACKAGE: ODWS\_AO\_OG - Phenols (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	7	8	9	10	11	12	13	14
Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
4AAP-Phenolics	mg/L	0.002			< 0.002	< 0.002	< 0.002	0.005	0.002	< 0.002	< 0.002	< 0.002



# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: ODWS\_AO\_OG - Phenols (WATER)

**Sample Number** 15  
**Sample Name** GW DUP  
**Sample Matrix** Ground Water  
**Sample Date** 07/10/2021

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	Result
4AAP-Phenolics	mg/L	0.002			< 0.002

## Phenols

PACKAGE: ODWS\_MAC - General Chemistry  
(WATER)

**Sample Number** 7 8 9 10 11 12 13 14  
**Sample Name** BH1 BH8 BH9 BH10 BH11 BH12 BH13 BH14  
**Sample Matrix** Ground Water Ground Water Ground Water Ground Water Ground Water Ground Water Ground Water Ground Water  
**Sample Date** 07/10/2021 07/10/2021 07/10/2021 07/10/2021 07/10/2021 07/10/2021 07/10/2021 07/10/2021

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	Result	Result	Result	Result	Result	Result	Result	Result
Turbidity	NTU	0.10	5	1	3.28	17.0	69.0	1.84	8.74	10.5	42.5	180
Phosphorus (total reactive)	mg/L	0.03			< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	0.03	0.04
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †	< 4 †
Total Suspended Solids	mg/L	2			40	152	157	53	53	153	10300	710
Alkalinity	mg/L as CaCO3	2	500		59	16	156	383	380	70	55	84
Conductivity	uS/cm	2			192	60	439	2300	1390	182	130	305
Total Dissolved Solids	mg/L	30	500		240	46	287	1420	827	147	120	207
Chemical Oxygen Demand	mg/L	8			33	8	67	52	139	9	19	22
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.42	0.15	2.18	12.3	37.1	0.10	0.56	0.46
Ammonia+Ammonium (N)	as N mg/L	0.04			0.12	< 0.04	1.48	11.2	34.1	0.08	0.37	0.29
Dissolved Organic Carbon	mg/L	1	5		13	4	22	18	54	4	5	4

## General Chemistry



# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: ODWS\_MAC - General Chemistry

Sample Number 15

(WATER)

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 07/10/2021

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	Result
-----------	-------	----	----	----	--------

## General Chemistry

Turbidity	NTU	0.10	5	1	159
Phosphorus (total reactive)	mg/L	0.03			0.03
Biochemical Oxygen Demand (BOD5)	mg/L	2			< 4 †
Total Suspended Solids	mg/L	2			1080
Alkalinity	mg/L as CaCO3	2	500		82
Conductivity	uS/cm	2			303
Total Dissolved Solids	mg/L	30	500		320
Chemical Oxygen Demand	mg/L	8			22
Total Kjeldahl Nitrogen (N)	as N mg/L	0.05			0.43
Ammonia+Ammonium (N)	as N mg/L	0.04			0.29
Dissolved Organic Carbon	mg/L	1	5		4



# FINAL REPORT

CA15289-OCT21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: ODWS\_MAC - Metals and Inorganics  
(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		7	8	9	10	11	12	13	14
			Sample Name		BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
			Sample Matrix		Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
			Sample Date		07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021
Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics												
Phosphorus (total)	mg/L	0.03			0.07	0.19	0.21	< 0.03	0.04	0.06	3.46	1.73
Sulphate	mg/L	2	500		< 20 †	10	< 20 †	25	59	9	4	17
Nitrite (as N)	as N mg/L	0.03		1	< 0.03	< 0.03	< 0.03	< 0.3 †	0.24	< 0.03	< 0.03	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	0.53	0.23	0.51	1.31	12.1	0.08	< 0.06	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		50.1	9.21	150	553	210	78.5	50.5	106
Silver (dissolved)	mg/L	0.00005			< 0.00005	< 0.00005	< 0.00005	< 0.00005	0.00005	< 0.00005	0.00024	< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.464	0.163	0.159	0.026	0.236	0.038	0.502	0.051
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0021	0.0004	0.0014	0.0025	0.0009	0.0009	0.0011	0.0005
Barium (dissolved)	mg/L	0.00002		1	0.0509	0.0151	0.0718	0.243	0.0740	0.0479	0.0476	0.0610
Beryllium (dissolved)	mg/L	0.00000			0.000124	0.000028	0.000040	0.000015	0.000043	0.000045	0.000145	0.000056
		7										
Boron (dissolved)	mg/L	0.002		5	0.059	0.009	0.460	1.11	1.88	0.083	0.038	0.111
Bismuth (dissolved)	mg/L	0.00001			0.00003	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001
Calcium (dissolved)	mg/L	0.01			15.3	2.76	50.6	181	61.5	27.3	16.9	33.4
Cadmium (dissolved)	mg/L	0.00000		0.005	0.000009	0.000028	0.000042	0.000061	0.000111	0.000014	0.000042	< 0.000003
		3										
Cobalt (dissolved)	mg/L	0.00000			0.0118	0.00124	0.0105	0.00283	0.00727	0.000106	0.000362	0.000525
		4										
Chromium (dissolved)	mg/L	0.00008		0.05	0.00166	0.00026	0.00197	0.00125	0.00283	0.00023	0.00047	0.00019
Copper (dissolved)	mg/L	0.0002		1	0.0033	0.0238	0.0028	0.0076	0.0125	0.0007	0.0052	0.0004
Iron (dissolved)	mg/L	0.007		0.3	10.4	0.095	16.5	0.019	0.231	1.19	1.48	2.87
Potassium (dissolved)	mg/L	0.009			2.09	0.556	6.89	52.3	61.0	1.60	1.47	3.50





# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: ODWS\_MAC - Metals and Inorganics  
(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		7	8	9	10	11	12	13	14
			Sample Name		BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
			Sample Matrix		Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
			Sample Date		07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021
Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result
Metals and Inorganics (continued)												
Magnesium (dissolved)	mg/L	0.001			2.88	0.563	5.87	24.3	13.8	2.50	2.00	5.42
Manganese (dissolved)	mg/L	0.00001	0.05		1.17	0.00663	1.62	2.34	1.81	0.377	0.212	0.749
Sodium (dissolved)	mg/L	0.01	200	20	8.09	4.26	24.5	191	147	5.84	2.11	10.8
Lead (dissolved)	mg/L	0.00009		0.01	0.00089	0.00015	< 0.00009	< 0.00009	< 0.00009	< 0.00009	0.00045	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00026	0.00008	0.00027	0.00024	0.00107	< 0.00004	0.00011	0.00006
Strontium (dissolved)	mg/L	0.00002			0.0768	0.0151	0.173	0.800	0.140	0.124	0.0350	0.144
Zinc (dissolved)	mg/L	0.002	5		0.006	0.015	0.007	0.005	0.004	0.003	0.008	0.003
Molybdenum (dissolved)	mg/L	0.00004			0.00034	0.00066	0.00090	0.00116	0.00527	0.00104	0.00030	0.00044
Nickel (dissolved)	mg/L	0.0001			0.0011	0.0050	0.0028	0.0021	0.0066	0.0003	0.0008	0.0004
Silicon (dissolved)	mg/L	0.02			5.00	3.57	4.85	4.95	1.43	6.16	4.37	8.59
Tin (dissolved)	mg/L	0.00006			< 0.00006	< 0.00006	< 0.00006	0.00009	0.00014	< 0.00006	0.00006	< 0.00006
Titanium (dissolved)	mg/L	0.00005			0.0572	0.00437	0.00288	0.00077	0.00447	0.00109	0.0448	0.00156
Uranium (dissolved)	mg/L	0.00000 2		0.02	0.00145	0.000210	0.000535	0.00347	0.00448	0.000191	0.00296	0.000499
Vanadium (dissolved)	mg/L	0.00001			0.00452	0.00029	0.00304	0.00041	0.00058	0.00034	0.00171	0.00070



# FINAL REPORT

CA15289-OCT21 R

**Client:** Pinchin Ltd

**Project:** 225335.003-Croft Landfill GW

**Project Manager:** Alana Valle

**Samplers:** Alana Valle

PACKAGE: ODWS\_MAC - Metals and Inorganics  
(WATER)

**Sample Number** 15

**Sample Name** GW DUP

**Sample Matrix** Ground Water

**Sample Date** 07/10/2021

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	Result
<b>Metals and Inorganics</b>					
Phosphorus (total)	mg/L	0.03			1.73
Sulphate	mg/L	2	500		16
Nitrite (as N)	as N mg/L	0.03		1	< 0.03
Nitrate (as N)	as N mg/L	0.06		10	< 0.06
Hardness (dissolved)	mg/L as CaCO3	0.05	100		104
Silver (dissolved)	mg/L	0.00005			< 0.00005
Aluminum (dissolved)	mg/L	0.001			0.142
Arsenic (dissolved)	mg/L	0.0002		0.01	0.0005
Barium (dissolved)	mg/L	0.00002		1	0.0630
Beryllium (dissolved)	mg/L	0.000007			0.000068
Boron (dissolved)	mg/L	0.002		5	0.064
Bismuth (dissolved)	mg/L	0.00001			< 0.00001
Calcium (dissolved)	mg/L	0.01			32.8
Cadmium (dissolved)	mg/L	0.000003		0.005	< 0.000003
Cobalt (dissolved)	mg/L	0.000004			0.000552
Chromium (dissolved)	mg/L	0.00008		0.05	0.00022
Copper (dissolved)	mg/L	0.0002	1		0.0004
Iron (dissolved)	mg/L	0.007	0.3		2.88
Potassium (dissolved)	mg/L	0.009			3.49



FINAL REPORT

CA15289-OCT21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: ODWS\_MAC - Metals and Inorganics  
(WATER)

Sample Number 15

Sample Name GW DUP

Sample Matrix Ground Water

Sample Date 07/10/2021

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	Result
Metals and Inorganics (continued)					
Magnesium (dissolved)	mg/L	0.001			5.48
Manganese (dissolved)	mg/L	0.00001	0.05		0.740
Sodium (dissolved)	mg/L	0.01	200	20	10.8
Lead (dissolved)	mg/L	0.00009		0.01	< 0.00009
Antimony (dissolved)	mg/L	0.0009		0.006	< 0.0009
Selenium (dissolved)	mg/L	0.00004		0.05	0.00007
Strontium (dissolved)	mg/L	0.00002			0.141
Zinc (dissolved)	mg/L	0.002	5		0.003
Molybdenum (dissolved)	mg/L	0.00004			0.00051
Nickel (dissolved)	mg/L	0.0001			0.0004
Silicon (dissolved)	mg/L	0.02			9.53
Tin (dissolved)	mg/L	0.00006			< 0.00006
Titanium (dissolved)	mg/L	0.00005			0.00589
Uranium (dissolved)	mg/L	0.00000 2		0.02	0.000737
Vanadium (dissolved)	mg/L	0.00001			0.00091



FINAL REPORT

CA15289-OCT21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: ODWS\_MAC - Other (ORP) (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	7	8	9	10	11	12	13	14
					Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result	Result
Other (ORP)													
pH	No unit	0.05	8.5		7.10	6.93	7.64	7.92	7.81	7.65	7.41	7.63	
Chloride	mg/L	1	250		11	< 1	36	480	150	9	6	41	

PACKAGE: ODWS\_MAC - Other (ORP) (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	15
					Sample Name	GW DUP
					Sample Matrix	Ground Water
					Sample Date	07/10/2021

Parameter	Units	RL	L1	L2	Result
Other (ORP)					
pH	No unit	0.05	8.5		7.75
Chloride	mg/L	1	250		41

PACKAGE: ODWS\_MAC - Phenols (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	7	8	9	10	11	12	13	14
					Sample Name	BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
					Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
					Sample Date	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021	07/10/2021

Parameter	Units	RL	L1	L2	Result	Result	Result	Result	Result	Result	Result	Result	Result
Phenols													
4AAP-Phenolics	mg/L	0.002			< 0.002	< 0.002	< 0.002	0.005	0.002	< 0.002	< 0.002	< 0.002	



FINAL REPORT

CA15289-OCT21 R

Client: Pinchin Ltd

Project: 225335.003-Croft Landfill GW

Project Manager: Alana Valle

Samplers: Alana Valle

PACKAGE: ODWS\_MAC - Phenols (WATER)

Sample Number 15  
Sample Name GW DUP  
Sample Matrix Ground Water  
Sample Date 07/10/2021

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	Result
Phenols					
4AAP-Phenolics	mg/L	0.002			< 0.002



## 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

## BH1

Turbidity	SM 2130	NTU	3.28		1
Iron (dissolved)	SM 3030/EPA 200.8	µg/L	10.4	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	1.17	0.05	
Dissolved Organic Carbon	SM 5310	mg/L	13	5	

## BH8

Turbidity	SM 2130	NTU	17.0	5	1
-----------	---------	-----	------	---	---

## BH9

Turbidity	SM 2130	NTU	69.0	5	1
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L	150	100	
Iron (dissolved)	SM 3030/EPA 200.8	µg/L	16.5	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	1.62	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	24.5		20
Dissolved Organic Carbon	SM 5310	mg/L	22	5	

## BH10

Turbidity	SM 2130	NTU	1.84		1
Total Dissolved Solids	SM 2540C	mg/L	1420	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L	553	100	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	2.34	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	191		20
Dissolved Organic Carbon	SM 5310	mg/L	18	5	
Chloride	US EPA 325.2	mg/L	480	250	

## BH11

Nitrate as Nitrogen	EPA300/MA300-Ions1.3	mg/L	12.1		10
Turbidity	SM 2130	NTU	8.74	5	1
Total Dissolved Solids	SM 2540C	mg/L	827	500	
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L	210	100	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	1.81	0.05	
Sodium (dissolved)	SM 3030/EPA 200.8	mg/L	147		20
Dissolved Organic Carbon	SM 5310	mg/L	54	5	

## BH12

Turbidity	SM 2130	NTU	10.5	5	1
Iron (dissolved)	SM 3030/EPA 200.8	µg/L	1.19	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	0.377	0.05	

## BH13

Turbidity	SM 2130	NTU	42.5	5	1
-----------	---------	-----	------	---	---

## 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

### BH13 (continued)

Iron (dissolved)	SM 3030/EPA 200.8	µg/L	1.48	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	0.212	0.05	

### BH14

Turbidity	SM 2130	NTU	180	5	1
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L	106	100	
Iron (dissolved)	SM 3030/EPA 200.8	µg/L	2.87	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	0.749	0.05	

### GW DUP

Turbidity	SM 2130	NTU	159	5	1
Hardness (dissolved)	SM 3030/EPA 200.7	mg/L	104	100	
Iron (dissolved)	SM 3030/EPA 200.8	µg/L	2.88	0.3	
Manganese (dissolved)	SM 3030/EPA 200.8	µg/L	0.740	0.05	



FINAL REPORT

CA15289-OCT21 R

QC SUMMARY

Alkalinity

Method: SM 2320 | Internal ref.: ME-CA-1ENVIEWL-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 (%)	
								Low	High		Low	High
Alkalinity	EWL0261-OCT21	mg/L as CaCO3	2	< 2	1	20	100	80	120	NA		

Ammonia by SFA

Method: SM 4500 | Internal ref.: ME-CA-1ENVISFA-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 (%)	
								Low	High		Low	High
Ammonia+Ammonium (N)	SKA0125-OCT21	mg/L	0.04	<0.04	ND	10	103	90	110	87	75	125
Ammonia+Ammonium (N)	SKA0109-OCT21	mg/L	0.04	<0.04	2	10	105	90	110	98	75	125



# FINAL REPORT

CA15289-OCT21 R

## 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 (%)	
								Low	High		Low	High
Chloride	DIO5039-OCT21	mg/L	1	<1	ND	20	101	80	120	109	75	125
Sulphate	DIO5039-OCT21	mg/L	2	<2	7	20	99	80	120	93	75	125

### Anions by IC

Method: EPA300/MA300-Ions1.3 | Internal ref.: ME-CA-IENVIIC-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 (%)	
								Low	High		Low	High
Nitrite (as N)	DIO0198-OCT21	mg/L	0.03	<0.03	ND	20	97	90	110	90	75	125
Nitrate (as N)	DIO0198-OCT21	mg/L	0.06	<0.06	0	20	103	90	110	108	75	125
Nitrite (as N)	DIO0226-OCT21	mg/L	0.03	<0.03	ND	20	99	90	110	99	75	125



FINAL REPORT

CA15289-OCT21 R

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 (%)	
								Low	High		Low	High
Biochemical Oxygen Demand (BOD5)	BOD0014-OCT21	mg/L	2	< 2	1	30	115	70	130	122	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 (%)	
								Low	High		Low	High
Dissolved Organic Carbon	SKA0122-OCT21	mg/L	1	<1	1	20	108	90	110	99	75	125
Dissolved Organic Carbon	SKA0142-OCT21	mg/L	1	<1	0	20	104	90	110	108	75	125



FINAL REPORT

CA15289-OCT21 R

QC SUMMARY

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 (%)	
								Low	High		Low	High
Chemical Oxygen Demand	EWL0334-OCT21	mg/L	8	<8	7	20	94	80	120	98	75	125
Chemical Oxygen Demand	EWL0364-OCT21	mg/L	8	<8	ND	20	102	80	120	73	75	125
Chemical Oxygen Demand	EWL0365-OCT21	mg/L	8	<8	8	20	96	80	120	101	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 (%)	
								Low	High		Low	High
Conductivity	EWL0261-OCT21	uS/cm	2	< 2	1	20	98	90	110	NA		





FINAL REPORT

CA15289-OCT21 R

QC SUMMARY

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 (%)	
								Low	High		Low	High
Silver (dissolved)	EMS0075-OCT21	mg/L	0.00005	<0.00005	ND	20	97	90	110	95	70	130
Aluminum (dissolved)	EMS0075-OCT21	mg/L	0.001	<0.001	4	20	91	90	110	128	70	130
Arsenic (dissolved)	EMS0075-OCT21	mg/L	0.0002	<0.0002	10	20	101	90	110	101	70	130
Barium (dissolved)	EMS0075-OCT21	mg/L	0.00002	<0.00002	7	20	92	90	110	92	70	130
Beryllium (dissolved)	EMS0075-OCT21	mg/L	0.000007	<0.00007	7	20	100	90	110	104	70	130
Boron (dissolved)	EMS0075-OCT21	mg/L	0.002	<0.002	5	20	100	90	110	103	70	130
Bismuth (dissolved)	EMS0075-OCT21	mg/L	0.00001	<0.00001	ND	20	105	90	110	111	70	130
Calcium (dissolved)	EMS0075-OCT21	mg/L	0.01	<0.01	5	20	99	90	110	102	70	130
Cadmium (dissolved)	EMS0075-OCT21	mg/L	0.000003	<0.000003	6	20	98	90	110	119	70	130
Cobalt (dissolved)	EMS0075-OCT21	mg/L	0.000004	<0.000004	5	20	97	90	110	104	70	130
Chromium (dissolved)	EMS0075-OCT21	mg/L	0.00008	<0.00008	14	20	95	90	110	109	70	130
Copper (dissolved)	EMS0075-OCT21	mg/L	0.0002	<0.0002	4	20	95	90	110	106	70	130
Iron (dissolved)	EMS0075-OCT21	mg/L	0.007	<0.007	3	20	99	90	110	NV	70	130
Potassium (dissolved)	EMS0075-OCT21	mg/L	0.009	<0.009	5	20	103	90	110	105	70	130
Magnesium (dissolved)	EMS0075-OCT21	mg/L	0.001	<0.001	2	20	99	90	110	99	70	130
Manganese (dissolved)	EMS0075-OCT21	mg/L	0.00001	<0.00001	5	20	98	90	110	108	70	130
Molybdenum (dissolved)	EMS0075-OCT21	mg/L	0.00004	<0.00004	2	20	97	90	110	97	70	130
Sodium (dissolved)	EMS0075-OCT21	mg/L	0.01	<0.01	4	20	95	90	110	100	70	130
Nickel (dissolved)	EMS0075-OCT21	mg/L	0.0001	<0.0001	5	20	94	90	110	97	70	130
Lead (dissolved)	EMS0075-OCT21	mg/L	0.00009	<0.00001	5	20	97	90	110	98	70	130



FINAL REPORT

CA15289-OCT21 R

QC SUMMARY

Metals in aqueous samples - ICP-MS (continued)  
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 (%)	
								Low	High		Low	High
Antimony (dissolved)	EMS0075-OCT21	mg/L	0.0009	<0.0009	ND	20	103	90	110	95	70	130
Selenium (dissolved)	EMS0075-OCT21	mg/L	0.00004	<0.00004	14	20	97	90	110	121	70	130
Silicon (dissolved)	EMS0075-OCT21	mg/L	0.02	<0.02	1	20	92	90	110	NV	70	130
Tin (dissolved)	EMS0075-OCT21	mg/L	0.00006	<0.00006	ND	20	93	90	110	NV	70	130
Strontium (dissolved)	EMS0075-OCT21	mg/L	0.00002	<0.00002	6	20	96	90	110	96	70	130
Titanium (dissolved)	EMS0075-OCT21	mg/L	0.00005	<0.00005	17	20	95	90	110	NV	70	130
Uranium (dissolved)	EMS0075-OCT21	mg/L	0.000002	<0.000002	2	20	94	90	110	103	70	130
Vanadium (dissolved)	EMS0075-OCT21	mg/L	0.00001	<0.00001	10	20	97	90	110	104	70	130
Zinc (dissolved)	EMS0075-OCT21	mg/L	0.002	<0.002	2	20	91	90	110	107	70	130
Boron (dissolved)	EMS0084-OCT21	mg/L	0.002	<0.002	9	20	102	90	110	93	70	130
Zinc (dissolved)	EMS0084-OCT21	mg/L	0.002	<0.002	ND	20	96	90	110	99	70	130

pH  
Method: SM 4500 | 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 (%)	
								Low	High		Low	High
pH	EWL0261-OCT21	No unit	0.05	NA	0		100			NA		



FINAL REPORT

CA15289-OCT21 R

QC SUMMARY

Phenols by SFA  
Method: SM 5530B-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 (%)	
								Low	High		Low	High
4AAP-Phenolics	SKA0130-OCT21	mg/L	0.002	<0.002	ND	10	101	80	120	95	75	125

Phosphorus by SFA  
Method: SM 4500-P J | Internal ref.: ME-CA-IENVISFA-LAK-AN-003

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		Low	High
Phosphorus (total)	SKA0123-OCT21	mg/L	0.03	<0.03	5	10	105	90	110	89	75	125
Phosphorus (total)	SKA0143-OCT21	mg/L	0.03	<0.03	2	10	97	90	110	96	75	125

Reactive Phosphorus by SFA  
Method: SM 4500-P F | Internal ref.: ME-CA-IENVISFA-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 (%)	
								Low	High		Low	High
Phosphorus (total reactive)	SKA0115-OCT21	mg/L	0.03	<0.03	5	10	100	90	110	102	75	125



FINAL REPORT

CA15289-OCT21 R

QC SUMMARY

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 (%)	
								Low	High		Low	High
Total Dissolved Solids	EWL0264-OCT21	mg/L	30	<30	0	20	103	90	110	NA		
Total Dissolved Solids	EWL0267-OCT21	mg/L	30	<30	0	20	98	90	110	NA		
Total Dissolved Solids	EWL0299-OCT21	mg/L	30	<30	3	20	103	90	110	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 (%)	
								Low	High		Low	High
Total Suspended Solids	EWL0279-OCT21	mg/L	2	< 2	4	10	109	90	110	NA		
Total Suspended Solids	EWL0287-OCT21	mg/L	2	< 2	2	10	101	90	110	NA		



FINAL REPORT

CA15289-OCT21 R

QC SUMMARY

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 (%)	
								Low	High		Low	High
Total Kjeldahl Nitrogen (N)	SKA0114-OCT21	mg/L	0.05	<0.05	ND	10	107	90	110	109	75	125
Total Kjeldahl Nitrogen (N)	SKA0139-OCT21	mg/L	0.05	<0.05	ND	10	110	90	110	101	75	125
Total Kjeldahl Nitrogen (N)	SKA0154-OCT21	mg/L	0.05	<0.05	ND	10	102	90	110	105	75	125

Turbidity

Method: SM 2130 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-003

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		Low	High
Turbidity	EWL0193-OCT21	NTU	0.10	< 0.10	3	10	99	90	110	NA		

## 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.



## 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

Samples analysed as received. 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" published by the Ministry and dated March 9, 2004 as amended.

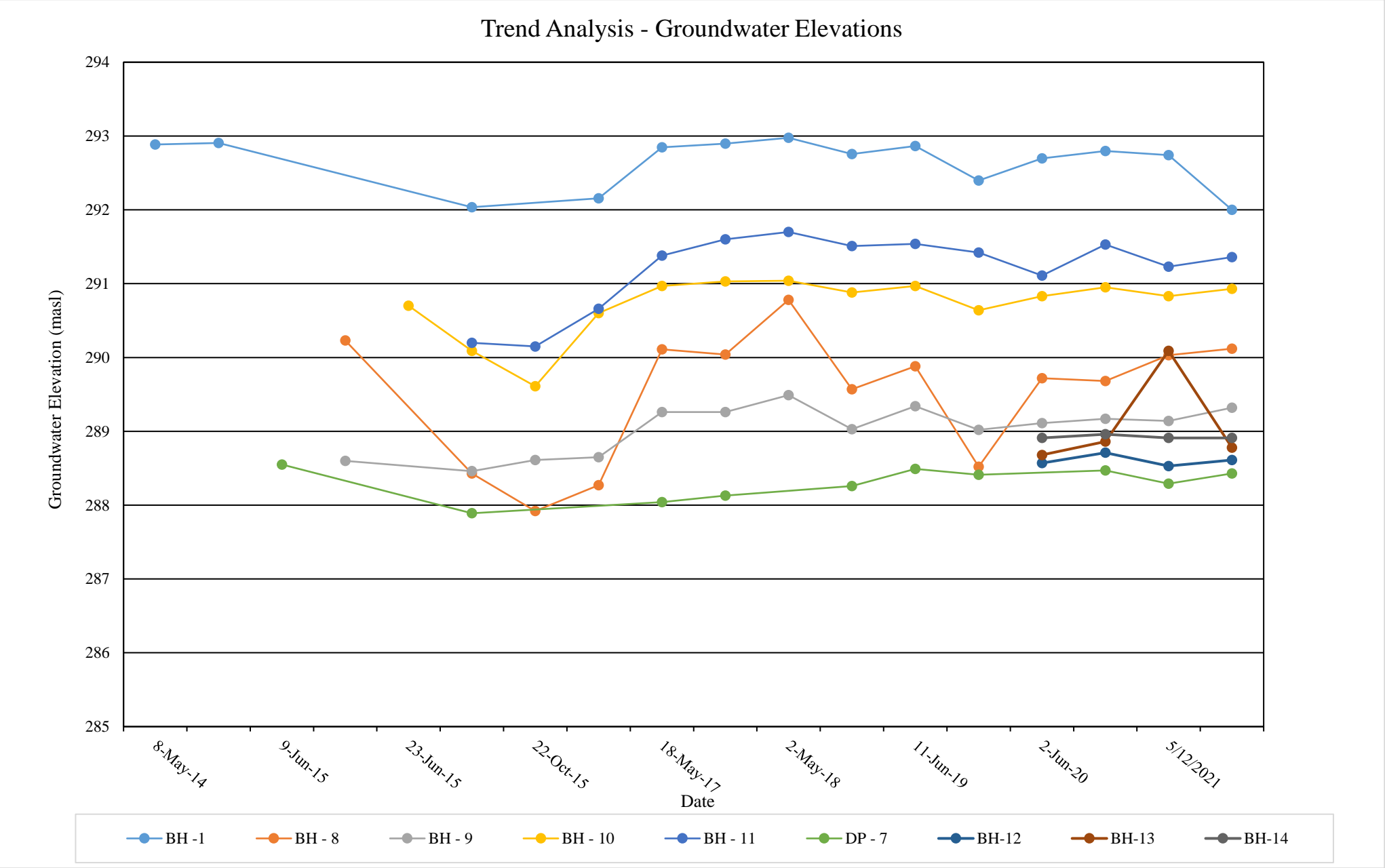
SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility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

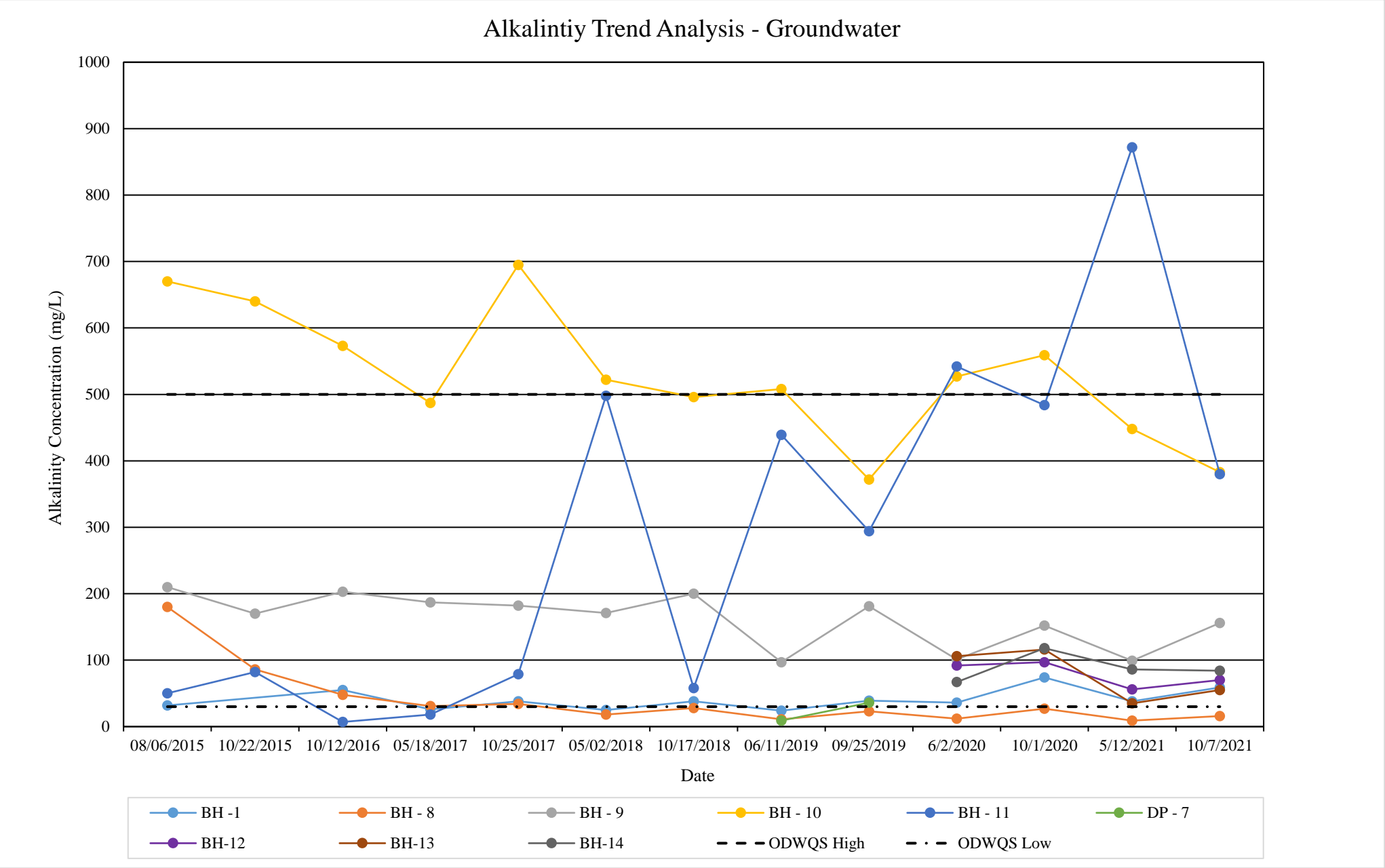
This report must not be reproduced, except in full. This report supersedes all previous versions.

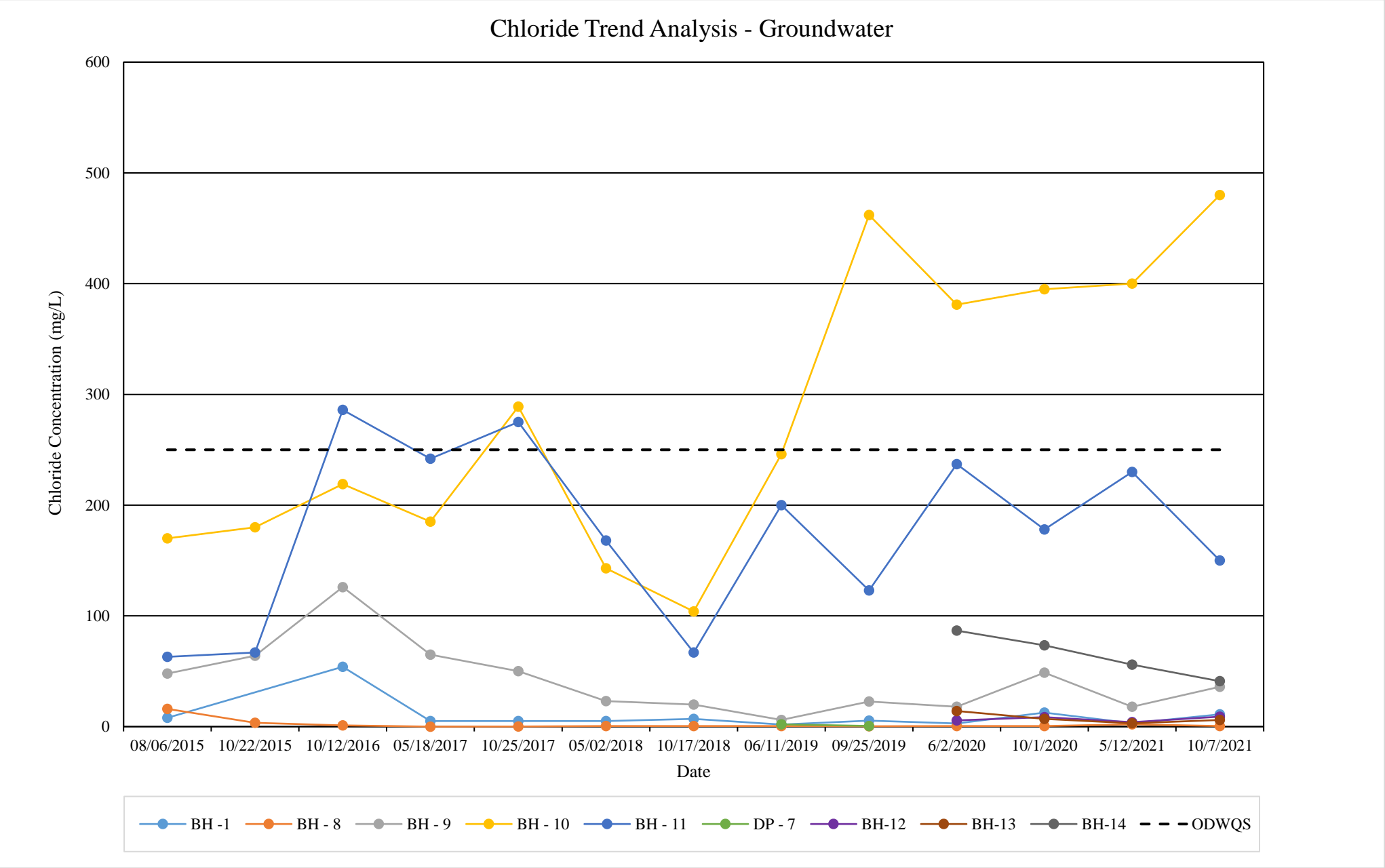
-- End of Analytical Report --



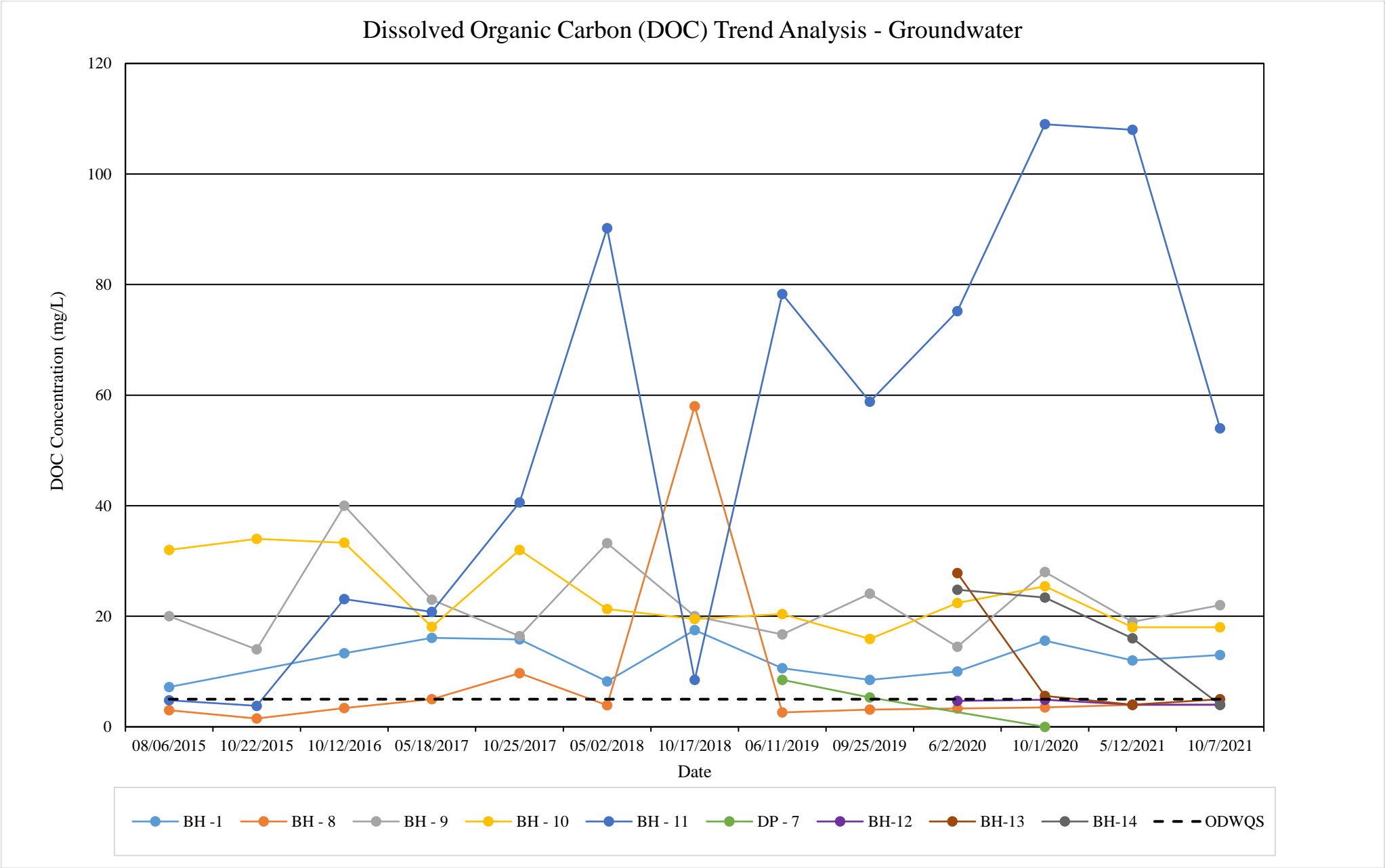
**APPENDIX VI**  
**Groundwater Trend Analysis**

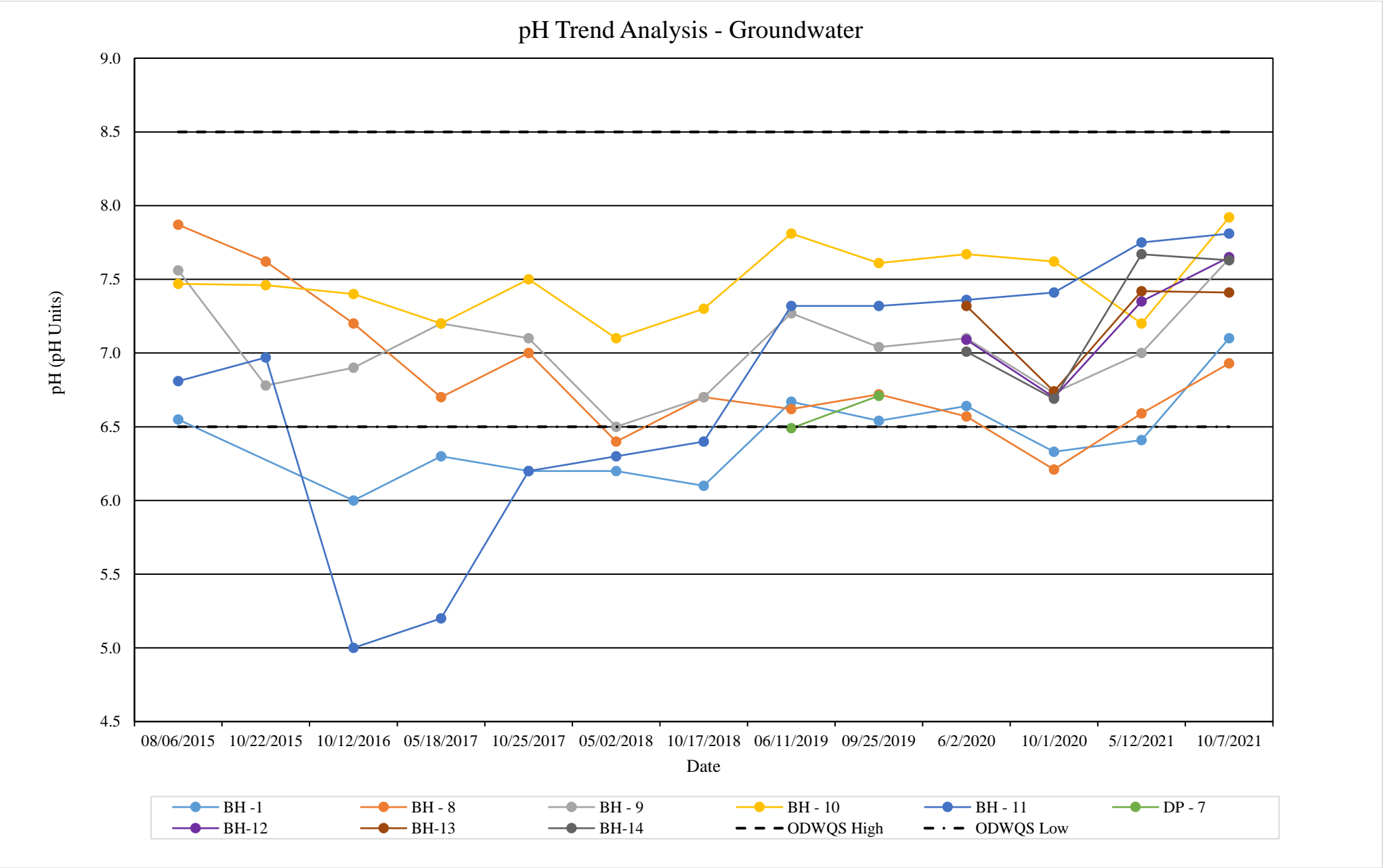


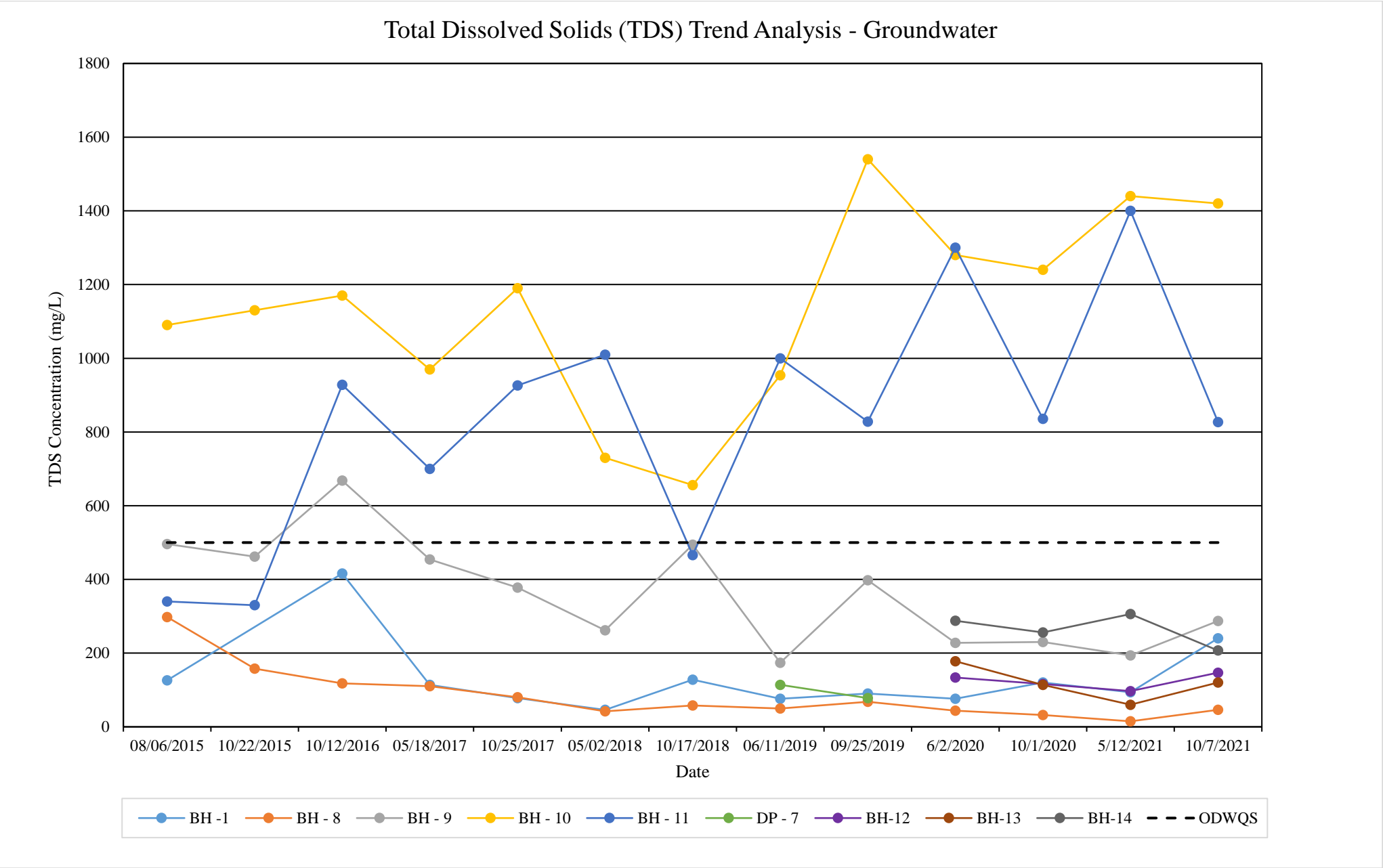


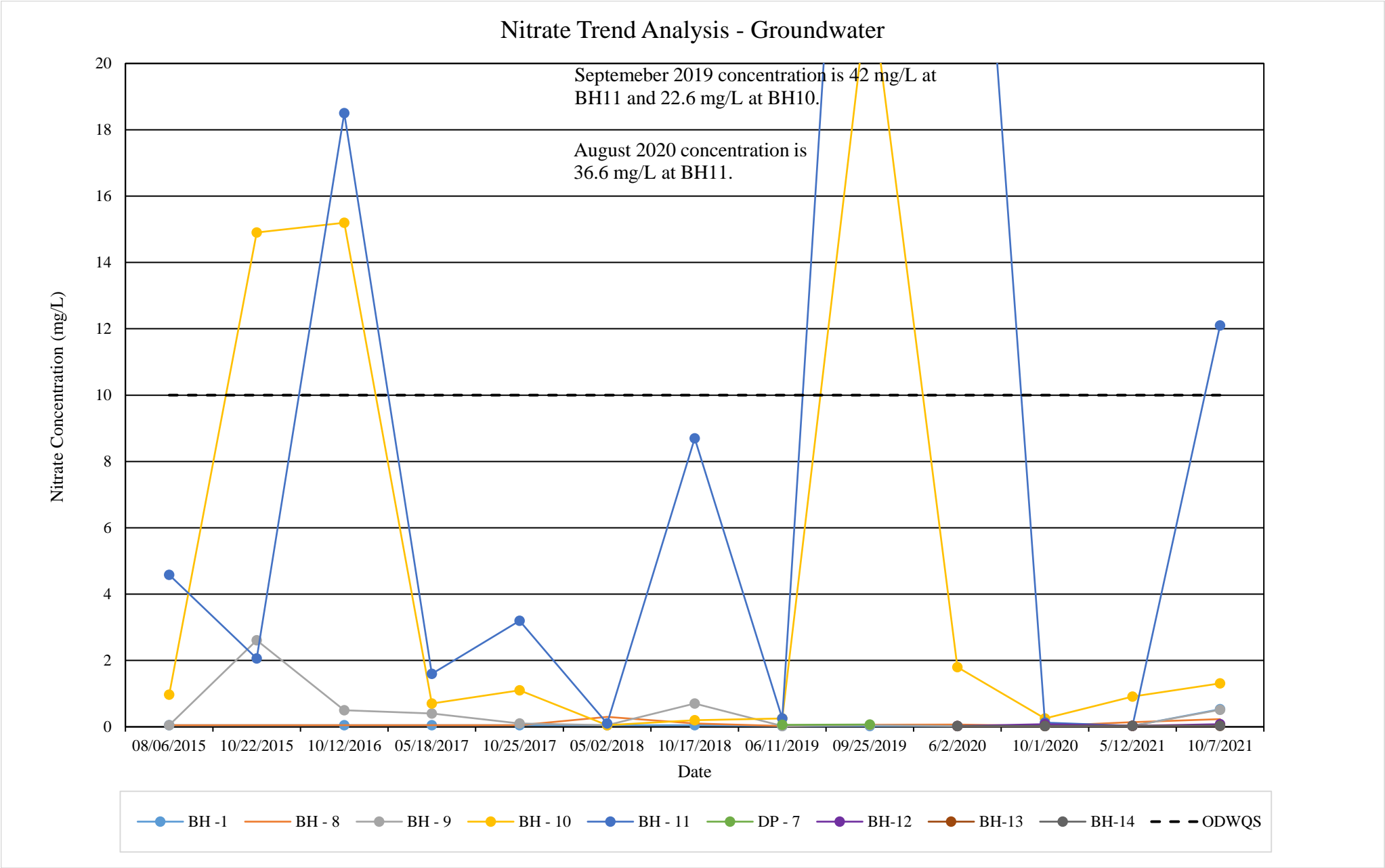


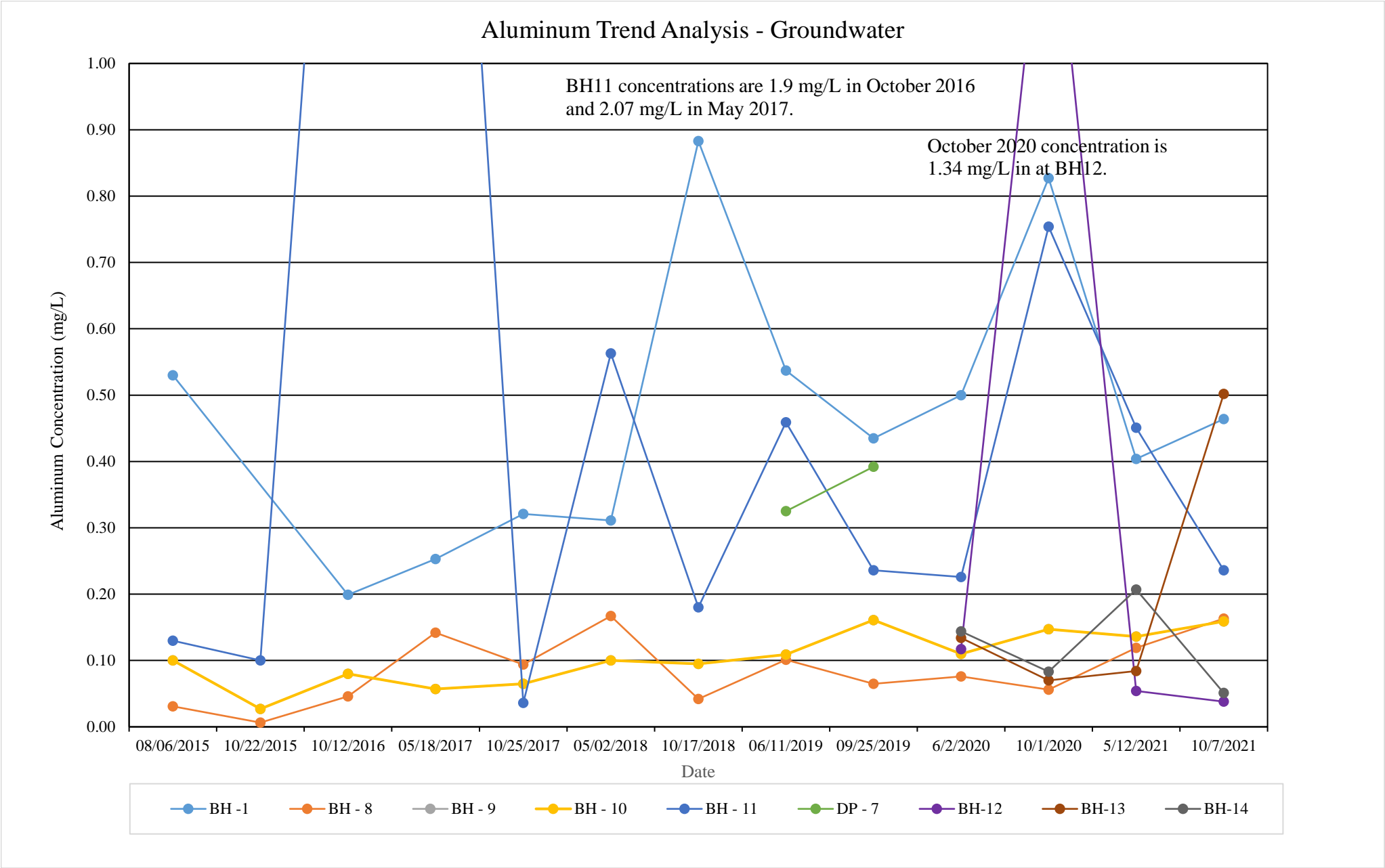


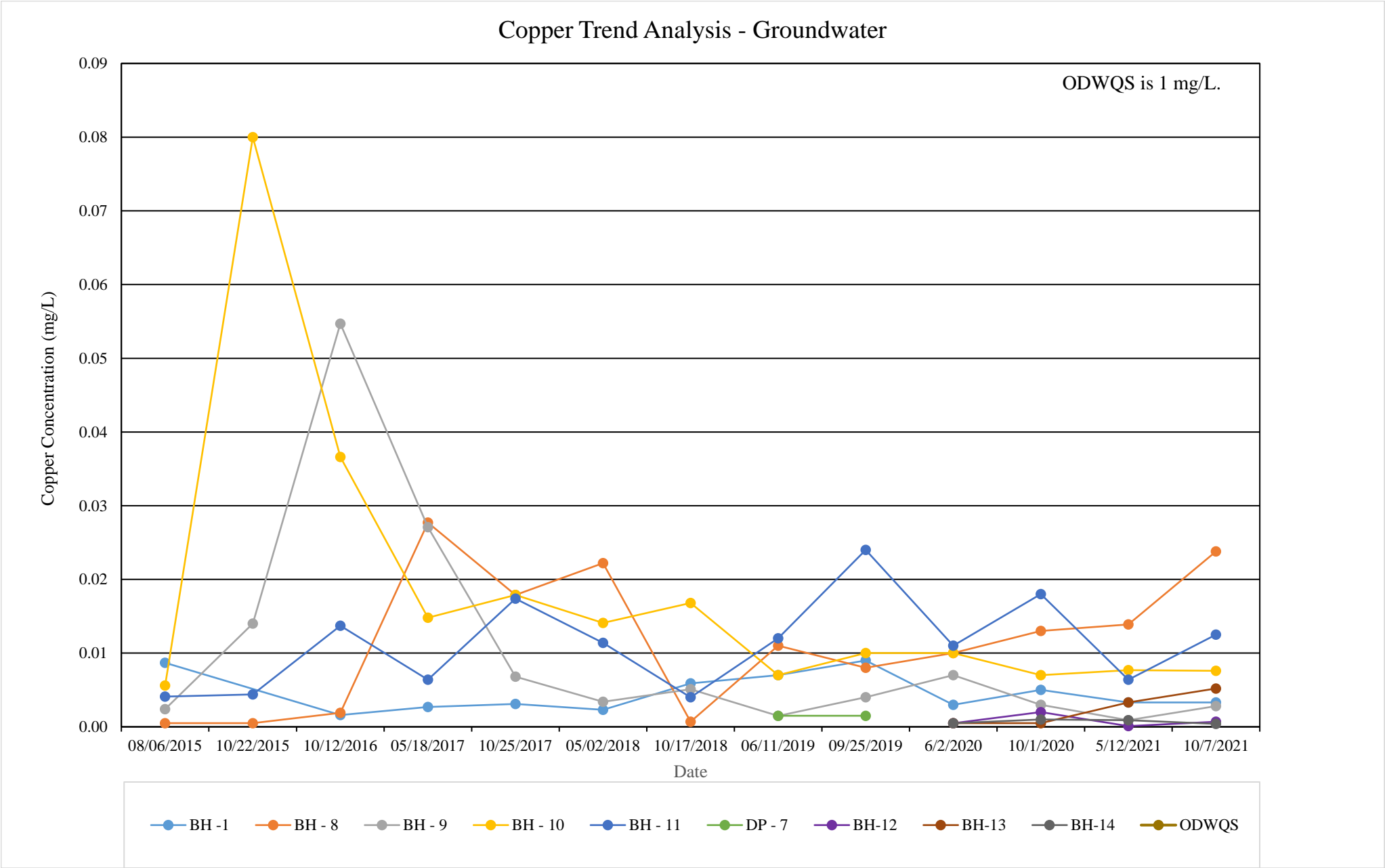






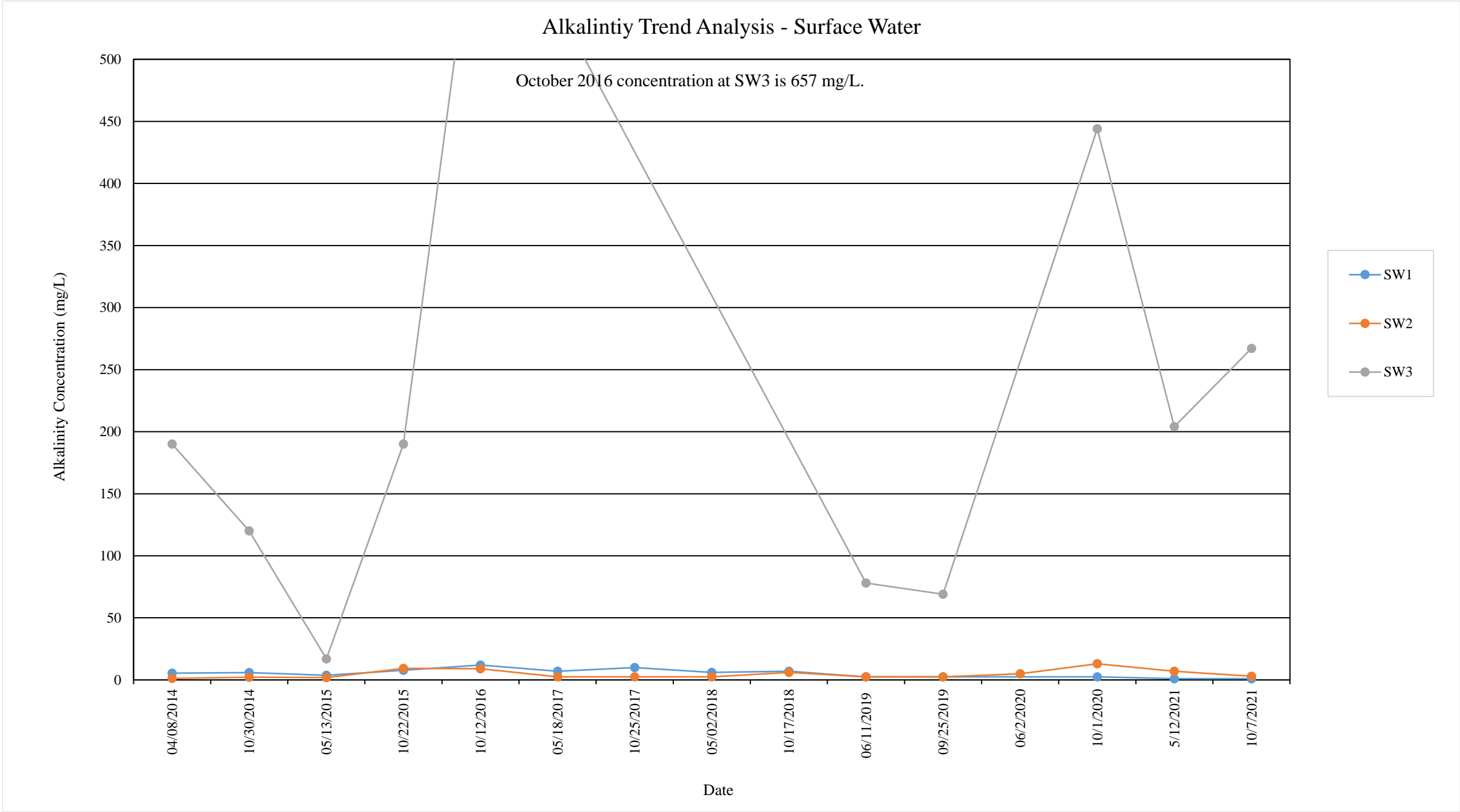


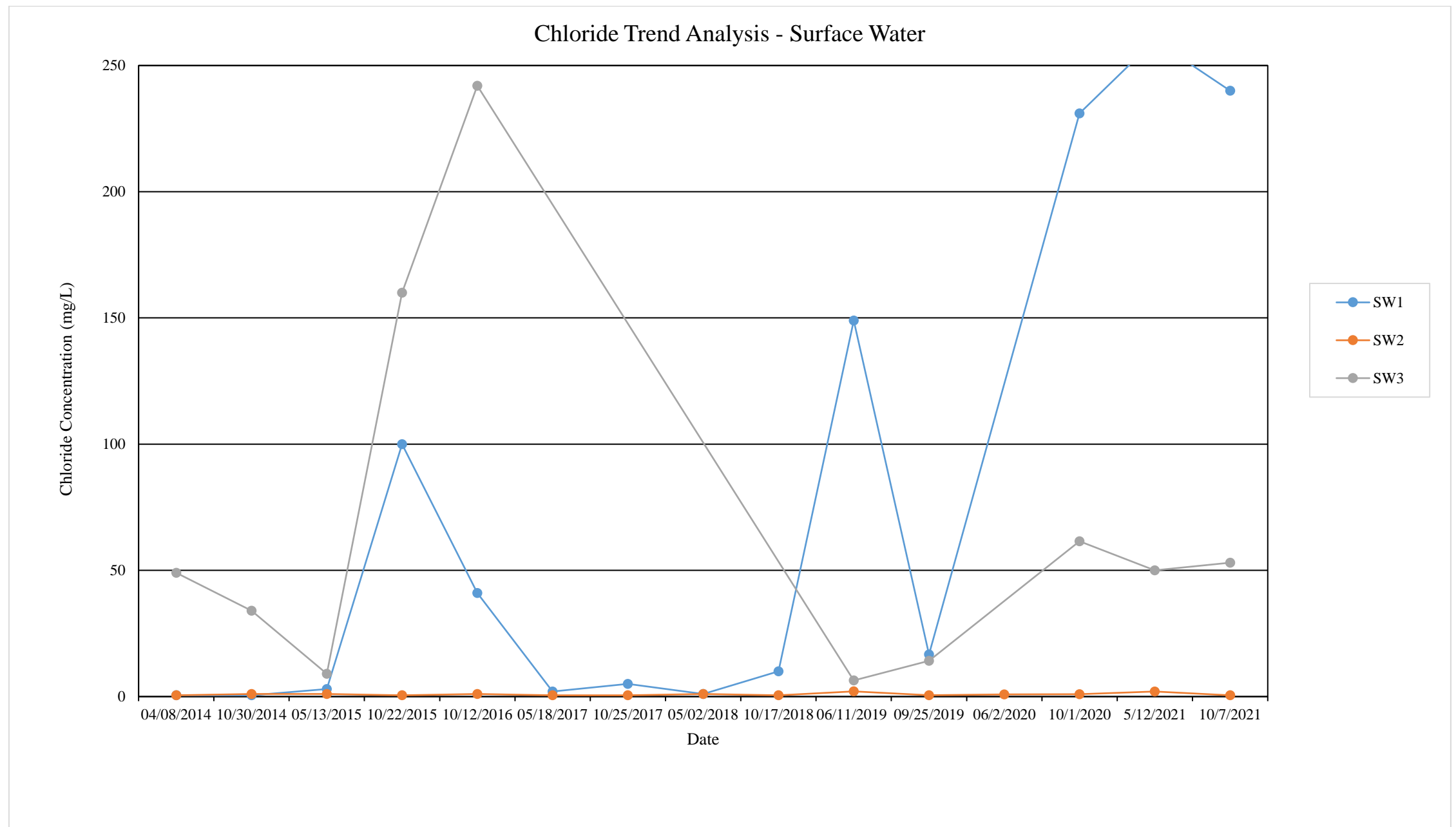


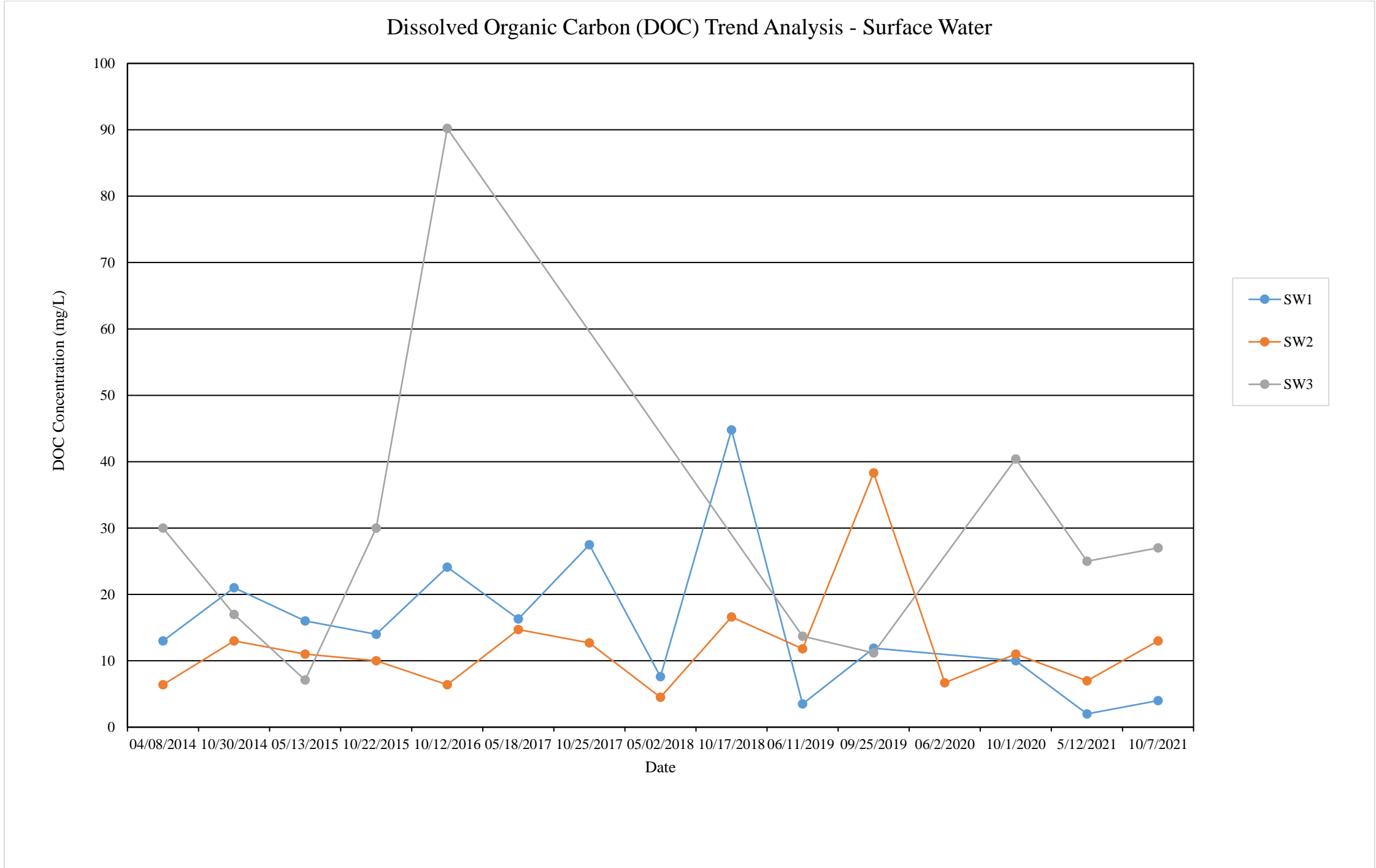


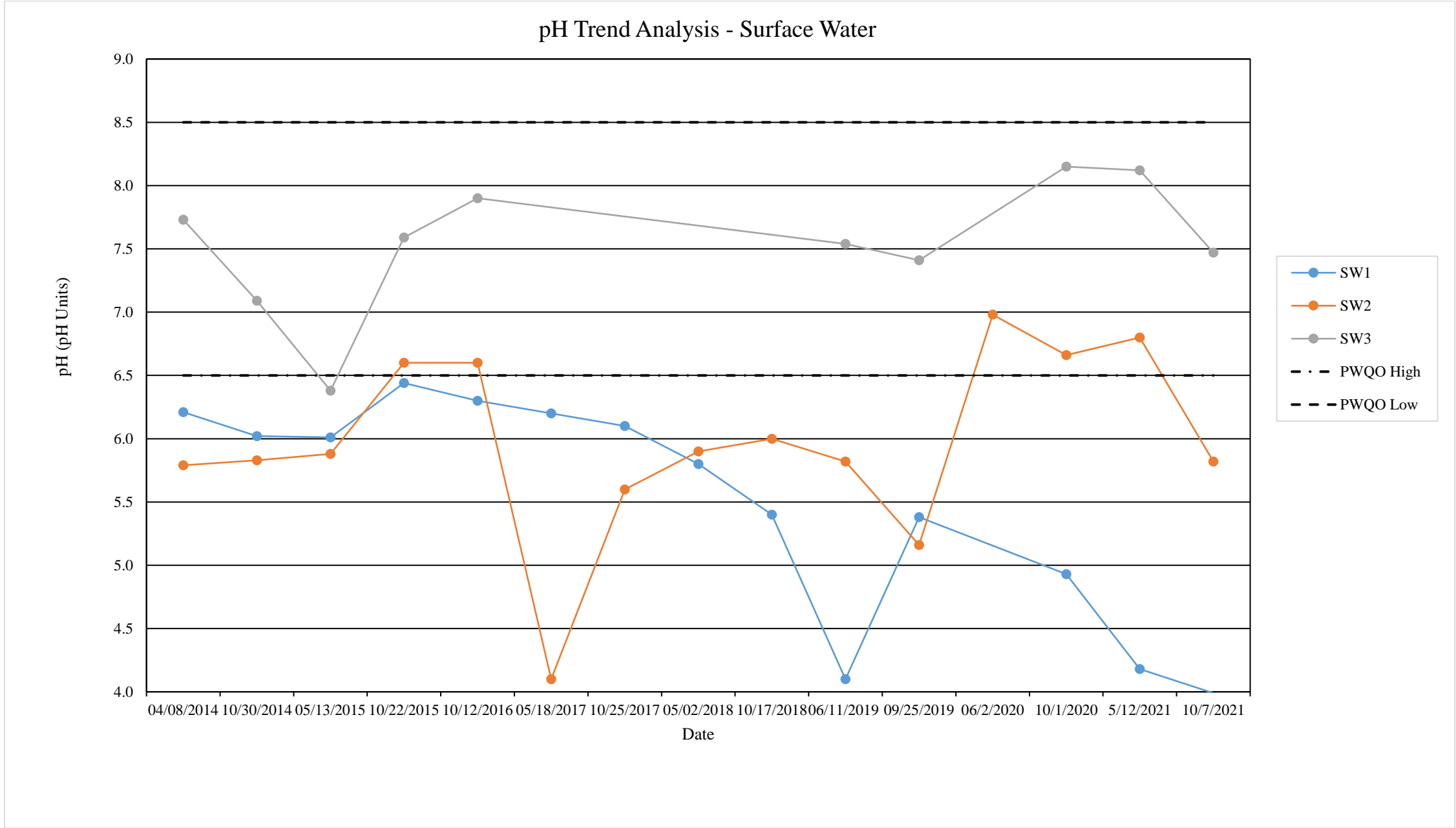


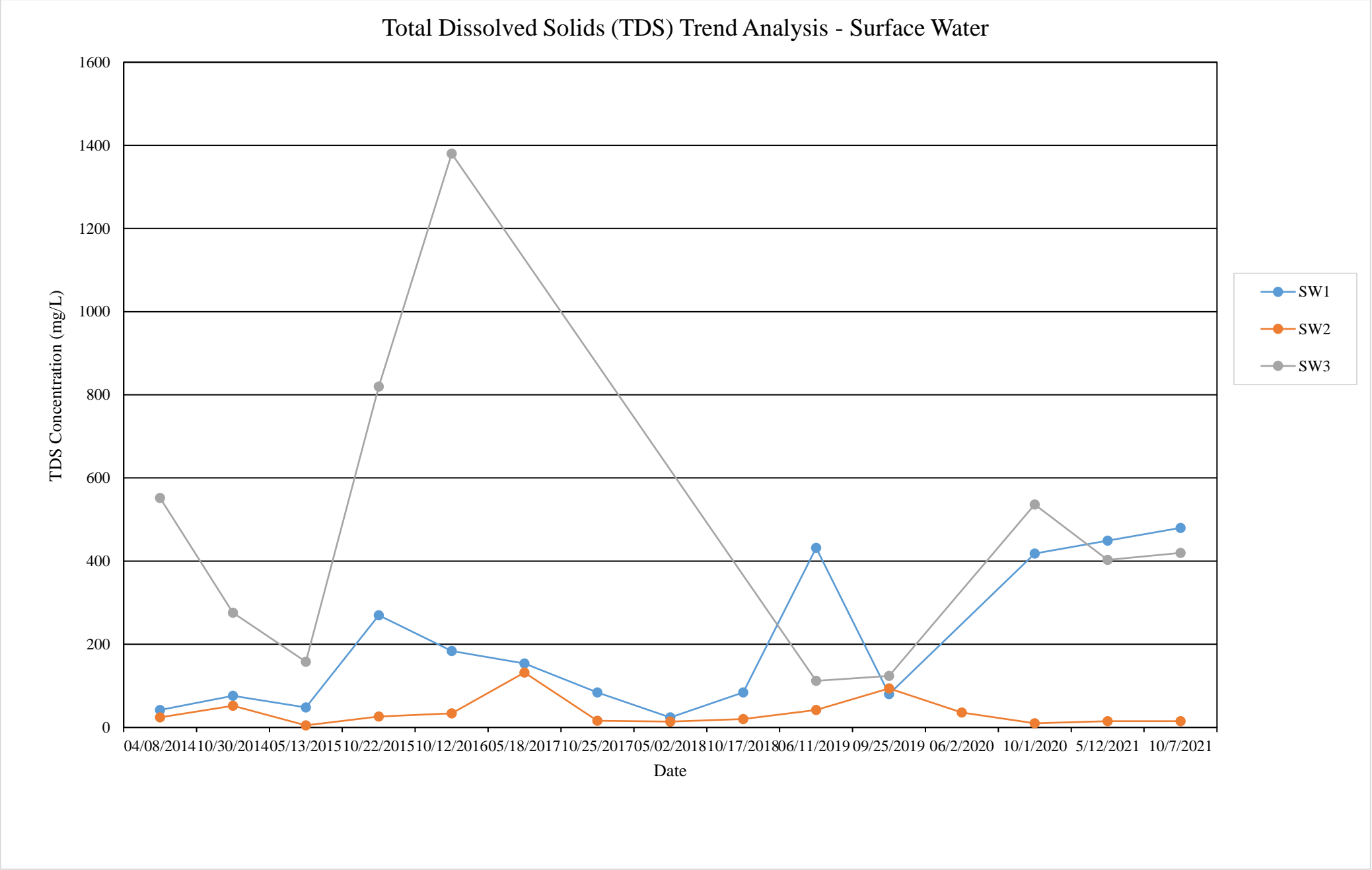
**APPENDIX VII**  
**Surface Water Trend Analysis**



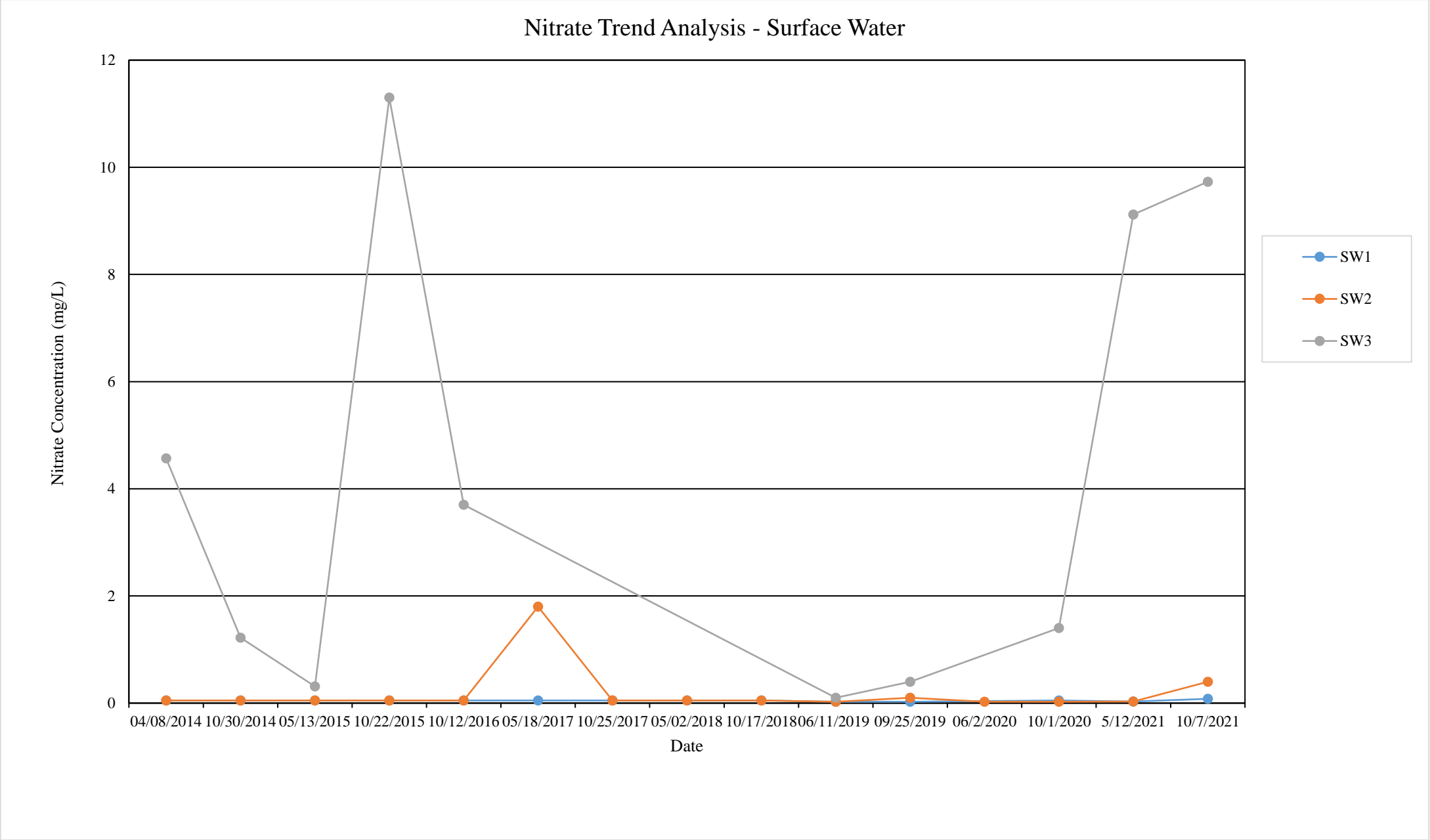


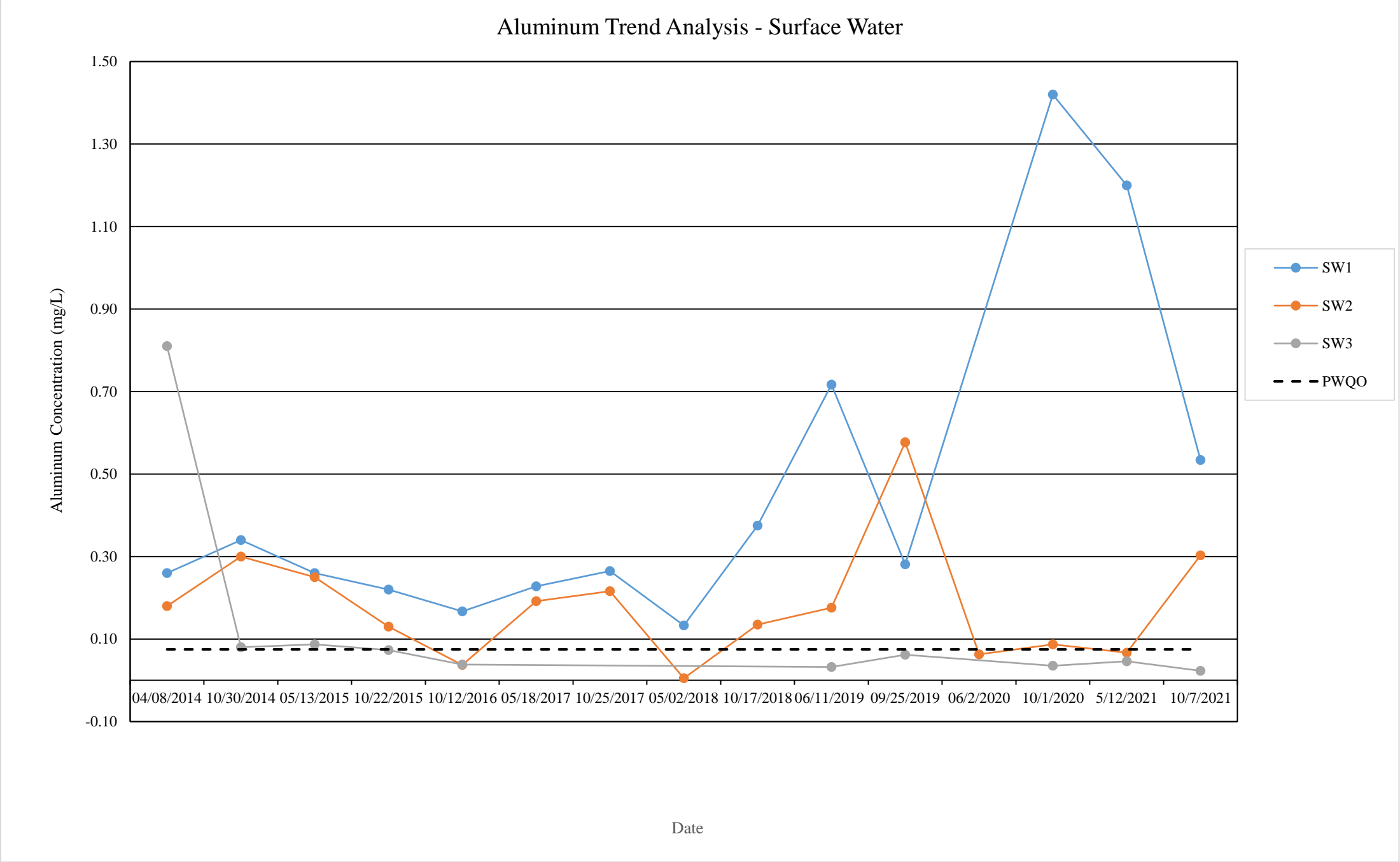


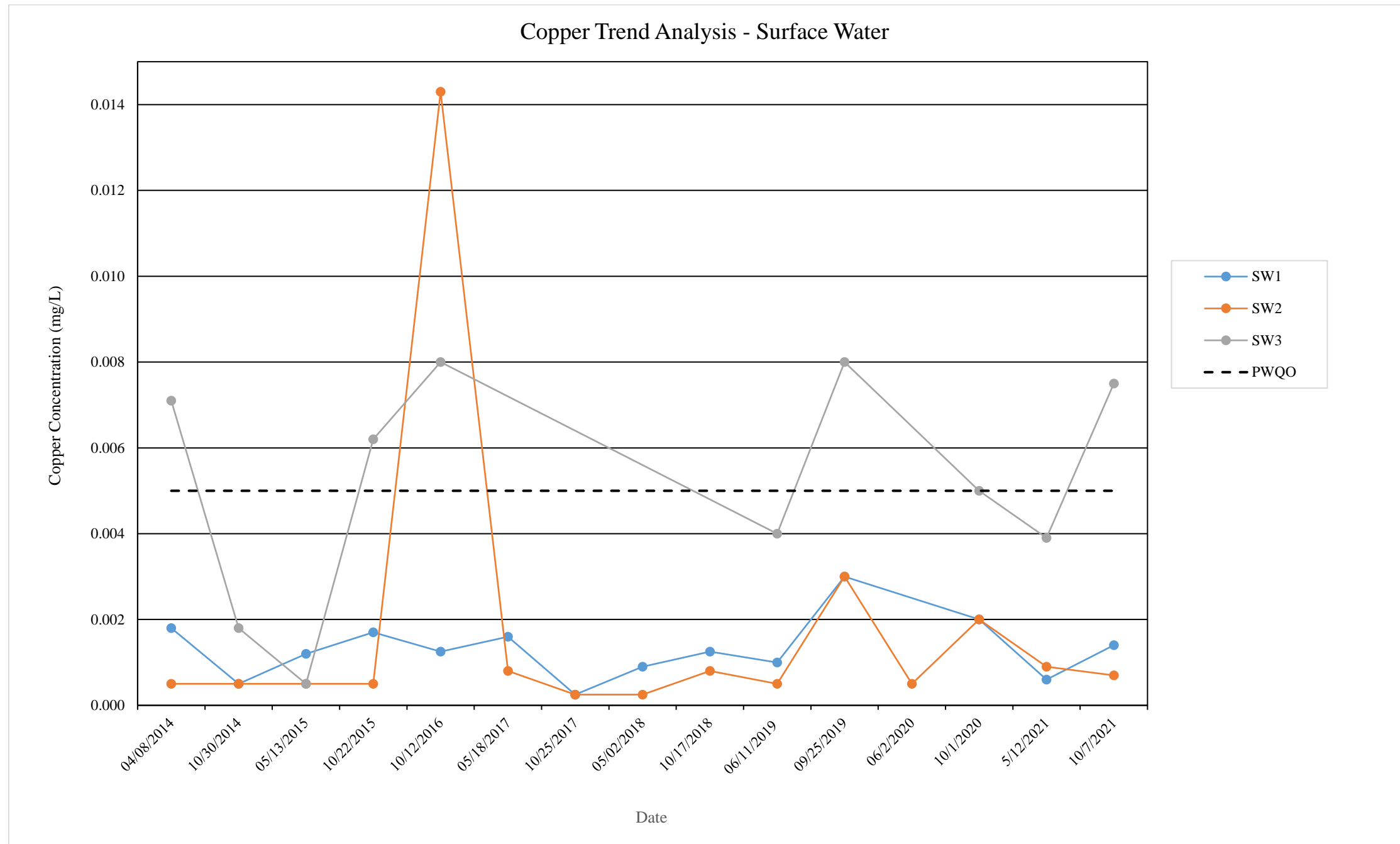












**APPENDIX VIII**  
**Monitoring and Screening Checklist**

## Appendix D-Monitoring and Screening Checklist

### General Information and Instructions

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

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

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

**Definition of Groundwater CEP:**

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

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

**Definition of Surface water CEP:**

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

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

<b>Monitoring Report and Site Information</b>	
<b>Waste Disposal Site Name</b>	Croft Waste Disposal Site
<b>Location (e.g. street address, lot, concession)</b>	Lot 26, Concession 11, within the Municipality of Magnetawan, District of Parry Sound, Ontario
<b>GPS Location (taken within the property boundary at front gate/ front entry)</b>	Universal Transverse Mercator (UTM) coordinates Zone 17U, 593659 meters (m) Easting and 5058398 m Northing (North American Datum 1983)
<b>Municipality</b>	Magnetawan
<b>Client and/or Site Owner</b>	The Corporation of the Municipality of Magnetawan
<b>Monitoring Period (Year)</b>	2021
This Monitoring Report is being submitted under the following:	
<b>Certificate of Approval No.:</b>	A7034002
<b>Director's Order No.:</b>	
<b>Provincial Officer's Order No.:</b>	
<b>Other:</b>	

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



## Groundwater WDS Verification:

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

### Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, list exceptions (Type Here):
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):	<input checked="" type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Not Applicable	If no, list exceptions below or attach information.
Groundwater Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
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>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	If no, list exceptions below or attach additional information.
<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 checked="" type="radio"/> Yes <input type="radio"/> No	If no, specify (Type Here):

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

<b>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.</b>	<input checked="" type="radio"/> Yes  <input type="radio"/> No	No formal CAZ registered for the site, but all wells reflective of property boundary conditions currently meet the applicable criteria.	
<b>6) The site meets compliance and assessment criteria.</b>	<input checked="" type="radio"/> Yes  <input type="radio"/> No	If no, list and explain exceptions (Type Here):	
<b>7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.</b>	<input checked="" type="radio"/> Yes  <input type="radio"/> No	If no, list exceptions and explain reason for increase/change (Type Here):	
<b>1) Is one or more of the following risk reduction practices in place at the site:</b> <b>(a) There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or</b> <b>(b) There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or</b> <b>(c) The site meets the following two conditions (typically achieved after 15 years or longer of site operation):</b>  <i>i. The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and</i> <i>ii. Seasonal and annual water levels and water quality fluctuations are well understood.</i>	<input checked="" type="radio"/> Yes          <input type="radio"/> No	<b>Note which practice(s):</b>	<input type="checkbox"/> (a)  <input type="checkbox"/> (b)  <input checked="" type="checkbox"/> (c)
<b>9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):</b>	<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):	

## 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:

23-Mar-2022

## Recommendations:

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

☐ No changes to the monitoring program are recommended

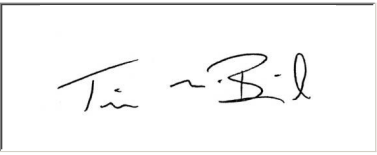


☒ The following change(s) to the monitoring program is/are recommended:

It is recommended that drive point monitoring locations DP7, DP8 and DP9 be removed from the sampling program as these locations have consistently been found to have insufficient volume to sample. It is recommended that these wells should be retained as water level only monitoring locations to supplement the groundwater elevation monitoring for the Site; however, the drive point monitors should be equipped with appropriate caps to ensure representative water level data is obtained.

☒ No Changes to site design and operation are recommended

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

Type Here

<b>Name:</b>	Tim McBride		
<b>Seal:</b>	Add Image		
<b>Signature:</b>		<b>Date:</b>	23-Mar-2022
<b>CEP Contact Information:</b>	Tim McBride		
<b>Company:</b>	Pinchin Ltd.		
<b>Address:</b>	662 Falconbridge Road, Unit 3 Sudbury, Ontario P3A 4S4		
<b>Telephone No.:</b>	705.521.0560 ext 3416	<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

## 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)	Love Lake Unnamed tributary to Ahmic Lake
Distance(s)	500 m north of the Site South of the Site

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

### Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, identify issues (Type Here):
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):	<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not applicable (No C of A, authorizing / control document applies)	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
SW1 and SW3	Dry	7-Oct-2021
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date



<b>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.</b>		<input type="radio"/> Yes <input checked="" type="radio"/> No <input type="radio"/> Not Applicable	
<b>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:</b>		<input type="radio"/> Yes <input type="radio"/> No <input checked="" type="radio"/> Not Applicable	If no, specify below or provide details in an attachment.
<b>Surface Water 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 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):</b>	<input checked="" type="radio"/> Yes <input type="radio"/> No	If no, specify (Type Here):	

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

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

☐ Yes

☒ No

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

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
See section 4.6		
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	Elevated background conditions

<p>7) <b>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>8) <b>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>9) <b>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>

## 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:

23-Mar-2022

## Recommendations:

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

<p><input checked="" type="radio"/> No Changes to the monitoring program are recommended</p> <p><input type="radio"/> The following change(s) to the monitoring program is/are recommended:</p>	
<p><input checked="" type="radio"/> No changes to the 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>	

<b>CEP Signature</b>		
<b>Relevant Discipline</b>	Hydrogeologist	
<b>Date:</b>	23-Mar-2022	
<b>CEP Contact Information:</b>	Tim McBride	
<b>Company:</b>	Pinchin Ltd.	
<b>Address:</b>	9662 Falconbridge Road, Unit 3 Sudbury, Ontario P3A 4S4	
<b>Telephone No.:</b>	705.521.0560 ext 3416	
<b>Fax No. :</b>	705.521.1309	
<b>E-mail Address:</b>	tmcbride@pinchin.com	
<b>Save As</b>		<b>Print Form</b>