2020 Annual Monitoring Report

Croft Waste Disposal Site
Magnetawan, Ontario

Prepared for:

Municipality of Magnetawan
4304 Highway 520
Magnetawan, ON P0A 1P0

February 2, 2021

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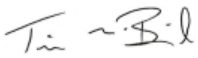

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by the Corporation of the Municipality of Magnetawan (Client) to prepare the 2020 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 2020 monitoring data and was completed to constitute the 2020 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 2020. 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 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.$_{ESA}$

Pinchin Ltd.

957 Cambrian Heights Drive, Suite #203

Sudbury, ON P3C 5S5

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 25th and 26th Side Road approximately 1 km north of the intersection of 25th and 26th 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^3) 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); and
- Report entitled "*Aquifer Instrumentation Memo, Croft Waste Disposal Site, Magnetawan, Ontario"* completed by Pinchin Ltd. for the Municipality of Magnetawan dated June 16, 2020.

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 2020 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 Pinchin Monitoring Report 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 our 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 our 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. Our 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 our 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 our report;
- Our 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 our contract for these services. It should be noted that other compounds or materials not tested for may be present in the Site environment;
- The conclusions of this report are based, in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the Site in locations not specifically investigated. Should such an event occur, Pinchin must be notified in order that we may determine if modifications to our conclusions are necessary;
- The utilization of Pinchin's services during future monitoring at the Site will allow Pinchin to observe compliance with the conclusions and recommendations contained herein. It will also provide for changes as necessary to suit field conditions as they are encountered; and
- Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, 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 2020 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 2020 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 (1.99 metres below ground surface (mbgs)) recorded at BH8, located northwest of the Site, during the spring 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 Pinchin Annual Monitoring Report 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 2018 and 2019 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 2019 for chloride, sodium, boron, nitrate, 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 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 2018 and 2019 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 2020 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 2020 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 2. 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 2020 sampling events, with the exception of DP7 and DP8 in the spring and fall due to the wells having insufficient volume to sample at the time of the monitoring events.

Additionally, DP9 could not be located during the spring event and was found to have insufficient volume to sample during the fall event.

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
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 2020 sampling events, with the exception of SW1 and SW3 during the spring event due to dry conditions at the time of sampling. 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 25th and 26th 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 2. 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 – June 2, 2020; and
- Fall – October 1, 2020.

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 parameters temperature, pH, conductivity, oxidation reduction potential (ORP) and dissolved oxygen (DO) were measured.

3.5.2 Surface Water Monitoring Parameters

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

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[tm] 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[TM] 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, AGAT Laboratories (AGAT) in Mississauga, 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 AGAT. 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 2020 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 no 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 25ºC;
- *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.

7.1 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 AGAT 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.

AGAT'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.

3.7 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 (Cm) 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 of "*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 contaminates are regulated under the Ontario Regulation 169/03 Drinking Water Standards:

- Microbiological – Originating from human and animals waste, coliforms and bacteria are common in the environment. Most are harmless however their presence may be indicative of other harmful bacteria in the water. Under the ODWQS, Escherichia coli ("E. Coli"), fecal coliforms and total coliforms must be non-detectable in drinking water;
- Chemical – ODWQS regulates maximum quantities of organic and inorganic chemicals allowed in drinking water. Industrial discharges or agricultural runoff are not necessarily removed by drinking water treatment. Consuming water exhibiting a greater concentration of these chemicals than the ODWQS may cause serious health problems; and
- Radiation – Natural and artificial radio nuclides are also regulated in the ODWQS. Standards are expressed as maximum allowable concentrations in becquerels per litre ("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 2020 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 pH (low), hardness (low), dissolved organic carbon (DOC), iron, manganese, aluminum, and turbidity were quantified above the recommended levels specified in the ODWQS. 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, turbidity, 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.

Boron (a health-related parameter) was quantified to be in exceedance of the Guideline B-7 criteria during both the spring and fall of 2020 at BH10. This concentration is consistent with the historical monitoring record at this location.

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 2020 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 2020 at BH11. This concentration is consistent with the historical monitoring record at this location.

Nitrate (a health-related parameter) was quantified, in the spring, to be in exceedance of both the ODWQS and the Guideline B-7 at BH11, but returned to levels within the standards during the fall event. Concentrations of nitrate observed at this location fluctuate considerably throughout the historical monitoring record; therefore, these concentrations should be confirmed during the next sampling event.

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. Elevated pH (low), hardness (low), alkalinity (low) and turbidity concentrations were identified at BH8 that exceeded the ODWQS. Concentrations of alkalinity (low) quantified during the spring and fall of 2020 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

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 2020 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 2020 monitoring events.

Drive Point Monitor DP9

Drive point monitoring location DP9, located east of the Site, could not be located during the spring 2020 monitoring event, and was observed to have insufficient groundwater volume to sample at the time of sampling during the fall 2020 monitoring event.

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. Elevated iron, manganese, turbidity, and aluminum 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, elevated 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. Elevated hardness (high), DOC, iron, manganese, turbidity, 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, 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.

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 2020 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 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 were significantly higher than the historical record at these locations and were interpreted to be anomalous. During the 2020 monitoring period, the chloride and 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 June 2 and October 1, 2020 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, with the exception of wells BH10 and BH11 which were observed to have higher conductivity measurements which is an indicator of stagnant anaerobic conditions and possibly impact from leachate generated from the landfill.

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 2020, with the exceptions of SW1 and SW3 during the spring due to dry conditions at the time of sampling. 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 25th and 26th Side Road, is considered representative of background water quality conditions and is characterized by naturally elevated concentrations of pH (low), phenols, iron, 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 2020 monitoring events and an additional CWQG/APV exceedance was quantified for chloride during the fall event. These zinc and chloride concentrations have only previously been quantified during the 2019 events and were therefore interpreted to be anomalous. This interpretation should be confirmed during the next sampling event. 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 2020 for potassium, phenols, iron, total phosphorous, cobalt, boron, 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 potassium, phenols, 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. Additional exceedances were quantified at SW2 during 2020 for silver and cadmium which exceeded the PWQO, APV and CWQG standards; these concentrations are interpreted to be anomalous and should be confirmed during the next monitoring event.

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 June 2 and October 1, 2020, 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 2020 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 June 2, 2020, the depth to groundwater was observed to range from 0.17 metres above the ground surface at BH10 to 2.06 mbgs at BH13. During the fall monitoring event on October 1, 2020, the depth to groundwater was observed to range from 0.0 mbgs at BH10 to 1.99 mbgs at BH8.

Accurate triangulation of the water table elevations was undertaken for the 2020 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 3 and 4, respectively. The presentation of the groundwater contours and the associated inferred groundwater flow direction for the 2020 sampling events, as illustrated on Figures 3 and 4, 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 2020 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 2020 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 2020 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 2020 are provided in Tables 17 and 18 for groundwater and surface water, respectively.

The following table summarizes the duplicate pairs for 2020:

Sampling Event	Duplicate Sample ID	Original Sample ID
Spring	GW DUP	BH10
	SW DUP	SW2
Fall	GW DUP	BH10
	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 RPDs met the corresponding performance standard, with the exception of turbidity for the spring groundwater duplicate and orthophosphate and bismuth for 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 (AGAT) 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 AGAT 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 June 2 and October 1, 2020, with the exception of DP7 and DP8 in the spring and fall due to the insufficient sample volume at the time of sampling and DP9 during the spring and fall as the drive point monitor could not be located during the spring and had insufficient volume to sample during the fall. 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 June 2 and October 1, 2020, with the exception of SW1 and SW3 during the spring event due to dry conditions at the time of sampling. 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 June 2, 2020, the depth to groundwater was observed to range from 0.17 metres above the ground surface at BH10 to 2.06 mbgs at BH13. During the fall monitoring event on October 1, 2020, the depth to groundwater was observed to range from 0.0 mbgs at BH10 to 1.99 mbgs at BH8. 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, BH13 and BH14;
    - Hardness (low) at BH1 and BH8;
    - Chloride at BH10;
    - DOC at BH1, BH9, BH10, BH11, BH13 and BH14;

- Manganese at BH1, BH9, BH10, BH11, BH12, BH13 and BH14;
- Turbidity at all locations;
- Iron at BH1, BH9, BH12, BH13 and BH14;
- Aluminum at BH1, BH9, BH11, BH12, BH13 and BH14;
- Alkalinity (high) at BH10;
- Alkalinity (low) at BH8;
- TDS at BH10 and 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;
  - Nitrate at BH11;
  - Chloride at BH10 and BH11;
  - Sodium at BH10 and BH11;
  - Boron at BH10 and BH11;
  - Alkalinity (low) at BH8; and
  - Alkalinity (high) at BH10 and BH11.
- The current 2020 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;
  - Chloride at SW1;
  - Potassium at all locations;
  - Phenols at all locations;
  - Iron at all locations;

- Aluminum at SW1 and SW2;
- Cobalt at all SW1 and SW3;
- Total phosphorous at SW3;
- Zinc at SW1;
- Silver at SW2;
- Cadmium at SW2;
- 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 nitrate which is a health-related parameter. The elevated concentrations of nitrate 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 2020 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 2021 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.

8.0 MONITORING AND SCREENING CHECKLIST

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

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

APPENDIX I
Figures

SCALE

0 1000 2000 3000 4000 5000

Meters

1:160,000

NOTES, REFERENCES AND SOURCES

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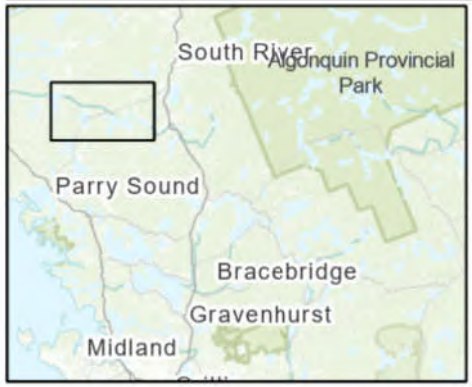
Esri,NASA,NGA,USGS,Province of Ontario,Esri,HERE,Garmin, FAO,NOAA,USGS,EPA,NPS,NRCan,Parks Canada,Province of Ontario,Esri,HERE,Garmin,METI/NASA,USGS,EPA,NPS, USDA,NRCan,Parks Canada,Esri,USGS



PROJECT NAME

2020 ANNUAL MONITORING REPORT - CROFT WASTE DISPOSAL SITE

CLIENT

MUNICIPALITY OF MAGNETEWAN

PINCHIN

Municipality of Magnetawan

TITLE	FIGURE
KEY MAP	1

PROJECT	225335.003
DATE	JANUARY 2021
PREPARED	PKM
REVIEWED	TIM

PINCHIN

Municipality of Magnetawan

LEGEND

- Monitoring Well / Drive Point
- Surface Water Monitoring
- 30m Buffer
- Proposed Limit of Waste
- UAV Survey Area

SCALE

0 30 60 90 120 150

Meters

1:3,000

NOTES, REFERENCES AND SOURCES

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2) Do not scale drawing.
3) This drawing may have been reduced. All scale notations indicated are based on a 11"x17" format drawings.
4) Coordinate system: NAD 1983 CSRS UTM Zone 17N

Sources:

Province of Ontario, Esri, HERE, Garmin, FAO, METI/NASA, USGS, EPA, NPS, NRCan Parks Canada, Esri, CGIAR, USGS, Archipelago, GeoEye, Maxar, Microsoft

KEY PLAN

PROJECT LOCATION

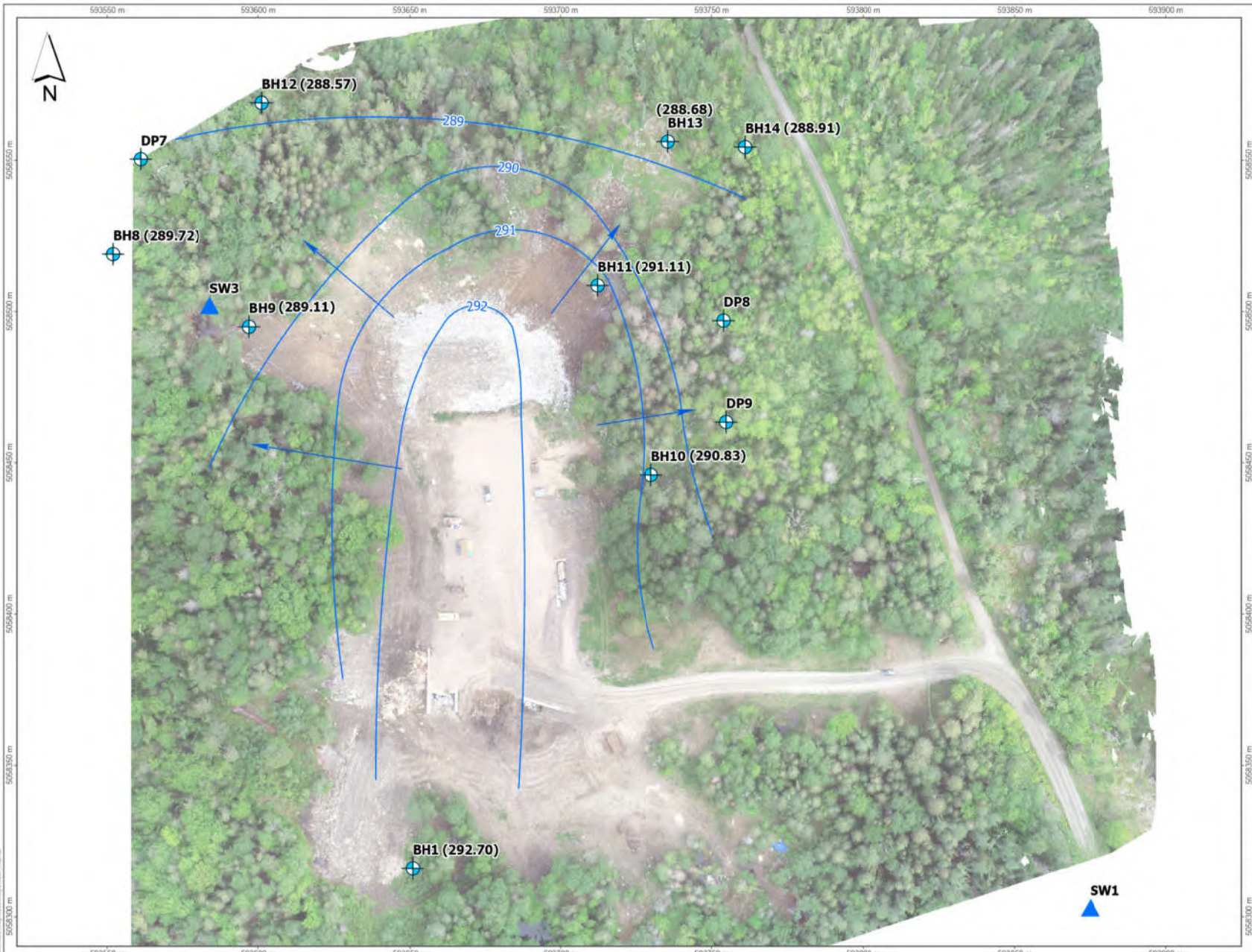
CROFT WASTE DISPOSAL SITE

CLIENT

MUNICIPALITY OF MAGNETEWAN

TITLE	FIGURE
SITE PLAN	2

PROJECT	225335.003
DATE	JANUARY 2021
PREPARED PKM	REVIEWED TIM



PINCHIN

Municipality of Magnetawan

LEGEND

- Boreholes
- Surface Water Monitoring
- Groundwater Contour
- Groundwater flow direction

SCALE

0 10 20 30 40 50

Meters

1:1,200

NOTES, REFERENCES AND SOURCES

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3) This drawing may have been reduced. All scale notations indicated are based on a 11"x17" format drawings.
4) Coordinate system: NAD 1983 CSRS UTM Zone 17N

Sources:
Esri,NASA,NGA,USGS,ProvinceofOntario,Esri,HERE,Garmin,FAO,METI/NASA,USGS,EPA,NPS,NRCan,ParksCanada

KEY PLAN

PROJECT LOCATION

CROFT WASTE DISPOSAL SITE

CLIENT

MUNICIPALITY OF MAGNETEWAN

TITLE	FIGURE
INFERRED GROUNDWATER CONTOURS (SPRING 2020)	3

PROJECT	225335.003
DATE	JANUARY 2021
PREPARED PKM	REVIEWED TIM

PINCHIN

Municipality of Magnetawan

LEGEND

- Boreholes
- Surface Water Monitoring
- Groundwater Contours
- Groundwater flow direction

SCALE

0 10 20 30 40 50
Meters
1:1,200

NOTES, REFERENCES AND SOURCES

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2) Do not scale drawing.
3) This drawing may have been reduced. All scale notations indicated are based on a 11"x17" format drawings.
4) Coordinate system: NAD 1983 CSRS UTM Zone 17N

Sources:

Province of Ontario, Esri, HERE, Garmin, FAO, METI/NASA, USGS, EPA, NPS, NRCan, Parks Canada, Esri, CGIAR, USGS

KEY PLAN

PROJECT LOCATION

CROFT WASTE DISPOSAL SITE

CLIENT

MUNICIPALITY OF MAGNETEWAN

TITLE	FIGURE
INFERRED GROUNDWATER CONTOURS (FALL 2020)	4
PROJECT	225335.003
DATE	JANUARY 2021
PREPARED PKM	REVIEWED TIM

APPENDIX II

Borehole Logs

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 (ft / m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
0–20 / 0–6		***Gneissic Bedrock*** Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineral, ization, massive		Riser; Bentonite; Silica Sand; Screen	100	RC1		
					100	RC2		
					100	RC3		
					100	RC4		
20 / 6		End of Borehole	-6.10					

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

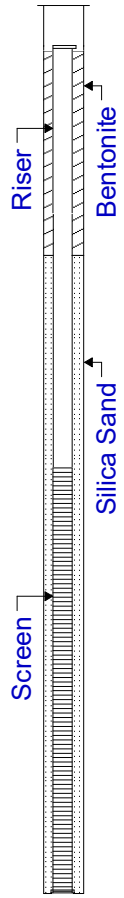
Project #: 225335.005 **Logged By:** TG

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 (ft / m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
0–20 / 0–6		***Gneissic Bedrock*** Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineral, ization, massive			100	RC1		
					100	RC2		
					100	RC3		
					100	RC4		
20 / 6		End of Borehole	-6.10					

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 (ft / m)	Symbol	Description	Elevation (m)	Monitoring Well Details	Recovery (%)	Sample ID	Soil Vapour Concentration (ppm) CGI/PID	Laboratory Analysis
0 / 0		Ground Surface	0.00					
0–20 / 0–6		***Gneissic Bedrock*** Grey to black metamorphic bedrock, some quartzite and biotite with garnet mineral, ization, massive		Riser; Bentonite; Silica Sand; Screen	100	RC1		
					100	RC2		
					100	RC3		
					100	RC4		
20 / 6		End of Borehole	-6.10					

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	17	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.
BH8	8-May-14	291.63	292.47						17	5058519	593552	
	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				
BH9	8-May-14	289.52	290.44						17	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				
BH10	8-May-14	290.87	291.83						17	5058446	593730	
	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				
BH11	8-May-14	290.74	292.61						17	5058508	593716	
	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			290.66				
	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				
DP-7	8-May-14	289.30	289.77						17	5058303	593561	
	30-Oct-14											
	9-Jun-15				1.22			288.55				
	22-Jun-15											
	23-Jun-15											
	6-Aug-15				1.88			287.89				
	22-Oct-15				DRY							
	13-Oct-16				DRY							
	18-May-17				1.73			288.04				
	25-Oct-17				1.64			288.13				
	2-May-18				DRY							
	17-Oct-18				1.51			288.26				
	11-Jun-19			1.21	1.28	1.93	0.07	288.49				
	25-Sep-19			1.13	1.36	1.81	0.23	288.41				
	2-Jun-20					NA						
	1-Oct-20			1.19	1.30	1.60	0.11	288.47				Insufficient volume to sample. No cap.
DP-8	8-May-14	290.54	291.06						17	5058497	593754	
	30-Oct-14											
	9-Jun-15				1.59			289.47				
	22-Jun-15											
	23-Jun-15											
	6-Aug-15				1.89			289.17				
	22-Oct-15				1.96			289.10				
	13-Oct-16				1.70			289.36				
	18-May-17				DRY							
	25-Oct-17				2.06			289.00				
	2-May-18				1.35			289.71				
	17-Oct-18				2.04			289.02				
	11-Jun-19				DRY							
	25-Sep-19			1.23	1.44	2.13	0.21	289.62				
	2-Jun-20					NA						
	1-Oct-20			1.28	1.48	1.60	0.20	289.58				Insufficient volume to sample. No cap.
DP-9	8-May-14	289.97	290.92						17	5058461	593752	
	30-Oct-14											
	9-Jun-15				1.28			289.64				
	22-Jun-15											
	23-Jun-15											
	6-Aug-15				1.58			289.34				
	22-Oct-15				DRY							
	13-Oct-16				1.33			289.59				
	18-May-17				1.11			289.81				
	25-Oct-17				1.18			289.74				
	2-May-18				1.08			289.84				
	17-Oct-18				1.22			289.70				
	11-Jun-19											
	25-Sep-19				Could not locate							
	2-Jun-20											
	1-Oct-20			0.95	1.06	1.57	0.11	289.86				Insufficient volume to sample. No cap.
BH-12	2-Jun-20	288.90	289.87	0.80	1.30	7.21	0.50	288.57	17	5058582	593608	
	1-Oct-20			0.87	1.16	7.30	0.29	288.71				Black, odour.
BH-13	2-Jun-20	290.82	291.57	0.83	2.89	6.80	2.06	288.68	17	5058508	593714	
	1-Oct-20			0.85	2.71	6.79	1.86	288.86				Clear, odour.
BH-14	2-Jun-20	289.42	290.26	0.68	1.35	7.16	0.67	288.91	17	5058558	593733	
	1-Oct-20			0.74	1.30	7.12	0.56	288.96				Grey, odour.

Notes:

mbgs	Meters below ground surface
masl	Meters above sea level
TOC	Top of casing
NA	No data available

TABLE 2
Surface Water Monitoring Location Data
Croft Waste Disposal Site
Magnetawan, Ontario

Surface Water Monitoring Location	*UTM Coordinates*			*Comments*
	Zone	*Easting (m)*	*Northing (m)*	
SW1	17	593875	5058303	Stagnant
SW2	17	593527	5058933	Stagnant
SW3	17	593584	5058502	Stagnant

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**	
pH Lab	pH Units	6.55	NA	**6**	**6.3**	**6.2**	**6.2**	**6.1**	6.67	6.54	6.64	**6.33**	6.5-8.5
Conductivity	uS/cm	92		596	96	97	68	134	57	146	101	189	-
Hardness	mg/L	**34**		185	**16**	**25**	**19**	**33**	**17.2**	**32**	**20.7**	**59**	80-100
Total Dissolved Solids	mg/L	126		416	114	78	46	128	76	90	76	120	500
Alkalinity	mg/L	32		55	**26**	38	**25**	38	**24**	39	36	74	30-500
Chloride	mg/L	7.9		54	5	5	5	7	1.9	5.34	2.8	12.70	250
Sodium	mg/L	1.2		30	5.61	6.32	3.33	5.23	3.9	7.55	4.7	7.32	200
Calcium	mg/L	9.9		63.1	5.42	8.24	6.11	10.5	5.5	9.62	6.4	18.10	-
Magnesium	mg/L	2.3		6.75	0.699	1.12	0.859	1.62	0.86	1.84	1.13	3.36	-
Potassium	mg/L	1.4		2.95	1.16	1.79	1.09	1.5	1.2	1.82	1.3	2.24	-
Sulphate	mg/L	<1		154	5	154	1	19	2.1	10.2	2.4	18.0	500
Ammonia	mg/L	<0.05		0.09	0.12	0.23	0.08	0.08	0.4	0.21	0.2	0.14	-
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	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	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	-
Phenolics	mg/L	<0.001		<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	-
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**	5
Chemical Oxygen Demand	mg/L	76		62	108	63	27	74	28	31	32	<5	-
Iron	mg/L	**8.5**		**16.7**	**1.49**	**4.94**	**2.29**	**8.76**	**4.35**	**7.32**	**5.48**	**13.90**	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**	0.05
Phosphorus	mg/L	0.7		0.1	0.8	0.29	0.06	0.27	0.22	0.06	0.02	0.06	-
Orthophosphate	mg/L										<0.10		-
Turbidity	NTU	**60**		**94.1**	**507**	**158**	**22.9**	**118**	**58.4**	**44.2**	**22.4**	**8.1**	5
Total Suspended Solids	mg/L	140		142	822	422	56	181	150	61	37	27	-
BOD	mg/L	<2		2	<20	6	<2	3	<5	<5	<5	3.00	-
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	-
Aluminum	mg/L	**0.53**		**0.199**	**0.253**	**0.321**	**0.311**	**0.883**	**0.537**	**0.44**	**0.50**	**0.83**	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	0.006
Arsenic	mg/L	<0.001		<0.001	<0.001	0.001	0.001	0.004	<0.003	<0.003	<0.001	0.007	0.010
Barium	mg/L	0.033		0.192	0.025	0.032	0.013	0.045	0.024	0.04	0.023	0.06	1
Beryllium	mg/L	<0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	-
Bismuth	mg/L	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	-
Boron	mg/L	<0.01		0.202	0.014	0.015	0.025	0.026	0.017	0.03	0.014	0.05	5
Cadmium	mg/L	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	0.005
Chromium	mg/L	<0.005		0.003	<0.001	0.001	<0.001	0.002	<0.003	<0.003	<0.002	0.003	0.05
Cobalt	mg/L	0.031		0.0686	0.0071	0.0087	0.0044	0.0105	0.005	0.01	0.005	0.02	-
Copper	mg/L	0.0087		0.0016	0.0027	0.0031	0.0023	0.0059	0.007	0.01	0.003	0.01	1
Molybdenum	mg/L	0.0005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	-
Nickel	mg/L	0.0019		0.004	<0.001	0.001	<0.001	0.003	<0.003	<0.003	<0.003	<0.003	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.0002	<0.10	<0.10		<0.10	-
Lead	mg/L	0.00094		0.0002	0.0005	0.0005	0.0002	0.0016	0.001	0.002	0.0008	0.002	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	0.05
Sillicon	mg/L	7.4		5.05	3.13	4.05	2.52	3.6	3.22	5.90	3.43	4.96	-
Tin	mg/L	<0.001		<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.05	<0.002	<0.002	-
Strontium	mg/L	0.06		0.068	0.019	0.048	0.035	0.06	0.031	<0.002	0.033	0.09	-
Titanium	mg/L	0.14		0.009	0.027	0.034	0.025	0.072	0.056	0.08	0.035	0.13	-
Uranium	mg/L	0.002		0.0012	0.0008	0.0007	0.0005	0.0014	<0.002	<0.002	0.001	0.0022	0.02
Vanadium	mg/L	0.0057		0.0071	0.0023	0.0027	0.0023	0.0077	0.004	0.01	0.004	0.01	-
Zinc	mg/L	<0.005		<0.005	<0.005	<0.005	<0.005	0.02	<0.005	0.03	<0.005	<0.005	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	-
pH	pH Units	-	-	-	-	-	-	-	6.4	5.4	5.4	5.9	6.5-8.5
Coductivity	uS/cm	6.55	-	786	-	-	0.08	0.19	78.40	118.50	116.70	143.00	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	145.3	176.5	170.6	98	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.21	1.18	1.15	7.44	-

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**	
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**	6.5-8.5
Conductivity	uS/cm	450	200	124	88	103	68	94	35	70	51	51	-
Hardness	mg/L	190	**62**	**39**	**18**	**20**	**10**	**27**	**9.8**	**22.8**	**13.5**	**18.9**	80-100
Total Dissolved Solids	mg/L	298	158	118	110	80	42	58	50	68	44	32	500
Alkalinity	mg/L	180	86	48	31	34	**18**	**28**	**11**	**23**	**12**	**27**	30-500
Chloride	mg/L	16	3.5	1	<0.001	<0.1	<1	<1	0.5	0.4	0.5	0.4	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	200
Calcium	mg/L	53	17	11.3	5.8	6.28	2.97	7.39	2.9	6.2	4.0	5.4	-
Magnesium	mg/L	15	5.1	2.59	0.926	1.06	0.533	2.1	0.7	1.8	0.9	1.3	-
Potassium	mg/L	12	5.6	3.14	1.42	1.65	0.888	2.02	0.8	1.70	0.8	1.32	-
Sulphate	mg/L	31	8.6	10	0.014	17	12	17	5.1	8.8	6.8	7.1	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	-
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	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	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	-
Phenolics	mg/L	0.0012	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	NA	0.001	<0.001	-
Dissolved Organic Carbon	mg/L	3	1.5	3.4	**5**	**9.7**	3.9	**58**	2.6	3.1	3.3	3.5	5
Chemical Oxygen Demand	mg/L	120	14	127	59	109	54	37	<5	12	8	<5	-
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	0.3
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	0.05
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	-
Orthophosphate	mg/L										<0.10		-
Turbidity	NTU	**4100**	**220**	**900**	**225**	**451**	**195**	**304**	**162**	**192**	**150**	**119**	5
Total Suspended Solids	mg/L	4200	1100	932	272	584	297	234	154	227	198	274	-
BOD	mg/L	2	<2	ND (20)	<2	<20	<2	<2	<5	<5	<5	<2	-
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	-
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	0.1
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	0.006
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	0.010
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	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	-
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	-
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	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	0.005
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	0.05
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	-
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	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	-
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	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.2	<0.10	<0.10		<0.10	-
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	0.01
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	0.05
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	-
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	-
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	-
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	-
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	0.02
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	-
Zinc	mg/L	<0.005	0.0088	0.01	0.088		0.018	0.031	0.017	0.032	0.021	0.031	5
Field Measurements													
Temperature	oC	-	-	-	-	-	-	-	11.3	Partial sample,	7	10.7	-
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	-
Coductivity	uS/cm	368	179	114	-	-	0.1	0.11	43.3	-	42.1	38	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	111	-	105.5	353.4	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	12.4	-	8.74	10.29	-

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

Parameter	Units	08/06/2015	10/22/2015	10/12/2016	05/18/2017	10/25/2017	05/02/218	10/17/2018	06/11/2019	09/25/2019	06/2/2020	10/1/2020	ODWQS
pH Lab	pH Units	7.56	6.78	6.9	7.2	7.1	6.5	6.7	7.27	7.04	7.10	6.73	6.5-8.5
Conductivity	uS/cm	730	750	1050	678	587	523	735	289	694	371	397	-
Hardness	mg/L	**220**	**220**	**240**	**156**	**157**	**147**	**276**	**104**	**235**	**115**	**159**	80-100
Total Dissolved Solids	mg/L	496	462	**668**	454	378	262	494	174	398	228	230	500
Alkalinity	mg/L	210	170	203	187	182	171	200	97	181	101	152	30-500
Chloride	mg/L	48	64	126	65	50	23	20	6.04	22.6	18.0	48.70	250
Sodium	mg/L	50	50	132	61.3	47.7	29.8	23.9	10.8	23.9	10.1	45.8	200
Calcium	mg/L	64	72	81.8	49.9	49.3	44.4	89.4	34.50	76.50	37.40	51.40	-
Magnesium	mg/L	13	11	8.67	7.55	8.34	8.88	12.8	4.41	10.70	5.25	7.42	-
Potassium	mg/L	17	19	24.8	11	10.7	9.75	15	6.08	9.87	4.74	7.17	-
Sulphate	mg/L	75	88	128	75.0	56.0	62.0	180	37.7	95.8	33.4	16.20	500.0
Ammonia	mg/L	2.2	0.37	0.82	0.6	0.71	1.78	2.13	1.04	1.47	0.99	0.96	-
Nitrate as N	mg/L	<0.1	2.61	0.5	0.4	0.1	<0.1	0.7	<0.05	<0.10	<0.05	<0.05	10
Nitrite as N	mg/L	<0.01	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	1
Total Kjeldahl Nitrogen	mg/L	3.5	1.1	2.7	2.3	1.4	2.8	4.2	1.70	2.73	1.79	2.12	-
Phenolics	mg/L	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.002	<0.001	-
Dissolved Organic Carbon	mg/L	**20**	**14**	**40**	**23**	**16.4**	**33.2**	**20**	**16.7**	**24.1**	**14.5**	**28.0**	5
Chemical Oxygen Demand	mg/L	380	81	159	155	16.4	160	169	36	69	68	53	-
Iron	mg/L	**1.9**	**0.71**	<0.1	0.263	**11.4**	**18.7**	**17.7**	**11.1**	**25.1**	**15.6**	**15.9**	0.3
Manganese	mg/L	**1.6**	**1.1**	**1.03**	**1.11**	**1.38**	**2.79**	**5.65**	**1.64**	**4.16**	**1.62**	**1.86**	0.05
Phosphorus	mg/L	12	1.3	0.41	0.58	0.18	0.8	0.72	0.1	0.32	0.1	0.11	-
Orthophosphate	mg/L										<0.10		-
Turbidity	NTU	**38000**	**510**	**758**	**1130**	**281**	**1900**	**2010**	**151**	**196**	**282**	**72.8**	5
Total Suspended Solids	mg/L	55000	1600	1750	1600	394	1660	2770	212	100	283	108	-
BOD	mg/L	<2	<2	ND (30)	12	3	20	<20	<5	<5	<5	9	-
Anion Sum		7.18	7.18	10.3	7.18	6.23	5.37	8.37					-
Cation Sum		7.17	7.16	11.2	6.06	5.5	4.49	6.94					-
Ion Balance	%	0.1	0.1	3.9	-8.4	-6.3	-8.9	-9.3					-
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	-
Aluminum	mg/L	0.1	0.027	0.08	0.057	0.065	**0.1**	0.095	**0.109**	**0.161**	**0.110**	**0.147**	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	0.006
Arsenic	mg/L	0.0011	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.003	<0.003	0.002	0.002	0.010
Barium	mg/L	0.13	0.12	0.178	0.095	0.111	0.062	0.18	0.054	0.114	0.047	0.059	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	-
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	-
Boron	mg/L	0.62	0.68	1.07	0.394	0.31	0.264	0.527	0.259	0.489	0.217	0.384	5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	0.005
Chromium	mg/L	<0.005	<0.005	0.019	0.001	0.001	0.002	0.002	<0.003	<0.003	<0.002	<0.002	0.05
Cobalt	mg/L	0.0015	0.0071	0.0033	0.002	0.0038	0.0044	0.0203	0.011	0.027	0.0118	0.009	-
Copper	mg/L	0.0024	0.014	0.0547	0.0271	0.0068	0.0034	0.0051	<0.003	0.004	0.007	0.003	1
Molybdenum	mg/L	0.0094	0.0076	0.0048	0.0036	0.0027	0.001	0.0014	<0.002	<0.002	<0.002	<0.002	-
Nickel	mg/L	0.025	0.052	0.037	0.015	0.011	0.01	0.01	<0.003	0.008	0.01	0.004	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.2	<0.10	<0.20		<0.10	-
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	0.01
Selenium	mg/L	<0.002	<0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.004	<0.004	<0.001	<0.001	0.05
Sillicon	mg/L	6.1	2.6	3.28	3.53	4.95	3.44	3.77	3.57	5.21	3.06	3.84	-
Tin	mg/L	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	0.267	<0.002	<0.002	-
Strontium	mg/L	0.3	0.24	0.253	0.183	0.235	0.166	0.347	0.121	<0.002	0.110	0.099	-
Titanium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	0.004	<0.002	0.005	-
Uranium	mg/L	0.0025	0.00053	0.0017	0.0029	0.0024	0.0012	0.0024	<0.002	<0.002	<0.0005	<0.0005	0.02
Vanadium	mg/L	0.00088	<0.0005	0.0049	0.0009	0.0009	0.0011	0.0018	<0.002	0.002	<0.002	<0.002	-
Zinc	mg/L	0.0063	0.033	0.027	0.023	0.027	0.034	0.04	0.016	0.047	0.008	0.006	5
Field Measurements													
Temperature	oC	-	-	-	-	-	-	-	10.9	15	9.1	12.69	-
pH	pH Units	6.33	6.52	5.68	6.62	6.65	7.23	7.04	6.82	6.15	5.96	6.39	6.5-8.5
Coductivity	uS/cm	652	562	1014	-	-	0.55	0.87	339.2	591	34.9	388	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	143.4	46.6	71.6	89.2	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	6.32	6.05	5.02	10.84	-

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 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**	
pH Lab	pH Units	7.47	7.46	7.4	7.2	7.5	7.1	7.3	7.81	7.6	7.67	7.6	6.5-8.5
Conductivity	uS/cm	1900	2100	1980	1.48	2010	1440	1210	1790	2680	2430	1880	-
Hardness	mg/L	**550**	**610**	**607**	**513**	**627**	**426**	**328**	**507**	**630**	**563**	**531**	80-100
Total Dissolved Solids	mg/L	**1090**	**1130**	**1170**	**970**	**1190**	**730**	**656**	**954**	**1540**	**1280**	**1240**	500
Alkalinity	mg/L	**670**	**640**	**573**	487	**695**	**522**	496	**508**	372	**527**	**559**	30-500
Chloride	mg/L	170	180	219	185	**289**	143	104	246	**462**	**381**	**395**	250
Sodium	mg/L	120	120	164	84.8	107	66.5	71.8	129	182.0	144	159.0	200
Calcium	mg/L	170	190	192	177	200	136	107	169	214.0	178	170.0	-
Magnesium	mg/L	30	33	30.8	17.2	31.1	21.3	14.5	20.6	23.30	28.7	25.90	-
Potassium	mg/L	85	93	78.2	54.7	76.7	49.7	39.8	46.2	50.9	57.2	57.1	-
Sulphate	mg/L	49	45	82	67	46	37	42	68.6	53	27.6	25	500.0
Ammonia	mg/L	24	24	8.69	8	23.5	17.3	7.43	11.7	7.82	16.3	13.40	-
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	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	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	-
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	-
Dissolved Organic Carbon	mg/L	**32**	**34**	**33.3**	**18.1**	**32**	**21.3**	**19.5**	**20.4**	**16**	**22.4**	**25**	5
Chemical Oxygen Demand	mg/L	670	91	145	67	95	81	87	51	49	61	45	-
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	0.3
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**	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	-
Orthophosphate	mg/L										<2.0		-
Turbidity	NTU	**1600**	**28**	**147**	**22.9**	**34.6**	**101**	**175**	**6.6**	**31.0**	**60.8**	**9.1**	5
Total Suspended Solids	mg/L	5800	380	516	123	90	228	312	328	132	115	43	-
BOD	mg/L	<2	<2	23	<2	3	4	4	<5	<5	<5	<2	-
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	-
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	0.1
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	0.006
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	0.010
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	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	-
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	-
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	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	0.005
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	0.05
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	-
Copper	mg/L	0.0056	0.08	0.0366	0.0148	0.0179	0.0141	0.0168	0.007	0.0100	0.01	0.0070	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	-
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	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.0002	<1.0	<2.0		<1.0	-
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	0.01
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	0.05
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	-
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	-
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	-
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	-
Uranium	mg/L	0.0081	0.011	0.0083	0.0057	0.0072	0.0043	0.0046	0.007	0.0050	0.005	0.0040	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	-
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	5
Field Measurements													
Temperature	oC	-	-	-	-	-	-	-	11.7	13.5	8.3	11.83	-
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	6.5-8.5
Coductivity	uS/cm	1715	1481	1913	-	-	1.52	1.24	1935	2120	2184	1521	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	129.1	134.9	50.7	126	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.61	4.25	5.44	7.29	-

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 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**	
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	6.5-8.5
Conductivity	uS/cm	550	600	1590	1130	1500	1880	825	1730	1620	2530	1420	-
Hardness	mg/L	**140**	**190**	**171**	77	**211**	**250**	**140**	**245**	**225**	**411**	**237**	80-100
Total Dissolved Solids	mg/L	340	330	**928**	**700**	**926**	**1010**	466	**1000**	**828**	**1300**	**836**	500
Alkalinity	mg/L	50	82	7	18	79	498	58	439	294	**542**	484	30-500
Chloride	mg/L	63	67	**286**	242	275	168	67	200	123	237	178	250
Sodium	mg/L	41	30	215	160	192	187	63.4	184	136	**209**	150	200
Calcium	mg/L	40	58	52.4	22.9	33.1	59.7	32.6	65.3	64.6	119.0	68.5	-
Magnesium	mg/L	8.8	11	9.75	4.93	31.3	24.6	14.3	19.90	15.5	27.70	15.9	-
Potassium	mg/L	5.6	4.9	39	22.2	79.4	59.7	29.1	67.90	56.5	82.30	55.2	-
Sulphate	mg/L	86	91	258	165	243	213	194	115	83.7	118	84.5	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	-
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	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	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	30.30	-
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	-
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**	5
Chemical Oxygen Demand	mg/L	32	23	98	114	129	266	54	224	152	192	200	-
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	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**	**2.110**	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	-
Orthophosphate	mg/L										<2.0		-
Turbidity	NTU	**1100**	**270**	**713**	**64.4**	**139**	**119**	**29.1**	**88.4**	**41.7**	**18.4**	**44.6**	5
Total Suspended Solids	mg/L	600	1600	846	170	216	345	50	164	103	62	65	-
BOD	mg/L	<2	<2	ND (12)	<20	<20	<20	<2	<5	<5	<5	3	-
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	-
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**	0.1
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	0.006
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	0.010
Barium	mg/L	0.12	0.11	0.093	207	0.269	0.053	0.034	0.106	0.067	0.129	0.154	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	-
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	-
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	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	0.005
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	0.05
Cobalt	mg/L	0.00062	<0.0005	0.0444	0.0167	0.0044	0.0374	0.0039	0.021	0.006	0.0096	0.007	-
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	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	-
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	-
Phosphate	mg/L			<0.0002	<0.2	<0.2	<0.2	<0.2	<1.0	<0.50		<0.50	-
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	0.01
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	0.05
Sillicon	mg/L	5.3	5.7	4.42	3.42	4.76	1.32	1.24	2	1	2	2	-
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	-
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	-
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	-
Uranium	mg/L	0.0015	0.0034	0.0024	0.0012	0.0072	0.0034	0.0006	0.006	0.003	0.0075	0.005	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	-
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	5
Field Measurements													
Temperature	oC	-	-	-	-	-	-	-	11.1	15	10.9	13.07	-
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	6.5-8.5
Coductivity	uS/cm	473	233	1475	-	-	1.35	0.85	1972	1305	2289	1139	-
Oxidation Reduction Potential	mV	-	-	-	-	-	-	-	129.2	83.7	120.7	172	-
Dissolved Oxygen	mg/L	-	-	-	-	-	-	-	1.96	1.26	1.8	6.47	-

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									ODWQS
		Sample Collection Date (mm/dd/yyyy)									
		DP-7									
		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**	
pH Lab	pH Units	DRY	DRY	DRY	DRY	DRY	**6.49**	6.71	Insufficient	Insufficient	6.5-8.5
Conductivity	uS/cm						41	122	volume	volume	-
Hardness	mg/L						**15.2**	**48**	for sample	for sample	80-100
Total Dissolved Solids	mg/L						114	78			500
Alkalinity	mg/L						**9**	36			30-500
Chloride	mg/L						2.06	0.6			250
Sodium	mg/L						1.68	2.8			200
Calcium	mg/L						4.6	13.5			-
Magnesium	mg/L						0.90	3.47			-
Potassium	mg/L						0.16	0.27			-
Sulphate	mg/L						7.5	15.9			500
Ammonia	mg/L						0.48	<0.02			-
Nitrate as N	mg/L						0.06	0.07			10
Nitrite as N	mg/L						<0.05	<0.05			1
Total Kjeldahl Nitrogen	mg/L						1.14	1.69			-
Phenolics	mg/L						0.004	0.001			-
Dissolved Organic Carbon	mg/L						**8.5**	**5.3**			5
Chemical Oxygen Demand	mg/L						33	156			-
Iron	mg/L						**7.26**	**0.342**			0.3
Manganese	mg/L						**0.549**	**0.082**			0.05
Phosphorus	mg/L						0.54	3.78			-
Orthophosphate	mg/L										-
Turbidity	NTU						**1100**	**6240**			5
Total Suspended Solids	mg/L						7060	3780			-
BOD	mg/L						7	<5			-
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 Potential	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**	
pH Lab	pH Units	7.09	6.70	6.5-8.5
Conductivity	uS/cm	266	205	-
Hardness	mg/L	91.9	80.9	80-100
Total Dissolved Solids	mg/L	134	116	500
Alkalinity	mg/L	92	97	30-500
Chloride	mg/L	6	9	250
Sodium	mg/L	15	12	200
Calcium	mg/L	30.9	27.6	-
Magnesium	mg/L	3.59	2.9	-
Potassium	mg/L	7.87	3.0	-
Sulphate	mg/L	12	16.7	500.0
Ammonia	mg/L	0.25	0.11	-
Nitrate as N	mg/L	<0.05	0.08	10
Nitrite as N	mg/L	<0.05	<0.05	1
Total Kjeldahl Nitrogen	mg/L	0.45	0.30	-
Phenolics	mg/L	0.001	<0.001	-
Dissolved Organic Carbon	mg/L	4.7	4.9	5
Chemical Oxygen Demand	mg/L	10	<5	-
Iron	mg/L	**1.91**	**3.8**	0.3
Manganese	mg/L	**1.18**	**0.423**	0.05
Phosphorus	mg/L	0.43	0.80	-
Orthophosphate	mg/L	<0.10		-
Turbidity	NTU	**406**	**550**	5
Total Suspended Solids	mg/L	316	1500	-
BOD	mg/L	<5	<2	-
Anion Sum				-
Cation Sum				-
Ion Balance	%			-
Silver	mg/L	<0.0001	<0.0001	-
Aluminum	mg/L	**0.117**	**1.340**	0.1
Antimony	mg/L	<0.001	<0.001	0.006
Arsenic	mg/L	<0.001	0.002	0.010
Barium	mg/L	0.067	0.057	1.00
Beryllium	mg/L	<0.0005	<0.0005	-
Bismuth	mg/L	<0.002	<0.002	-
Boron	mg/L	0.16	0.07	5
Cadmium	mg/L	<0.0001	<0.0001	0.005
Chromium	mg/L	<0.002	<0.002	0.05
Cobalt	mg/L	0.0008	<0.0005	-
Copper	mg/L	<0.001	0.002	1
Molybdenum	mg/L	0.005	<0.002	-
Nickel	mg/L	<0.003	<0.003	-
Phosphate	mg/L		<0.10	-
Lead	mg/L	<0.0005	0.0008	0.01
Selenium	mg/L	<0.001	<0.001	0.05
Sillicon	mg/L	5	8	-
Tin	mg/L	<0.002	<0.002	-
Strontium	mg/L	0.089	0.096	-
Titanium	mg/L	0.004	0.144	-
Uranium	mg/L	0.0012	0.001	0.02
Vanadium	mg/L	<0.002	<0.002	-
Zinc	mg/L	<0.005	0.012	5
Field Measurements				
Temperature	oC	7.8	11.3	-
pH	pH Units	6.7	6.6	6.5-8.5
Coductivity	uS/cm	272	158	-
Oxidation Reduction Potential	mV	108.7	61.1	-
Dissolved Oxygen	mg/L	1.15	7.55	-

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**	
pH Lab	pH Units	7.32	6.74	6.5-8.5
Conductivity	uS/cm	291	206	-
Hardness	mg/L	**103**	**108**	80-100
Total Dissolved Solids	mg/L	178	114	500
Alkalinity	mg/L	106	116	30-500
Chloride	mg/L	14	7	250
Sodium	mg/L	9	3	200
Calcium	mg/L	32.9	36.3	-
Magnesium	mg/L	5.17	4.2	-
Potassium	mg/L	5.82	2.5	-
Sulphate	mg/L	2	2.9	500.0
Ammonia	mg/L	0.08	0.48	-
Nitrate as N	mg/L	<0.05	<0.05	10
Nitrite as N	mg/L	<0.05	<0.05	1
Total Kjeldahl Nitrogen	mg/L	2.52	0.92	-
Phenolics	mg/L	0.006	0.002	-
Dissolved Organic Carbon	mg/L	**27.8**	**5.6**	5
Chemical Oxygen Demand	mg/L	221	18	-
Iron	mg/L	**7.29**	**2.26**	0.3
Manganese	mg/L	**0.695**	**0.515**	0.05
Phosphorus	mg/L	31.90	8.74	-
Orthophosphate	mg/L	<0.10		-
Turbidity	NTU	**28700**	**23200**	5
Total Suspended Solids	mg/L	39600	18600	-
BOD	mg/L	35	2	-
Anion Sum				-
Cation Sum				-
Ion Balance	%			-
Silver	mg/L	<0.0001	<0.0001	-
Aluminum	mg/L	**0.134**	0.070	0.1
Antimony	mg/L	<0.001	<0.001	0.006
Arsenic	mg/L	<0.001	<0.001	0.010
Barium	mg/L	0.041	0.054	1.00
Beryllium	mg/L	<0.0005	<0.0005	-
Bismuth	mg/L	<0.002	<0.002	-
Boron	mg/L	0.05	0.03	5
Cadmium	mg/L	<0.0001	<0.0001	0.005
Chromium	mg/L	<0.002	<0.002	0.05
Cobalt	mg/L	0.0009	<0.0005	-
Copper	mg/L	<0.001	<0.001	1
Molybdenum	mg/L	0.006	<0.002	-
Nickel	mg/L	<0.003	<0.003	-
Phosphate	mg/L		<0.10	-
Lead	mg/L	<0.0005	<0.0005	0.01
Selenium	mg/L	<0.001	<0.001	0.05
Sillicon	mg/L	5.6	5.6	-
Tin	mg/L	<0.002	<0.002	-
Strontium	mg/L	0.087	0.062	-
Titanium	mg/L	<0.002	0.002	-
Uranium	mg/L	0.002	0.001	0.02
Vanadium	mg/L	<0.002	<0.002	-
Zinc	mg/L	<0.005	<0.005	5
Field Measurements				
Temperature	oC	7.9	11.93	-
pH	pH Units	6.3	6.8	6.5-8.5
Coductivity	uS/cm	287	171	-
Oxidation Reduction Potential	mV	259	83.1	-
Dissolved Oxygen	mg/L	3.43	7.45	-

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**	
pH Lab	pH Units	7.01	6.69	6.5-8.5
Conductivity	uS/cm	472	408	-
Hardness	mg/L	**106**	**130**	80-100
Total Dissolved Solids	mg/L	288	256	500
Alkalinity	mg/L	67	118	30-500
Chloride	mg/L	87	73	250
Sodium	mg/L	31	27	200
Calcium	mg/L	31.3	39.8	-
Magnesium	mg/L	6.84	7.5	-
Potassium	mg/L	8.35	6.1	-
Sulphate	mg/L	4	6.8	500.0
Ammonia	mg/L	0.02	0.29	-
Nitrate as N	mg/L	<0.05	<0.05	10
Nitrite as N	mg/L	<0.05	<0.05	1
Total Kjeldahl Nitrogen	mg/L	0.98	0.96	-
Phenolics	mg/L	0.003	<0.001	-
Dissolved Organic Carbon	mg/L	**24.8**	**23.4**	5
Chemical Oxygen Demand	mg/L	75	35	-
Iron	mg/L	**3.77**	**4.35**	0.3
Manganese	mg/L	**1.19**	**1.12**	0.05
Phosphorus	mg/L	4.98	7.38	-
Orthophosphate	mg/L	<0.10		-
Turbidity	NTU	**5920**	**6190**	5
Total Suspended Solids	mg/L	8970	4150	-
BOD	mg/L	32	8	-
Anion Sum				-
Cation Sum				-
Ion Balance	%			-
Silver	mg/L	<0.0001	<0.0001	-
Aluminum	mg/L	**0.144**	0.083	0.1
Antimony	mg/L	<0.001	<0.001	0.006
Arsenic	mg/L	0.002	0.002	0.010
Barium	mg/L	0.103	0.109	1.00
Beryllium	mg/L	<0.0005	<0.0005	-
Bismuth	mg/L	<0.002	<0.002	-
Boron	mg/L	0.22	0.17	5
Cadmium	mg/L	<0.0001	<0.0001	0.005
Chromium	mg/L	<0.002	<0.002	0.05
Cobalt	mg/L	0.0019	0.002	-
Copper	mg/L	<0.001	0.001	1
Molybdenum	mg/L	<0.002	<0.002	-
Nickel	mg/L	0.007	<0.003	-
Phosphate	mg/L		<0.10	-
Lead	mg/L	<0.0005	<0.0005	0.01
Selenium	mg/L	<0.001	0.012	0.05
Sillicon	mg/L	4	8	-
Tin	mg/L	<0.002	<0.002	-
Strontium	mg/L	0.161	0.154	-
Titanium	mg/L	<0.002	<0.002	-
Uranium	mg/L	0.0006	<0.0005	0.02
Vanadium	mg/L	<0.002	<0.002	-
Zinc	mg/L	<0.005	<0.005	5
Field Measurements				
Temperature	oC	7.7	12.7	-
pH	pH Units	6.4	6.3	6.5-8.5
Coductivity	uS/cm	442	332	-
Oxidation Reduction Potential	mV	46.2	55.3	-
Dissolved Oxygen	mg/L	1.12	6.95	-

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 2020
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation / Sample Collection Date (dd/mm/yyyy)							ODWQS	Guideline B-7 Calculation Cm = Cb + x (Cr - Cb)			
		BH8	BH9	BH10	BH11	BH-12	BH-13	BH-14		Cb	x	Cr	Cm
		06/2/2020	**06/2/2020**	**06/2/2020**	**06/2/2020**	**06/2/2020**	**06/2/2020**	**06/2/2020**					
Chloride	mg/L	0.5	18.0	**381**	**237**	6	14	87	250	6.0	0.5	250	128.0
Sulphate	mg/L	7	33	28	118	12	2	4	500	7.30	0.5	500	253.6
Sodium	mg/L	2	10	**144**	**209**	15	9	31	200	5	0.5	200	102.6
Boron	mg/L	<0.010	0.22	**1.29**	**2.72**	0.16	0.05	0.22	5	0.02	0.25	5	1.27
Nitrate	mg/L	0.070	<0.05	1.8	**36.6**	<0.05	<0.05	<0.05	10	0.05	0.25	10	2.54
Alkalinity	mg/L	**12**	101	**527**	**542**	92	106	67	30-500	34	0.5	30-500	31.8 - 266.8
Dissolved Organic Carbon	mg/L	3	15	22	75.2	4.7	27.8	24.8	5	11	0.5	5	NC
Total Dissolved Solids	mg/L	44.0	228	**1280**	**1300**	134	178	288	500	104	0.5	500	302.0
Iron	mg/L	0.1	15.6	0.031	0.126	1.91	7.29	3.77	0.3	5.36	0.5	0.3	NC
Manganese	mg/L	0.007	1.62	2.143	3.736	1.18	0.695	1.19	0.05	0.820	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.

BOLD	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 2020
Croft Waste Disposal Site
Magnetawan, Ontario

Parameter	Units	Sample Designation / Sample Collection Date (dd/mm/yyyy)							ODWQS	Guideline B-7 Calculation Cm = Cb + x (Cr - Cb)			
		BH8	BH9	BH10	BH11	BH12	BH13	BH14		Cb	x	Cr	Cm
		10/1/2020	**10/1/2020**	**10/1/2020**	**10/1/2020**	**10/1/2020**	**10/1/2020**	**10/1/2020**					
Chloride	mg/L	0.4	48.7	**395**	**178**	9	7	73	250	6.5	0.5	250	128.2
Sulphate	mg/L	7	16	25	85	17	3	7	500	7.99	0.5	500	254.0
Sodium	mg/L	2	46	**159**	**150**	12	3	27	200	5.43	0.5	200	102.7
Boron	mg/L	<0.010	0.38	**1.47**	**2.63**	0.07	0.03	0.17	5	0.02	0.25	5	1.27
Nitrate	mg/L	<0.05	<0.05	<0.5	<0.25	0.08	<0.05	<0.05	10	0.05	0.25	10	2.53
Alkalinity	mg/L	**27**	152	**559**	**484**	97	116	118	30-500	36	0.5	30-500	33.2 - 268.2
Dissolved Organic Carbon	mg/L	4	28	25	109	4.9	5.6	23.4	5	12	0.5	5	NC
Total Dissolved Solids	mg/L	32.0	230	**1240**	**836**	116	114	256	500	106	0.5	500	302.8
Iron	mg/L	0.0	15.9	0.049	0.719	3.80	2.26	4.35	0.3	5.90	0.5	0.3	NC
Manganese	mg/L	0.012	1.86	2.02	2.11	0.423	0.515	1.12	0.05	0.865	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.

BOLD	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
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	APV	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**			
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**	6.5-8.5		6.5-9.0
Conductivity	uS/cm	23	23	27	400	186	27	45	20	72	478	89		676			
Hardness	mg/L	10	11	11	150	56	12	22	7	27	80	22		158			
Total Dissolved Solids	mg/L	42	76	48	270	184	154	84	24	84	432	80		418			
Alkalinity	mg/L	5.5	5.9	3.8	7.8	12	7	10	6	7	<5	<5		<5			
Chloride	mg/L	<1	<1	3	100	41	2	5	1	10	*149*	17		*231*		180	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		180	
Calcium	mg/L	3.3	3.6	3	32	14.9	3.96	6.41	2.1	7.99	32	5		38			
Magnesium	mg/L	0.52	0.59	0.47	13	4.53	0.58	1.33	0.394	1.76	14	2		15			
Potassium	mg/L	*0.27*	*0.31*	*0.38*	*6.5*	*1.23*	*0.34*	*1.47*	*0.468*	*1.37*	*2*	*1*		*2*		0.039	
Sulphate	mg/L	<1	<1	<1	15	2	1	<1	2	6	4	3		3			
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			
Nitrate as N	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05	<0.05		<0.10			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			0.06
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			
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**	0.001	0.961	0.004
Dissolved Organic Carbon	mg/L	13	21	16	14	24.1	16.3	27.5	7.6	44.8	4	12		10			
Chemical Oxygen Demand	mg/L	27	56	47	38	81	55	77	28	85	8	37		20			
Iron	mg/L	0.12	0.29	0.15	**0.65**	**0.981**	0.167	**0.888**	**0.2**	**0.794**	**2**	**0.42**		**5.58**	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		0.87			
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		
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			
BOD	mg/L	<2	2	<2	<2	<12			<2	<2	<5	<5		<5			
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	0.0001	0.00012	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**	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	0.02	1.6	
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	0.1	0.15	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		2.3	
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	1.1	0.0053	
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			
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		0.023	0.2	3.55	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	0.00021	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	0.0089	0.064	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***	0.0009	0.0052	
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	0.005	0.0069	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	0.04	0.73	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	0.025	0.039	0.15
Phosphate	mg/L					<0.0002	<0.2	<0.0002	<0.0002	<0.2		<0.10		<0.20			
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	0.005	0.002	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	0.1	0.005	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			
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			
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			
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			
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	0.005	0.033	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	0.006	0.02	
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***	0.03	0.089	0.093
Field Measurements																	
Temperature	oC										14.7	15.6		12.66			
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			
Coductivity	uS/cm	41	21	19.2	303	1975			0.03	0.08	772	83		550			
Oxidation Reduction Potential	mV										174.9	226.3		276.5			
Dissolved Oxygen	mg/L										1.26	3.6		9.62			

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
BOLD	Exceeds PWQO
ITALICS	Exceeds APV
UNDERLINED	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	APV	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**			
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	6.5-8.5		6.5-9.0
Conductivity	uS/cm	15	18	15	32	27	45	16	13	19	21	33	32	23			
Hardness	mg/L	4.3	5.2	5	13	7	5	5	3	7	4	11.3	8.1	9.5			
Total Dissolved Solids	mg/L	24	52	<10	26	34	132	16	14	20	42	94	36	<20			
Alkalinity	mg/L	1.2	2.1	1.8	9.3	9	<5	<5	<5	6	<5	<5	5	13			
Chloride	mg/L	<1	1	1	<1	1	<1	<1	1	<1	2.05	0.6	0.86	0.9		180	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		180	
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			
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			
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*		0.039	
Sulphate	mg/L	2	<1	<1	<1	3	3	<1	1	2	0.7	3.9	2.9	1.9			
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			
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			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			0.06
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			
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	0.961	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			
Chemical Oxygen Demand	mg/L	15	35	26	28	36	63	30	19	21	44	125	21	7			
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**	0.3		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			
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		
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			
BOD	mg/L	<2	<2	<2	<2	<2			<2	<2	<5	<5	<5	13			
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***	0.0001	0.00012	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**	0.075		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	0.02	1.6	
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	0.1	0.15	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		2.3	
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	1.1	0.0053	
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			
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	0.2	3.55	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***	0.0002	0.00021	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	0.0089	0.064	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	0.0009	0.0052	
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	0.005	0.0069	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	0.04	0.73	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	0.025	0.039	0.15
Phosphate	mg/L					<0.0002	<0.0002	<0.0002	<0.2	<0.2		<0.10		<0.10			
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	0.005	0.002	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	0.1	0.005	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			
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			
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			
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			
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	0.005	0.033	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	0.006	0.02	
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	0.03	0.089	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			
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			
Coductivity	uS/cm	34	1044	13	46	6.6	4.1	5.6	5.9	6	251	30.1	28	22.0			
Oxidation Reduction Potential	mV										139.5	205.9	141.8	129.6			
Dissolved Oxygen	mg/L	6.86	4.4	8.17	7.36						2.73	1.57	6.27	9.62			

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
BOLD	Exceeds PWQO
ITALICS	Exceeds APV
UNDERLINED	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	APV	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**			
pH Lab	pH units	7.73	7.09	**6.38**	7.59	7.9	DRY	DRY	7.54	7.41	No Sample	8.15	6.5-8.5		6.5-9.0
Conductivity	uS/cm	820	510	210	1400	2060			193	241		901			
Hardness	mg/L	250	170	77	410	460			64.7	56.7		309.0			
Total Dissolved Solids	mg/L	552	276	158	820	1380			112	124		536			
Alkalinity	mg/L	190	120	17	190	657			78	69		444			
Chloride	mg/L	49	34	9	160	*242*			6.38	14.20		61.50		180	120
Sodium	mg/L	60	31	8	99	*227*			7.49	14.90		62.32		180	
Calcium	mg/L	83	55	22	120	146			25.90	18.90		101.58			
Magnesium	mg/L	11	8.6	3.3	17	23.1			2.69	2.31		13.45			
Potassium	mg/L	*33*	*13*	*3.3*	*33*	*66.7*			*4.77*	*9.13*		*29.6*		0.039	
Sulphate	mg/L	110	73	58	160	159			6.96	6.96		17.00			
Ammonia	mg/L	4.6	1.1	0.48	0.1	4.54			0.05	0.66		14.30			
Nitrate as N	mg/L	4.57	1.22	0.31	11.3	3.7			0.10	0.40		1.40			13
Nitrite as N	mg/L	0.171	0.045	<0.01	0.12	<0.05			<0.05	0.08		<0.25			0.06
Total Kjeldahl Nitrogen	mg/L	6.9	2	0.93	1.6	9			1.22	1.52		17.40			
Phenolics	mg/L	**0.0027**	**0.0053**	<0.001	**0.0017**	**0.029**			**0.003**	**0.008**		**0.003**	0.001	0.961	0.004
Dissolved Organic Carbon	mg/L	30	17	7.1	30	90.2			13.7	11.2		40.4			
Chemical Oxygen Demand	mg/L	81	47	16	80	270			44	53		75			
Iron	mg/L	**0.76**	**2.4**	0.21	0.16	**0.854**			**1.35**	**1.65**		**1.04**	0.3		0.3
Manganese	mg/L	0.067	0.18	0.042	0.25	1.07			0.351	0.138		0.479			
Phosphorus	mg/L	**0.052**	**0.062**	0.014	**0.045**	**0.17**			**0.06**	**0.21**		**0.04**	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			
BOD	mg/L	3	<2	<2	<2	32			<5	<5		444			
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	0.0001	0.00012	0.00025
Aluminum	mg/L	**0.81**	**0.08**	**0.087**	0.073	0.038			0.032	0.062		0.035	0.075		0.1
Antimony	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025			<0.001	<0.001		<0.001	0.02	1.6	
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005			<0.003	<0.003		<0.003	0.1	0.15	0.01
Barium	mg/L	0.077	0.063	0.052	0.11	0.119			0.026	0.029		0.040		2.3	
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025			<0.0005	<0.0005		<0.0005	1.1	0.0053	
Bismuth	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005			<0.002	<0.002		<0.002			
Boron	mg/L	**1**	**0.51**	0.15	**1**	**2.29**			**0.219**	**0.471**		**1.42**	0.2	3.55	1.5
Cadmium	mg/L	0.00014	<0.0001	<0.0001	0.0002	<0.0005			<0.0001	<0.0001		<0.0001	0.0002	0.00021	0.00026
Chromium	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005			<0.003	<0.003		<0.003	0.0089	0.064	0.001
Cobalt	mg/L	**0.0012**	**0.0012**	<0.0005	**0.0016**	**0.005**			**0.0012**	**0.001**		**0.001**	0.0009	0.0052	
Copper	mg/L	***0.0071***	0.0018	<0.001	***0.0062***	***0.008***			0.004	***0.008***		0.005	0.005	0.0069	0.004
Molybdenum	mg/L	0.001	<0.0005	<0.0005	0.0014	0.0035			<0.002	<0.002		<0.002	0.04	0.73	0.073
Nickel	mg/L	0.0018	0.0017	<0.001	0.0025	0.01			<0.003	<0.003		<0.003	0.025	0.039	0.15
Phosphate	mg/L					<0.0002				<0.10		<0.50			
Lead	mg/L	0.0013	<0.0005	<0.0005	<0.0005	0.0005			0.001	*0.003*		<0.001	0.005	0.002	0.01
Selenium	mg/L	<0.002	<0.002	<0.002	<0.002	<0.005			<0.004	<0.004		<0.004	0.1	0.005	0.001
Sillicon	mg/L	2.3	3	2.2	1.4	1.04			0.99	1.01		2.48			
Tin	mg/L	<0.001	<0.001	<0.001	<0.001	<0.025			<0.002	<0.002		<0.002			
Strontium	mg/L	0.3	0.19	0.084	0.38	0.523			0.095	0.076		0.317			
Titanium	mg/L	0.047	<0.005	<0.005	<0.005	<0.025			0.013	0.038		0.008			
Uranium	mg/L	0.0026	0.00072	0.00011	0.0018	0.0059			<0.002	<0.002		<0.002	0.005	0.033	0.02
Vanadium	mg/L	0.0017	<0.0005	<0.0005	0.00068	<0.0025			<0.002	0.002		<0.002	0.006	0.02	
Zinc	mg/L	0.0082	<0.005	<0.005	0.009	**0.055**			0.009	0.013		<0.005	0.03	0.089	0.09
Field Measurements															
Temperature	oC	16	6.7	14.1	8.2	18.9			19.2	16.5		11.68			
pH	pH Units	7.68	6.67	6.43	5.33	6.73			7.1	7.33		7.86			
Coductivity	uS/cm	249	15	490	860	179			215.1	6.25		772			
Oxidation Reduction Potential	mV								116.3	112.6		297.7			
Dissolved Oxygen	mg/L	5.05	11.12	6.56	4.98				6.05	6.43		17.01			

Notes:

PWQO	Provincial Water Quality Objective
APV	Aquatic Protection Values
CWQG	Canadian Water Quality Guidelines
BOLD	Exceeds PWQO
ITALICS	Exceeds APV
UNDERLINED	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	2-Jun-20			1-Oct-20		
				BH-10	GW DUP	Relative Percent Difference (%)	BH-10	GW DUP	Relative Percent Difference (%)
pH Lab	pH Units	NA		7.67	7.61	0.79	7.62	7.65	0.39
Conductivity	uS/cm	2	10	2430	2360	2.92	1880	1880	0.00
Hardness	mg/L	0.5	2.5	563	568	0.88	531	547	2.97
Total Dissolved Solids	mg/L	20	100	1280	1190	7.29	1240	1090	12.88
Alkalinity	mg/L	5	25	527	501	5.06	559	559	0.00
Chloride	mg/L	0.10	0.5	381	367	3.74	395	422	6.61
Sodium	mg/L	0.05	0.25	144	146	1.38	159	166	4.31
Calcium	mg/L	0.05	0.25	178	180	1.12	170	175	2.90
Magnesium	mg/L	0.05	0.25	28.7	28.8	0.35	25.9	26.8	3.42
Potassium	mg/L	0.05	0.25	57.2	57.9	1.22	57.1	58.3	2.08
Sulphate	mg/L	0.10	0.5	27.6	21.8	23.48	24.5	26.3	7.09
Ammonia	mg/L	0.02	0.1	16.3	16.7	2.42	13.4	13.7	2.21
Nitrate as N	mg/L	0.05	0.25	1.8	2.4	28.57	<0.5	<0.5	NC
Nitrite as N	mg/L	0.05	0.25	<1.0	<1.0	NC	<0.5	<0.5	NC
Total Kjeldahl Nitrogen	mg/L	0.10	0.5	18.1	17.6	2.80	15.4	14.9	3.30
Phenolics	mg/L	0.001	0.005	0.003	0.006	NC	0.003	0.003	0.00
Dissolved Organic Carbon	mg/L	0.5	2.5	22.4	22.9	2.21	25.4	24.8	2.39
Chemical Oxygen Demand	mg/L	5	25	61	55	10.34	45	42	6.90
Iron	mg/L	0.010	0.05	0.031	0.026	NC	0.049	0.03	NC
Manganese	mg/L	0.002	0.01	2.143	1.89	12.55	2.02	1.78	12.63
Phosphorus	mg/L	0.02	0.1	<0.02	0.03	NC	0.06	0.06	NC
Turbidity	NTU	0.5	2.5	60.8	31.3	**64.06**	9.1	10.9	18.00
Total Suspended Solids	mg/L	10	50	115	106	8.14	43	18	NC
BOD	mg/L	5	25	<5	<5	NC	<2	<2	NC
Silver	mg/L	0.002	0.01	<0.0001	<0.0001	NC	<0.0001	<0.0001	NC
Aluminum	mg/L	0.004	0.02	0.048	0.035	31.33	0.036	0.038	5.41
Antimony	mg/L	0.003	0.015	<0.001	<0.001	NC	<0.001	<0.001	NC
Arsenic	mg/L	0.003	0.015	<0.001	<0.001	NC	<0.001	<0.001	NC
Barium	mg/L	0.002	0.01	0.276	0.278	0.72	0.236	0.25	5.76
Beryllium	mg/L	0.001	0.005	<0.0005	<0.0005	NC	<0.0005	<0.0005	NC
Bismuth	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.002	<0.002	NC
Boron	mg/L	0.010	0.05	1.29	1.364	5.58	1.47	1.32	10.75
Cadmium	mg/L	0.001	0.005	<0.0001	<0.0001	NC	<0.0001	<0.0001	NC
Chromium	mg/L	0.003	0.015	<0.002	<0.002	NC	<0.002	<0.002	NC
Cobalt	mg/L	0.001	0.005	0.0025	0.0023	NC	0.0023	0.0031	NC
Copper	mg/L	0.003	0.015	0.01	0.008	NC	0.007	0.008	NC
Molybdenum	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.002	<0.002	NC
Nickel	mg/L	0.003	0.015	0.003	0.004	NC	<0.003	<0.003	NC
Phosphate	mg/L	0.10	0.5				<1.0	<1.0	NC
Lead	mg/L	0.001	0.005	<0.0005	<0.0005	NC	<0.0005	<0.0005	NC
Selenium	mg/L	0.004	0.02	<0.001	0.002	NC	0.001	0.002	NC
Sillicon	mg/L	0.05	0.25	3.67	3.92	6.59	3.89	4.27	9.31
Tin	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.002	<0.002	NC
Strontium	mg/L	0.005	0.025	0.783	0.753	3.91	0.601	0.673	11.30
Titanium	mg/L	0.002	0.01	<0.002	<0.002	NC	0.005	0.003	NC
Uranium	mg/L	0.002	0.01	0.005	0.0047	NC	0.004	0.0044	NC
Vanadium	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.002	<0.002	NC
Zinc	mg/L	0.005	0.025	<0.005	<0.005	NC	<0.005	<0.005	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).

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	2-Jun-20			1-Oct-20		
				SW-2	SW DUP	Relative Percent Difference (%)	SW2	SW DUP	Relative Percent Difference (%)
pH Lab	pH units	NA		6.98	6.3	10.24	6.66	6.45	3.20
Conductivity	uS/cm	2	10	32	31	3.17	23	23	0.00
Hardness	mg/L	0.5	2.5	8.10	8.60	5.99	9.50	10.10	6.12
Total Dissolved Solids	mg/L	20	100	36	36	NC	<20	20	NC
Alkalinity	mg/L	5	25	5	6	NC	13	13	NC
Chloride	mg/L	0.50	2.5	0.86	0.85	NC	0.92	0.81	NC
Sodium	mg/L	0.05	0.25	1.12	1.14	1.77	0.97	1.04	6.97
Calcium	mg/L	0.05	0.25	2.42	2.55	5.23	2.83	3.05	7.48
Magnesium	mg/L	0.05	0.25	0.5	0.55	9.52	0.59	0.6	1.68
Potassium	mg/L	0.05	0.25	0.62	0.61	1.63	0.58	0.63	8.26
Sulphate	mg/L	0.10	0.5	2.92	2.89	1.03	1.89	1.26	40.00
Ammonia	mg/L	0.02	0.1	<0.02	0.03	NC	0.03	0.04	NC
Nitrate as N	mg/L	0.05	0.25	<0.05	<0.05	NC	<0.05	<0.05	NC
Nitrite as N	mg/L	0.05	0.25	<0.05	<0.05	NC	<0.05	<0.05	NC
Total Kjeldahl Nitrogen	mg/L	0.10	0.5	0.45	0.55	NC	0.62	0.56	10.17
Phenolics	mg/L	0.001	0.005	0.002	0.002	NC	<0.001	0.001	NC
Dissolved Organic Carbon	mg/L	0.5	2.5	6.7	6.7	0.00	11	11.7	6.17
Chemical Oxygen Demand	mg/L	5	25	21	28	NC	7	9	NC
Iron	mg/L	0.010	0.05	0.451	0.474	4.97	1.25	1.3	3.92
Manganese	mg/L	0.002	0.01	0.077	0.078	1.29	0.076	0.076	0.00
Phosphorus	mg/L	0.02	0.1	<0.02	0.02	NC	<0.02	<0.02	NC
Orthophosphate	mg/L	0.10	0.5	<0.10	<0.10	NC	0.5	2.4	**131.03**
Turbidity	NTU	0.5	2.5	1	1.3	NC	10	<10	NC
Total Suspended Solids	mg/L	10	50	<10	<10	NC	5	13	NC
BOD	mg/L	5	25	<5	<5	NC	0.0004	<0.0001	NC
Silver	mg/L	0.0001	0.0005	<0.0001	<0.0001	NC	0.087	0.088	1.14
Aluminum	mg/L	0.004	0.02	0.063	0.058	8.26	<0.001	<0.001	NC
Antimony	mg/L	0.001	0.005	<0.001	<0.001	NC	<0.003	<0.003	NC
Arsenic	mg/L	0.003	0.015	<0.003	<0.003	NC	0.012	0.012	NC
Barium	mg/L	0.002	0.01	0.008	0.009	NC	<0.0005	<0.0005	NC
Beryllium	mg/L	0.0005	0.0025	<0.0005	<0.0005	NC	<0.002	<0.002	NC
Bismuth	mg/L	0.002	0.01	<0.002	<0.002	NC	0.019	0.06	**103.80**
Boron	mg/L	0.010	0.05	<0.010	<0.010	NC	0.0004	<0.0001	NC
Cadmium	mg/L	0.0001	0.0005	<0.0001	<0.0001	NC	<0.003	<0.003	NC
Chromium	mg/L	0.003	0.015	<0.003	<0.003	NC	<0.0005	<0.0005	NC
Cobalt	mg/L	0.0005	0.0025	<0.0005	<0.0005	NC	0.002	<0.001	NC
Copper	mg/L	0.001	0.005	<0.001	<0.001	NC	<0.002	<0.002	NC
Molybdenum	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.003	0.003	NC
Nickel	mg/L	0.003	0.015	<0.003	<0.003	NC	<0.10	<0.10	NC
Lead	mg/L	0.001	0.005	<0.001	<0.001	NC	<0.001	<0.001	NC
Selenium	mg/L	0.004	0.02	<0.004	<0.004	NC	<0.004	<0.004	NC
Sillicon	mg/L	0.05	0.25	0.91	0.88	3.35	2.02	2.1	3.88
Tin	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.002	<0.002	NC
Strontium	mg/L	0.005	0.025	0.015	0.016	NC	0.019	0.018	NC
Titanium	mg/L	0.002	0.01	<0.002	<0.002	NC	0.002	<0.002	NC
Uranium	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.002	<0.002	NC
Vanadium	mg/L	0.002	0.01	<0.002	<0.002	NC	<0.002	<0.002	NC
Zinc	mg/L	0.005	0.025	<0.005	0.008	NC	0.008	0.006	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).

BOLD — Bolded and shaded entries indicates that the relative percent difference (RPD) exceeds the industry standard of 50%.

APPENDIX IV

Photographic Log

	**BH1**

	**BH1**

	**BH8**

	**BH8**

	**BH9**

	**BH9**

	**BH10**

	**BH10**

BH11

BH11

	**DP7**

	**DP7**

	**DP8**

	**DP8**

BH12

BH12

BH13

BH13

BH14

BH14

SW1

SW2

		**SW3**

APPENDIX V

Laboratory Certificates of Analysis

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.
957 CAMBRIAN HEIGHTS DRIVE, UNIT 203
SUDBURY, ON P3C 5S5
(705) 521-0560
ATTENTION TO: Tim McBride
PROJECT: 225335 Croft Landfill
AGAT WORK ORDER: 20U609240
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Jun 12, 2020
PAGES (INCLUDING COVER): 15
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
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AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-12

SAMPLE DESCRIPTION:				BH1		BH8	BH9		BH10		BH11
SAMPLE TYPE:				Water		Water	Water		Water		Water
DATE SAMPLED:				2020-06-02		2020-06-02	2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172631	RDL	1172636	1172637	RDL	1172638	RDL	1172639
BOD (5)	mg/L		5	<5	5	<5	<5	5	<5	5	<5
Electrical Conductivity	µS/cm		2	101	2	51	371	2	2430	2	2530
pH	pH Units		NA	6.64	NA	6.57	7.10	NA	7.67	NA	7.36
Hardness (as CaCO3) (Calculated)	mg/L		0.5	20.7	0.5	13.5	115	0.5	563	0.5	411
Total Dissolved Solids	mg/L		20	76	20	44	228	20	1280	20	1300
Total Suspended Solids	mg/L		10	37	10	198	283	10	115	10	62
Alkalinity (as CaCO3)	mg/L		5	36	5	12	101	5	527	5	542
Chloride	mg/L		0.10	2.82	0.10	0.48	18.0	2.0	381	2.0	237
Nitrate as N	mg/L		0.05	<0.05	0.05	0.07	<0.05	1.0	1.8	1.0	36.6
Nitrite as N	mg/L		0.05	<0.05	0.05	<0.05	<0.05	1.0	<1.0	1.0	<1.0
Sulphate	mg/L		0.10	2.40	0.10	6.81	33.4	2.0	27.6	2.0	118
Ortho Phosphate as P	mg/L		0.10	<0.10	0.10	<0.10	<0.10	2.0	<2.0	2.0	<2.0
Ammonia as N	mg/L		0.02	0.23	0.02	<0.02	0.99	0.4	16.3	0.4	29.9
Total Phosphorus	mg/L		0.02	0.02	0.02	0.32	0.11	0.02	<0.02	0.02	0.03
Chemical Oxygen Demand	mg/L		5	32	5	8	68	5	61	10	192
Total Kjeldahl Nitrogen	mg/L		0.10	0.53	0.10	0.28	1.79	0.10	18.1	0.10	38.4
Dissolved Organic Carbon	mg/L		1.0	10.0	0.5	3.3	14.5	0.5	22.4	1.0	75.2
Phenols	mg/L		0.001	0.001	0.001	0.001	0.002	0.001	0.003	0.001	0.009
Turbidity	NTU		0.5	22.4	0.5	150	282	0.5	60.8	0.5	18.4
Dissolved Calcium	mg/L		0.05	6.43	0.05	4.00	37.4	0.25	178	0.25	119
Dissolved Magnesium	mg/L		0.05	1.13	0.05	0.85	5.25	0.25	28.7	0.25	27.7
Dissolved Potassium	mg/L		0.05	1.27	0.05	0.76	4.74	0.25	57.2	0.25	82.3
Dissolved Sodium	mg/L		0.05	4.70	0.05	1.82	10.1	0.25	144	0.25	209
Dissolved Aluminum	mg/L		0.004	0.50	0.004	0.076	0.110	0.004	0.048	0.004	0.226
Dissolved Antimony	mg/L		0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Arsenic	mg/L		0.001	<0.001	0.001	<0.001	0.002	0.001	<0.001	0.001	<0.001
Dissolved Barium	mg/L		0.002	0.023	0.002	0.020	0.047	0.002	0.276	0.002	0.129
Dissolved Beryllium	mg/L		0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Boron	mg/L		0.010	0.014	0.010	<0.010	0.217	0.1	1.29	0.1	2.715

Certified By: Iris Veraástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-12

		SAMPLE DESCRIPTION:		BH1		BH8	BH9		BH10		BH11
		SAMPLE TYPE:		Water		Water	Water		Water		Water
		DATE SAMPLED:		2020-06-02		2020-06-02	2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172631	RDL	1172636	1172637	RDL	1172638	RDL	1172639
Dissolved Cadmium	mg/L		0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0002
Dissolved Chromium	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	0.003
Dissolved Cobalt	mg/L		0.0005	0.0053	0.0005	0.0011	0.0118	0.0005	0.0025	0.0005	0.0096
Dissolved Copper	mg/L		0.001	0.003	0.001	0.010	0.007	0.001	0.010	0.001	0.011
Dissolved Iron	mg/L		0.010	5.48	0.010	0.055	15.6	0.010	0.031	0.010	0.126
Dissolved Lead	mg/L		0.0005	0.0008	0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L		0.002	0.526	0.002	0.007	1.62	0.02	2.143	0.02	3.736
Dissolved Molybdenum	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	0.003
Dissolved Nickel	mg/L		0.003	<0.003	0.003	0.006	0.010	0.003	0.003	0.003	0.008
Dissolved Selenium	mg/L		0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Silicon	mg/L		0.05	3.43	0.05	2.85	3.06	0.05	3.67	0.05	1.68
Dissolved Silver	mg/L		0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.033	0.005	0.015	0.110	0.005	0.783	0.005	0.272
Dissolved Tin	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Titanium	mg/L		0.002	0.035	0.002	0.005	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Uranium	mg/L		0.0005	0.0011	0.0005	<0.0005	<0.0005	0.0005	0.0050	0.0005	0.0075
Dissolved Vanadium	mg/L		0.002	0.004	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L		0.005	<0.005	0.005	0.021	0.008	0.005	<0.005	0.005	0.005

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AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-12

		SAMPLE DESCRIPTION:		BH12		BH13		BH14		BH-DUP
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2020-06-02		2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172640	RDL	1172641	RDL	1172642	RDL	1173978
BOD (5)	mg/L		5	<5	5	35	5	32	5	<5
Electrical Conductivity	µS/cm		2	266	2	291	2	472	2	2360
pH	pH Units		NA	7.09	NA	7.32	NA	7.01	NA	7.61
Hardness (as CaCO3) (Calculated)	mg/L		0.5	91.9	0.5	103	0.5	106	0.5	568
Total Dissolved Solids	mg/L		20	134	20	178	20	288	20	1190
Total Suspended Solids	mg/L		10	316	10	39600	10	8970	10	106
Alkalinity (as CaCO3)	mg/L		5	92	5	106	5	67	5	501
Chloride	mg/L		0.10	5.56	0.10	14.1	0.20	86.7	2.0	367
Nitrate as N	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	1.0	2.4
Nitrite as N	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	1.0	<1.0
Sulphate	mg/L		0.10	12.4	0.10	1.50	0.10	3.61	2.0	21.8
Ortho Phosphate as P	mg/L		0.10	<0.10	0.10	<0.10	0.10	<0.10	2.0	<2.0
Ammonia as N	mg/L		0.02	0.25	0.02	0.08	0.02	0.02	0.4	16.7
Total Phosphorus	mg/L		0.02	0.43	0.2	31.9	0.04	4.98	0.02	0.03
Chemical Oxygen Demand	mg/L		5	10	25	221	5	75	5	55
Total Kjeldahl Nitrogen	mg/L		0.10	0.45	0.10	2.52	0.10	0.98	0.10	17.6
Dissolved Organic Carbon	mg/L		0.5	4.7	0.5	27.8	1.0	24.8	1.0	22.9
Phenols	mg/L		0.001	0.001	0.001	0.006	0.001	0.003	0.001	0.006
Turbidity	NTU		0.5	406	3.0	28700	0.5	5920	0.5	31.3
Dissolved Calcium	mg/L		0.05	30.9	0.05	32.9	0.05	31.3	0.25	180
Dissolved Magnesium	mg/L		0.05	3.59	0.05	5.17	0.05	6.84	0.25	28.8
Dissolved Potassium	mg/L		0.05	7.87	0.05	5.82	0.05	8.35	0.25	57.9
Dissolved Sodium	mg/L		0.05	14.5	0.05	9.36	0.05	31.1	0.25	146
Dissolved Aluminum	mg/L		0.004	0.117	0.004	0.134	0.004	0.144	0.004	0.035
Dissolved Antimony	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Arsenic	mg/L		0.001	<0.001	0.001	<0.001	0.001	0.002	0.001	<0.001
Dissolved Barium	mg/L		0.002	0.067	0.002	0.041	0.002	0.103	0.002	0.278
Dissolved Beryllium	mg/L		0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Boron	mg/L		0.010	0.159	0.010	0.051	0.010	0.223	0.010	1.364

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-12

		SAMPLE DESCRIPTION:		BH12		BH13		BH14		BH-DUP
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2020-06-02		2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172640	RDL	1172641	RDL	1172642	RDL	1173978
Dissolved Cadmium	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	0.0008	0.0005	0.0009	0.0005	0.0019	0.0005	0.0023
Dissolved Copper	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.008
Dissolved Iron	mg/L		0.010	1.91	0.010	7.29	0.010	3.77	0.010	0.026
Dissolved Lead	mg/L		0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L		0.002	1.18	0.002	0.695	0.002	1.19	0.002	1.89
Dissolved Molybdenum	mg/L		0.002	0.005	0.002	0.006	0.002	<0.002	0.002	<0.002
Dissolved Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	0.007	0.003	0.004
Dissolved Selenium	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.002
Dissolved Silicon	mg/L		0.05	4.70	0.05	5.63	0.05	3.79	0.05	3.92
Dissolved Silver	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.089	0.005	0.087	0.005	0.161	0.005	0.753
Dissolved Tin	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Titanium	mg/L		0.002	0.004	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Uranium	mg/L		0.0005	0.0012	0.0005	0.0020	0.0005	0.0006	0.0005	0.0047
Dissolved Vanadium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1172631-1173978 DOC analysis completed on a lab filtered sample.

Samples were received and analyzed beyond recommended hold times for Turbidity analyses.

Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Veraástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Surface Water Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-12

		SAMPLE DESCRIPTION:		SW2	SW-DUP
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2020-06-02	2020-06-02
Parameter	Unit	G / S	RDL	1172668	1172670
BOD (5)	mg/L		5	<5	<5
Electrical Conductivity	µS/cm		2	32	31
pH	pH Units	6.5-8.5	NA	6.98	**6.30**
Hardness (as CaCO3) (Calculated)	mg/L		0.5	8.1	8.6
Total Dissolved Solids	mg/L		20	36	36
Total Suspended Solids	mg/L		10	<10	<10
Alkalinity (as CaCO3)	mg/L		5	5	6
Bicarbonate (as CaCO3)	mg/L		5	5	6
Chloride	mg/L		0.10	0.86	0.85
Nitrate as N	mg/L		0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05
Sulphate	mg/L		0.10	2.92	2.89
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	0.03
Total Phosphorus	mg/L	*	0.02	<0.02	0.02
Chemical Oxygen Demand	mg/L		5	21	28
Dissolved Organic Carbon	mg/L		0.5	6.7	6.7
Total Kjeldahl Nitrogen	mg/L		0.10	0.45	0.55
Phenols	mg/L	0.001	0.001	**0.002**	**0.002**
Turbidity	NTU		0.5	1.0	1.3
Total Calcium	mg/L		0.05	2.42	2.55
Total Magnesium	mg/L		0.05	0.50	0.55
Total Potassium	mg/L		0.05	0.62	0.61
Total Sodium	mg/L		0.05	1.12	1.14
Aluminum-dissolved	mg/L	0.075	0.004	0.063	0.058
Total Antimony	mg/L	0.020	0.001	<0.001	<0.001
Total Arsenic	mg/L	0.1	0.003	<0.003	<0.003
Total Barium	mg/L		0.002	0.008	0.009
Total Beryllium	mg/L	*	0.0005	<0.0005	<0.0005
Total Bismuth	mg/L		0.002	<0.002	<0.002

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Surface Water Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-12

		SAMPLE DESCRIPTION:		SW2	SW-DUP
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2020-06-02	2020-06-02
Parameter	Unit	G / S	RDL	1172668	1172670
Total Boron	mg/L	0.2	0.010	<0.010	<0.010
Total Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	<0.0005	<0.0005
Total Copper	mg/L	0.005	0.001	<0.001	<0.001
Total Iron	mg/L	0.3	0.010	**0.451**	**0.474**
Total Lead	mg/L	*	0.001	<0.001	<0.001
Total Manganese	mg/L		0.002	0.077	0.078
Total Molybdenum	mg/L	0.040	0.002	<0.002	<0.002
Total Nickel	mg/L	0.025	0.003	<0.003	<0.003
Total Selenium	mg/L	0.1	0.004	<0.004	<0.004
Total Silicon	mg/L		0.05	0.91	0.88
Total Silver	mg/L	0.0001	0.0001	<0.0001	<0.0001
Total Strontium	mg/L		0.005	0.015	0.016
Total Tin	mg/L		0.002	<0.002	<0.002
Total Titanium	mg/L		0.002	<0.002	<0.002
Total Uranium	mg/L	0.005	0.002	<0.002	<0.002
Total Vanadium	mg/L	0.006	0.002	<0.002	<0.002
Total Zinc	mg/L	0.030	0.005	<0.005	0.008

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1172668-1172670 DOC and Dissolved Aluminum analysis completed on a lab filtered sample.

Samples were received and analyzed beyond recommended hold times for Turbidity analyses.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Veraástegui

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Guideline Violation

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
1172668	SW2	ON PWQO	Croft Surface Water Parameters	Phenols	mg/L	0.001	0.002
1172668	SW2	ON PWQO	Croft Surface Water Parameters	Total Iron	mg/L	0.3	0.451
1172670	SW-DUP	ON PWQO	Croft Surface Water Parameters	Phenols	mg/L	0.001	0.002
1172670	SW-DUP	ON PWQO	Croft Surface Water Parameters	Total Iron	mg/L	0.3	0.474
1172670	SW-DUP	ON PWQO	Croft Surface Water Parameters	pH	pH Units	6.5-8.5	6.30

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Jun 12, 2020

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Croft Surface Water Parameters															
BOD (5)	1172668	1172668	<5	<5	NA	< 5	101%	75%	125%						
Electrical Conductivity	1172462		2160	2130	1.4%	< 2	102%	80%	120%						
pH	1172462		7.61	7.57	0.5%	NA	100%	90%	110%						
Total Dissolved Solids	1167008		734	728	0.8%	< 20	98%	80%	120%						
Total Suspended Solids	1172638	1172638	115	105	9.1%	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	1172462		615	620	0.8%	< 5	95%	80%	120%						
Bicarbonate (as CaCO3)	1172462		615	620	0.8%	< 5	NA								
Chloride	1173978	1173978	367	368	0.3%	< 0.10	100%	70%	130%	109%	80%	120%	106%	70%	130%
Nitrate as N	1173978	1173978	2.4	2.3	4.3%	< 0.05	103%	70%	130%	109%	80%	120%	111%	70%	130%
Nitrite as N	1173978	1173978	<1.0	<1.0	NA	< 0.05	92%	70%	130%	107%	80%	120%	111%	70%	130%
Sulphate	1173978	1173978	21.8	21.1	3.3%	< 0.10	103%	70%	130%	107%	80%	120%	109%	70%	130%
Ortho Phosphate as P	1173978	1173978	<2.0	<2.0	NA	< 0.10	95%	70%	130%	100%	80%	120%	100%	70%	130%
Ammonia as N	1171454		<0.02	<0.02	NA	< 0.02	98%	70%	130%	99%	80%	120%	94%	70%	130%
Total Phosphorus	1171459		<0.02	<0.02	NA	< 0.02	98%	70%	130%	96%	80%	120%	88%	70%	130%
Chemical Oxygen Demand	1168448		<5	<5	NA	< 5	99%	80%	120%	96%	90%	110%	99%	70%	130%
Dissolved Organic Carbon	1160323		10.4	10.4	0.0%	< 0.5	98%	90%	110%	104%	90%	110%	106%	80%	120%
Total Kjeldahl Nitrogen	1172668	1172668	0.45	0.43	NA	< 0.10	101%	70%	130%	103%	80%	120%	101%	70%	130%
Phenols	1172631	1172631	0.001	0.001	NA	< 0.001	98%	90%	110%	102%	90%	110%	104%	80%	120%
Turbidity	1168448		899	881	2.0%	< 0.5	100%	80%	120%						
Total Calcium	1168834		21.1	20.6	2.4%	< 0.05	101%	70%	130%	100%	80%	120%	97%	70%	130%
Total Magnesium	1168834		8.69	8.41	3.3%	< 0.05	108%	70%	130%	106%	80%	120%	103%	70%	130%
Total Potassium	1168834		444	439	1.1%	< 0.05	102%	70%	130%	100%	80%	120%	99%	70%	130%
Total Sodium	1168834		15.3	14.7	4.0%	< 0.05	99%	70%	130%	98%	80%	120%	97%	70%	130%
Aluminum-dissolved	1172668	1172668	0.063	0.053	17.2%	< 0.004	87%	70%	130%	92%	80%	120%	82%	70%	130%
Total Antimony	1177024		<0.005	<0.005	NA	< 0.001	103%	70%	130%	99%	80%	120%	97%	70%	130%
Total Arsenic	1177024		<0.003	<0.003	NA	< 0.003	104%	70%	130%	103%	80%	120%	105%	70%	130%
Total Barium	1177024		0.120	0.117	2.5%	< 0.002	100%	70%	130%	97%	80%	120%	95%	70%	130%
Total Beryllium	1177024		<0.0005	<0.0005	NA	< 0.0005	105%	70%	130%	99%	80%	120%	101%	70%	130%
Total Bismuth	1177024		<0.010	<0.010	NA	< 0.002	84%	70%	130%	102%	80%	120%	98%	70%	130%
Total Boron	1177024		0.074	0.079	6.5%	< 0.010	102%	70%	130%	99%	80%	120%	101%	70%	130%
Total Cadmium	1177024		<0.0005	<0.0005	NA	< 0.0001	103%	70%	130%	101%	80%	120%	98%	70%	130%
Total Chromium	1177024		<0.015	<0.015	NA	< 0.003	104%	70%	130%	101%	80%	120%	98%	70%	130%
Total Cobalt	1177024		<0.0005	<0.0005	NA	< 0.0005	106%	70%	130%	101%	80%	120%	99%	70%	130%
Total Copper	1177024		<0.001	<0.001	NA	< 0.001	107%	70%	130%	103%	80%	120%	96%	70%	130%
Total Iron	1177024		0.129	0.124	4.0%	< 0.010	110%	70%	130%	105%	80%	120%	101%	70%	130%
Total Lead	1177024		<0.001	<0.001	NA	< 0.001	113%	70%	130%	91%	80%	120%	89%	70%	130%
Total Manganese	1177024		0.235	0.237	0.8%	< 0.002	102%	70%	130%	100%	80%	120%	93%	70%	130%
Total Molybdenum	1177024		<0.010	<0.010	NA	< 0.002	105%	70%	130%	103%	80%	120%	100%	70%	130%
Total Nickel	1177024		0.007	0.006	NA	< 0.003	108%	70%	130%	99%	80%	120%	93%	70%	130%

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jun 12, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Selenium	1177024		<0.020	<0.020	NA	< 0.004	98%	70%	130%	97%	80%	120%	98%	70%	130%
Total Silicon	1177024		<0.25	0.27	NA	< 0.05	97%	70%	130%	96%	80%	120%	107%	70%	130%
Total Silver	1177024		<0.0005	<0.0005	NA	< 0.0001	105%	70%	130%	96%	80%	120%	84%	70%	130%
Total Strontium	1177024		0.463	0.439	5.3%	< 0.005	99%	70%	130%	99%	80%	120%	98%	70%	130%
Total Tin	1177024		<0.010	<0.010	NA	< 0.002	98%	70%	130%	97%	80%	120%	96%	70%	130%
Total Titanium	1177024		<0.010	<0.010	NA	< 0.002	101%	70%	130%	102%	80%	120%	94%	70%	130%
Total Uranium	1177024		<0.010	<0.010	NA	< 0.002	85%	70%	130%	101%	80%	120%	101%	70%	130%
Total Vanadium	1177024		<0.002	<0.002	NA	< 0.002	108%	70%	130%	100%	80%	120%	100%	70%	130%
Total Zinc	1177024		<0.005	<0.005	NA	< 0.005	104%	70%	130%	103%	80%	120%	95%	70%	130%
Croft Groundwater Parameters															
BOD (5)	1172638	1172638	<5	<5	NA	< 5	101%	75%	125%						
Electrical Conductivity	1177024		795	796	0.1%	< 2	104%	80%	120%						
pH	1177024		7.45	7.40	0.7%	NA	100%	90%	110%						
Total Dissolved Solids	1167008		734	728	0.8%	< 20	98%	80%	120%						
Total Suspended Solids	1182701		<10	<10	NA	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	1177024		91	91	0.0%	< 5	94%	80%	120%						
Chloride	1173978	1173978	367	368	0.3%	< 0.10	100%	70%	130%	109%	80%	120%	106%	70%	130%
Nitrate as N	1173978	1173978	2.4	2.3	4.3%	< 0.05	103%	70%	130%	109%	80%	120%	111%	70%	130%
Nitrite as N	1173978	1173978	<1.0	<1.0	NA	< 0.05	92%	70%	130%	107%	80%	120%	111%	70%	130%
Sulphate	1173978	1173978	21.8	21.1	3.3%	< 0.10	103%	70%	130%	107%	80%	120%	109%	70%	130%
Ortho Phosphate as P	1173978	1173978	<2.0	<2.0	NA	< 0.10	95%	70%	130%	100%	80%	120%	100%	70%	130%
Ammonia as N	1171866		<0.02	<0.02	NA	< 0.02	96%	70%	130%	96%	80%	120%	95%	70%	130%
Total Phosphorus	1172631	1172631	0.02	<0.02	NA	< 0.02	97%	70%	130%	97%	80%	120%	107%	70%	130%
Chemical Oxygen Demand	1172631	1172631	32	36	11.8%	< 5	101%	80%	120%	102%	90%	110%	90%	70%	130%
Total Kjeldahl Nitrogen	1172631	1172631	0.53	0.57	7.3%	< 0.10	101%	70%	130%	103%	80%	120%	100%	70%	130%
Dissolved Organic Carbon	1172631	1172631	10.0	9.9	1.0%	< 0.5	94%	90%	110%	100%	90%	110%	99%	80%	120%
Phenols	1172631	1172631	0.001	0.001	NA	< 0.001	98%	90%	110%	102%	90%	110%	104%	80%	120%
Turbidity	1172631	1172631	22.4	22.8	1.8%	< 0.5	102%	80%	120%						
Dissolved Calcium	1172631	1172631	6.43	6.41	0.3%	< 0.05	97%	70%	130%	97%	80%	120%	98%	70%	130%
Dissolved Magnesium	1172631	1172631	1.13	1.12	0.9%	< 0.05	100%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Potassium	1172631	1172631	1.27	1.26	0.8%	< 0.05	106%	70%	130%	106%	80%	120%	109%	70%	130%
Dissolved Sodium	1172631	1172631	4.70	4.69	0.2%	< 0.05	97%	70%	130%	96%	80%	120%	100%	70%	130%
Dissolved Aluminum	1172631	1172631	0.500	0.436	13.7%	< 0.004	101%	70%	130%	94%	80%	120%	79%	70%	130%
Dissolved Antimony	1172631	1172631	<0.001	<0.001	NA	< 0.001	95%	70%	130%	93%	80%	120%	93%	70%	130%
Dissolved Arsenic	1172631	1172631	<0.001	<0.001	NA	< 0.001	100%	70%	130%	99%	80%	120%	102%	70%	130%
Dissolved Barium	1172631	1172631	0.023	0.023	0.0%	< 0.002	94%	70%	130%	91%	80%	120%	92%	70%	130%
Dissolved Beryllium	1172631	1172631	<0.0005	<0.0005	NA	< 0.0005	100%	70%	130%	97%	80%	120%	97%	70%	130%
Dissolved Bismuth	1172631	1172631	<0.002	<0.002	NA	< 0.002	100%	70%	130%	101%	80%	120%	98%	70%	130%
Dissolved Boron	1172631	1172631	0.014	0.012	NA	< 0.010	98%	70%	130%	97%	80%	120%	96%	70%	130%

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jun 12, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Cadmium	1172631	1172631	<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	97%	80%	120%	95%	70%	130%
Dissolved Chromium	1172631	1172631	<0.002	<0.002	NA	< 0.002	96%	70%	130%	92%	80%	120%	91%	70%	130%
Dissolved Cobalt	1172631	1172631	0.0053	0.0054	1.9%	< 0.0005	95%	70%	130%	93%	80%	120%	90%	70%	130%
Dissolved Copper	1172631	1172631	0.003	0.004	NA	< 0.001	96%	70%	130%	93%	80%	120%	91%	70%	130%
Dissolved Iron	1172631	1172631	5.48	5.50	0.4%	< 0.010	101%	70%	130%	97%	80%	120%	97%	70%	130%
Dissolved Lead	1172631	1172631	0.0008	0.0008	NA	< 0.0005	102%	70%	130%	99%	80%	120%	95%	70%	130%
Dissolved Manganese	1172631	1172631	0.526	0.519	1.3%	< 0.002	100%	70%	130%	92%	80%	120%	92%	70%	130%
Dissolved Molybdenum	1172631	1172631	<0.002	<0.002	NA	< 0.002	99%	70%	130%	94%	80%	120%	93%	70%	130%
Dissolved Nickel	1172631	1172631	<0.003	0.004	NA	< 0.003	94%	70%	130%	90%	80%	120%	92%	70%	130%
Dissolved Selenium	1172631	1172631	0.002	0.002	NA	< 0.001	100%	70%	130%	98%	80%	120%	110%	70%	130%
Dissolved Silicon	1172631	1172631	3.49	3.13	10.9%	< 0.05	104%	70%	130%	103%	80%	120%	87%	70%	130%
Dissolved Silver	1172631	1172631	<0.0001	<0.0001	NA	< 0.0001	97%	70%	130%	91%	80%	120%	88%	70%	130%
Dissolved Strontium	1172631	1172631	0.033	0.034	3.0%	< 0.005	96%	70%	130%	94%	80%	120%	89%	70%	130%
Dissolved Tin	1172631	1172631	<0.002	<0.002	NA	< 0.002	96%	70%	130%	93%	80%	120%	90%	70%	130%
Dissolved Titanium	1172631	1172631	0.050	0.047	6.2%	< 0.002	83%	70%	130%	83%	80%	120%	107%	70%	130%
Dissolved Uranium	1172631	1172631	0.0011	0.0011	NA	< 0.0005	98%	70%	130%	101%	80%	120%	99%	70%	130%
Dissolved Vanadium	1172631	1172631	0.004	0.004	NA	< 0.002	95%	70%	130%	92%	80%	120%	92%	70%	130%
Dissolved Zinc	1172631	1172631	<0.005	<0.005	NA	< 0.005	98%	70%	130%	97%	80%	120%	96%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Dissolved Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Aluminum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Bismuth	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS

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AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

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SAMPLING SITE:

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PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silicon	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Strontium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Tin	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Titanium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Bismuth	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silicon	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories
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CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY
Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature: 8.6 | 8.1 | 8.4
AGAT Job Number:
Notes: 20U609240.

Client Information

Company: Pinchin Ltd.
Contact: Tim McBride
Address: 957 Cambrian Heights, Unit # 203
Sudbury ON P3C 5S5
Phone: 705-521-0560 Fax:
PO#:
Client Project #: 225335 Croft Landfill
AGAT Quotation #: 267698

Report Information

1. Name: Tim McBride
Email: tmcbride@Pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format (Please "x" those that apply)
[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)* (Please "x" the applicable box below)
Regular TAT:
[x] 5 to 7 working days
Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours
Date Required (Rush surcharges may apply)

Regulatory Guideline Required: (Please "x" those that apply)

[ ] Reg 153 Table (indicate one) [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one) [ ] Sanitary [ ] Storm
[ ] PWQO [ ] Reg 558 [ ] CCME [x] Other (indicate) GW - ODWS

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes [x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions - Cl, NO3, NO2, Phos-P, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Ammonia	BOD, COD, DOC	Conductivity, Phenols	Total Phosphorous	TDS, TSS	TKN, Turbidity	pH, Hardness						
BH1	Jun 2 '20		water	7		x	x	x	x	x	x	x	x	x	x						
BH8			water	7		x	x	x	x	x	x	x	x	x	x						
BH9			water	7		x	x	x	x	x	x	x	x	x	x						
BH10			water	7		x	x	x	x	x	x	x	x	x	x						
BH11			water	7		x	x	x	x	x	x	x	x	x	x						
BH12			water	7		x	x	x	x	x	x	x	x	x	x						
BH13			water	7		x	x	x	x	x	x	x	x	x	x						
BH14			water	7		x	x	x	x	x	x	x	x	x	x						
DP7			water	7		x	x	x	x	x	x	x	x	x	x						
DP8			water	7		x	x	x	x	x	x	x	x	x	x						
DP9			water	7		x	x	x	x	x	x	x	x	x	x						
			TOTAL # OF CONTAINERS	77	* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays																

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	Special Instructions
Meagan Bradley	3:30pm/June2 2020	Shaymin	June 4/2020 11AM	PLEASE FILTER DOC AT SAMPLE RECEPTION
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.
957 CAMBRIAN HEIGHTS DRIVE, UNIT 203
SUDBURY, ON P3C 5S5
(705) 521-0560
ATTENTION TO: Tim McBride
PROJECT: 225335 Croft Landfill
AGAT WORK ORDER: 20U609240
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Jun 11, 2020
PAGES (INCLUDING COVER): 15
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-11

SAMPLE DESCRIPTION:				BH1		BH8	BH9		BH10		BH11
SAMPLE TYPE:				Water		Water	Water		Water		Water
DATE SAMPLED:				2020-06-02		2020-06-02	2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172631	RDL	1172636	1172637	RDL	1172638	RDL	1172639
BOD (5)	mg/L		5	<5	5	<5	<5	5	<5	5	<5
Electrical Conductivity	µS/cm		2	101	2	51	371	2	2430	2	2530
pH	pH Units		NA	6.64	NA	6.57	7.10	NA	7.67	NA	7.36
Hardness (as CaCO3) (Calculated)	mg/L		0.5	20.7	0.5	13.5	115	0.5	563	0.5	411
Total Dissolved Solids	mg/L		20	76	20	44	228	20	1280	20	1300
Total Suspended Solids	mg/L		10	37	10	198	283	10	115	10	62
Alkalinity (as CaCO3)	mg/L		5	36	5	12	101	5	527	5	542
Chloride	mg/L		0.10	2.82	0.10	0.48	18.0	2.0	381	2.0	237
Nitrate as N	mg/L		0.05	<0.05	0.05	0.07	<0.05	1.0	1.8	1.0	36.6
Nitrite as N	mg/L		0.05	<0.05	0.05	<0.05	<0.05	1.0	<1.0	1.0	<1.0
Sulphate	mg/L		0.10	2.40	0.10	6.81	33.4	2.0	27.6	2.0	118
Ortho Phosphate as P	mg/L		0.10	<0.10	0.10	<0.10	<0.10	2.0	<2.0	2.0	<2.0
Ammonia as N	mg/L		0.02	0.23	0.02	<0.02	0.99	0.4	16.3	0.4	29.9
Total Phosphorus	mg/L		0.02	0.02	0.02	0.32	0.11	0.02	<0.02	0.02	0.03
Chemical Oxygen Demand	mg/L		5	32	5	8	68	5	61	10	192
Total Kjeldahl Nitrogen	mg/L		0.10	0.53	0.10	0.28	1.79	0.10	18.1	0.10	38.4
Dissolved Organic Carbon	mg/L		1.0	10.0	0.5	3.3	14.5	0.5	22.4	1.0	75.2
Phenols	mg/L		0.001	0.001	0.001	0.001	0.002	0.001	0.003	0.001	0.009
Turbidity	NTU		0.5	22.4	0.5	150	282	0.5	60.8	0.5	18.4
Dissolved Calcium	mg/L		0.05	6.43	0.05	4.00	37.4	0.25	178	0.25	119
Dissolved Magnesium	mg/L		0.05	1.13	0.05	0.85	5.25	0.25	28.7	0.25	27.7
Dissolved Potassium	mg/L		0.05	1.27	0.05	0.76	4.74	0.25	57.2	0.25	82.3
Dissolved Sodium	mg/L		0.05	4.70	0.05	1.82	10.1	0.25	144	0.25	209
Dissolved Aluminum	mg/L		0.004	0.50	0.004	0.076	0.110	0.004	0.048	0.004	0.226
Dissolved Antimony	mg/L		0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Arsenic	mg/L		0.001	<0.001	0.001	<0.001	0.002	0.001	<0.001	0.001	<0.001
Dissolved Barium	mg/L		0.002	0.023	0.002	0.020	0.047	0.002	0.276	0.002	0.129
Dissolved Beryllium	mg/L		0.0005	<0.0005	0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Boron	mg/L		0.010	0.014	0.010	<0.010	0.217	0.1	1.29	0.1	2.715

Certified By: Iris Veraástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-11

		SAMPLE DESCRIPTION:		BH1		BH8	BH9		BH10		BH11
		SAMPLE TYPE:		Water		Water	Water		Water		Water
		DATE SAMPLED:		2020-06-02		2020-06-02	2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172631	RDL	1172636	1172637	RDL	1172638	RDL	1172639
Dissolved Cadmium	mg/L		0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	0.0002
Dissolved Chromium	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	0.003
Dissolved Cobalt	mg/L		0.0005	0.0053	0.0005	0.0011	0.0118	0.0005	0.0025	0.0005	0.0096
Dissolved Copper	mg/L		0.001	0.003	0.001	0.010	0.007	0.001	0.010	0.001	0.011
Dissolved Iron	mg/L		0.010	5.48	0.010	0.055	15.6	0.010	0.031	0.010	0.126
Dissolved Lead	mg/L		0.0005	0.0008	0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L		0.002	0.526	0.002	0.007	1.62	0.02	2.143	0.02	3.736
Dissolved Molybdenum	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	0.003
Dissolved Nickel	mg/L		0.003	<0.003	0.003	0.006	0.010	0.003	0.003	0.003	0.008
Dissolved Selenium	mg/L		0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Silicon	mg/L		0.05	3.43	0.05	2.85	3.06	0.05	3.67	0.05	1.68
Dissolved Silver	mg/L		0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.033	0.005	0.015	0.110	0.005	0.783	0.005	0.272
Dissolved Tin	mg/L		0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Titanium	mg/L		0.002	0.035	0.002	0.005	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Uranium	mg/L		0.0005	0.0011	0.0005	<0.0005	<0.0005	0.0005	0.0050	0.0005	0.0075
Dissolved Vanadium	mg/L		0.002	0.004	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L		0.005	<0.005	0.005	0.021	0.008	0.005	<0.005	0.005	0.005

Certified By: Iris Veraástegui

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AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-11

		SAMPLE DESCRIPTION:		BH12		BH13		BH14		BH-DUP
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2020-06-02		2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172640	RDL	1172641	RDL	1172642	RDL	1173978
BOD (5)	mg/L		5	<5	5	35	5	32	5	<5
Electrical Conductivity	µS/cm		2	266	2	291	2	472	2	2360
pH	pH Units		NA	7.09	NA	7.32	NA	7.01	NA	7.61
Hardness (as CaCO3) (Calculated)	mg/L		0.5	91.9	0.5	103	0.5	106	0.5	568
Total Dissolved Solids	mg/L		20	134	20	178	20	288	20	1190
Total Suspended Solids	mg/L		10	316	10	39600	10	8970	10	106
Alkalinity (as CaCO3)	mg/L		5	92	5	106	5	67	5	501
Chloride	mg/L		0.10	5.56	0.10	14.1	0.20	86.7	2.0	367
Nitrate as N	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	1.0	2.4
Nitrite as N	mg/L		0.05	<0.05	0.05	<0.05	0.05	<0.05	1.0	<1.0
Sulphate	mg/L		0.10	12.4	0.10	1.50	0.10	3.61	2.0	21.8
Ortho Phosphate as P	mg/L		0.10	<0.10	0.10	<0.10	0.10	<0.10	2.0	<2.0
Ammonia as N	mg/L		0.02	0.25	0.02	0.08	0.02	0.02	0.4	16.7
Total Phosphorus	mg/L		0.02	0.43	0.2	31.9	0.04	4.98	0.02	0.03
Chemical Oxygen Demand	mg/L		5	10	25	221	5	75	5	55
Total Kjeldahl Nitrogen	mg/L		0.10	0.45	0.10	2.52	0.10	0.98	0.10	17.6
Dissolved Organic Carbon	mg/L		0.5	4.7	0.5	27.8	1.0	24.8	1.0	22.9
Phenols	mg/L		0.001	0.001	0.001	0.006	0.001	0.003	0.001	0.006
Turbidity	NTU		0.5	406	3.0	28700	0.5	5920	0.5	31.3
Dissolved Calcium	mg/L		0.05	30.9	0.05	32.9	0.05	31.3	0.25	180
Dissolved Magnesium	mg/L		0.05	3.59	0.05	5.17	0.05	6.84	0.25	28.8
Dissolved Potassium	mg/L		0.05	7.87	0.05	5.82	0.05	8.35	0.25	57.9
Dissolved Sodium	mg/L		0.05	14.5	0.05	9.36	0.05	31.1	0.25	146
Dissolved Aluminum	mg/L		0.004	0.117	0.004	0.134	0.004	0.144	0.004	0.035
Dissolved Antimony	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Arsenic	mg/L		0.001	<0.001	0.001	<0.001	0.001	0.002	0.001	<0.001
Dissolved Barium	mg/L		0.002	0.067	0.002	0.041	0.002	0.103	0.002	0.278
Dissolved Beryllium	mg/L		0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Bismuth	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Boron	mg/L		0.010	0.159	0.010	0.051	0.010	0.223	0.010	1.364

Certified By: Iris Verástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Groundwater Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-11

		SAMPLE DESCRIPTION:		BH12		BH13		BH14		BH-DUP
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2020-06-02		2020-06-02		2020-06-02		2020-06-02
Parameter	Unit	G / S	RDL	1172640	RDL	1172641	RDL	1172642	RDL	1173978
Dissolved Cadmium	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Cobalt	mg/L		0.0005	0.0008	0.0005	0.0009	0.0005	0.0019	0.0005	0.0023
Dissolved Copper	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.008
Dissolved Iron	mg/L		0.010	1.91	0.010	7.29	0.010	3.77	0.010	0.026
Dissolved Lead	mg/L		0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L		0.002	1.18	0.002	0.695	0.002	1.19	0.002	1.89
Dissolved Molybdenum	mg/L		0.002	0.005	0.002	0.006	0.002	<0.002	0.002	<0.002
Dissolved Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	0.007	0.003	0.004
Dissolved Selenium	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.002
Dissolved Silicon	mg/L		0.05	4.70	0.05	5.63	0.05	3.79	0.05	3.92
Dissolved Silver	mg/L		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L		0.005	0.089	0.005	0.087	0.005	0.161	0.005	0.753
Dissolved Tin	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Titanium	mg/L		0.002	0.004	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Uranium	mg/L		0.0005	0.0012	0.0005	0.0020	0.0005	0.0006	0.0005	0.0047
Dissolved Vanadium	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1172631-1173978 DOC analysis completed on a lab filtered sample.

Samples were received and analyzed beyond recommended hold times for Turbidity analyses.

Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range or reduce matrix interference.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Veraástegui

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Surface Water Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-11

		SAMPLE DESCRIPTION:		SW2	SW-DUP
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2020-06-02	2020-06-02
Parameter	Unit	G / S	RDL	1172668	1172670
BOD (5)	mg/L		5	<5	<5
Electrical Conductivity	µS/cm		2	32	31
pH	pH Units	6.5-8.5	NA	6.98	**6.30**
Hardness (as CaCO3) (Calculated)	mg/L		0.5	8.1	8.6
Total Dissolved Solids	mg/L		20	36	36
Total Suspended Solids	mg/L		10	<10	<10
Alkalinity (as CaCO3)	mg/L		5	5	6
Bicarbonate (as CaCO3)	mg/L		5	5	6
Chloride	mg/L		0.10	0.86	0.85
Nitrate as N	mg/L		0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	<0.05
Sulphate	mg/L		0.10	2.92	2.89
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	0.03
Total Phosphorus	mg/L	*	0.02	<0.02	0.02
Chemical Oxygen Demand	mg/L		5	21	28
Dissolved Organic Carbon	mg/L		0.5	6.7	6.7
Total Kjeldahl Nitrogen	mg/L		0.10	0.45	0.55
Phenols	mg/L	0.001	0.001	**0.002**	**0.002**
Turbidity	NTU		0.5	1.0	1.3
Total Calcium	mg/L		0.05	2.42	2.55
Total Magnesium	mg/L		0.05	0.50	0.55
Total Potassium	mg/L		0.05	0.62	0.61
Total Sodium	mg/L		0.05	1.12	1.14
Aluminum-dissolved	mg/L	0.075	0.004	0.063	0.058
Total Antimony	mg/L	0.020	0.001	<0.001	<0.001
Total Arsenic	mg/L	0.1	0.003	<0.003	<0.003
Total Barium	mg/L		0.002	0.008	0.009
Total Beryllium	mg/L	*	0.0005	<0.0005	<0.0005
Total Bismuth	mg/L		0.002	<0.002	<0.002

Certified By: Iris Veraástegui

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Surface Water Parameters

DATE RECEIVED: 2020-06-04

DATE REPORTED: 2020-06-11

		SAMPLE DESCRIPTION:		SW2	SW-DUP
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2020-06-02	2020-06-02
Parameter	Unit	G / S	RDL	1172668	1172670
Total Boron	mg/L	0.2	0.010	<0.010	<0.010
Total Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	<0.0005	<0.0005
Total Copper	mg/L	0.005	0.001	<0.001	<0.001
Total Iron	mg/L	0.3	0.010	**0.451**	**0.474**
Total Lead	mg/L	*	0.001	<0.001	<0.001
Total Manganese	mg/L		0.002	0.077	0.078
Total Molybdenum	mg/L	0.040	0.002	<0.002	<0.002
Total Nickel	mg/L	0.025	0.003	<0.003	<0.003
Total Selenium	mg/L	0.1	0.004	<0.004	<0.004
Total Silicon	mg/L		0.05	0.91	0.88
Total Silver	mg/L	0.0001	0.0001	<0.0001	<0.0001
Total Strontium	mg/L		0.005	0.015	0.016
Total Tin	mg/L		0.002	<0.002	<0.002
Total Titanium	mg/L		0.002	<0.002	<0.002
Total Uranium	mg/L	0.005	0.002	<0.002	<0.002
Total Vanadium	mg/L	0.006	0.002	<0.002	<0.002
Total Zinc	mg/L	0.030	0.005	<0.005	0.008

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1172668-1172670 DOC and Dissolved Aluminum analysis completed on a lab filtered sample.

Samples were received and analyzed beyond recommended hold times for Turbidity analyses.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Veraástegui

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Guideline Violation

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
1172668	SW2	ON PWQO	Croft Surface Water Parameters	Phenols	mg/L	0.001	0.002
1172668	SW2	ON PWQO	Croft Surface Water Parameters	Total Iron	mg/L	0.3	0.451
1172670	SW-DUP	ON PWQO	Croft Surface Water Parameters	Phenols	mg/L	0.001	0.002
1172670	SW-DUP	ON PWQO	Croft Surface Water Parameters	Total Iron	mg/L	0.3	0.474
1172670	SW-DUP	ON PWQO	Croft Surface Water Parameters	pH	pH Units	6.5-8.5	6.30

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Jun 11, 2020

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Croft Surface Water Parameters															
BOD (5)	1172668	1172668	<5	<5	NA	< 5	101%	75%	125%						
Electrical Conductivity	1172462		2160	2130	1.4%	< 2	102%	80%	120%						
pH	1172462		7.61	7.57	0.5%	NA	100%	90%	110%						
Total Dissolved Solids	1167008		734	728	0.8%	< 20	98%	80%	120%						
Total Suspended Solids	1172638	1172638	115	105	9.1%	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	1172462		615	620	0.8%	< 5	95%	80%	120%						
Bicarbonate (as CaCO3)	1172462		615	620	0.8%	< 5	NA								
Chloride	1173978	1173978	367	368	0.3%	< 0.10	100%	70%	130%	109%	80%	120%	106%	70%	130%
Nitrate as N	1173978	1173978	2.4	2.3	4.3%	< 0.05	103%	70%	130%	109%	80%	120%	111%	70%	130%
Nitrite as N	1173978	1173978	<1.0	<1.0	NA	< 0.05	92%	70%	130%	107%	80%	120%	111%	70%	130%
Sulphate	1173978	1173978	21.8	21.1	3.3%	< 0.10	103%	70%	130%	107%	80%	120%	109%	70%	130%
Ortho Phosphate as P	1173978	1173978	<2.0	<2.0	NA	< 0.10	95%	70%	130%	100%	80%	120%	100%	70%	130%
Ammonia as N	1171454		<0.02	<0.02	NA	< 0.02	98%	70%	130%	99%	80%	120%	94%	70%	130%
Total Phosphorus	1171459		<0.02	<0.02	NA	< 0.02	98%	70%	130%	96%	80%	120%	88%	70%	130%
Chemical Oxygen Demand	1168448		<5	<5	NA	< 5	99%	80%	120%	96%	90%	110%	99%	70%	130%
Dissolved Organic Carbon	1160323		10.4	10.4	0.0%	< 0.5	98%	90%	110%	104%	90%	110%	106%	80%	120%
Total Kjeldahl Nitrogen	1172668	1172668	0.45	0.43	NA	< 0.10	101%	70%	130%	103%	80%	120%	101%	70%	130%
Phenols	1172631	1172631	0.001	0.001	NA	< 0.001	98%	90%	110%	102%	90%	110%	104%	80%	120%
Turbidity	1168448		899	881	2.0%	< 0.5	100%	80%	120%						
Total Calcium	1168834		21.1	20.6	2.4%	< 0.05	101%	70%	130%	100%	80%	120%	97%	70%	130%
Total Magnesium	1168834		8.69	8.41	3.3%	< 0.05	108%	70%	130%	106%	80%	120%	103%	70%	130%
Total Potassium	1168834		444	439	1.1%	< 0.05	102%	70%	130%	100%	80%	120%	99%	70%	130%
Total Sodium	1168834		15.3	14.7	4.0%	< 0.05	99%	70%	130%	98%	80%	120%	97%	70%	130%
Aluminum-dissolved	1172668	1172668	0.063	0.053	17.2%	< 0.004	87%	70%	130%	92%	80%	120%	82%	70%	130%
Total Antimony	1177024		<0.005	<0.005	NA	< 0.001	103%	70%	130%	99%	80%	120%	97%	70%	130%
Total Arsenic	1177024		<0.003	<0.003	NA	< 0.003	104%	70%	130%	103%	80%	120%	105%	70%	130%
Total Barium	1177024		0.120	0.117	2.5%	< 0.002	100%	70%	130%	97%	80%	120%	95%	70%	130%
Total Beryllium	1177024		<0.0005	<0.0005	NA	< 0.0005	105%	70%	130%	99%	80%	120%	101%	70%	130%
Total Bismuth	1177024		<0.010	<0.010	NA	< 0.002	84%	70%	130%	102%	80%	120%	98%	70%	130%
Total Boron	1177024		0.074	0.079	6.5%	< 0.010	102%	70%	130%	99%	80%	120%	101%	70%	130%
Total Cadmium	1177024		<0.0005	<0.0005	NA	< 0.0001	103%	70%	130%	101%	80%	120%	98%	70%	130%
Total Chromium	1177024		<0.015	<0.015	NA	< 0.003	104%	70%	130%	101%	80%	120%	98%	70%	130%
Total Cobalt	1177024		<0.0005	<0.0005	NA	< 0.0005	106%	70%	130%	101%	80%	120%	99%	70%	130%
Total Copper	1177024		<0.001	<0.001	NA	< 0.001	107%	70%	130%	103%	80%	120%	96%	70%	130%
Total Iron	1177024		0.129	0.124	4.0%	< 0.010	110%	70%	130%	105%	80%	120%	101%	70%	130%
Total Lead	1177024		<0.001	<0.001	NA	< 0.001	113%	70%	130%	91%	80%	120%	89%	70%	130%
Total Manganese	1177024		0.235	0.237	0.8%	< 0.002	102%	70%	130%	100%	80%	120%	93%	70%	130%
Total Molybdenum	1177024		<0.010	<0.010	NA	< 0.002	105%	70%	130%	103%	80%	120%	100%	70%	130%
Total Nickel	1177024		0.007	0.006	NA	< 0.003	108%	70%	130%	99%	80%	120%	93%	70%	130%

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jun 11, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Selenium	1177024		<0.020	<0.020	NA	< 0.004	98%	70%	130%	97%	80%	120%	98%	70%	130%
Total Silicon	1177024		<0.25	0.27	NA	< 0.05	97%	70%	130%	96%	80%	120%	107%	70%	130%
Total Silver	1177024		<0.0005	<0.0005	NA	< 0.0001	105%	70%	130%	96%	80%	120%	84%	70%	130%
Total Strontium	1177024		0.463	0.439	5.3%	< 0.005	99%	70%	130%	99%	80%	120%	98%	70%	130%
Total Tin	1177024		<0.010	<0.010	NA	< 0.002	98%	70%	130%	97%	80%	120%	96%	70%	130%
Total Titanium	1177024		<0.010	<0.010	NA	< 0.002	101%	70%	130%	102%	80%	120%	94%	70%	130%
Total Uranium	1177024		<0.010	<0.010	NA	< 0.002	85%	70%	130%	101%	80%	120%	101%	70%	130%
Total Vanadium	1177024		<0.002	<0.002	NA	< 0.002	108%	70%	130%	100%	80%	120%	100%	70%	130%
Total Zinc	1177024		<0.005	<0.005	NA	< 0.005	104%	70%	130%	103%	80%	120%	95%	70%	130%
Croft Groundwater Parameters															
BOD (5)	1172638	1172638	<5	<5	NA	< 5	101%	75%	125%						
Electrical Conductivity	1177024		795	796	0.1%	< 2	104%	80%	120%						
pH	1177024		7.45	7.40	0.7%	NA	100%	90%	110%						
Total Dissolved Solids	1167008		734	728	0.8%	< 20	98%	80%	120%						
Total Suspended Solids	1182701		<10	<10	NA	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	1177024		91	91	0.0%	< 5	94%	80%	120%						
Chloride	1173978	1173978	367	368	0.3%	< 0.10	100%	70%	130%	109%	80%	120%	106%	70%	130%
Nitrate as N	1173978	1173978	2.4	2.3	4.3%	< 0.05	103%	70%	130%	109%	80%	120%	111%	70%	130%
Nitrite as N	1173978	1173978	<1.0	<1.0	NA	< 0.05	92%	70%	130%	107%	80%	120%	111%	70%	130%
Sulphate	1173978	1173978	21.8	21.1	3.3%	< 0.10	103%	70%	130%	107%	80%	120%	109%	70%	130%
Ortho Phosphate as P	1173978	1173978	<2.0	<2.0	NA	< 0.10	95%	70%	130%	100%	80%	120%	100%	70%	130%
Ammonia as N	1188939		NA	NA	0.0%	< 0.02	96%	70%	130%	96%	80%	120%	95%	70%	130%
Total Phosphorus	1172631	1172631	0.02	<0.02	NA	< 0.02	97%	70%	130%	97%	80%	120%	107%	70%	130%
Chemical Oxygen Demand	1172631	1172631	32	36	11.8%	< 5	101%	80%	120%	102%	90%	110%	90%	70%	130%
Total Kjeldahl Nitrogen	1172631	1172631	0.53	0.57	7.3%	< 0.10	101%	70%	130%	103%	80%	120%	100%	70%	130%
Dissolved Organic Carbon	1172631	1172631	10.0	9.9	1.0%	< 0.5	94%	90%	110%	100%	90%	110%	99%	80%	120%
Phenols	1172631	1172631	0.001	0.001	NA	< 0.001	98%	90%	110%	102%	90%	110%	104%	80%	120%
Turbidity	1172631	1172631	22.4	22.8	1.8%	< 0.5	102%	80%	120%						
Dissolved Calcium	1172631	1172631	6.43	6.41	0.3%	< 0.05	97%	70%	130%	97%	80%	120%	98%	70%	130%
Dissolved Magnesium	1172631	1172631	1.13	1.12	0.9%	< 0.05	100%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Potassium	1172631	1172631	1.27	1.26	0.8%	< 0.05	106%	70%	130%	106%	80%	120%	109%	70%	130%
Dissolved Sodium	1172631	1172631	4.70	4.69	0.2%	< 0.05	97%	70%	130%	96%	80%	120%	100%	70%	130%
Dissolved Aluminum	1172631	1172631	0.500	0.436	13.7%	< 0.004	101%	70%	130%	94%	80%	120%	79%	70%	130%
Dissolved Antimony	1172631	1172631	<0.001	<0.001	NA	< 0.001	95%	70%	130%	93%	80%	120%	93%	70%	130%
Dissolved Arsenic	1172631	1172631	<0.001	<0.001	NA	< 0.001	100%	70%	130%	99%	80%	120%	102%	70%	130%
Dissolved Barium	1172631	1172631	0.023	0.023	0.0%	< 0.002	94%	70%	130%	91%	80%	120%	92%	70%	130%
Dissolved Beryllium	1172631	1172631	<0.0005	<0.0005	NA	< 0.0005	100%	70%	130%	97%	80%	120%	97%	70%	130%
Dissolved Bismuth	1172631	1172631	<0.002	<0.002	NA	< 0.002	100%	70%	130%	101%	80%	120%	98%	70%	130%
Dissolved Boron	1172631	1172631	0.014	0.012	NA	< 0.010	98%	70%	130%	97%	80%	120%	96%	70%	130%

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jun 11, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Cadmium	1172631	1172631	<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	97%	80%	120%	95%	70%	130%
Dissolved Chromium	1172631	1172631	<0.002	<0.002	NA	< 0.002	96%	70%	130%	92%	80%	120%	91%	70%	130%
Dissolved Cobalt	1172631	1172631	0.0053	0.0054	1.9%	< 0.0005	95%	70%	130%	93%	80%	120%	90%	70%	130%
Dissolved Copper	1172631	1172631	0.003	0.004	NA	< 0.001	96%	70%	130%	93%	80%	120%	91%	70%	130%
Dissolved Iron	1172631	1172631	5.48	5.50	0.4%	< 0.010	101%	70%	130%	97%	80%	120%	97%	70%	130%
Dissolved Lead	1172631	1172631	0.0008	0.0008	NA	< 0.0005	102%	70%	130%	99%	80%	120%	95%	70%	130%
Dissolved Manganese	1172631	1172631	0.526	0.519	1.3%	< 0.002	100%	70%	130%	92%	80%	120%	92%	70%	130%
Dissolved Molybdenum	1172631	1172631	<0.002	<0.002	NA	< 0.002	99%	70%	130%	94%	80%	120%	93%	70%	130%
Dissolved Nickel	1172631	1172631	<0.003	0.004	NA	< 0.003	94%	70%	130%	90%	80%	120%	92%	70%	130%
Dissolved Selenium	1172631	1172631	0.002	0.002	NA	< 0.001	100%	70%	130%	98%	80%	120%	110%	70%	130%
Dissolved Silicon	1172631	1172631	3.49	3.13	10.9%	< 0.05	104%	70%	130%	103%	80%	120%	87%	70%	130%
Dissolved Silver	1172631	1172631	<0.0001	<0.0001	NA	< 0.0001	97%	70%	130%	91%	80%	120%	88%	70%	130%
Dissolved Strontium	1172631	1172631	0.033	0.034	3.0%	< 0.005	96%	70%	130%	94%	80%	120%	89%	70%	130%
Dissolved Tin	1172631	1172631	<0.002	<0.002	NA	< 0.002	96%	70%	130%	93%	80%	120%	90%	70%	130%
Dissolved Titanium	1172631	1172631	0.050	0.047	6.2%	< 0.002	83%	70%	130%	83%	80%	120%	107%	70%	130%
Dissolved Uranium	1172631	1172631	0.0011	0.0011	NA	< 0.0005	98%	70%	130%	101%	80%	120%	99%	70%	130%
Dissolved Vanadium	1172631	1172631	0.004	0.004	NA	< 0.002	95%	70%	130%	92%	80%	120%	92%	70%	130%
Dissolved Zinc	1172631	1172631	<0.005	<0.005	NA	< 0.005	98%	70%	130%	97%	80%	120%	96%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
BOD (5)	INOR-93-6006	SM 5210 B	DO METER
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Phenols	INOR-93-6050	MOE ROPHEN-E 3179 & SM 5530 D	TECHNICON AUTO ANALYZER
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Dissolved Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Aluminum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Bismuth	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silicon	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Strontium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Tin	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Titanium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Bismuth	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U609240

PROJECT: 225335 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silicon	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario; L4Z 1Y2
Phone: 905-712-5100;
Fax: 905-712-5122

CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY
Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature: 8.6 | 8.1 | 8.4
AGAT Job Number:
Notes: 20U609240.

Client Information

Company: Pinchin Ltd.
Contact: Tim McBride
Address: 957 Cambrian Heights, Unit # 203
Sudbury ON P3C 5S5
Phone: 705-521-0560 Fax:
PO#:
Client Project #: 225335 Croft Landfill
AGAT Quotation #: 267698

Report Information

1. Name: Tim McBride
Email: tmcbride@Pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format (Please "x" those that apply)
[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)* (Please "x" the applicable box below)
Regular TAT:
[x] 5 to 7 working days
Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours
Date Required (Rush surcharges may apply)

Regulatory Guideline Required: (Please "x" those that apply)

[ ] Reg 153 Table (indicate one) [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one) [ ] Sanitary [ ] Storm
[ ] PWQO [ ] Reg 558 [ ] CCME [x] Other (indicate) GW - ODWS

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes [x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions - Cl, NO3, NO2, Phos-P, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Ammonia	BOD, COD, DOC	Conductivity, Phenols	Total Phosphorous	TDS, TSS	TKN, Turbidity	pH, Hardness						
BH1	Jun 2'20		water	7		x	x	x	x	x	x	x	x	x	x						
BH8			water	7		x	x	x	x	x	x	x	x	x	x						
BH9			water	7		x	x	x	x	x	x	x	x	x	x						
BH10			water	7		x	x	x	x	x	x	x	x	x	x						
BH11			water	7		x	x	x	x	x	x	x	x	x	x						
BH12			water	7		x	x	x	x	x	x	x	x	x	x						
BH13			water	7		x	x	x	x	x	x	x	x	x	x						
BH14			water	7		x	x	x	x	x	x	x	x	x	x						
DP7			water	7		x	x	x	x	x	x	x	x	x	x						
DP8			water	7		x	x	x	x	x	x	x	x	x	x						
DP9			water	7		x	x	x	x	x	x	x	x	x	x						
			TOTAL # OF CONTAINERS	77	* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays																

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	Special Instructions
Meagan Bradley	3:30pm/June2 2020	Shaymin	June 4/2020 11AM	PLEASE FILTER DOC AT SAMPLE RECEPTION
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: PINCHIN LTD.
957 CAMBRIAN HEIGHTS DRIVE, UNIT 203
SUDBURY, ON P3C 5S5
(705) 521-0560
ATTENTION TO: Tim McBride
PROJECT: 225335.003 Croft Landfill
AGAT WORK ORDER: 20U658705
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Oct 14, 2020
PAGES (INCLUDING COVER): 21
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days following analysis, unless expressly agreed otherwise in writing. Please contact your Client Project Manager if you require additional sample storage time.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

BOD-Toronto

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

		SAMPLE DESCRIPTION:		BH1	BH8	BH9	BH10	BH11	BH12	BH13	BH14
		SAMPLE TYPE:		Water	Water	Water	Water	Water	Water	Water	Water
		DATE SAMPLED:		2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00
Parameter	**Unit**	**G / S**	**RDL**	**1509797**	**1509825**	**1509826**	**1509827**	**1509828**	**1509829**	**1509830**	**1509831**
Biochemical Oxygen Demand, Total	mg/L		2	3	<2	9	<2	3	<2	2	8

		SAMPLE DESCRIPTION:		BHDUP	SW-1	SW-2	SW-3	SW-DUP
		SAMPLE TYPE:		Water	Water	Water	Water	Water
		DATE SAMPLED:		2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00	2020-10-01 09:00
Parameter	**Unit**	**G / S**	**RDL**	**1509832**	**1509833**	**1509857**	**1509858**	**1509859**
Biochemical Oxygen Demand, Total	mg/L		2	<2	3	3	3	3

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Iris Veraástegui

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Groundwater Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

					SAMPLE DESCRIPTION:	BH1		BH8		BH9		BH10
					SAMPLE TYPE:	Water		Water		Water		Water
					DATE SAMPLED:	2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00
Parameter	Unit	G / S: A	G / S: B	RDL	1509797	RDL	1509825	RDL	1509826	RDL	1509827
Electrical Conductivity	µS/cm			2	189	2	51	2	397	2	1880
pH	pH Units		6.5-8.5	NA	6.33	NA	6.21	NA	6.73	NA	7.62
Hardness (as CaCO3) (Calculated)	mg/L		80-100	0.5	59.0	0.5	18.9	0.5	159	0.5	531
Total Dissolved Solids	mg/L		500	20	120[<B]	20	32[<B]	20	230[<B]	20	1240[>B]
Total Suspended Solids	mg/L			10	27	10	274	10	108	10	43
Alkalinity (as CaCO3)	mg/L		30-500	5	74	5	27	5	152	5	559
Chloride	mg/L		250	0.10	12.7[<B]	0.10	0.44[<B]	0.10	48.7[<B]	1.0	395[>B]
Nitrate as N	mg/L	10.0		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.5	<0.5
Nitrite as N	mg/L	1.0		0.05	<0.05	0.05	<0.05	0.05	<0.05	0.5	<0.5
Sulphate	mg/L		500	0.10	18.0[<B]	0.10	7.08[<B]	0.10	16.2[<B]	1.0	24.5[<B]
Phosphate as P	mg/L			0.10	<0.10	0.10	<0.10	0.10	<0.10	1.0	<1.0
Ammonia as N	mg/L			0.02	0.14	0.02	<0.02	0.02	0.96	0.04	13.4
Total Kjeldahl Nitrogen	mg/L			0.10	0.72	0.10	0.19	0.10	2.12	0.10	15.4
Total Phosphorus	mg/L			0.02	0.06	0.02	0.13	0.02	0.11	0.02	0.06
Chemical Oxygen Demand	mg/L			5	<5	5	<5	5	53	5	45
Dissolved Organic Carbon	mg/L		5	0.5	15.6[>B]	0.5	3.5[<B]	0.5	28.0[>B]	0.5	25.4[>B]
Phenols	mg/L			0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.003
Turbidity	NTU		5	0.5	8.1[>B]	0.5	119[>B]	0.5	72.8[>B]	0.5	9.1[>B]
Dissolved Calcium	mg/L			0.05	18.1	0.05	5.44	0.05	51.4	0.25	170
Dissolved Magnesium	mg/L			0.05	3.36	0.05	1.28	0.05	7.42	0.25	25.9
Dissolved Potassium	mg/L			0.05	2.24	0.05	1.32	0.05	7.17	0.25	57.1
Dissolved Sodium	mg/L	20		0.05	7.32[<A]	0.05	1.91[<A]	0.05	45.8[>A]	0.25	159[>A]
Dissolved Aluminum	mg/L			0.004	0.827	0.004	0.056	0.004	0.147	0.004	0.036
Dissolved Antimony	mg/L	0.006		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Dissolved Arsenic	mg/L	0.01		0.001	0.007[<A]	0.001	<0.001	0.001	0.002[<A]	0.001	<0.001
Dissolved Barium	mg/L	1.0		0.002	0.059[<A]	0.002	0.024[<A]	0.002	0.059[<A]	0.002	0.236[<A]
Dissolved Beryllium	mg/L			0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Bismuth	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Boron	mg/L	5.0		0.010	0.045[<A]	0.010	<0.010	0.010	0.384[<A]	0.10	1.47[<A]

Certified By: Iris Veraástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Groundwater Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

				SAMPLE DESCRIPTION:	BH1		BH8		BH9		BH10
				SAMPLE TYPE:	Water		Water		Water		Water
				DATE SAMPLED:	2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00
Parameter	Unit	G / S: A	G / S: B	RDL	1509797	RDL	1509825	RDL	1509826	RDL	1509827
Dissolved Cadmium	mg/L	0.005		0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	0.003[<A]	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Cobalt	mg/L			0.0005	0.0158	0.0005	0.0018	0.0005	0.0090	0.0005	0.0023
Dissolved Copper	mg/L			0.001	0.005	0.001	0.013	0.001	0.003	0.001	0.007
Dissolved Iron	mg/L			0.050	13.9	0.010	0.030	0.10	15.9	0.010	0.049
Dissolved Lead	mg/L	0.010		0.0005	0.0020[<A]	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L			0.010	1.40	0.002	0.012	0.02	1.86	0.02	2.02
Dissolved Molybdenum	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Nickel	mg/L			0.003	<0.003	0.003	0.008	0.003	0.004	0.003	<0.003
Dissolved Selenium	mg/L	0.05		0.001	0.001[<A]	0.001	<0.001	0.001	<0.001	0.001	0.001[<A]
Dissolved Silicon	mg/L			0.05	4.96	0.05	4.30	0.05	3.84	0.05	3.89
Dissolved Silver	mg/L			0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L			0.005	0.092	0.005	0.022	0.005	0.099	0.005	0.601
Dissolved Tin	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Titanium	mg/L			0.002	0.125	0.002	<0.002	0.002	0.005	0.002	0.005
Dissolved Uranium	mg/L	0.02		0.0005	0.0022[<A]	0.0005	<0.0005	0.0005	<0.0005	0.0005	0.0040[<A]
Dissolved Vanadium	mg/L			0.002	0.007	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L			0.005	<0.005	0.005	0.031	0.005	0.006	0.005	<0.005
Lab Filtration Performed					Y		Y		Y		Y

Certified By: Iris Veraástegui

AGAT Laboratories

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TEL (905)712-5100
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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Groundwater Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

					SAMPLE DESCRIPTION:		BH11		BH12		BH13		BH14
					SAMPLE TYPE:		Water		Water		Water		Water
					DATE SAMPLED:		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00
Parameter	Unit	G / S: A	G / S: B	RDL	1509828	RDL	1509829	RDL	1509830	RDL	1509831		
Electrical Conductivity	µS/cm			2	1420	2	205	2	206	2	408		
pH	pH Units		6.5-8.5	NA	7.41	NA	6.70	NA	6.74	NA	6.69		
Hardness (as CaCO3) (Calculated)	mg/L		80-100	0.5	237	0.5	80.9	0.5	108	0.5	130		
Total Dissolved Solids	mg/L		500	20	836[>B]	20	116[<B]	20	114[<B]	20	256[<B]		
Total Suspended Solids	mg/L			10	65	10	1500	10	18600	10	4150		
Alkalinity (as CaCO3)	mg/L		30-500	5	484	5	97	5	116	5	118		
Chloride	mg/L		250	0.50	178[<B]	0.10	8.55[<B]	0.10	6.98[<B]	0.10	73.4[<B]		
Nitrate as N	mg/L	10.0		0.25	<0.25	0.05	0.08[<A]	0.05	<0.05	0.05	<0.05		
Nitrite as N	mg/L	1.0		0.25	<0.25	0.05	<0.05	0.05	<0.05	0.05	<0.05		
Sulphate	mg/L		500	0.50	84.5[<B]	0.10	16.7[<B]	0.10	2.94[<B]	0.10	6.82[<B]		
Phosphate as P	mg/L			0.50	<0.50	0.10	<0.10	0.10	<0.10	0.10	<0.10		
Ammonia as N	mg/L			0.2	26.2	0.02	0.11	0.02	0.48	0.02	0.29		
Total Kjeldahl Nitrogen	mg/L			0.10	30.3	0.10	0.30	0.10	0.92	0.10	0.96		
Total Phosphorus	mg/L			0.02	0.14	0.02	0.80	0.10	8.74	0.10	7.38		
Chemical Oxygen Demand	mg/L			50	200	5	<5	5	18	5	35		
Dissolved Organic Carbon	mg/L		5	7	109[>B]	0.5	4.9[<B]	0.5	5.6[>B]	0.5	23.4[>B]		
Phenols	mg/L			0.001	0.004	0.001	<0.001	0.001	0.002	0.001	<0.001		
Turbidity	NTU		5	0.5	44.6[>B]	0.5	550[>B]	3.0	23200[>B]	2.5	6190[>B]		
Dissolved Calcium	mg/L			0.25	68.5	0.05	27.6	0.05	36.3	0.05	39.8		
Dissolved Magnesium	mg/L			0.25	15.9	0.05	2.92	0.05	4.21	0.05	7.49		
Dissolved Potassium	mg/L			0.25	55.2	0.05	3.00	0.05	2.45	0.05	6.14		
Dissolved Sodium	mg/L	20		0.25	150[>A]	0.05	12.4[<A]	0.05	2.68[<A]	0.05	26.9[>A]		
Dissolved Aluminum	mg/L			0.004	0.754	0.04	1.34	0.004	0.070	0.004	0.083		
Dissolved Antimony	mg/L	0.006		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001		
Dissolved Arsenic	mg/L	0.01		0.001	<0.001	0.001	0.002[<A]	0.001	<0.001	0.001	0.002[<A]		
Dissolved Barium	mg/L	1.0		0.002	0.154[<A]	0.002	0.057[<A]	0.002	0.054[<A]	0.002	0.109[<A]		
Dissolved Beryllium	mg/L			0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005		
Dissolved Bismuth	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002		
Dissolved Boron	mg/L	5.0		0.10	2.63[<A]	0.010	0.067[<A]	0.010	0.026[<A]	0.010	0.165[<A]		

Certified By: Iris Veraástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Groundwater Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

					SAMPLE DESCRIPTION:	BH11		BH12		BH13		BH14
					SAMPLE TYPE:	Water		Water		Water		Water
					DATE SAMPLED:	2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00
Parameter	Unit	G / S: A	G / S: B	RDL	1509828	RDL	1509829	RDL	1509830	RDL	1509831
Dissolved Cadmium	mg/L	0.005		0.0001	0.0003[<A]	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	0.004[<A]	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Cobalt	mg/L			0.0005	0.0069	0.0005	<0.0005	0.0005	<0.0005	0.0005	0.0016
Dissolved Copper	mg/L			0.001	0.018	0.001	0.002	0.001	<0.001	0.001	0.001
Dissolved Iron	mg/L			0.010	0.719	0.010	3.80	0.010	2.26	0.010	4.35
Dissolved Lead	mg/L	0.010		0.0005	<0.0005	0.0005	0.0008[<A]	0.0005	<0.0005	0.0005	<0.0005
Dissolved Manganese	mg/L			0.02	2.11	0.002	0.423	0.002	0.515	0.02	1.12
Dissolved Molybdenum	mg/L			0.002	0.004	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Nickel	mg/L			0.003	0.007	0.003	<0.003	0.003	<0.003	0.003	<0.003
Dissolved Selenium	mg/L	0.05		0.001	0.003[<A]	0.001	<0.001	0.001	<0.001	0.001	0.012[<A]
Dissolved Silicon	mg/L			0.05	2.22	0.5	7.8	0.5	5.6	0.5	7.9
Dissolved Silver	mg/L			0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Dissolved Strontium	mg/L			0.005	0.175	0.005	0.096	0.005	0.062	0.005	0.154
Dissolved Tin	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Titanium	mg/L			0.002	0.021	0.002	0.144	0.002	0.002	0.002	<0.002
Dissolved Uranium	mg/L	0.02		0.0005	0.0052[<A]	0.0005	0.0007[<A]	0.0005	0.0013[<A]	0.0005	<0.0005
Dissolved Vanadium	mg/L			0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Dissolved Zinc	mg/L			0.005	0.008	0.005	0.012	0.005	<0.005	0.005	<0.005
Lab Filtration Performed					Y		Y		Y		Y

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Groundwater Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

					SAMPLE DESCRIPTION:	BHDUP
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2020-10-01 09:00
Parameter	Unit	G / S: A	G / S: B	RDL	1509832	
Electrical Conductivity	µS/cm			2	1880	
pH	pH Units		6.5-8.5	NA	7.65	
Hardness (as CaCO3) (Calculated)	mg/L		80-100	0.5	547	
Total Dissolved Solids	mg/L		500	20	1090[>B]	
Total Suspended Solids	mg/L			10	18	
Alkalinity (as CaCO3)	mg/L		30-500	5	559	
Chloride	mg/L		250	1.0	422[>B]	
Nitrate as N	mg/L	10.0		0.5	<0.5	
Nitrite as N	mg/L	1.0		0.5	<0.5	
Sulphate	mg/L		500	1.0	26.3[<B]	
Phosphate as P	mg/L			1.0	<1.0	
Ammonia as N	mg/L			0.08	13.7	
Total Kjeldahl Nitrogen	mg/L			0.10	14.9	
Total Phosphorus	mg/L			0.02	0.06	
Chemical Oxygen Demand	mg/L			5	42	
Dissolved Organic Carbon	mg/L		5	0.5	24.8[>B]	
Phenols	mg/L			0.001	0.003	
Turbidity	NTU		5	0.5	10.9[>B]	
Dissolved Calcium	mg/L			0.25	175	
Dissolved Magnesium	mg/L			0.25	26.8	
Dissolved Potassium	mg/L			0.25	58.3	
Dissolved Sodium	mg/L	20		0.25	166[>A]	
Dissolved Aluminum	mg/L			0.004	0.038	
Dissolved Antimony	mg/L	0.006		0.001	<0.001	
Dissolved Arsenic	mg/L	0.01		0.001	<0.001	
Dissolved Barium	mg/L	1.0		0.002	0.250[<A]	
Dissolved Beryllium	mg/L			0.0005	<0.0005	
Dissolved Bismuth	mg/L			0.002	<0.002	
Dissolved Boron	mg/L	5.0		0.10	1.32[<A]	

Certified By: Iris Veraástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Groundwater Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

				SAMPLE DESCRIPTION:	**BHDUP**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2020-10-01 09:00**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**1509832**
Dissolved Cadmium	mg/L	0.005		0.0001	<0.0001
Dissolved Chromium	mg/L	0.05		0.002	<0.002
Dissolved Cobalt	mg/L			0.0005	0.0031
Dissolved Copper	mg/L			0.001	0.008
Dissolved Iron	mg/L			0.010	0.030
Dissolved Lead	mg/L	0.010		0.0005	<0.0005
Dissolved Manganese	mg/L			0.02	1.78
Dissolved Molybdenum	mg/L			0.002	<0.002
Dissolved Nickel	mg/L			0.003	<0.003
Dissolved Selenium	mg/L	0.05		0.001	0.002[<A]
Dissolved Silicon	mg/L			0.05	4.27
Dissolved Silver	mg/L			0.0001	<0.0001
Dissolved Strontium	mg/L			0.005	0.673
Dissolved Tin	mg/L			0.002	<0.002
Dissolved Titanium	mg/L			0.002	0.003
Dissolved Uranium	mg/L	0.02		0.0005	0.0044[<A]
Dissolved Vanadium	mg/L			0.002	<0.002
Dissolved Zinc	mg/L			0.005	<0.005
Lab Filtration Performed					Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to O. Reg 169/03 - Ontario Drinking Water Quality Standards. Na value derived from O. Reg 248, B Refers to O. Reg 169/03 - Ontario Drinking Water Quality Standards - Aesthetic Objectives and Operational Guidelines
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1509797-1509832 DOC analysis completed on a lab filtered sample.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Veraástegui

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Surface Water Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

		SAMPLE DESCRIPTION:		SW-1		SW-2		SW-3		SW-DUP
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00
Parameter	Unit	G / S	RDL	1509833	RDL	1509857	RDL	1509858	RDL	1509859
Electrical Conductivity	µS/cm		2	676	2	23	2	901	2	23
pH	pH Units	6.5-8.5	NA	**4.93**	NA	6.66	NA	8.15	NA	**6.45**
Hardness (as CaCO3) (Calculated)	mg/L		0.5	158	0.5	9.5	0.5	309	0.5	10.1
Total Dissolved Solids	mg/L		20	418	20	<20	20	536	20	20
Total Suspended Solids	mg/L		10	10	10	<10	10	<10	10	<10
Alkalinity (as CaCO3)	mg/L		5	<5	5	13	5	444	5	13
Bicarbonate (as CaCO3)	mg/L		5	<5	5	13	5	444	5	13
Chloride	mg/L		0.50	231	0.10	0.92	0.50	61.5	0.10	0.81
Nitrate as N	mg/L		0.10	<0.10	0.05	<0.05	0.25	1.40	0.05	<0.05
Nitrite as N	mg/L		0.10	<0.10	0.05	<0.05	0.25	<0.25	0.05	<0.05
Sulphate	mg/L		0.20	2.71	0.10	1.89	0.50	17.0	0.10	1.26
Phosphate as P	mg/L		0.20	<0.20	0.10	<0.10	0.50	<0.50	0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02	0.02	0.03	0.08	14.3	0.02	0.04
Total Kjeldahl Nitrogen	mg/L		0.10	0.45	0.10	0.62	0.10	17.4	0.10	0.56
Total Phosphorus	mg/L	*	0.02	0.02	0.02	<0.02	0.02	0.04	0.02	<0.02
Chemical Oxygen Demand	mg/L		5	20	5	7	5	75	5	9
Dissolved Organic Carbon	mg/L		0.5	10.0	0.5	11.0	0.5	40.4	0.5	11.7
Phenols	mg/L	0.001	0.001	**0.003**	0.001	<0.001	0.001	**0.003**	0.001	0.001
Turbidity	NTU		0.5	4.8	0.5	1.5	0.5	7.2	0.5	2.4
Total Calcium	mg/L		0.25	37.78	0.25	2.83	0.25	101.58	0.25	3.05
Total Magnesium	mg/L		0.25	15.49	0.25	0.59	0.25	13.45	0.25	0.60
Total Potassium	mg/L		0.25	1.71	0.25	0.58	0.25	29.60	0.25	0.63
Total Sodium	mg/L		0.25	22.60	0.25	0.97	0.25	62.32	0.25	1.04
Aluminum-dissolved	mg/L	*	0.004	1.42	0.004	0.087	0.004	0.035	0.004	0.088
Total Antimony	mg/L	0.020	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Total Arsenic	mg/L	0.1	0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Total Barium	mg/L		0.002	0.106	0.002	0.012	0.002	0.040	0.002	0.012
Total Beryllium	mg/L	*	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005	0.0005	<0.0005
Total Bismuth	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002

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Certificate of Analysis

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Croft Landfill - Surface Water Parameters

DATE RECEIVED: 2020-10-01

DATE REPORTED: 2020-10-14

		SAMPLE DESCRIPTION:		SW-1		SW-2		SW-3		SW-DUP
		SAMPLE TYPE:		Water		Water		Water		Water
		DATE SAMPLED:		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00		2020-10-01 09:00
Parameter	Unit	G / S	RDL	1509833	RDL	1509857	RDL	1509858	RDL	1509859
Total Boron	mg/L	0.2	0.010	0.023	0.010	0.019	0.010	**1.42**	0.010	0.060
Total Cadmium	mg/L	0.0002	0.0001	0.0002	0.0001	**0.0004**	0.0001	<0.0001	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	**0.0131**	0.0005	<0.0005	0.0005	**0.0013**	0.0005	<0.0005
Total Copper	mg/L	0.005	0.001	0.002	0.001	0.002	0.001	0.005	0.001	<0.001
Total Iron	mg/L	0.3	0.010	**5.58**	0.010	**1.25**	0.010	**1.04**	0.010	**1.30**
Total Lead	mg/L	*	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001
Total Manganese	mg/L		0.002	0.873	0.002	0.076	0.002	0.479	0.002	0.076
Total Molybdenum	mg/L	0.040	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Total Nickel	mg/L	0.025	0.003	0.006	0.003	<0.003	0.003	<0.003	0.003	0.003
Total Selenium	mg/L	0.1	0.004	<0.004	0.004	<0.004	0.004	<0.004	0.004	<0.004
Total Silicon	mg/L		0.05	3.88	0.05	2.02	0.05	2.48	0.05	2.10
Total Silver	mg/L	0.0001	0.0001	<0.0001	0.0001	**0.0004**	0.0001	<0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.378	0.005	0.019	0.005	0.317	0.005	0.018
Total Tin	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Total Titanium	mg/L		0.002	0.002	0.002	0.002	0.002	0.008	0.002	<0.002
Total Uranium	mg/L	0.005	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Total Vanadium	mg/L	0.006	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002
Total Zinc	mg/L	0.030	0.005	**0.089**	0.005	0.008	0.005	<0.005	0.005	0.006
Lab Filtration Performed				Y		Y		Y		Y

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

1509833-1509859 DOC & Dissolved Al analysis completed on a lab filtered sample.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Veraástegui

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Exceedance Summary

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
1509797	BH1	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Dissolved Organic Carbon	mg/L	5	15.6
1509797	BH1	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	59.0
1509797	BH1	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	8.1
1509797	BH1	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	pH	pH Units	6.5-8.5	6.33
1509825	BH8	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Alkalinity (as CaCO3)	mg/L	30-500	27
1509825	BH8	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	18.9
1509825	BH8	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	119
1509825	BH8	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	pH	pH Units	6.5-8.5	6.21
1509826	BH9	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Dissolved Organic Carbon	mg/L	5	28.0
1509826	BH9	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	159
1509826	BH9	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	72.8
1509826	BH9	ON 169/03 MAC/IMAC	Croft Landfill - Groundwater Parameters	Dissolved Sodium	mg/L	20	45.8
1509827	BH10	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Alkalinity (as CaCO3)	mg/L	30-500	559
1509827	BH10	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Chloride	mg/L	250	395
1509827	BH10	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Dissolved Organic Carbon	mg/L	5	25.4
1509827	BH10	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	531
1509827	BH10	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Total Dissolved Solids	mg/L	500	1240
1509827	BH10	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	9.1
1509827	BH10	ON 169/03 MAC/IMAC	Croft Landfill - Groundwater Parameters	Dissolved Sodium	mg/L	20	159
1509828	BH11	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Dissolved Organic Carbon	mg/L	5	109
1509828	BH11	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	237
1509828	BH11	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Total Dissolved Solids	mg/L	500	836
1509828	BH11	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	44.6
1509828	BH11	ON 169/03 MAC/IMAC	Croft Landfill - Groundwater Parameters	Dissolved Sodium	mg/L	20	150
1509829	BH12	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	550
1509830	BH13	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Dissolved Organic Carbon	mg/L	5	5.6
1509830	BH13	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	108
1509830	BH13	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	23200
1509831	BH14	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Dissolved Organic Carbon	mg/L	5	23.4
1509831	BH14	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	130
1509831	BH14	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	6190
1509831	BH14	ON 169/03 MAC/IMAC	Croft Landfill - Groundwater Parameters	Dissolved Sodium	mg/L	20	26.9
1509832	BHDUP	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Alkalinity (as CaCO3)	mg/L	30-500	559
1509832	BHDUP	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Chloride	mg/L	250	422
1509832	BHDUP	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Dissolved Organic Carbon	mg/L	5	24.8
1509832	BHDUP	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Hardness (as CaCO3) (Calculated)	mg/L	80-100	547
1509832	BHDUP	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Total Dissolved Solids	mg/L	500	1090
1509832	BHDUP	ON 169/03 AO&OG	Croft Landfill - Groundwater Parameters	Turbidity	NTU	5	10.9
1509832	BHDUP	ON 169/03 MAC/IMAC	Croft Landfill - Groundwater Parameters	Dissolved Sodium	mg/L	20	166
1509833	SW-1	ON PWQO	Croft Landfill - Surface Water Parameters	Phenols	mg/L	0.001	0.003
1509833	SW-1	ON PWQO	Croft Landfill - Surface Water Parameters	Total Cobalt	mg/L	0.0009	0.0131
1509833	SW-1	ON PWQO	Croft Landfill - Surface Water Parameters	Total Iron	mg/L	0.3	5.58
1509833	SW-1	ON PWQO	Croft Landfill - Surface Water Parameters	Total Zinc	mg/L	0.030	0.089

AGAT Laboratories

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Exceedance Summary

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

CLIENT NAME: PINCHIN LTD.

ATTENTION TO: Tim McBride

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
1509833	SW-1	ON PWQO	Croft Landfill - Surface Water Parameters	pH	pH Units	6.5-8.5	4.93
1509857	SW-2	ON PWQO	Croft Landfill - Surface Water Parameters	Total Cadmium	mg/L	0.0002	0.0004
1509857	SW-2	ON PWQO	Croft Landfill - Surface Water Parameters	Total Iron	mg/L	0.3	1.25
1509857	SW-2	ON PWQO	Croft Landfill - Surface Water Parameters	Total Silver	mg/L	0.0001	0.0004
1509858	SW-3	ON PWQO	Croft Landfill - Surface Water Parameters	Phenols	mg/L	0.001	0.003
1509858	SW-3	ON PWQO	Croft Landfill - Surface Water Parameters	Total Boron	mg/L	0.2	1.42
1509858	SW-3	ON PWQO	Croft Landfill - Surface Water Parameters	Total Cobalt	mg/L	0.0009	0.0013
1509858	SW-3	ON PWQO	Croft Landfill - Surface Water Parameters	Total Iron	mg/L	0.3	1.04
1509859	SW-DUP	ON PWQO	Croft Landfill - Surface Water Parameters	Total Iron	mg/L	0.3	1.30
1509859	SW-DUP	ON PWQO	Croft Landfill - Surface Water Parameters	pH	pH Units	6.5-8.5	6.45

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Oct 14, 2020

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Croft Landfill - Groundwater Parameters															
Electrical Conductivity	1509781		441	441	0.0%	< 2	96%	90%	110%						
pH	1509781		6.85	6.79	0.9%	NA	100%	90%	110%						
Total Dissolved Solids	1509709		594	582	2.0%	< 20	102%	80%	120%						
Total Suspended Solids	1512211		<10	<10	NA	< 10	98%	80%	120%						
Alkalinity (as CaCO3)	1509781		201	200	0.5%	< 5	102%	80%	120%						
Chloride	1509858	1509858	61.5	61.1	0.7%	< 0.10	96%	70%	130%	105%	80%	120%	112%	70%	130%
Nitrate as N	1509858	1509858	1.40	1.40	0.0%	< 0.05	99%	70%	130%	103%	80%	120%	107%	70%	130%
Nitrite as N	1509858	1509858	<0.25	<0.25	NA	< 0.05	94%	70%	130%	99%	80%	120%	106%	70%	130%
Sulphate	1509858	1509858	17.0	16.9	0.6%	< 0.10	96%	70%	130%	101%	80%	120%	106%	70%	130%
Phosphate as P	1509858	1509858	<0.50	<0.50	NA	< 0.10	105%	70%	130%	99%	80%	120%	106%	70%	130%
Ammonia as N	1509777		0.27	0.26	3.8%	< 0.02	105%	70%	130%	101%	80%	120%	96%	70%	130%
Total Kjeldahl Nitrogen	1509709		0.80	0.79	1.3%	< 0.10	103%	70%	130%	101%	80%	120%	103%	70%	130%
Total Phosphorus	1509765		<0.02	<0.02	NA	< 0.02	102%	70%	130%	106%	80%	120%	105%	70%	130%
Chemical Oxygen Demand	1509718		18	17	NA	< 5	106%	80%	120%	102%	90%	110%	105%	70%	130%
Dissolved Organic Carbon	1509718		9.9	9.9	0.0%	< 0.5	98%	90%	110%	107%	90%	110%	NA	80%	120%
Phenols	1509779		0.009	0.009	0.0%	< 0.001	101%	90%	110%	98%	90%	110%	106%	80%	120%
Turbidity	1509797	1509797	8.1	8.2	1.2%	< 0.5	102%	80%	120%						
Dissolved Calcium	1509797	1509797	18.1	20.0	10.0%	< 0.05	101%	70%	130%	98%	80%	120%	103%	70%	130%
Dissolved Magnesium	1509797	1509797	3.36	3.73	10.4%	< 0.05	102%	70%	130%	99%	80%	120%	104%	70%	130%
Dissolved Potassium	1509797	1509797	2.24	2.39	6.5%	< 0.05	102%	70%	130%	98%	80%	120%	104%	70%	130%
Dissolved Sodium	1509797	1509797	7.32	7.93	8.0%	< 0.05	100%	70%	130%	95%	80%	120%	100%	70%	130%
Dissolved Aluminum	1509797	1509797	0.827	0.808	2.3%	< 0.004	95%	70%	130%	101%	80%	120%	95%	70%	130%
Dissolved Antimony	1509797	1509797	<0.001	<0.001	NA	< 0.001	104%	70%	130%	99%	80%	120%	103%	70%	130%
Dissolved Arsenic	1509797	1509797	0.007	0.006	15.4%	< 0.001	103%	70%	130%	97%	80%	120%	108%	70%	130%
Dissolved Barium	1509797	1509797	0.059	0.056	5.2%	< 0.002	101%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Beryllium	1509797	1509797	<0.0005	<0.0005	NA	< 0.0005	102%	70%	130%	104%	80%	120%	105%	70%	130%
Dissolved Bismuth	1509797	1509797	<0.002	<0.002	NA	< 0.002	97%	70%	130%	102%	80%	120%	100%	70%	130%
Dissolved Boron	1509797	1509797	0.045	0.046	NA	< 0.010	99%	70%	130%	100%	80%	120%	98%	70%	130%
Dissolved Cadmium	1509797	1509797	<0.0001	<0.0001	NA	< 0.0001	107%	70%	130%	101%	80%	120%	101%	70%	130%
Dissolved Chromium	1509797	1509797	0.003	0.002	NA	< 0.002	106%	70%	130%	105%	80%	120%	101%	70%	130%
Dissolved Cobalt	1509797	1509797	0.0158	0.0147	7.2%	< 0.0005	107%	70%	130%	105%	80%	120%	99%	70%	130%
Dissolved Copper	1509797	1509797	0.005	0.004	NA	< 0.001	106%	70%	130%	107%	80%	120%	104%	70%	130%
Dissolved Iron	1509797	1509797	13.9	15.3	9.6%	< 0.010	110%	70%	130%	107%	80%	120%	98%	70%	130%
Dissolved Lead	1509797	1509797	0.0020	0.0020	NA	< 0.0005	96%	70%	130%	101%	80%	120%	100%	70%	130%
Dissolved Manganese	1509797	1509797	1.40	1.50	6.9%	< 0.002	108%	70%	130%	108%	80%	120%	100%	70%	130%
Dissolved Molybdenum	1509797	1509797	<0.002	<0.002	NA	< 0.002	110%	70%	130%	107%	80%	120%	106%	70%	130%
Dissolved Nickel	1509797	1509797	<0.003	<0.003	NA	< 0.003	107%	70%	130%	104%	80%	120%	103%	70%	130%
Dissolved Selenium	1509797	1509797	0.001	0.001	NA	< 0.001	107%	70%	130%	102%	80%	120%	112%	70%	130%
Dissolved Silicon	1509797	1509797	4.96	4.56	8.4%	< 0.05	84%	70%	130%	105%	80%	120%	71%	70%	130%

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Oct 14, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Silver	1509797	1509797	<0.0001	<0.0001	NA	< 0.0001	108%	70%	130%	108%	80%	120%	102%	70%	130%
Dissolved Strontium	1509797	1509797	0.092	0.083	10.3%	< 0.005	99%	70%	130%	86%	80%	120%	90%	70%	130%
Dissolved Tin	1509797	1509797	<0.002	<0.002	NA	< 0.002	103%	70%	130%	108%	80%	120%	108%	70%	130%
Dissolved Titanium	1509797	1509797	0.125	0.112	11.0%	< 0.002	111%	70%	130%	96%	80%	120%	92%	70%	130%
Dissolved Uranium	1509797	1509797	0.0022	0.0023	NA	< 0.0005	97%	70%	130%	105%	80%	120%	99%	70%	130%
Dissolved Vanadium	1509797	1509797	0.007	0.006	NA	< 0.002	106%	70%	130%	107%	80%	120%	101%	70%	130%
Dissolved Zinc	1509797	1509797	<0.005	<0.005	NA	< 0.005	101%	70%	130%	104%	80%	120%	112%	70%	130%
Croft Landfill - Surface Water Parameters															
Electrical Conductivity	1509781		441	441	0.0%	< 2	96%	90%	110%						
pH	1509781		6.85	6.79	0.9%	NA	100%	90%	110%						
Total Dissolved Solids	1509825	1509825	32	34	NA	< 20	102%	80%	120%						
Total Suspended Solids	1512211		<10	<10	NA	< 10	98%	80%	120%						
Alkalinity (as CaCO3)	1509781		201	200	0.5%	< 5	102%	80%	120%						
Bicarbonate (as CaCO3)	1509781		201	200	0.5%	< 5	NA								
Chloride	1512213	1509858	139	146	4.9%	< 0.10	95%	70%	130%	109%	80%	120%	NA	70%	130%
Nitrate as N	1512213	1509858	6.21	6.48	4.3%	< 0.05	99%	70%	130%	107%	80%	120%	108%	70%	130%
Nitrite as N	1512213	1509858	<0.25	<0.25	NA	< 0.05	96%	70%	130%	106%	80%	120%	105%	70%	130%
Sulphate	1512213	1509858	27.1	28.5	5.0%	< 0.10	97%	70%	130%	107%	80%	120%	105%	70%	130%
Phosphate as P	1512213	1509858	<0.50	<0.50	NA	< 0.10	108%	70%	130%	109%	80%	120%	102%	70%	130%
Ammonia as N	1509829	1509829	0.11	0.11	0.0%	< 0.02	102%	70%	130%	101%	80%	120%	97%	70%	130%
Total Kjeldahl Nitrogen	1509831	1509831	0.96	0.95	1.0%	< 0.10	102%	70%	130%	100%	80%	120%	100%	70%	130%
Total Phosphorus	1509786		<0.02	<0.02	NA	< 0.02	98%	70%	130%	97%	80%	120%	86%	70%	130%
Chemical Oxygen Demand	1509825	1509825	<5	<5	NA	< 5	106%	80%	120%	102%	90%	110%	99%	70%	130%
Dissolved Organic Carbon	1511279		3.2	3.2	0.0%	< 0.5	103%	90%	110%	99%	90%	110%	113%	80%	120%
Phenols	1539868		<0.001	<0.001	NA	< 0.001	93%	90%	110%	92%	90%	110%	110%	80%	120%
Turbidity	1509797	1509797	8.1	8.2	1.2%	< 0.5	102%	80%	120%						
Total Calcium	1510769		63.56	62.87	1.1%	< 0.05	95%	70%	130%	98%	80%	120%	100%	70%	130%
Total Magnesium	1510769		23.35	23.02	1.4%	< 0.05	95%	70%	130%	96%	80%	120%	100%	70%	130%
Total Potassium	1510769		4.25	3.98	6.6%	< 0.05	95%	70%	130%	96%	80%	120%	97%	70%	130%
Total Sodium	1510769		66.90	66.28	0.9%	< 0.05	99%	70%	130%	102%	80%	120%	102%	70%	130%
Aluminum-dissolved	1510487		<0.004	<0.004	NA	< 0.004	95%	70%	130%	98%	80%	120%	95%	70%	130%
Total Antimony	1520863		<0.005	<0.005	NA	< 0.001	96%	70%	130%	98%	80%	120%	96%	70%	130%
Total Arsenic	1520863		<0.015	<0.015	NA	< 0.003	95%	70%	130%	96%	80%	120%	92%	70%	130%
Total Barium	1520863		0.276	0.257	7.1%	< 0.002	97%	70%	130%	97%	80%	120%	96%	70%	130%
Total Beryllium	1520863		<0.0025	<0.0025	NA	< 0.0005	97%	70%	130%	99%	80%	120%	101%	70%	130%
Total Bismuth	1520863		<0.010	<0.010	NA	< 0.002	103%	70%	130%	104%	80%	120%	97%	70%	130%
Total Boron	1520863		0.108	0.098	9.7%	< 0.010	107%	70%	130%	104%	80%	120%	103%	70%	130%
Total Cadmium	1520863		<0.0005	<0.0005	NA	< 0.0001	103%	70%	130%	103%	80%	120%	104%	70%	130%

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Quality Assurance

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Oct 14, 2020			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Chromium	1520863		<0.015	<0.015	NA	< 0.003	100%	70%	130%	100%	80%	120%	94%	70%	130%
Total Cobalt	1520863		<0.0025	<0.0025	NA	< 0.0005	100%	70%	130%	103%	80%	120%	97%	70%	130%
Total Copper	1520863		<0.005	<0.005	NA	< 0.001	96%	70%	130%	100%	80%	120%	88%	70%	130%
Total Iron	1520863		2.50	2.17	14.1%	< 0.010	94%	70%	130%	104%	80%	120%	95%	70%	130%
Total Lead	1520863		<0.005	<0.005	NA	< 0.001	100%	70%	130%	103%	80%	120%	98%	70%	130%
Total Manganese	1520863		0.227	0.216	5.0%	< 0.002	93%	70%	130%	97%	80%	120%	93%	70%	130%
Total Molybdenum	1520863		<0.010	<0.010	NA	< 0.002	106%	70%	130%	106%	80%	120%	110%	70%	130%
Total Nickel	1520863		<0.015	<0.015	NA	< 0.003	101%	70%	130%	103%	80%	120%	94%	70%	130%
Total Selenium	1520863		<0.020	<0.020	NA	< 0.004	98%	70%	130%	97%	80%	120%	96%	70%	130%
Total Silicon	1520863		13.5	12.7	6.1%	< 0.05	106%	70%	130%	110%	80%	120%	99%	70%	130%
Total Silver	1520863		<0.0005	<0.0005	NA	< 0.0001	105%	70%	130%	107%	80%	120%	100%	70%	130%
Total Strontium	1520863		0.746	0.704	5.8%	< 0.005	90%	70%	130%	90%	80%	120%	87%	70%	130%
Total Tin	1520863		<0.010	<0.010	NA	< 0.002	114%	70%	130%	100%	80%	120%	101%	70%	130%
Total Titanium	1520863		<0.010	<0.010	NA	< 0.002	101%	70%	130%	103%	80%	120%	102%	70%	130%
Total Uranium	1520863		<0.010	<0.010	NA	< 0.002	97%	70%	130%	97%	80%	120%	98%	70%	130%
Total Vanadium	1520863		<0.010	<0.010	NA	< 0.002	98%	70%	130%	101%	80%	120%	99%	70%	130%
Total Zinc	1520863		<0.025	<0.025	NA	< 0.005	97%	70%	130%	101%	80%	120%	92%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

Croft Landfill - Surface Water Parameters

Electrical Conductivity	1509857	1509857	23	22	7.1%	< 2	99%	90%	110%	NA		NA
pH	1509857	1509857	6.66	6.08	9.1%		100%	90%	110%	NA		NA
Total Suspended Solids	1509857	1509857	<10	<10	NA	< 10	98%	80%	120%	NA		NA
Alkalinity (as CaCO3)	1509857	1509857	13	10	NA	< 5	101%	80%	120%	NA		NA
Bicarbonate (as CaCO3)	1509857	1509857	13	10	NA	< 5	NA			NA		NA

BOD-Toronto

Biochemical Oxygen Demand, Total	1527483	4200	3900	7.4%	< 2	93%	70%	130%	

Comments: If RPD value is NA, the results of the duplicates are less than 5x the RDL and the RPD will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

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Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Biochemical Oxygen Demand, Total	INOR-121-6023	SM 5210 B	INCUBATOR
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Chemical Oxygen Demand	INOR-93-6042	SM 5220 D	SPECTROPHOTOMETER
Dissolved Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310 B	SHIMADZU CARBON ANALYZER
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Dissolved Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Aluminum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Antimony	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Beryllium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Bismuth	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cobalt	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Molybdenum	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Nickel	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Selenium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silicon	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Silver	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Strontium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Tin	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Titanium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Uranium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Vanadium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Lab Filtration Performed			FILTRATION
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Bismuth	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: PINCHIN LTD.

AGAT WORK ORDER: 20U658705

PROJECT: 225335.003 Croft Landfill

ATTENTION TO: Tim McBride

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silicon	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

7LG B1K

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario; L4Z 1Y2
Phone: 905-712-5100;
Fax: 905-712-5122

CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY
Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature: See Attached
AGAT Job Number: 20U658 705
Notes: on ice

Client Information

Company: Pinchin Ltd.
Contact: Tim McBride
Address: 957 Cambrian Heights, Unit # 203
Sudbury ON P3C 5S5
Phone: 705-521-0560 Fax:
PO#:
Client Project #: 225335.003 Croft Landfill
AGAT Quotation #: 267698

Report Information

1. Name: Tim McBride
Email: tmcbride@Pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format

(Please "x" those that apply)
[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)*

(Please "x" the applicable box below)
Regular TAT:
[x] 5 to 7 working days
Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours
Date Required (Rush surcharges may apply)

Regulatory Guideline Required: (Please "x" those that apply)

[ ] Reg 153 Table (indicate one): [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one): [ ] Sanitary [ ] Storm
[ ] PWQO
[ ] Reg 558
[ ] CCME
[x] Other (indicate) GW - ODWS

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes
[x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions - Cl, NO3, NO2, Phos-P, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Ammonia	BOD, COD, DOC	Conductivity, Phenols	Total Phosphorous	TDS, TSS	TKN, Turbidity	pH, Hardness						
BH1	01/10/20	9am - 1pm	water	7		x	x	x	x	x	x	x	x	x	x						
BH8	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
BH9	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
BH10	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
BH11	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
BH12	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
BH13	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
BH14	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
~~DP7~~ BHDUP	↓	↓	water	7		x	x	x	x	x	x	x	x	x	x						
~~DP8~~			~~water~~	~~7~~		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~						
~~DP9~~			~~water~~	~~7~~		~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~	~~x~~						
TOTAL # OF CONTAINERS				11	* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays																

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Valle AV	01/10/20	Katie Bowers KB	20/10/01 3:15pm
Sample Relinquished By (print name & sign)	**Date/Time**	**Samples Received By (print name and sign)**	**Date/Time**
	3pm	To Purolator KB	20/10/01 5:00pm

Special Instructions
PLEASE FILTER DOC AT SAMPLE RECEPTION

IMRAN RN Oct 2 20 1:30PM

Page 1 of 3

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario; L4Z 1Y2
Phone: 905-712-5100;
Fax: 905-712-5122

TLG BIK

CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY
Arrival Condition: [ ] Good [ ] Poor (complete "Notes")
Arrival Temperature:
AGAT Job Number:
Notes:

Client Information

Company: Pinchin Ltd.
Contact: Tim McBride
Address: 957 Cambrian Heights, Unit # 203
Sudbury ON P3C 5S5
Phone: 705-521-0560 Fax:
PO#:
Client Project #: 225335.003 Croft Landfill
AGAT Quotation #: 267698

Report Information

1. Name: Tim McBride
Email: tmcbride@Pinchin.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format
(Please "x" those that apply)
[ ] Single sample per page
[x] Multiple samples per page
[ ] Results by Fax

Turnaround Time (TAT)*
(Please "x" the applicable box below)
Regular TAT:
[x] 5 to 7 working days
Rush TAT (Rush Surcharges Apply):
[ ] 3 to 5 days
[ ] 48 to 72 hours
[ ] 24 to 48 hours
Date Required (Rush surcharges may apply)

Regulatory Guideline Required:
(Please "x" those that apply)

[ ] Reg 153 Table (indicate one) [ ] Ind/Com [ ] Res/Park [ ] Ag [ ] Med/Fine [ ] Coarse
[ ] Sewer Use Region (indicate one) [ ] Sanitary [ ] Storm
[x] PWQO [ ] Reg 558 [ ] CCME [ ] Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)?
[ ] Yes [x] No
If "Yes" please use the Drinking Water Chain of Custody Record

Sample Identification	Date Sampled	Time Sampled	Sample Matrix	# of Containers	Comments - Site/Sample Info, Sample Containment	Anions - Cl, NO3, NO2, Phos-P, Sulphate	Cations (K, Na, Mg, Ca)	Metals (see quote for list)	Alkalinity, Bicarbonate	Ammonia, BOD, COD	DOC, Conductivity	Phenols	Total Phosphorous	TDS, TSS, TKN	Turbidity	pH, Hardness	Dissolved Aluminum				
SW-1	01/10/20	9am-1pm	water	8		x	x	x	x	x	x	x	x	x	x	x	x				
SW-2	↓	↓	water	8		x	x	x	x	x	x	x	x	x	x	x	x				
SW-3	↓	↓	water	8		x	x	x	x	x	x	x	x	x	x	x	x				
SW-DUP	↓	↓	water	8		x	x	x	x	x	x	x	x	x	x	x	x				
TOTAL # OF CONTAINERS				32																	

* Samples received after 2:00 PM will be logged in for the next business day. TAT is exclusive of weekends and statutory holidays

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
Alana Valle AV	01/10/20		
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
	3pm	SIMRAN SV Oct 2/20	1:30 PM

Special Instructions
PLEASE FILTER for Diss. Al & DOC AT SR

AGAT Laboratories

Sample Temperature Log

Client: Pinchin

COC# or Work Order #: 20658705

# of Coolers: 3

# of Submissions: 2

7 coolers

Arrival Temperatures - Branch/Driver				Arrival Temperatures - Laboratory			
Cooler #1:	8.5	8.5	8.3	Cooler #1:	6.3	6.4	7.7
Cooler #2:	8.9	8.9	9.0	Cooler #2:	6.8	7.6	7.7
Cooler #3:	9.1	9.5	9.2	Cooler #3:	6.5	6.6	7.9
Cooler #4:				Cooler #4:	8.8	8.9	9.2
Cooler #5:				Cooler #5:	7.2	7.6	8.8
Cooler #6:				Cooler #6:	2.9	3.0	3.5
Cooler #7:				Cooler #7:	3.2	3.4	4.6
Cooler #8				Cooler #8			
Cooler #9:				Cooler #9:			
Cooler #10:				Cooler #10:			

on ice

on ice

IR Gun ID:

Taken By: Katie Bowers

Date (yyyy/mm/dd): 2020/10/01 **Time:** 3 : 15 AM / (PM)

IR Gun ID:

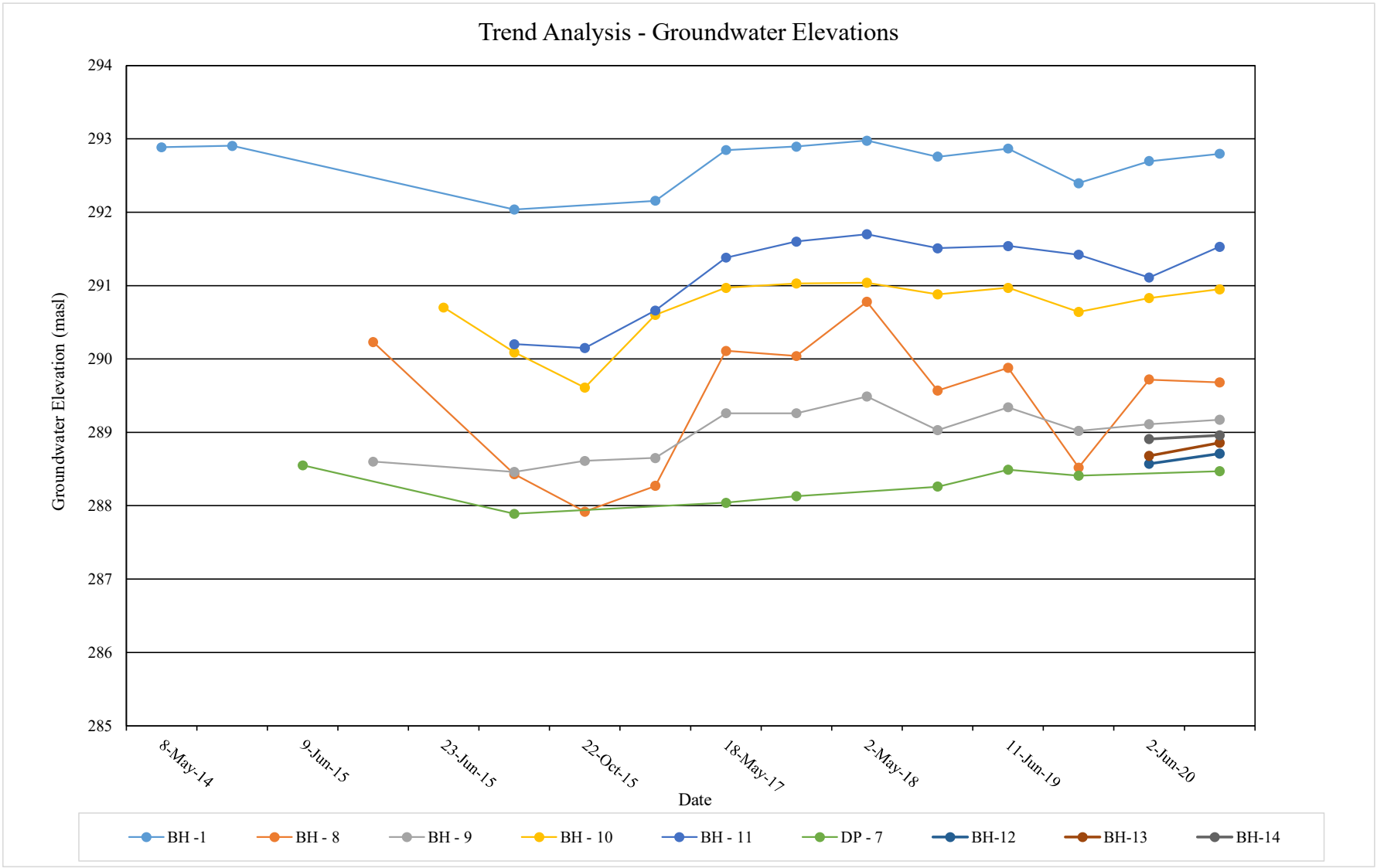
Taken By: SIMRAN

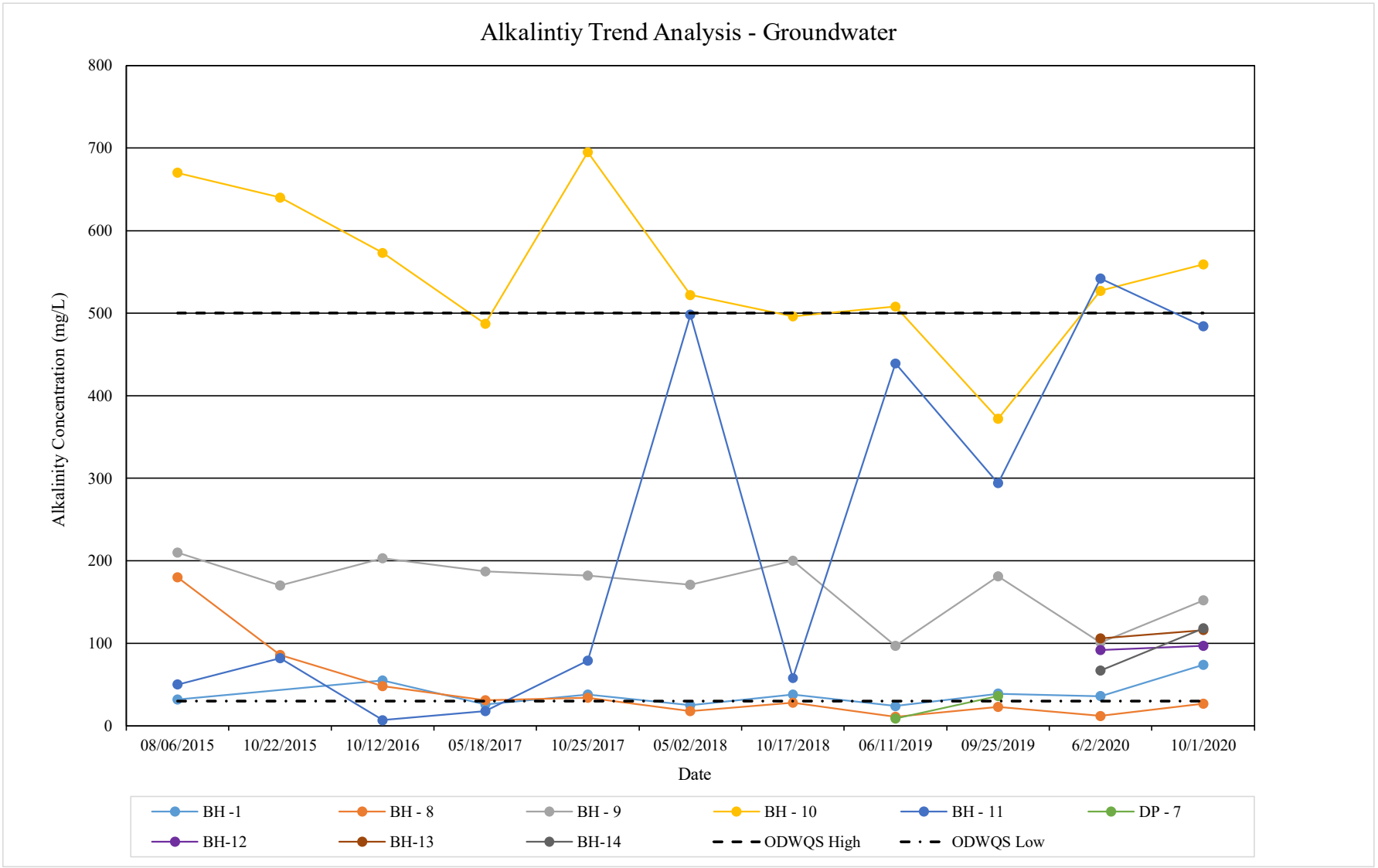
Date (yyyy/mm/dd): 2020/10/02 **Time:** 1 : 30 AM / (PM)

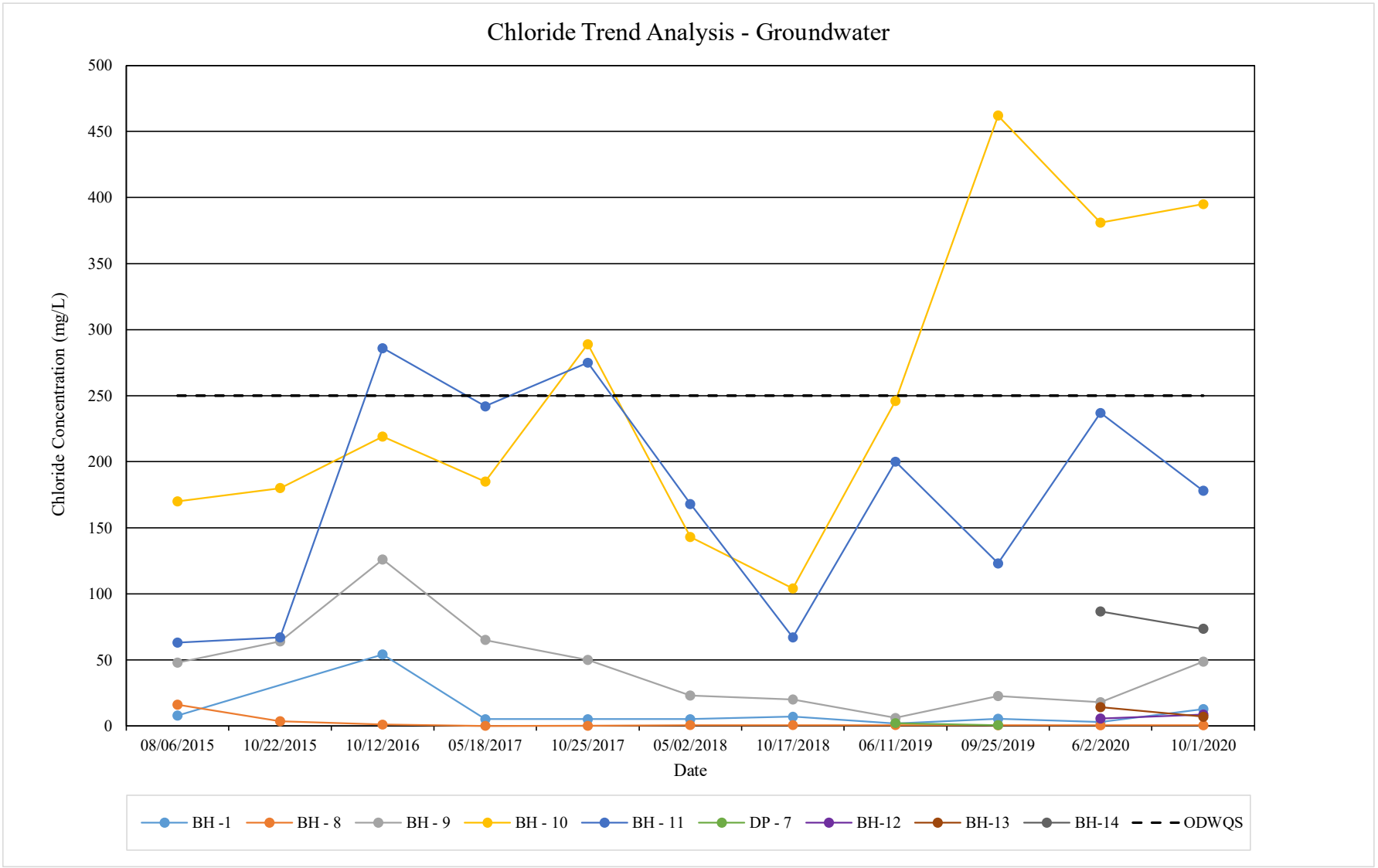
Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

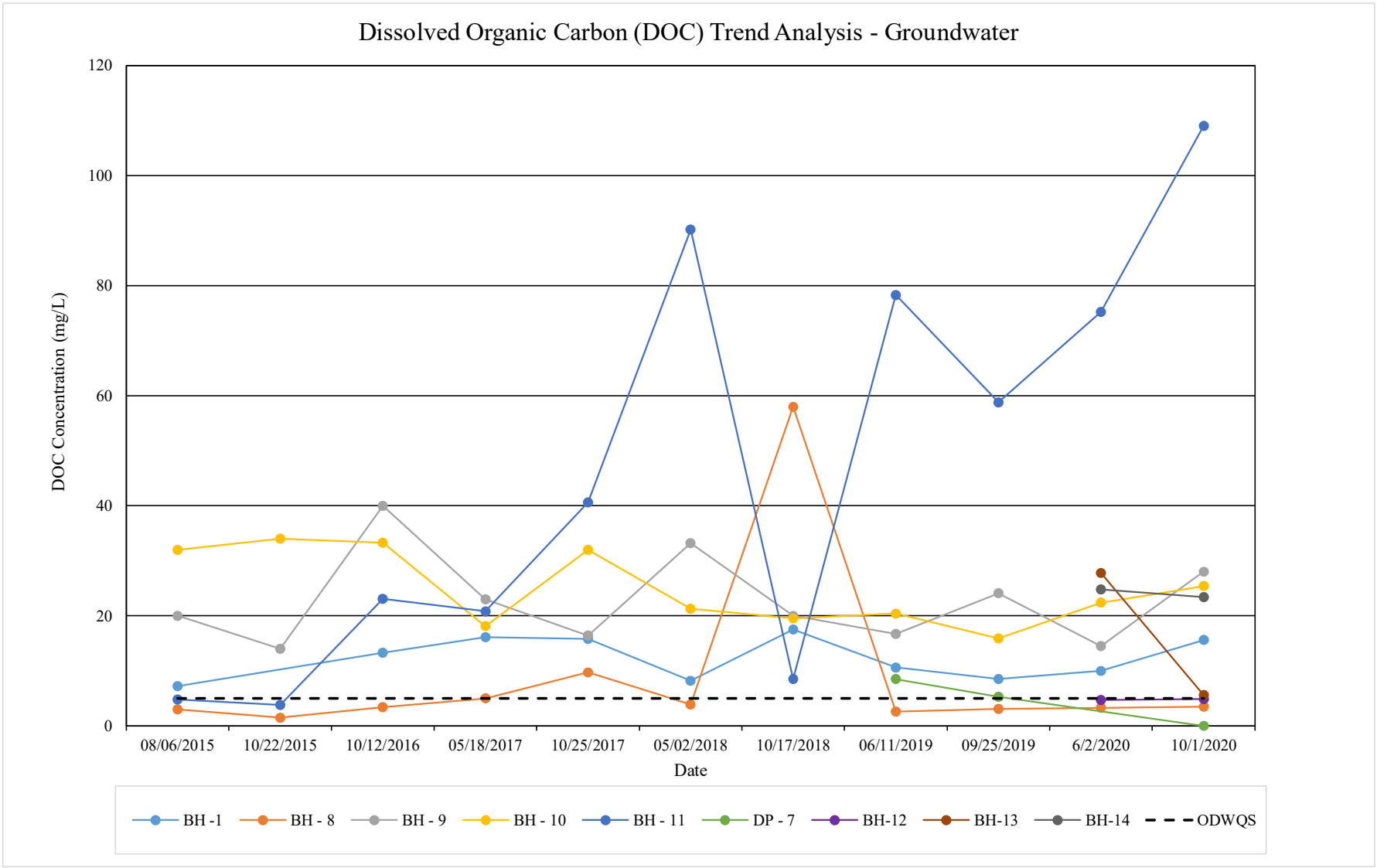
APPENDIX VI

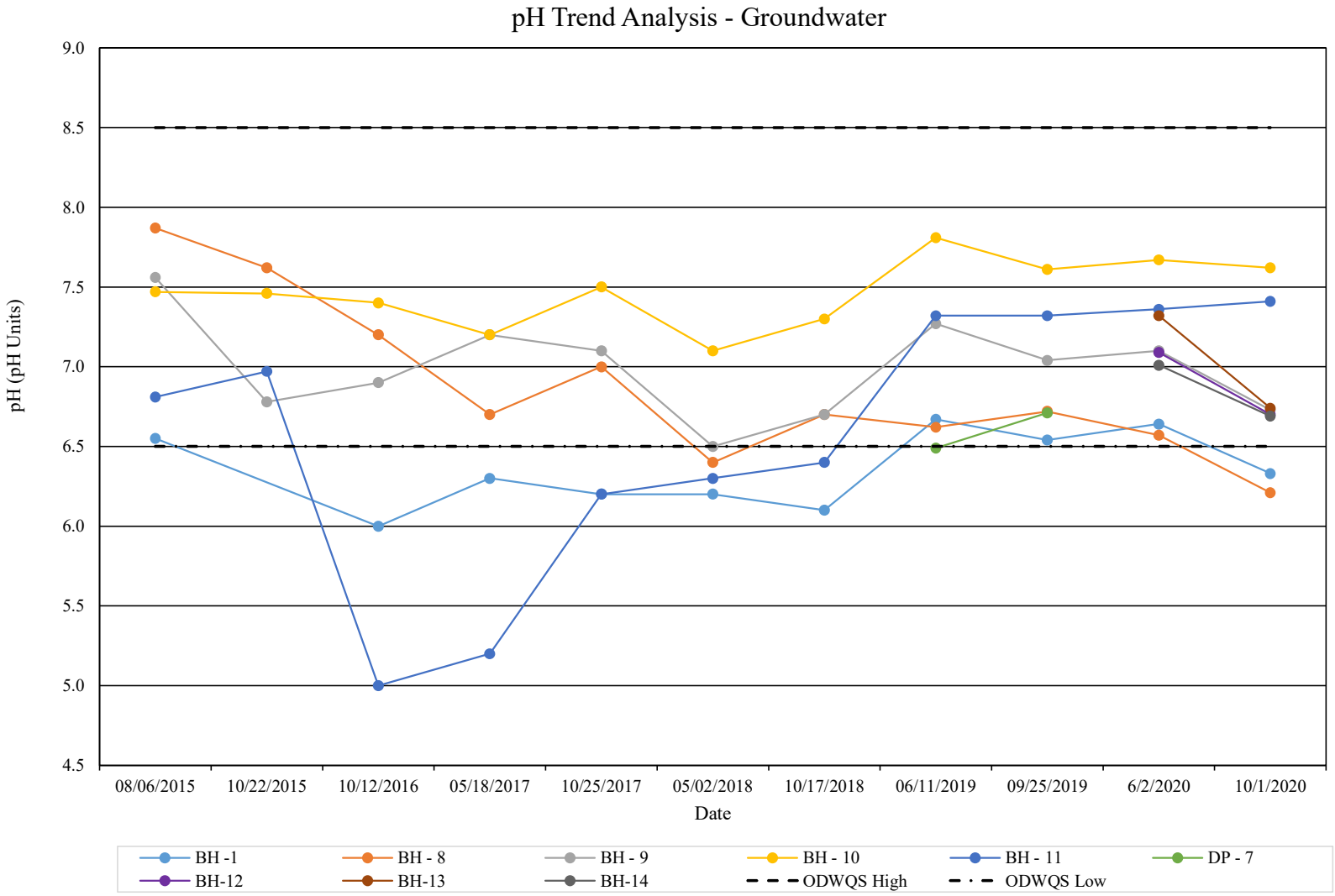
Groundwater Trend Analysis

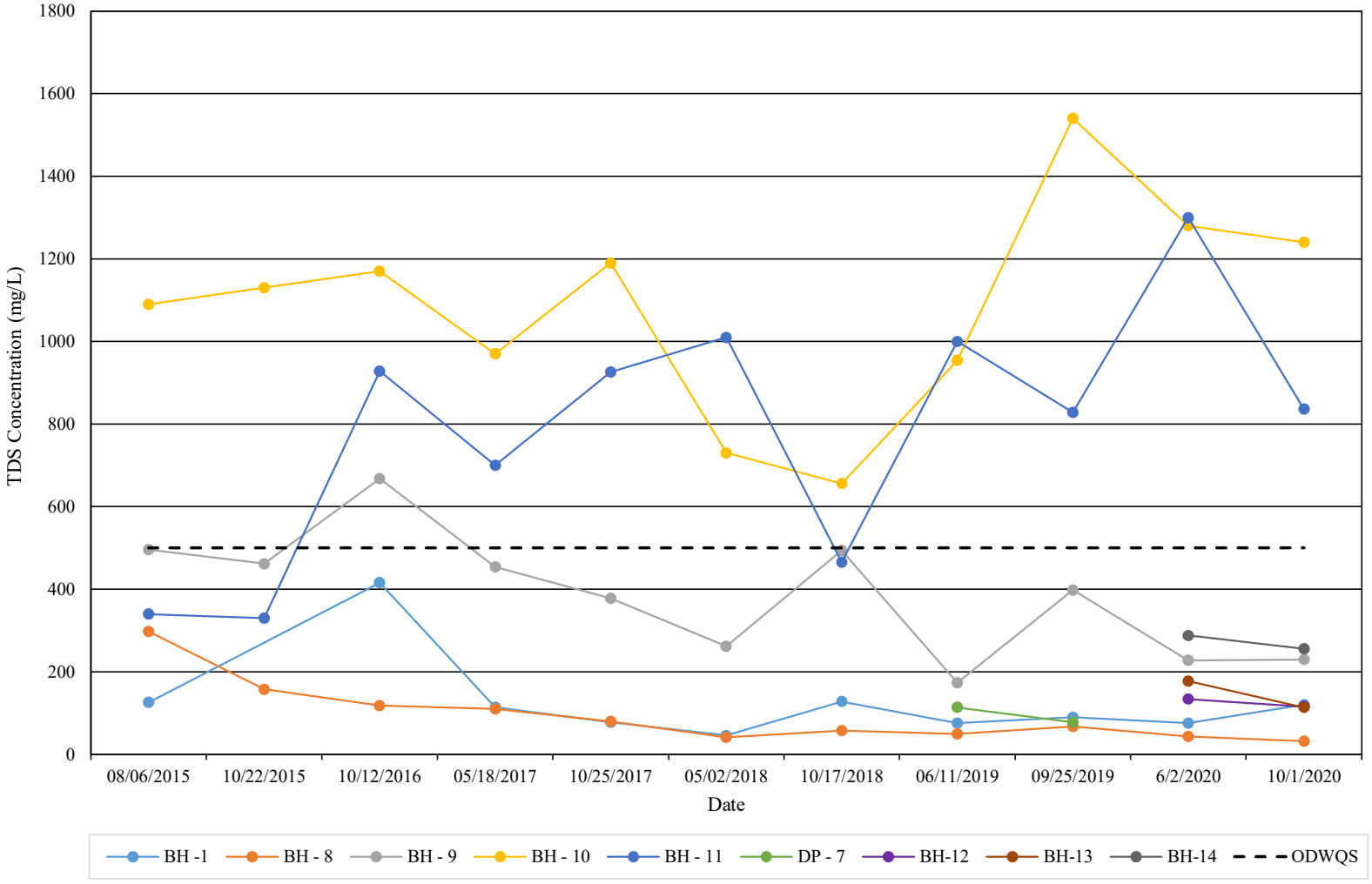


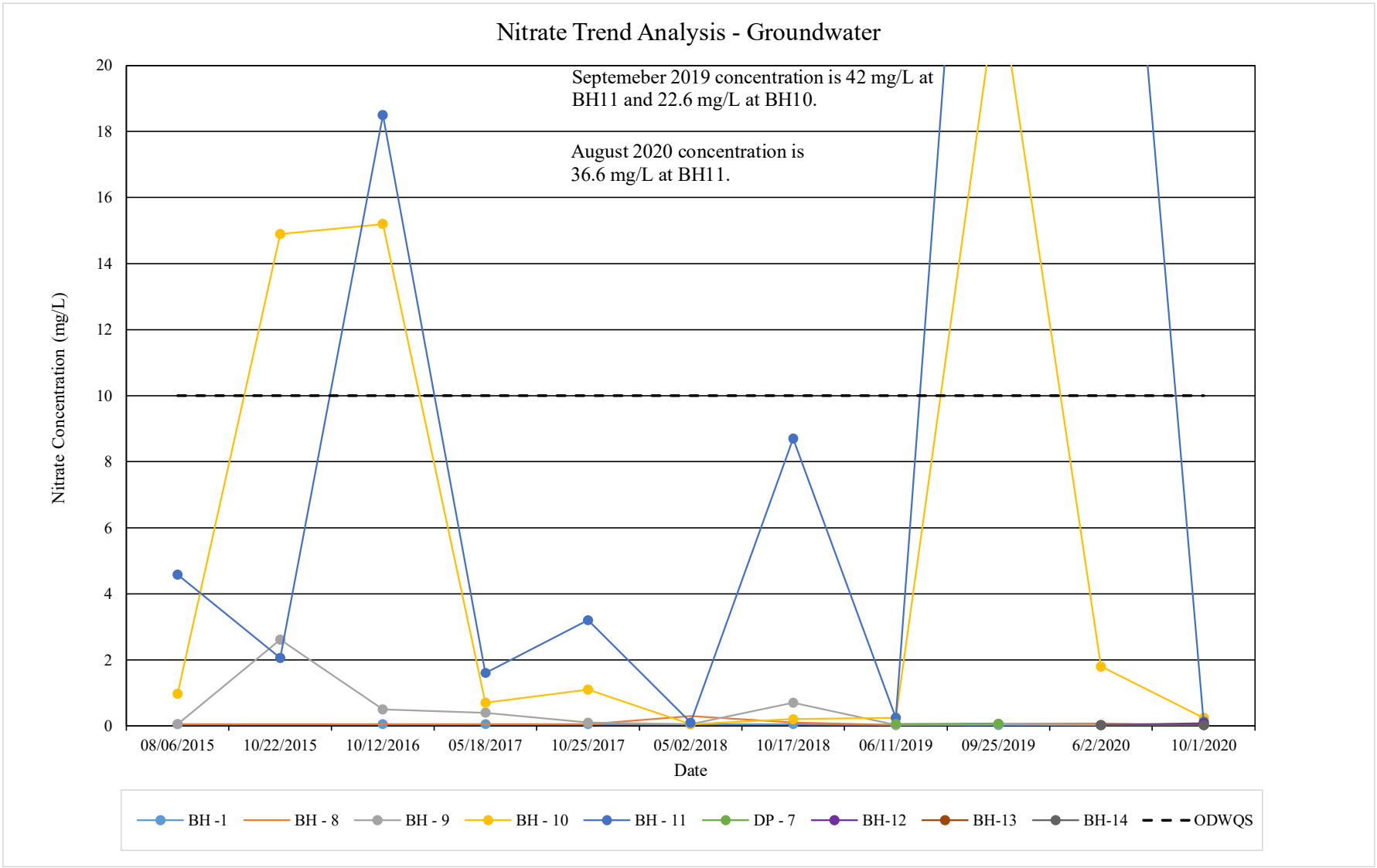


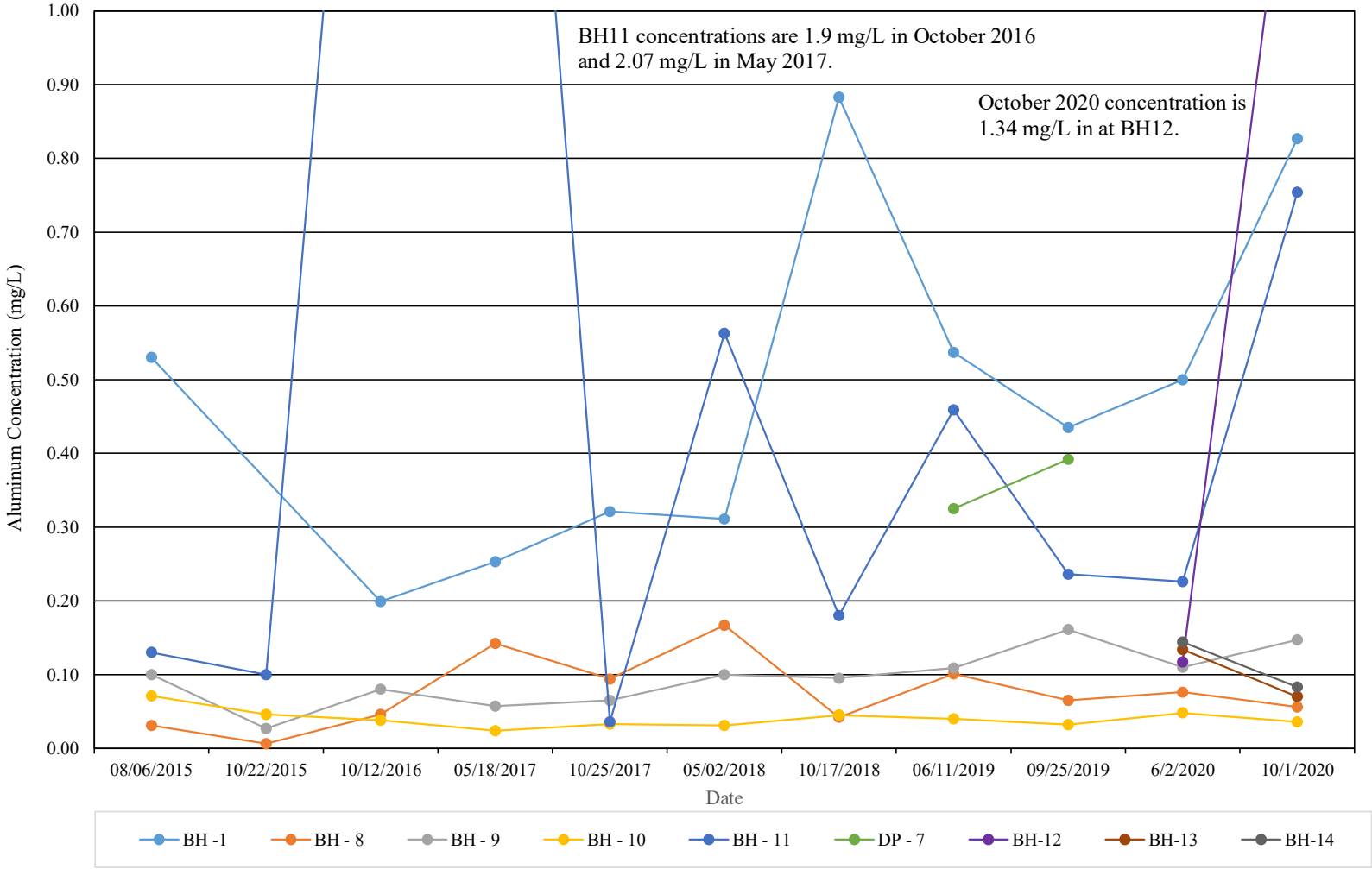


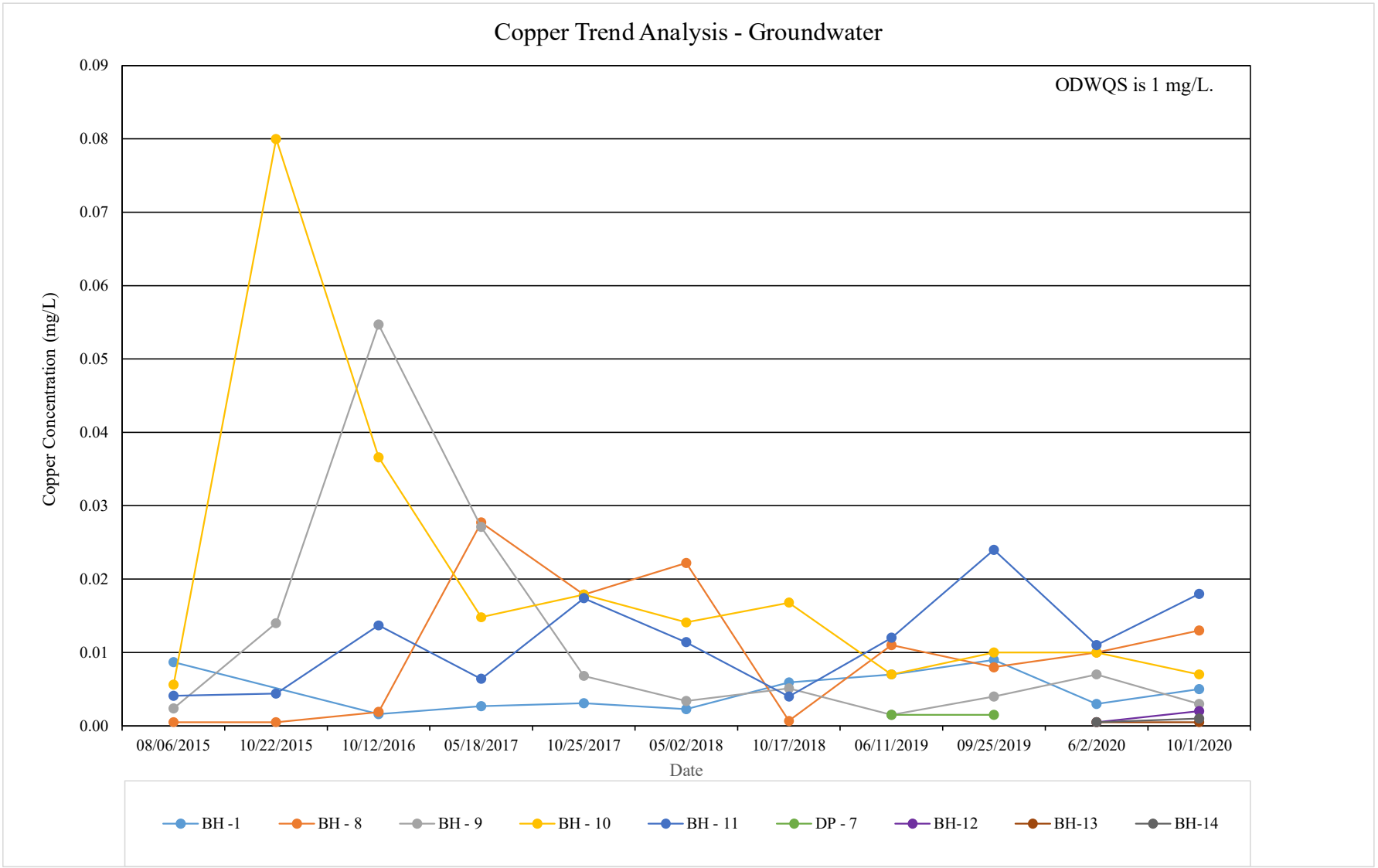






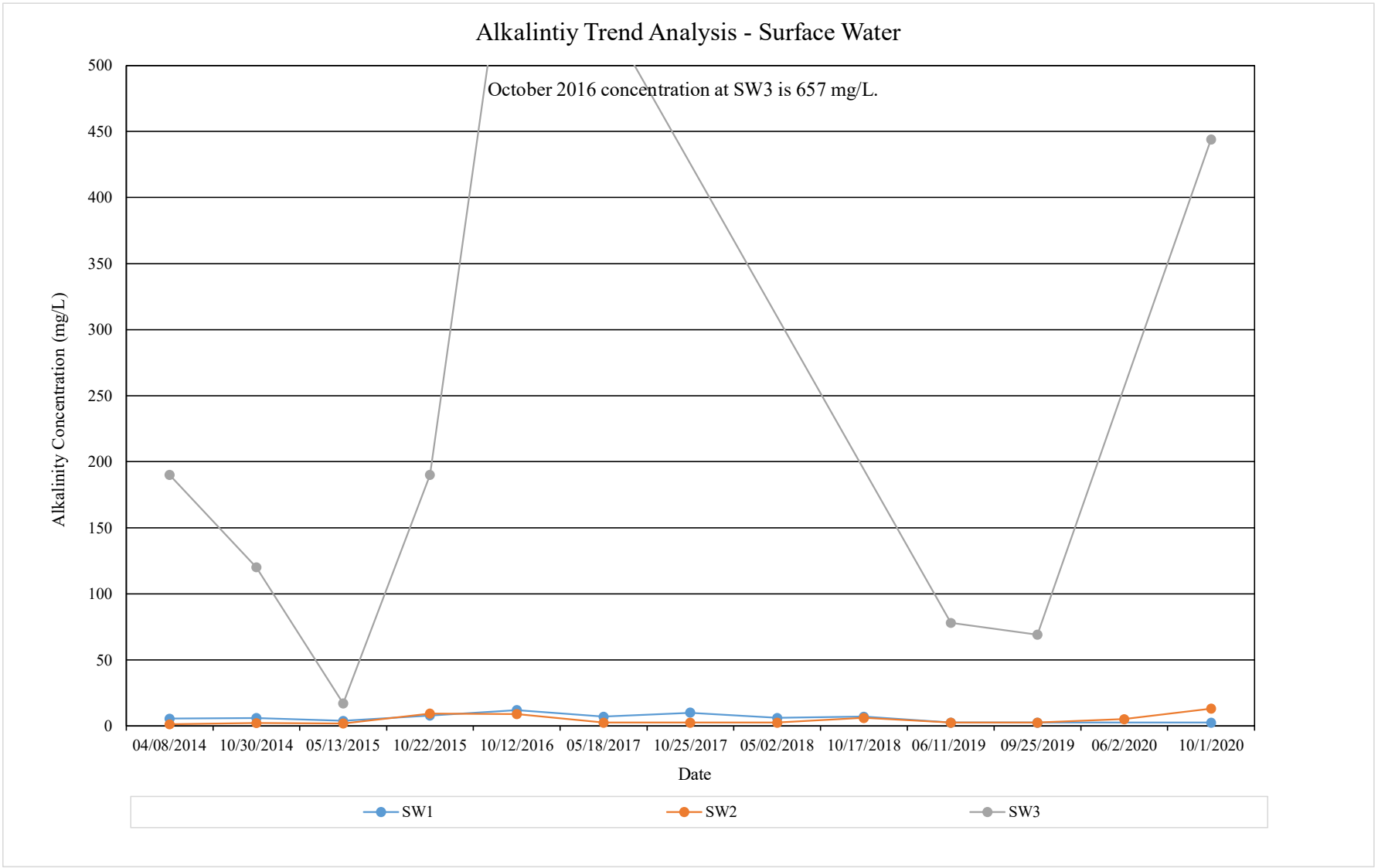


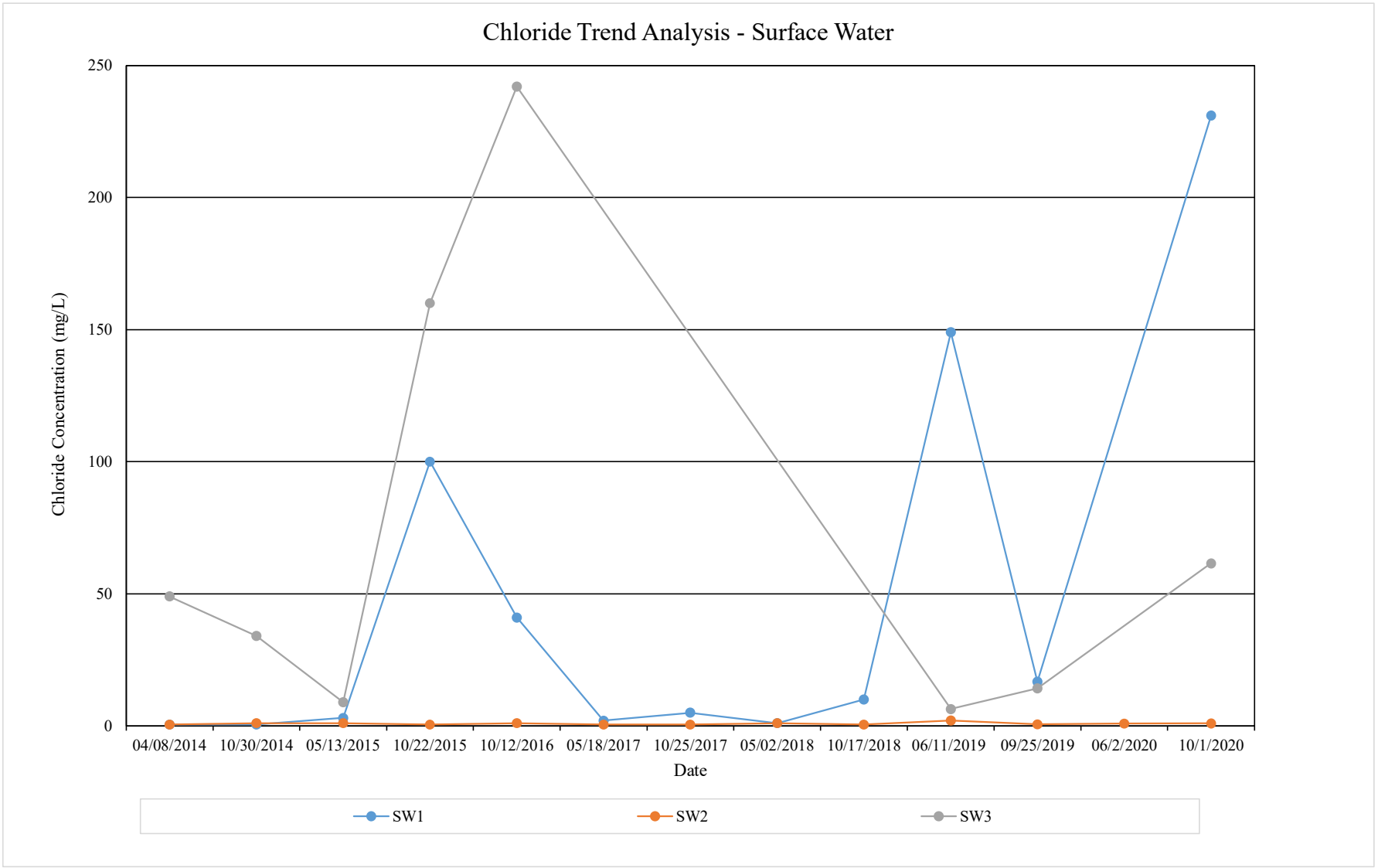


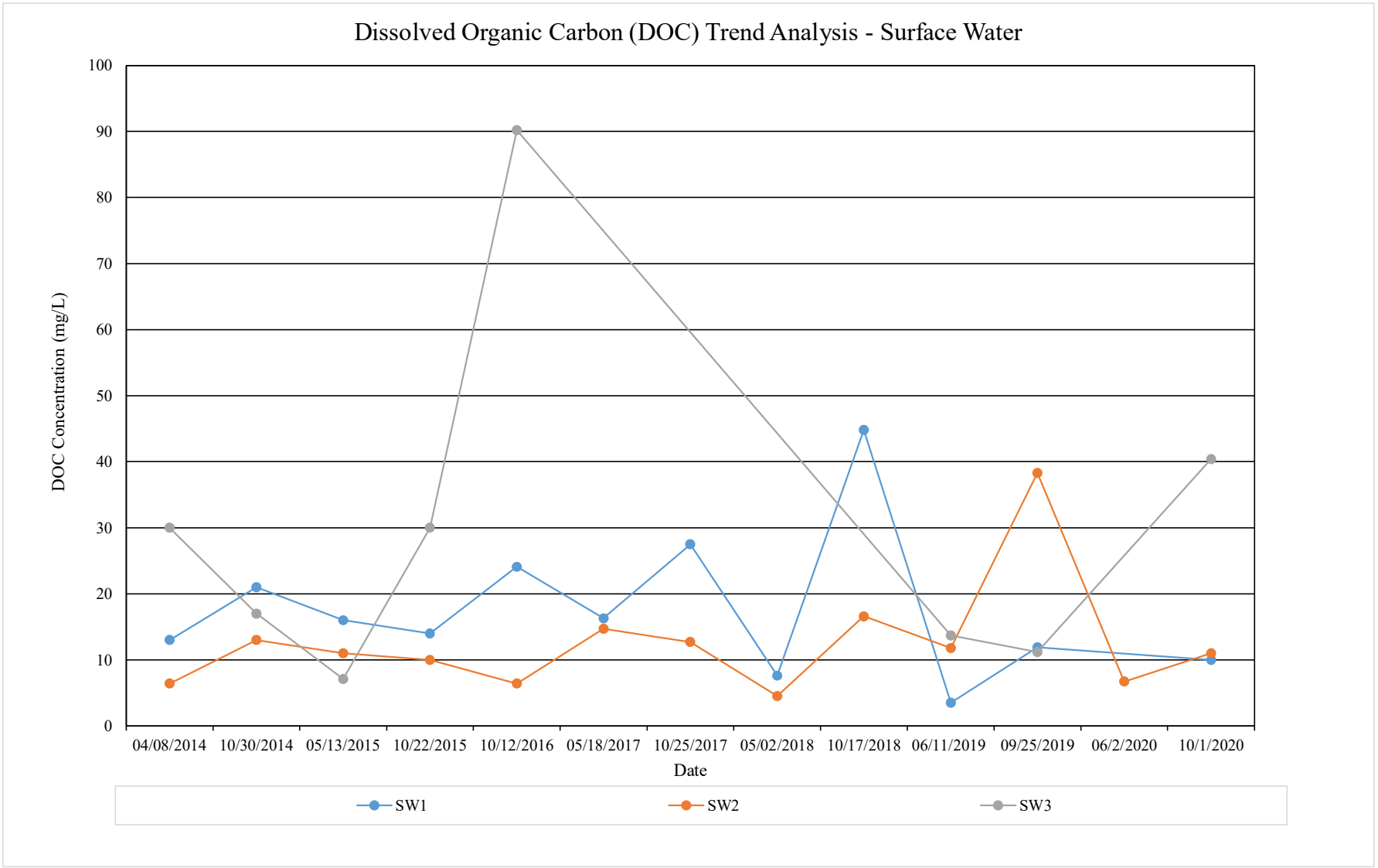


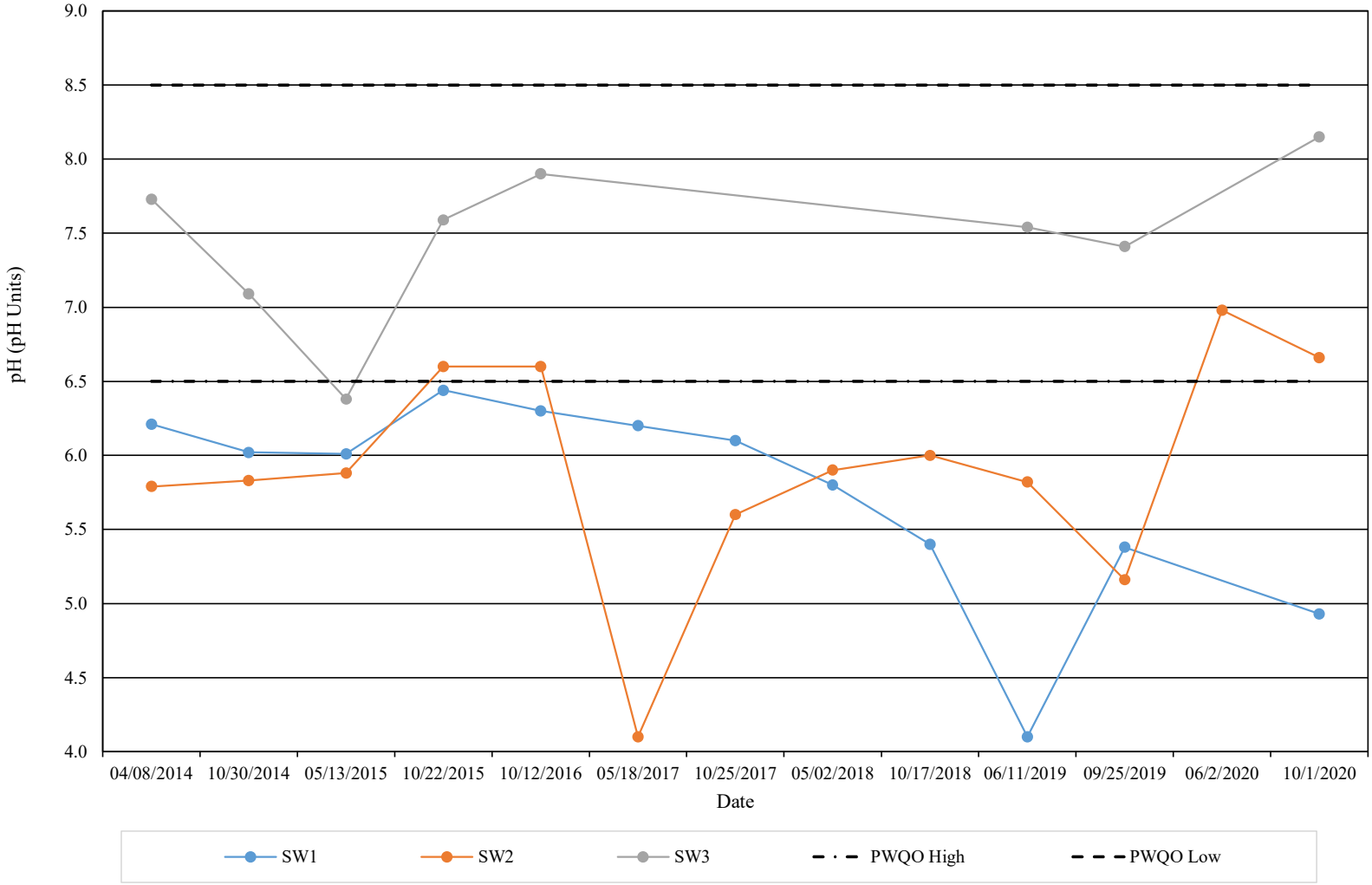
APPENDIX VII

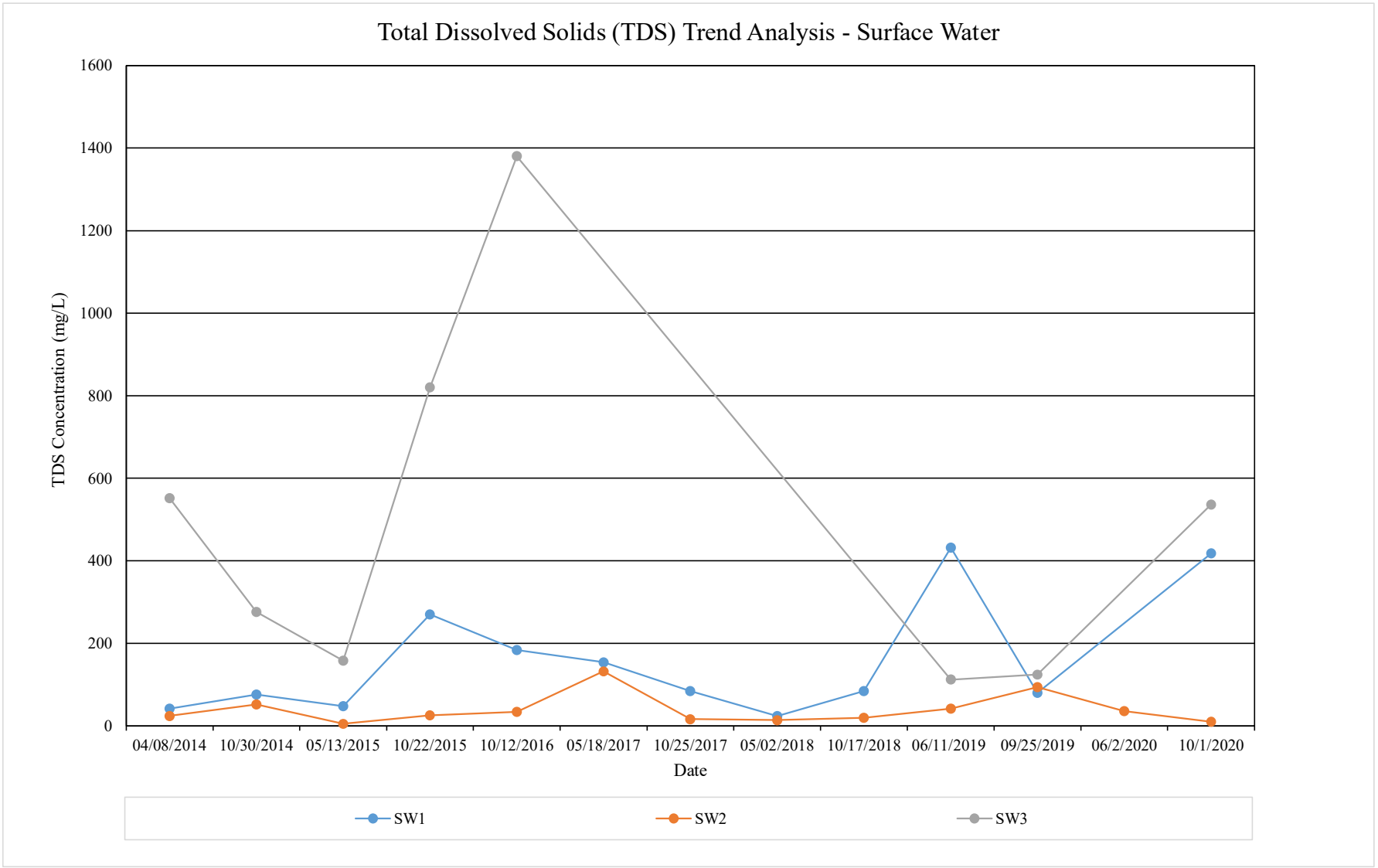
Surface Water Trend Analysis

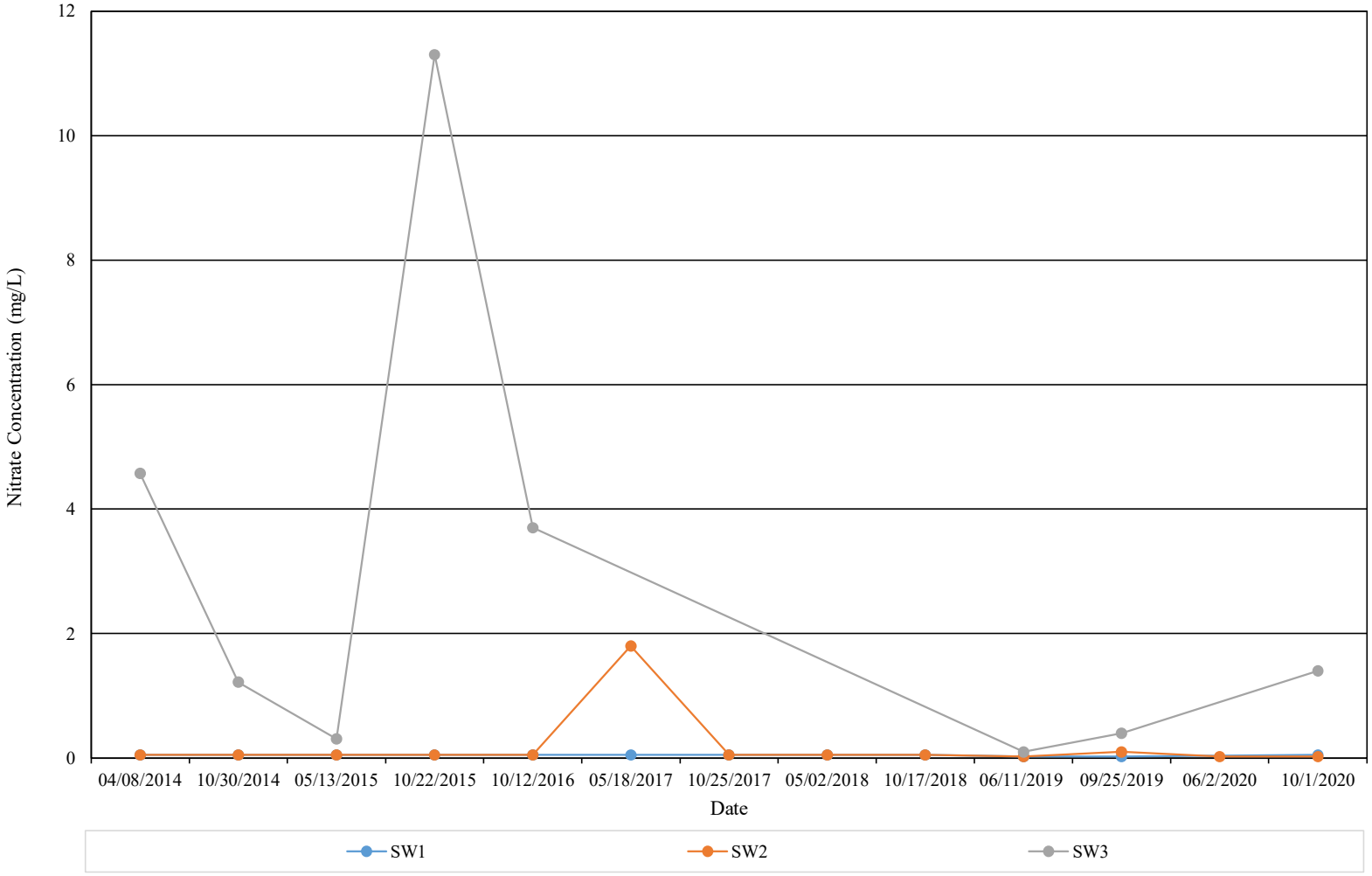


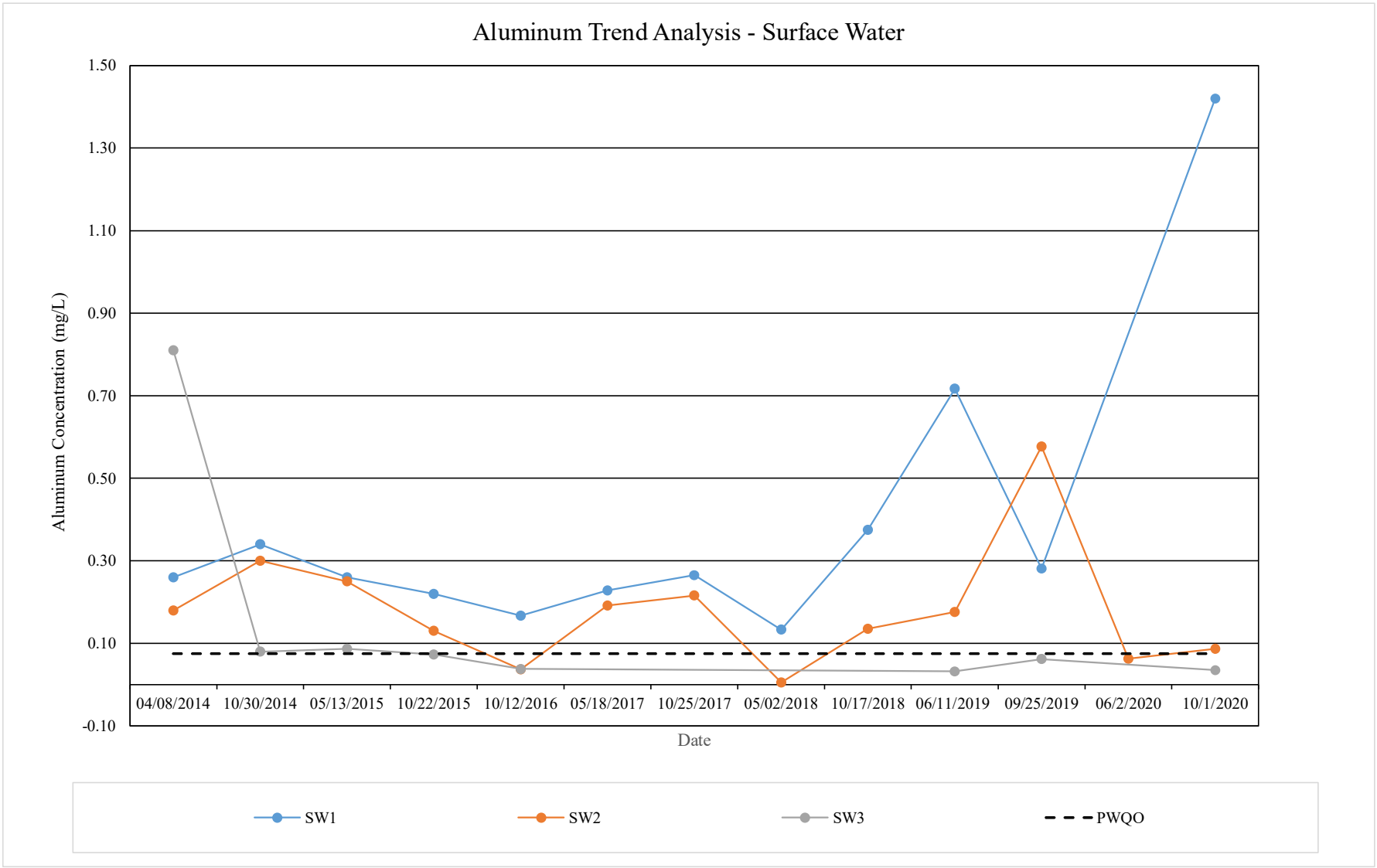


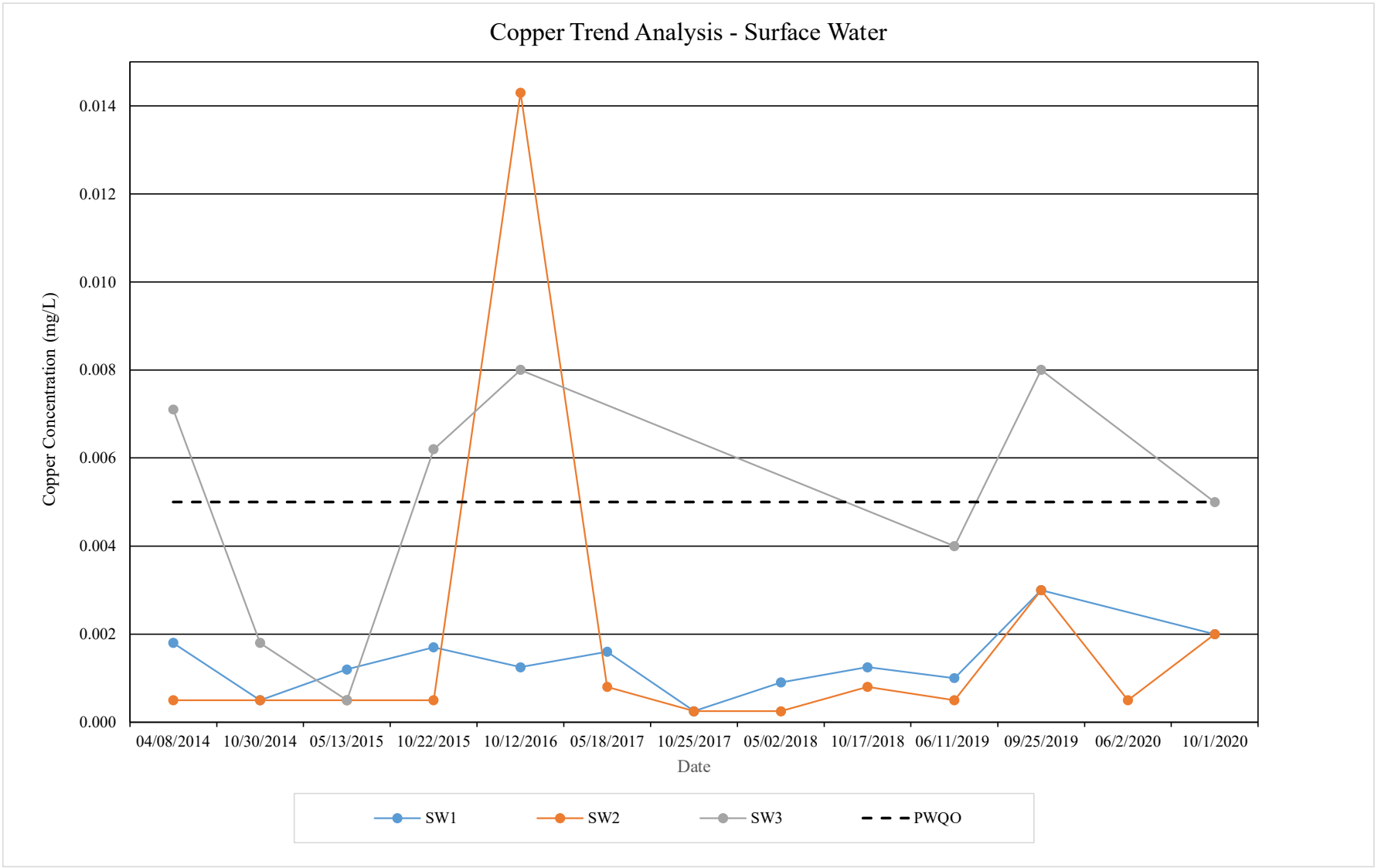












APPENDIX VIII

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.

Monitoring Report and Site Information	
Waste Disposal Site Name	Croft Waste Disposal Site
Location (e.g. street address, lot, concession)	Lot 26, Concession 11, within the Municipality of Magnetawan, District of Parry Sound, Ontario
GPS Location (taken within the property boundary at front gate/ front entry)	Universal Transverse Mercator (UTM) coordinates Zone 17U, 593659 meters (m) Easting and 5058398 m Northing (North American Datum 1983)
Municipality	Magnetawan
Client and/or Site Owner	The Corporation of the Municipality of Magnetawan
Monitoring Period (Year)	2020
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A7034002
Director's Order No.:	
Provincial Officer's Order No.:	
Other:	

Report Submission Frequency	◉ **Annual** ○ **Other**	Specify (Type Here):
The site is:	◉ **Active** ○ **Inactive** ○ **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?	○ **Yes** ◉ **No**	
If yes, provide details:		
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i. e. exceeded the LEL for methane)	○ Yes ◉ No	

Groundwater WDS Verification:

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

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	◉ **Yes** ○ **No**	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):	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, list exceptions below or attach information.

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

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.	○ **Yes** ◉ **No** ○ **Not Applicable**	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	○ **Yes** ○ **No** ◉ **Not Applicable**	If no, list exceptions below or attach additional 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

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	◉ **Yes** ○ **No**	No formal CAZ registered for the site, but all wells reflective of property boundary conditions currently meet the applicable criteria.	
6) The site meets compliance and assessment criteria.	◉ **Yes** ○ **No**	If no, list and explain exceptions (Type Here):	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	◉ **Yes** ○ **No**	If no, list exceptions and explain reason for increase/change (Type Here):	
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	◉ **Yes** ○ **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ○ **No** ◉ **Not Applicable**	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.

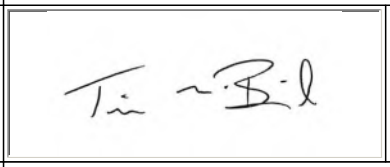
If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances 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:

1-Feb-2021

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

Name:	Tim McBride		
Seal:	Add Image		
Signature:		**Date:**	1-Feb-2021
CEP Contact Information:	Tim McBride		
Company:	Pinchin Ltd.		
Address:	957 Cambrian Heights Drive, Unit 203 Sudbury, Ontario P3C 5S5		
Telephone No.:	705.521.0560 ext 3416	Fax No. :	705.521.1309
E-mail Address:	tmcbride@pinchin.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	Select Date
Signature:		**Date:**	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:	(●) Yes ( ) 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):	( ) Yes (●) No ( ) **Not applicable (No C of A, authorizing / control document applies)**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
SW1 and SW3	Dry	2-Jun-2020
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.	◯ **Yes** ◉ **No** ◯ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	◯ **Yes** ◯ **No** ◉ **Not Applicable**	If no, specify below or provide details in an attachment.

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

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ◯ **No**	If no, specify (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
Potassium Phenols	APV - 0.039 mg/L PWQO - 0.001 mg/L	SW2 - 0.62 mg/L (spring) and 0.58 mg/L (fall) SW2 - 0.002 mg/L (spring)
Iron Aluminum	PWQO and CWQG - 0.3 mg/L PWQO - 0.075 mg/L	SW2 - 0.451 mg/L (spring) and 1.25 mg/L (fall) SW2 - 0.087 mg/L (fall)
Cadmium	PWQO - 0.0002 mg/L APV - 0.00021 mg/L CWQG - 0.00026 mg/L	SW2 - 0.0004 mg/L (fall)
Silver	PWQO - 0.0001 mg/L APV - 0.00012 mg/L CWQG - 0.00025 mg/L	SW2 - 0.0004 mg/L (fall)
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	◉ **Yes** ○ **No**	Elevated background conditions

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

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.

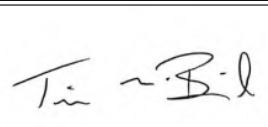
If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the 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:

1-Feb-2021

Recommendations:

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

(●) **No Changes to the monitoring program are recommended** ( ) **The following change(s) to the monitoring program is/are recommended:**	
(●) **No changes to the site design and operation are recommended** ( ) **The following change(s) to the site design and operation is/are recommended:**	

CEP Signature	
Relevant Discipline	Hydrogeologist
Date:	1-Feb-2021
CEP Contact Information:	Tim McBride
Company:	Pinchin Ltd.
Address:	957 Cambrian Heights Drive, Unit 203 Sudbury, Ontario P3C 5S5
Telephone No.:	705.521.0560 ext 3416
Fax No. :	705.521.1309
E-mail Address:	tmcbride@pinchin.com

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