2018 Annual Monitoring Report

Clean Harbors Lambton Facility Landfill

Clean Harbors Canada, Inc.

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1. Introduction

GHD has prepared this Annual Monitoring Report (herein referred to as the Report) on behalf of Clean Harbors Canada Inc. (Clean Harbors) to present the results of the 2018 Groundwater Monitoring Program for the Landfill at the Lambton Facility located on Lot 9 and part of Lot 8 in the Township of St. Clair, Lambton Ontario (Landfill, Site, or Facility). The address for the Site is 4090 Telfer Road and the Site entrance is on Telfer Road. Figure 1 provides the Site location with respect to the surrounding area. This Report presents the groundwater monitoring data collected and the data interpretations as they relate to the environmental performance of the Landfill in its current Regulatory setting. This Report covers the monitoring activities and data collected during the period of January 1 through December 31, 2018.

1.1 Site Background

Waste disposal operations at the Facility commenced in the early 1960s by Goodfellows Enterprises (Sarnia) Limited as an integrated waste management facility. The Facility accepted both industrial and domestic/municipal solid waste and disposed of the waste through landfilling in Cells 5.5 to 9 m deep, deep well disposal (1961), liquid waste incineration (1968) and pit/lagoon storage. In 1973 the Facility was acquired by Tricil (Sarnia) Limited. Tricil restricted the waste disposal operations to hazardous wastes, decommissioned the pits/lagoons with the exception of the S-Pit, constructed a new liquid incinerator in 1983, and discontinued the deep well disposal in 1976. From 1976 to 1986, Cells 1 through 15 were constructed and the cell depth had been established at a constant depth of 18.3 metres (m) and in 1985 to 1986 waste that was above grade, was regraded and covered. In 1986, the Ontario Ministry of the Environment (MOE) approved Cells 16 and 17 and the shallow entombment method of waste placement. The revised design had a cell depth of 18.3 m and the top of waste was set at 6.1 m below grade with the development of low permeability clay cap. Cell 16 operated from 1986 to 1990.

In 1990, Laidlaw Inc., later changed to Laidlaw Environmental Services, acquired the Facility. Cell 17 commenced and operated from 1990 to 1997 with an excavation depth of 18.3 m. In 1997, Cell 18 was approved with the maximum cell depth of 24.4 m and a waste cap thickness of 5.1 m. Sub-Cells 1 and 2 were excavated in 1997 and 1998. Laidlaw Environmental Services acquired Safety-Kleen Inc. in 1998, which then changed its name to Safety-Kleen Ltd (Safety Kleen). In 1999 the bottom in Sub-Cell 3 was unstable and the remedial measures installed. The base of the excavation trenches were reduced to a maximum depth of 18.3 m.

Clean Harbors acquired Safety-Kleen's Chemical Services Division in September 2002. Since 2002, several waste treatment facilities have been installed which include in 2007 the Land Disposal Regulation (LDR) Facility for treatment of inorganic waste streams and in 2010 the Thermal Desorption Unit (TDU). In 2007 an amendment to site design was obtained which related to the recovery of waste capacity by increasing the top surface of the waste in Cell 17 and 18, but maintaining the 5.1 m cap thickness.

The Facility operates as a hazardous waste landfill and waste processing facility. Hazardous solid waste, select non-hazardous waste, liquid waste, and untreated and pre-treated hazardous waste is accepted at the Facility. Waste is accepted from Ontario, other Canadian provinces, and the United

States. Most waste classes under *Ontario Regulation* (O. Reg.) 347 are accepted, with the exception of polychlorinated biphenyl (PCB) waste, radioactive waste, or pathological waste.

The Site includes operations of the following facilities:

- Landfill
- High Temperature Incinerator
- Waste Processing and Pre-Treatment Facilities
    - Thermal Pre-Treatment System
    - Spent Pot Liner (SPL) Pre-Treatment
    - Physical/Chemical Pre-Treatment System
    - LDR Facilities
- Support Facilities
    - Transportation Terminal
    - Vehicle Maintenance Facility
    - Analytical Laboratory
    - Administration Offices

Waste is delivered to the Site by waste haulers, entering the site via the primary entrance road. Daily records are kept of the types and quantities of waste, origin of the waste, analytical results, and landfilled location. Samples are taken of sludge and liquid wastes to determine the appropriate waste processing and pre-treatment methodology based on the chemical composition. The physical/chemical pre-treatment system neutralizes solid and liquid waste streams prior to disposal. Sludge and solid waste streams are also stabilized at the LDR Facility. The waste is managed at the Site through landfilling or liquid waste incineration. The incinerator is designed to process 245 litres per minute (lpm) of liquid industrial waste, operating 24 hours per day. Leachate is also directed to the incinerator for disposal.

In 2015, the Site received approval for a vertical expansion of the landfill over existing waste cells. The vertical expansion will provide an additional disposal capacity of 3.87 million cubic meters (m^3). The height of the vertical expansion will be limited to the maximum height of the perimeter berms. Engineered components were designed for the landfill expansion, including the addition of a hydraulic control layer, a leachate perimeter collection trench, and improved surface water management. The groundwater monitoring programs were enhanced to evaluate the performance of the engineered components on achieving hydraulic containment and on maintaining inward hydraulic gradients.

1.2 Site Setting

1.2.1 Facility Location and Plan

The Facility is located on Lots 8 and 9 of Concession 10, in St. Clair Township, Lambton County, and is shown on Figure 2. The Site has a total property area of 121.4 hectares (ha). The property boundary as set out in the Provisional Certificate of Approval No. A031806 is identified in Figure 2. Figure 2 also depicts the existing surface elevation contours, limit of waste, and existing site features. The landfill has a footprint of 56 ha for active disposal or 61 ha (including historical fill areas for Cell 18 Sub-Cells 1, 2 and 3).

The Facility has a buffer area around the waste disposal areas. The buffer areas contains the perimeter screening berms, access roads, stormwater ditches and ponds, process water ponds, the administration offices and facilities, the Site entrance, and Site monitoring locations. In accordance with Township of St. Clair Comprehensive Zoning By-Law[1], the setback distance from the property boundary to the waste disposal limit is set at 153 m for non-industrial adjacent lands and 15 m for industrial lands.

1.2.2 Site Topography and Drainage

The topography of St. Clair Township is generally flat, with an overall western slope towards the St. Clair River. The land surrounding the Facility also has limited topography. The Facility is primarily surrounded by agricultural land, with woodlots located to the south, east, and west. The Site topography has been altered through the Facility operations and waste disposal operations. The perimeter berms constructed around the property boundary are currently the highest elevation of the ground surface and range from 211 to 212 m above mean sea level (AMSL). A section of the eastern perimeter berm has been increased to 219.5 m AMSL to provide temporary storage of soils excavated from the Site.

Surface water is generated from non-operational areas at the Lambton Facility. Non-impacted surface water runoff from undeveloped portions of the Site, perimeter berms, and capped and closed landfill cells, and waste disposal cells with interim cover is directed through a series of on Site drainage ditches and ponds to the two on Site surface water storage ponds (West Pond and East Pond). The surface water is processed by the surface water treatment plant (SWTP). Treated surface water from of the Site eventually drain into Bear Creek to the south. Surface water generated from the exterior of the perimeter northern and eastern berm drains into the Perch Creek watershed.

Runoff from operational areas, including haul roads and uncapped areas of waste, is classified as process water and is collected and stored in three process water ponds. The process water is directed to one of the two process water ponds by ditches, culverts, and storm sewers that have been constructed in the process water catchment area. The third process water pond provides additional storage capacity and is filled or emptied through the use of pumps. The process water is used as quench water in the incinerator.

1.2.3 Site Geology

A detailed description of the geologic and hydrogeologic setting is provided in the *Geology and Hydrogeology Existing Conditions Report* prepared by RWDI (October 2014).

The Facility is located on the physiographic region of the St. Clair Clay Plain, characterized by thick clay sediments overlying Paleozoic shale bedrock from the Kettle Point Formation. The overburden

[1] Township of St. Clair Comprehensive Zoning By-Law, By-Law 17 of 2003, Section 10.4 – Waste Disposal Industrial (M4) Zone

at the Site is between 37 and 42 m thick and is characterized by five overburden units, as shown in Table 1.1:

Table 1.1 Description of Site Geology

Classification	Unit	Description	Thickness/ Depth
Overburden	Beach Strand	Medium to silty fine to coarse sand	Less than 1 m thick
	St. Joseph Till	Massive to laminated clay/silt with thin, discontinuous layers of silty sand and isolated lenses of sand. Upper portion shows signs of weathering and fractures between 3.5 to 5 m.	14 m thick; observed between 1 and 15 m bgs
	Mackinaw Interstadial Silt and Sand	Discontinuous black medium sand and silt containing shale fragments	Less than 0.5 m thick; observed between 10 and 14 m bgs
	Black Shale Till	Massive to laminated clayey silt, with shale clasts	27 m thick; observed to between 15 and 45 m bgs
	Basal Till	Dense to hard cobbly, sandy clayey silt till with shale fragments and occasional lenses of fine gravel and coarse sand.	1 to 2.6 m thick
Bedrock	Kettle Point Formation	Brown to black, bituminous shale with occasional interbeds of grey-green shale	Observed to at approximately 40 m bgs

Notes:
m - Metres
bgs –Below ground surface

1.2.4 Site Hydrogeology

The geology described above has been extensively examined based on its ability to conduct groundwater movement. Hydrostratigraphic units at the Site are described below:

- **Active Aquitard:** Groundwater flow within the weathered and fractured upper portion of the St. Joseph Till unit is referred to as the Active Aquitard. The Active Aquitard has a relatively high hydraulic conductivity due to fracturing.
- **Inactive Aquitard:** The lower portion of the St. Joseph Till and Black Shale Till conduct groundwater flow at extremely slow rates. Groundwater movement through the discontinuous layers of sand within these units is controlled by the surrounding low hydraulic conductivity.
- **Interface Aquifer:** Groundwater flow within the Basal Till is considered the Interface Aquifer. It is found between the overlying aquitard and underlying shale bedrock.
- **Shale Aquitard:** The hydraulic conductivity of the shale of the Kettle Point Formation is low, with little fracturing.

Groundwater flow through the Active Aquitard is primarily within the fractures of the upper weathered portion of the clay. Groundwater flow direction in the shallow overburden is controlled mainly by regional surface topography. The water table is found at depths of approximately 3 to 5 m bgs. Water levels within the Active Aquitard show seasonal variability.

Groundwater flow within the Interface Aquifer is generally towards the east to southeast direction. Groundwater flow is influenced by the extraction wells actively extracting groundwater from Sub-Cell 3. The Interface Aquifer has been used as a water source throughout Lambton County.

Regional groundwater chemistry has been characterized historically through several studies. Generally, the regional groundwater chemistry was identified to have high concentrations of chloride and sodium (exceeding the ODWS), with groundwater approaching brackish conditions near the St. Clair River. Additionally, iron, sulfate, and fluoride concentrations often exceeded the ODWS regionally. These conditions have been attributed to the Kettle Point Formation shale, which was deposited in a marine environment and has readily soluble salts in the shale matrix. Bitumen is also found within the Kettle Point Formation shale and has historically been attributed to detections of petroleum hydrocarbon constituents in groundwater samples from the Interface Aquifer.

1.3 Regulatory Setting

The Site is operated in accordance with 13 Environmental Compliance Approvals (ECA). Table 1.2 provides a list of the ECAs for the Site. Copies of the ECAs for the Site are provided in the 2018 Clean Harbors Lambton Facility Annual Landfill Report. The groundwater monitor program is regulated under ECA A031806 Condition 9(a)(i).

Table 1.2 ECAs

Approval Type	Approval Number	Operation/ Process
Waste Disposal Site	A031806	Landfill, TDU and LDR
Waste Disposal Site	A031831	Household Hazardous Waste
Waste Disposal Site	A031813	Liquid Waste Incinerator and Transfer Station and Financial Assurance
Industrial Sewage Works	1065-9VVJSW	Surface Water and Process Water Treatment Unit
Waste/Air	6547-5G5MSP	Incinerator
Air	8687-9MVRJ9	TDU
Air	8-1184-89-937	Laboratory
Air	5688-74BJFW	Land Disposal Restriction facility
Air	8-1030-94-006	Incinerator
Air	4873-7N5TS4	Spent Pot Liner
Waste/Air	2005-8RMJL6	Leachate Pond Vents
Waste Management System	A8581	PCB
Waste Management System	A860228	Collection, Handling and Transportation

Three ECAs relate to waste disposal operations, one ECA relates to industrial sewage works, six ECAs relate to air discharges, and two ECAs relate to waste management systems that operate from the Site. The primary ECAs that relate to the day-to-day operations at the Site are the waste disposal ECAs A031806 (landfill and TDU) and A031813 (incinerator and transfer station).

2. Groundwater Monitoring Program

The 2018 groundwater monitoring program was undertaken in accordance with the program defined in the document entitled "Final Draft – Groundwater and Landfill Performance Monitoring Programs" (RWDI, December 2015) (herein referred to as the Monitoring Program). As described in the Monitoring Program, there are three monitoring components, including:

- Groundwater Monitoring along the Perimeter of Facility Property
- Sub-Cell 3 Remedial Performance Monitoring
- Performance Monitoring of Engineered Landfill Systems

The Facility groundwater monitoring network is shown on Figure 3. A summary of the monitoring well completion details for the well network is attached as Table 1. Table 2.1 show the sampling breakdown in each hydrostratigraphic unit. The groundwater sampling activities included in each of the monitoring components is described below.

Table 2.1 Summary of Groundwater Sampling Monitoring Well Network

Hydrostratigraphic Unit	Monitoring Well Network	Sampling Frequency	Sampling Methodology
Active Aquitard	• 32 shallow monitoring wells - 27 located on Site property - 5 located on neighbouring property	Semi-annually	Continuous Volume
Hydraulic Control Layer	• 6 deep monitoring wells on Site property	Semi-annually	Low Flow Purging
Interface Aquifer	• 24 deep monitoring wells - 20 located on Site property - 4 located on neighbouring property	Semi-annually	Low Flow Purging
Shale Aquitard	• 2 deep monitoring wells	Biennially	Continuous Volume

2.1 Groundwater Monitoring along the Perimeter of Facility Property

The groundwater monitoring program along the perimeter of the facility was developed in 1986 and provides an assessment of the groundwater flow and quality. The perimeter monitoring program is conducted semi-annually (spring and fall). The monitoring program consists of hydraulic monitoring (water level) and groundwater sample collection. The collected groundwater samples are submitted for chemical analysis.

Monitoring wells included in the perimeter monitoring program are located on Site, as well as the neighbouring property owned by Clean Harbors. Table 2.2 shows the sampling locations of monitoring wells screened in each hydrostratigraphic unit for the groundwater monitoring along the Perimeter of the Facility.

Table 2.2 Perimeter Groundwater Sampling Monitoring Well Locations

Hydrostratigraphic Unit	Area of Site	Monitoring Wells
Active Aquitard	Located off the Facility Property	TW55-09S, TW56-11S, TW57-11S, TW58-11S, TW59-13S
	Northern Berm	TW39-99I, TW39-99S, TW46-99I, TW46-99S, TW61-13I, TW61-13S
	Downgradient of Northern Berm	OW32-90S, OW35-90S, TW21-94-II,TW22-94, TW32-94-IV, TW40-99S, TW53-03S
	Along Property Boundary	TW30-94, TW41-99S, TW42-99S, TW43-99S, TW45-99S, TW48-16S, TW62-13S
	Internal to Property	TW63-13S
Interface Aquifer	Located off the Facility Property	TW55-09D, TW56-11D, TW57-11D, TW59-13D
	Internal to Property	TW39-99D, TW46-99D, TW54-09D, TW61-13D
	Along Property Boundary (Compliance)	OW32-90D, OW35-05D, TW22-99D, TW30-99D, TW32-94-II, TW40-99D, TW41-99D, TW43-99D, TW45-99D, TW47-00D, TW48-00D, TW49-00D, TW53-03D, TW60-13D

The semi-annual monitoring events conducted at the Site include the collection of water levels and groundwater samples. These activities are undertaken in accordance with standard operating procedures, as further described in Section 2.4.

Water level measurements are collected to determine groundwater flow direction in each hydrostratigraphic unit, and are used to determine horizontal and vertical hydraulic gradients between monitoring locations. Assessing the vertical hydraulic gradients between hydrostratigraphic units is important to assess the potential for vertical groundwater flow and possible contaminant migration. Water levels are either collected manually using a water level meter or equipped with a dedicated pressure transducer and data loggers placed in the monitoring well for continuous measurement. The water level data collected with the pressure transducers is downloaded quarterly. A manual water level measurement is collected at each well equipped with a pressure transducer prior to data downloading in order to verify and calibrate the pressure transducer data. The attached Table 2 provides a description of the water level measurement methodology for each monitoring location.

Groundwater is sampled using one of three sampling methodologies depending on the monitoring location. Monitoring wells screened in the Active Aquitard and the Shale Aquitard are sampled using the continuous volume (CV) sampling methodology. These monitoring wells are equipped with dedicated tubing and inertial pumps. Water level measurements and CV purging of the monitoring wells screened in the Active Aquitard, shown in Table 2.2, are conducted by Clean Harbors staff for five weeks prior to sampling activities. Monitoring wells screened in the Interface Aquifer are sampled using the low flow purging method. Table 2, attached, shows the sampling methodology used at each monitoring location.

The Active Aquitard and Interface Aquifer/Kettle Point Shale Perimeter groundwater monitoring networks are presented on Figures 4 and 5, respectively. Groundwater samples are collected for the following parameters and at sampling frequencies, as shown in Table 2.3.

Table 2.3 Groundwater Sampling Frequency

Aquifer	Parameter for Analysis	Sampling and Analysis Frequency
Active Aquitard	General Indicators[1], Major[2] and Minor[3] Ions	Semi-annually
	Metals[4]	Annually
	VOCs	Biennially (sampled odd years)
Interface Aquifer	General Indicators, Major and Minor Ions	Semi-annually
	Metals	Annually
	VOCs	Annually
Shale Aquitard	General Indicators, Major and Minor Ions	Biennially (sampled odd years)
	Metals	
	VOCs	

Notes:
(1) General Indicators include: pH, Conductivity, Total Dissolved Solids (TDS)
(2) Major ions include: Alkalinity, Chloride, Sulfate, Calcium, Magnesium, Potassium, and Sodium
(3) Minor ions include: Ammonia (active aquitard only), Nitrite, Nitrate, Bromide, Cyanide, and Fluoride
(4) Metals include: Arsenic, Barium, Boron, Cadmium, Chromium, Iron, Lead, Nickel, Mercury, Zinc

2.2 Sub-Cell 3 Remedial Performance Monitoring

Sub-Cell 3 is located within Cell 18 in the northwest corner of the Site, as shown on Figure 6. In 1999 during a routine inspection of the excavation base of Sub-Cell 3, gas/water was found to be seeping from fractures in the base of the landfill excavation. The cause of the seeps was attributed to a number of factors, including: elevated bedrock elevations, high hydrostratigraphic head in the Interface Aquifer, the depth of the excavation, and heterogeneity in the underlying soil. With the removal of clay soils for the cell excavation, the remaining thickness of clay soil at the base of the excavation was insufficient to counteract the hydrostratigraphic head pressures. The remedial measures put in place ensured the clay base of the landfill was not compromised and consisted of:

- Installation of a hydraulic control layer (HCL) in Sub-Cell 3 to allow long-term control of hydraulic pressures. The HCL consists of a gravel-filled perimeter trench (installed around the affected areas) connected to a gravel blanket placed over the area surrounded by the trench.
- Placement of a clay layer above and around the HCL to provide a barrier to leachate movement from the adjacent sub-cells. The clay liner is at a minimum 5 m thick.
- Installation of extraction wells into the HCL to allow the long term control of hydraulic pressure. Operation of the extraction wells maintain water levels in the HCL below the level in the Interface Aquifer and the leachate level in adjacent landfill cells containing waste. The purpose of this action is to create an inward pressure gradient while maintaining an upward pressure/flow from the Interface Aquifer into the HCL. The intention is to reduce the potential for water/leachate to move downward through the fractures to the bedrock.

A HCL monitoring program was developed to determine the performance of the hydraulic and water-quality aspects of the remedial measures in Sub-Cell 3. The purpose of the hydraulic monitoring is to confirm an appropriate head difference between the HCL and the Interface Aquifer is being maintained. Discharge from the HCL extraction wells is sampled at the same semi-annual frequency as the routine groundwater program performed at the Lambton Facility.

The monitoring program conducted in Sub-Cell 3 includes the collection of water level measurements and groundwater samples. A summary of the Sub-Cell 3 monitoring network and program is summarized in Table 2.4. Groundwater samples are collected for specific parameters at a frequency consistent with the perimeter monitoring program, as presented in Table 2.1.

Table 2.4 Summary of the Sub-Cell 3 Groundwater Sampling

Hydrostratigraphic Unit	Monitoring Well Network	Water Level Measurements		Groundwater Sampling Methodology
		Methodology	Frequency	
HCL	• 2 extraction wells	Pressure Transducers	Quarterly	Collected from Pump Discharge Line
	• 4 monitoring wells			Continuous Volume
Interface Aquifer	• 2 monitoring wells			

2.3 Performance Monitoring of Engineered Landfill Systems

With the vertical expansion of the landfill, a perimeter leachate collection trench with sumps will be progressively installed around the active cells. The groundwater monitoring program includes collecting water levels at the four standpipes/wells midway between the sumps. The sumps have hydrostratigraphic level instruments connected to the Programmable Logic Controller (PLC). The standpipes/wells are equipped with pressure transducers and data loggers that record the water level every twelve hours, which is downloaded quarterly.

The performance monitoring of the engineered landfill systems consists of comparing the perimeter leachate collection system water level monitoring data with the perimeter monitoring program water level data to determine the status of the inward gradient to the leachate collection system. The monitoring well network to assess the performance monitoring of engineered landfill systems is shown on Figure 7.

Additionally, a berm constructed in an eastern orientation to the south of the southern property boundary was constructed in 2002 to induce groundwater mounding to promote an inward hydraulic gradient within the Active Aquitard unit from the South Berm towards Sub-Cell 19. The top of the berm is convex shaped to capture precipitation and facilitate downward percolation and recharge. The Active Aquitard is monitored beneath the Southern Berm and to the north of the southern berm near the surface water drainage ditch/toe of the southern extent of Sub-Cell 19. Groundwater mounding induced by the South Berm is assessed by comparing groundwater elevations at the berm to leachate elevations within the collection system at Leachate Standpipe LCSOW04-15 and sump PTS-04. Groundwater samples are collected for specific parameters at a frequency consistent with the Active Aquitard perimeter monitoring program, as presented in Table 2.1 and are compared to the ODWS to assess groundwater quality.

2.4 Quality Assurance/Quality Control Program

A Quality Assurance/Quality Control (QA/QC) program was performed for each monitoring event to ensure the reliability and the validity of the analytical results. The QA/QC program involved both field and laboratory measures to identify any form of sample contamination that might have occurred, or if any lack in precision of the analytical methods employed was evident. In addition, the QA/QC program addresses the potential source and degree of contamination or analytical imprecision.

The field QA/QC program consisted of the collection of field duplicate samples and the preparation of field blank samples. Three field blank were collected per sampling event. Duplicate samples were collected from EW1c-13, TW41-99D, and TW51-02B in spring 2018 and OW35-05D, PW2-S(R11), TW21-94-II, and TW61-13I in fall 2018.

The laboratory QA/QC program consisted of the analysis of method blank samples, laboratory spike samples, and surrogate recovery samples. Analyses of these samples were conducted in conjunction with the analyses of each batch or run of investigative samples.

All analytical data received were validated by a review of the standard quality control criteria including blind duplicate sample analysis and blind field blank analysis. As well, the laboratory QA/QC data were reviewed. The complete analytical data assessment and validation report for the 2018 reporting period is included in Appendix A. Based on the assessment, the dataset is acceptable without qualifications.

3. Monitoring Results

On February 15, June 4 through 7, August 22, and November 20 through 22, 2018, GHD conducted quarterly groundwater pressure transducer downloads and/or semi-annual groundwater monitoring and sampling activities on and/or off Site. Groundwater monitoring and pre-purging of the Active Aquitard monitoring wells was completed by Clean Harbors staff for the five weeks prior to GHD sampling. Calculated groundwater elevations from the manual groundwater monitoring measurement collected by GHD and Clean Harbors are provided in Table 3. The following sections detail the results of the water level data, groundwater quality, and compliance for each hydrostratigraphic unit monitored.

3.1 Perimeter Groundwater Monitoring Program

The objective of the perimeter groundwater monitoring and sampling program is to assess the vertical and horizontal hydraulic gradients and detect the extent and magnitude of potential contamination to groundwater (if any), in the hydrostratigraphic units monitored (Active Aquitard and Interface Aquifer).

3.1.1 Water Level Data

The interpreted groundwater contours for the Active Aquitard hydrostratigraphic unit based on groundwater monitoring data collected by Clean Harbors staff prior to continuous volume purging for the spring and fall monitoring events in 2018 are presented as Figures 8 and 9, respectively. The interpreted groundwater contours for the Interface Aquifer hydrostratigraphic unit for the spring and fall monitoring event in 2018 are presented as Figures 10 and 11, respectively.

Vertical hydraulic gradients between the Active Aquitard and Interface Aquifer for the spring and fall 2018 are presented on Figure 12. Hydrographs generated using 2018 groundwater pressure transducer data and manual groundwater monitoring measurements for the perimeter groundwater monitoring program are presented in Appendix B as Figures B-1 through B-27. Hydrographs of historical groundwater measurements are presented in Appendix C as Figures C-1 through C-14.

3.1.1.1 Active Aquitard

At the Lambton Facility, perimeter screening berms are located along the property boundary. The northern berm surrounds Cells 16 through 18 and is approximately 10 m above original ground surface. Following completion of the vertical expansion, the maximum height of the waste will be equal to height of the northern berm.

Groundwater contours of the Active Aquitard illustrate a potentiometric high present in the northwest portion of the property and an outward flow in April and October 2018. This potentiometric high is the direct result of groundwater mounding induced within the Active Aquitard by the northern berms. This mounding is a design feature of the northern berms and the observed groundwater mounding is consistent with historical groundwater elevations.

The groundwater contours for the April and October 2018 Active Aquitard were modified to illustrate GHD's interpretation of the groundwater mounding from the northern berm to the property boundary. The groundwater contours within the landfill footprint are not based on groundwater elevations as groundwater monitoring wells are not instrumented in this area and therefore are interpretations based on the groundwater elevations outside of the landfill footprint. GHD suspects that the mounding from the northern berm will induce an inward hydraulic gradient from the berm towards the site, discouraging lateral migration of potential site-related impacts in groundwater.

3.1.1.1.1 Northern Berm

The groundwater beneath the northern berm is monitored within the berm fill (TW39-99S, TW46-99S, and TW61-13S) and the native overburden beneath the northern berm (TW39-99I, TW46-99I, and TW61-13I). Conditions are also monitored adjacent to the berm along the property boundary within the native overburden (OW35-90S, TW21-94-II, TW22-94, and TW32-94-IV). Hydrographs for the Active Aquitard monitoring wells located along the northern berm are grouped by location and present the historical groundwater elevations for the northwest corner, northeast corner and northwest berm as Figures C-1 through C-3, respectively.

Groundwater elevations are mounded in the monitoring wells instrumented within the northern berm fill and beneath the northern berm (TW39-99S, TW39-99I, TW46-99S, and TW46-99I). As illustrated on Figures C-1 through C-3, these groundwater elevations have been slowly decreasing during recent monitoring, but the groundwater elevations monitored within the berm remain elevated compared to the groundwater elevations outside the berm. As described above, this pattern is consistent with the purpose of the berm, which is to induce an inward hydraulic gradient from the berm towards the site, discouraging lateral migration of potential site-related impacts in groundwater.

Groundwater elevations identified in monitoring wells instrumented along the outside of the northern berm remain stable compared to historical measurements (TW21-94-II, TW22-94, TW32-94-IV, OW35-90S and TW22-94).

3.1.1.2 Interface Aquifer

Groundwater contours for the Interface Aquifer illustrate a potentiometric high present in the northwest portion of the property in June and November 2018. This is consistent with historical groundwater patterns. The static groundwater elevation calculated at TW45-99D (located along the west side of the Site) is inconsistent with static groundwater elevations within the Interface Aquifer and is attributed to slow monitoring well recharge. This is consistent with historical observations and accordingly, the calculated groundwater elevation was not included in the groundwater contouring for the 2018 monitoring events. Redevelopment of monitoring well TW45-99D to assess if the screen and sandpack can be rehabilitated to improve monitoring well recharge is recommended.

Hydrographs of the Interface Aquifer demonstrate that the potentiometric head continues to rise at monitoring wells located off Site and along the northern property boundary, as presented in Appendix C as Figures C-7, C-8, C-9, and C-11 through C-13. Potentiometric head measured at TW40-99D noticeably declined in September 2012 and September 2014 as a result of pumping activities conducted at PW1-N and PW2-S(R11) during this time period. Potentiometric head at TW40-99D measured during 2018 was stable.

Groundwater monitoring well TW22-99D was identified to be artesian during the spring and prior to pre-purging in the fall 2018 monitoring events. Groundwater levels were above ground surface, but lower than the top of casing of the groundwater monitoring well.

3.1.1.3 Shale Aquitard

The two groundwater monitoring wells currently screened in the Shale Aquitard on Site are located on the northeast corner of the property (TW32-94-I) and to the south of the property (TW42-99D) and are monitored and sampled biennially and were not assessed in this reporting period. Groundwater flow direction and vertical gradient between the interface aquifer and Shale Aquitard were not assessed.

3.1.1.4 Vertical Gradient

The vertical gradient between two hydrostratigraphic units is assessed through nested well clusters (wells located closely together and screened at different depths) and indicates the direction of the vertical component of groundwater flow. Vertical gradients within the Site can help predict if landfill impacts have the potential to migrate downwards to underlying hydrostratigraphic units. The following sections compare the vertical gradients between the Active Aquitard and the Interface Aquifer.

3.1.1.4.1 Active Aquitard and Interface Aquifer Vertical Gradient

Groundwater movement between the Active Aquitard and Interface Aquifer is through unfractured clay with low hydraulic conductivities. The calculated vertical gradients are generally very low. Considering the low vertical gradients and low hydraulic conductivity of the aquitard separating the Active Aquitard from the Interface Aquifer, movement of groundwater between these units is expected to be very slow. The spatial distribution of the vertical gradients between the Active Aquitard and Interface Aquifer for June and November 2018 is presented on Figure 12. The calculated vertical gradients are presented in Table 3.1.

Table 3.1 Active Aquitard and Interface Aquifer Vertical Gradients

Nested Pair Monitoring Well Locations		Vertical Gradient			
Active Aquitard	Interface Aquifer	Spring Pre-Purge	Spring	Fall Pre-Purge	Fall
Wells Located Off the Facility Property					
TW55-09S	TW55-09D	-	-0.01	-	-0.03
TW56-11S	TW56-11D	-	-0.04	-	-0.05
TW57-11S	TW57-11D	-	0.06	-	0.06
TW58-11S	TW56-11D	-	-0.02	-	-0.04
TW59-13S	TW59-13D	-	0.07	-	0.09
Wells Installed in the North Berm					
TW39-99I	TW39-99D	-0.01	-0.08	-0.02	-0.11
TW39-99S	TW39-99D	0.07	0.00	0.07	-0.01
TW46-99I	TW46-99D	0.10	0.06	0.10	0.04
TW46-99S	TW46-99D	0.11	0.09	0.11	0.10
TW61-13I	TW61-13D	-0.04	-0.03	-0.05	-0.03
TW61-13S	TW61-13D	0.02	0.00	0.02	-0.02
Wells along Perimeter of Facility Property, Downgradient of North Berm					
OW32-90S	OW32-90D	-	0.00	-	0.04
OW35-90S	OW35-05D	0.06	0.05	0.06	0.06
TW21-94-II	TW47-00D	-	-0.01	-	-0.01
TW22-94	TW22-99D	-	0.08	-	-0.05
TW22-94	TW60-13D	-	0.08	-	-0.03
TW32-94-IV	TW32-94-II	0.06	-0.03	0.06	0.04
TW40-99S	TW40-99D	0.01	-0.05	-0.01	-0.07
TW53-03S	TW53-03D	0.07	0.04	0.07	0.07
Wells along Perimeter of Facility Property, Removed from North Berm					
TW30-94	TW30-99D	0.04	0.03	0.01	0.00
TW41-99S	TW41-99D	-	0.04	-	0.05
TW42-99S	TW49-00D	0.04	0.00	-0.02	-0.02
TW43-99S	TW43-99D	-	-0.03	-	-0.01
TW45-99S	TW45-99D	-	1.03	-	1.06
TW48-16S	TW48-00D	0.04	0.02	0.04	-0.01

Notes:
Positive vertical gradient value reflects a downward gradient.
Negative vertical gradient value reflects an upward gradient.

Groundwater from the Active Aquitard screened monitoring wells were pre-purged by Clean Harbors staff prior to the Spring and Fall 2018 GHD groundwater monitoring and sampling event. Vertical gradients were calculated based on the June and November 2018 monitoring data and may not be representative of the static water level, if the groundwater did not recharge fully following the Clean Harbors pre-purging.

During the Clean Harbors pre-purging, Interface Aquifer groundwater levels were not monitored. GHD calculated the vertical gradients from the April and October 2018 water levels monitored by Clean Harbors utilizing the transducer data for the Interface Aquifer, where available. To provide accurate vertical gradient calculations, GHD recommends groundwater monitoring OW32-90D, TW22-99D, TW41-99D, TW43-99D, TW45-99D, TW47-00D, TW55-09D, TW56-11D,TW57-11D, TW59-13D, and TW60-13D during the spring and fall pre-purge activities to properly assess vertical gradients utilizing static water levels.

The June and November 2018 monitoring event identified a slight downward gradient along the eastern property boundary and northeast corner of the property and an upward gradient along the north and northwest property boundary and off-Site to the south of the property boundary. The potentiometric head of the Interface Aquifer was identified to be highest in the northwest corner of the property which is driving the upward gradient. An elevated downward gradient at TW45-99S and TW45-99D was identified. This is attributed to the slow recharge of monitoring well TW45-99D, which may not have been at static levels during the June and November 2018 monitoring events.

3.1.2 Water Quality

The following sections discuss the results of the groundwater quality monitoring program conducted at the Site during 2018. The groundwater is assessed with respect to MECP criteria listed in the Ontario Drinking Water Standards (ODWS) for comparative reference. The groundwater is also assessed with respect to MECP criteria listed in the Provincial Water Quality Objectives (PWQO), due to the possibility for shallow groundwater to discharge to surface water.

Historically, eight leachate indicator parameters were selected to evaluate the effects of the landfill on surrounding water quality. The indicator parameters include chloride, sodium, sulfate, potassium, fluoride, barium, bromide, and boron. These parameters have historically been useful in determining the source of groundwater or potential impacts from leachate. Many other analytical parameter concentrations can change in leachate impacted water, but not generally at the levels of change noted in the above-listed parameters. The selection of specific indicator parameters may be refined for future reporting periods. For consistency, the same indicator parameters were selected for review of the 2018 analytical data.

The long-term goal of the groundwater monitoring program is to monitor for and identify potential landfill-related groundwater quality impairments migrating off Site. In order to evaluate this potential impact on water quality, the following was completed:

- An initial review of the analytical data for completeness and accuracy, include a review of laboratory QA/QC samples and protocols.
- Statistically assessing the analytical data in comparison to historical data, with assistance from:
  - The comparison to the historical range
  - Shewhart's upper confidence limit (UCL) statistical analysis
  - Linear regression statistical analysis

- Identifying increasing trends in the data through the development of concentration versus time plots.
- Comparing the analytical data to the ODWS and PWQO to assess the groundwater quality.

Background Water Quality

The following table includes chemical data from Jagger Hims Limited (1996) for wells installed in an area of the Lambton Facility that was undisturbed by landfilling activities upon sampling. The analytical results show an increase in chloride and sodium concentrations with depth, and a decrease in sulfate concentrations with depth. Other indicator parameters remain relatively consistent with depth.

Table 3.2 Average Concentration of Indicator Parameters at Monitoring Wells prior to Landfill Disturbance

Indicator Parameter	Average Concentration (mg/L)			
	Active Aquitard	Inactive Aquitard	Interface Aquifer	Shale Aquitard
Chloride	16	84	260.2	12,925
Sodium	58.9	127.8	254.1	8,163
Sulfate	389	53	3.7	4.8
Potassium	3.5	4.2	2.35	17.68
Fluoride	0.9	1.22	1.16	0.645
Barium	0.047	0.61	0.2	4.0
Bromide	<0.5	<0.5	<0.5	<5
Boron	0.022	19.5	1.42	5.19

Notes:
<0.5 = Not detected at the associated reporting limit

The relatively high concentrations of sodium and chloride with depth and within the Interface Aquifer and Shale Aquitard are attributed to naturally occurring readily soluble salts in the shale matrix of the Kettle Point Formation.

Leachate Quality

The following table shows the concentrations of indicator parameters in leachate (RWDI, 2013). Samples were collected in 2012 from monitoring wells installed within the limit of waste. This work was completed in support of the Environmental Assessment (EA) for vertical expansion. Concentrations of chloride, sodium, sulfate, potassium, fluoride, and bromide are elevated in comparison to baseline concentrations shown in Table 3.2, above.

Table 3.3 Concentrations of Indicator Parameters in Leachate Sources

Indicator Parameter	Average Concentration (mg/L)				
	Pre-1986 Landfill Area	Cell 16 Landfill Area (2012)	Cell 17 Landfill Area (2012)	Cell 18 Landfill Area (2012)	Cell 19 Landfill Area (2018)
Chloride	11,497	38,710	27,150	33,700	14,447
Sodium	8,290	17,275	22,875	28,540	12,033
Sulfate	779	5,508	6,433	10,708	-

Table 3.3 Concentrations of Indicator Parameters in Leachate Sources

Indicator Parameter	Average Concentration (mg/L)				
	Pre-1986 Landfill Area	Cell 16 Landfill Area (2012)	Cell 17 Landfill Area (2012)	Cell 18 Landfill Area (2012)	Cell 19 Landfill Area (2018)
Potassium	252	4,867	6,398	6,206	3,730
Fluoride	17.9	9.0	10.1	31.1	-
Barium	0.14	0.4	<0.5	2.3	0.17
Bromide	73.2	462	587	1,243	-
Boron	0.39	11.3	16.8	31	40.2

The collection and submission of leachate samples from the leachate collection system located around Cell 19 for laboratory analysis of select leachate indicator parameters was conducted by Clean Harbors on May 4 and 14, and July 3, 2018. The average concentrations from the three leachate samples are presented in Table 3.3. The leachate indicator parameters from Cell 19 are elevated compared to the pre-1986 landfill area concentrations, with the exception of barium, and are considered to be appropriate for use as indicator parameters. Sulfate, fluoride, and bromide were not analyzed as part of the sample collection.

To properly assess the potential changes to leachate conditions over time, the leachate quality within Cell 19, and the seasonal fluctuations, the collection and submission of leachate samples during the spring and fall is recommended. GHD recommends the submissions of leachate samples consisting of general Indicators, major and minor ions semi-annually, total metals annually, and VOC biennial (sampled in odd years), starting in the spring of 2019. The recommend sampling and analysis plan for leachate samples from Cell 19 is based on the parameters and frequency of the Active Aquitards sampling and analysis plan and will provide insight into the evolution of leachate quality within the active landfill cell.

Groundwater Quality

Water quality data collected during the 2018 monitoring program for wells installed in the Active Aquitard and Interface Aquifer are presented in Tables 4 through 13. The historical range for each sampled parameter is presented for individual wells. Additionally, locations with water quality data outside of the historical range or in exceedance of a standard (ODWS and/or PWQO) are highlighted.

Additionally, statistical analysis using UCLs and linear regression (trend analysis) is displayed for indicator parameters at each monitoring well in Table 14 and 15, respectively. Linear regression was performed for the last 5-years of monitoring data. Concentration versus time plots for indicator parameters at all monitoring locations are presented in Appendix D.

The analytical data from the reporting period has been evaluated according to the respective hydrostratigraphic unit. Inorganic and organic chemistry is evaluated separately. The following sections present the analytical results from the Active Aquitard and Interface Aquifer.

Electronic copies of all laboratory data reports for the monitoring period are included in Appendix E.

3.1.2.1 Active Aquitard

3.1.2.1.1 Inorganic Chemistry

Inorganic chemistry includes sampling for general indicators, major and minor ions, and metals, as described in Table 2.3. Monitoring well locations in the Active Aquitard exceeding ODWS and PWQO are shown in Table 3.4 and 3.5, respectively.

Comparison to ODWS

Table 3.4 Active Aquitard Monitoring Wells with ODWS Exceedances

Monitoring Location		Exceeding ODWS										
		TDS (AO)		Alkalinity (OG)		Chloride (AO)		Iron (MAC)	Sulfate (AO)		Sodium (AO)	
Location	Well ID	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Spring	Fall	Spring	Fall
ODWS (mg/L)		500		30-500		250		0.30	500		20/200	
Located off the Facility Property	TW55-09S	x	x								x	x
	TW56-11S	x	x	x	x				x	x	x	x
	TW57-11S	x	x	x	x			x	x		x	x
	TW58-11S	x	x	x	x	x	x		x	x	x	x
	TW59-13S	x	x								x	x
Northern Berm	TW39-99I	x	x	x	x						x	x
	TW39-99S	x	x								x	x
	TW46-99I	x	x								x	x
	TW46-99S	x	x						x	x	x	x
	TW61-13I	x	x								x	x
	TW61-13S	x	x								x	x
Downgradient of Northern Berm	OW32-90S	x	x								x	x
	OW35-90S	x	x	x	x				x	x	x	x
	TW21-94-II	x	x	x	x						x	
	TW22-94	x	x						x	x	x	x
	TW32-94-IV	x									x	x
	TW40-99S	x	x								x	x
	TW53-03S	x	x								x	x
Along Property Boundary (Removed from Northern Berm)	TW30-94		x								x	x
	TW41-99S	x	x		x						x	x
	TW42-99S	x	x						x	x	x	x
	TW43-99S										x	x
	TW45-99S	x	x								x	x
	TW62-13S	x	x								x	x
	TW48-16S	x	x								x	x
Internal to Property	TW63-13S	x	x			x	x				x	x

Notes:

(1) Aesthetic objectives (AO) were developed based for parameters affecting the aesthetic quality of drinking water sources. They are not based on risks to human health.
(2) Operational guidelines (OG) were developed based for parameters that may cause operational issues in water distribution infrastructure. They are not based on risks to human health.
(3) Maximum allowable concentration (MAC) guidelines were developed based on risk to human health
x Identifies exceedances for the applicable monitoring well, parameter and sampling event
x Exceeding associated standard and the historical range

Samples from Active Aquitard monitoring locations had exceedances of the ODWS for total dissolved solids (TDS), alkalinity, chloride, iron, sulfate, and sodium. It should be noted the ODWS for these parameters, with the exception of iron, were developed based on aesthetic or operational guidelines and are not based on risk to human health. Of the parameters with exceedances, chloride, sodium, and sulfate are considered indicator parameters. The majority of ODWS exceedances were within historical ranges.

The ODWS for TDS is an aesthetic objective (AO) for dissolved compounds in drinking water. The exceedances for TDS are fairly consistent across the monitoring well network, including detections at locations located off the Facility property. Although detected above the ODWS within the Active Aquitard, TDS was detected within the historical range, with the exception of monitoring locations TW42-99S, TW48-16S and TW61-13I. TDS has historically been detected across the monitoring well network due to screened intervals within the clay based stratigraphy. These detections are likely attributed to characteristics of the local geology and are not likely resultant of landfill impacts.

Under the ODWS and Ontario Regulation 169/03 there are two AO for sodium: 20 mg/L and 200 mg/L. AOs are standards that were developed for parameters affecting the aesthetic quality of drinking water sources, such as appearance or taste. The AO most commonly used for sodium is 200 mg/L. The lower AO concentration (20 mg/L) was developed for people on sodium restricted diets and thus is inappropriate for comparison purposes in this case. All of the exceedances for sodium in the Active Aquitard were in exceedance of the lower standard (20 mg/L) but were detected at concentrations less than the upper standard (200 mg/L). Exceedances of the lower standard are considered to be insignificant as concentrations of sodium in baseline samples (Table 3.2) exceeded the lower standard.

Monitoring locations in the Active Aquitard also had exceedances of sulfate above the ODWS. In 2015, an investigation was conducted at TW42-99S due to the detection of atypical sulfate concentrations. Sulfate was detected at comparable concentrations in 2018 (1,980 and 1,660 mg/L in the spring and fall 2018, respectively) to the 2014 and 2015 monitoring results (1,410 mg/L and 1,540 mg/L, respectively). The sulfate UCL at TW42-99S was calculated to be 922.8 mg/L in 2018. The linear regression statistical analysis identified a significantly increasing trend in sulfate concentrations at TW42-99S in 2018. No other on Site monitoring locations with sulfate detections above the ODWS had statistically significant increasing trends. As shown in Table 3.2, sulfate was detected in the baseline samples at higher concentrations within the Active Aquitard, although not at comparable concentrations to TW42-99S. The 2015 investigation at TW42-99S identified previous studies (Abbott, 1987) that acknowledged the presence of sulfate is common in the Lambton County groundwater. The studies concluded sulfate is resultant from the dissolution of sulfate minerals and oxidation of sulfur in the clay till. In the absence of elevated concentrations of other landfill indicator parameters (such as alkalinity, chloride, bromide), it is interpreted the sulfate detections are not related to the landfill.

Iron exceeded the ODWS for the groundwater sample collected from TW57-11S in spring 2018. Historically, iron concentrations for TW57-11S have been below the laboratory detection limit. TW57-11S is located off-Site and the elevated concentration is not related to landfilling operations. Subsequent sampling at TW57-11S is scheduled for 2019.

Comparison to PWQO

Table 3.5 Active Aquitard Monitoring Wells with PWQO Exceedances

Monitoring Location		Exceeding PWQO			
		Boron	Chromium	Iron	Nickel
Location	Well ID	Spring	Spring	Spring	Spring
PWQO (mg/L)		0.2	0.05	0.025	0.025
Located off the Facility Property	TW55-09S	x	<u>x</u>		
	TW56-11S	x	<u>x</u>		
	TW57-11S		x	<u>x</u>	
	TW58-11S	x	<u>x</u>		
	TW59-13S		x		
Northern Berm	TW39-99I		<u>x</u>		
	TW39-99S	x	<u>x</u>		
	TW46-99I		<u>x</u>		
	TW46-99S	x	<u>x</u>		
	TW61-13I		<u>x</u>		
	TW61-13S	x	x		
Downgradient of Northern Berm	OW32-90S	x	<u>x</u>		
	OW35-90S	x	<u>x</u>		
	TW21-94-II		<u>x</u>		
	TW22-94		<u>x</u>		
	TW32-94-IV		x		
	TW40-99S		<u>x</u>		
	TW53-03S		<u>x</u>		
Along Property Boundary (Removed from Northern Berm)	TW30-94		<u>x</u>		
	TW41-99S		x		
	TW42-99S		x		
	TW43-99S	x	x		
	TW45-99S		x		
	TW62-13S				
	TW48-16S		x		
Internal to Property	TW63-13S	x	x		x

Notes:

x Identifies exceedances for the applicable monitoring well, parameter and sampling event

<u>x</u> Exceeding associated standard and the historical range

The PWQO for boron, chromium, iron, and nickel were exceeded at locations screened in the Active Aquitard. Of the parameters exceeding the PWQO, boron is considered an indicator parameter. The PWQO concentrations for these parameters are lower than the ODWS concentrations, with the exception of iron, as the PWQOs were developed for the protection of freshwater aquatic life. These standards are being applied to groundwater samples because shallow groundwater discharges to surface ditches and drainage swales. Detections of boron above the PWQO were within historical ranges. Of the monitoring well locations with boron PWQO exceedances, a statistically significant increasing trend was only identified for the indicator parameter bromide for the off-site monitoring well location TW58-13S).

The exceedances for chromium are fairly consistent across the monitoring well network including at locations located off the Facility property. On the basis of the pattern of chromium exceedances observed, the landfill is not considered to be a likely source of chromium reported in Active Aquitard monitoring well groundwater samples.

Iron exceeded the PWQO for the groundwater sampled collected from TW57-11S in spring 2018. Historically, iron concentrations for TW57-11S have been below the laboratory detection limit. TW57-11S is located off-Site and the elevated concentration is not related to landfilling.

Nickel exceeded the PWQO for the groundwater sample collected from TW63-13S in spring 2018. The concentrations were within the historical range for TW63-13S. No statistically significant increasing trends for indicator parameters were identified for TW63-13S. It is anticipated that elevated concentrations and/or increasing trends of multiple indicator parameters would be evident if groundwater quality was impacted from the landfill.

Monitoring Locations Exceeding the Historical Range

In the Active Aquitard, locations with laboratory detections of parameters exceeding their historical ranges, but below the respective ODWS and PWQO standards (if applicable) are summarized in Table 3.6. Most locations showed only slight exceedances of the historical range.

Table 3.6 Active Aquitard Locations Exceeding the Historical Range

Monitoring Location		Parameters Exceeding Historical Range
Located off the Facility Property	TW55-09S	pH, Alkalinity, Chloride, Barium,
	TW56-11S	pH, Chloride,
	TW57-11S	Barium
	TW59-13S	Alkalinity, Chloride,
Northern Berm	TW46-99I	Chloride
	TW61-13I	Chloride, Sulfate
	TW61-13S	Alkalinity, Chloride
Downgradient of Northern Berm	OW35-90S	Alkalinity
	TW21-94-II	Alkalinity
	TW22-94	Alkalinity
	TW40-99S	Sulfate
Along Property Boundary (Removed from Northern Berm)	TW41-99S	Iron
	TW48-16S	Alkalinity, Chloride, Sulfate, Barium
	TW62-13S	pH. Chloride, Ammonia
Internal to Property	TW63-13	Alkalinity

Monitoring Locations with Increasing Trends

Statistical analysis was performed on indicator parameters for all wells in the Active Aquitard to determine if detections exhibited statistically significant trends. The majority of monitoring locations showed no trend or decreasing trends for indicator parameters. Concentration versus time plots and detailed statistical information of the UCL and linear regression for each location are summarized in Appendix D and Tables 14 and 15, respectively.

Increasing groundwater concentration trends are summarized in Table 3.7. The majority of monitoring locations with increasing trends had concentrations below the ODWS and within historical ranges. It is anticipated that elevated concentrations and/or increasing trends of multiple indicator parameters would be evident if groundwater quality was impacted by the landfill. Based on the patterns of groundwater quality observed during 2018, it is unlikely that the increasing trends presented in Table 3.7 are the result of landfill impacts.

Table 3.7 Active Aquitard Locations with Increasing Trends

Monitoring Location	Parameter with Increasing Trend	Notes
TW30-94	Sulfate	• Spring and fall samples below ODWS and within historical range
TW40-99S	Chloride	• Spring and fall samples below ODWS and within historical range
	Sulfate	• Spring and fall samples below ODWS and above historical range
TW41-99S	Sulfate	• Spring and fall samples below ODWS and within historical range
TW42-99S	Sulfate	• Spring and fall samples above the ODWS • Spring sample above historic range
TW46-99I	Sulfate	• Spring and fall samples below the ODWS within historical range
TW51-02A	Sulfate	• Spring sample above the ODWS • Spring and fall samples within historical range
TW51-02B	Sulfate	• Spring and fall samples above ODWS and outside historical range
TW58-11S	Bromide	• Trend result of increases in the laboratory detection limits. • No historical detections
TW59-13S	Chloride	• Spring and fall samples below ODWS and within historical range
TW61-13I	Sulfate	• Spring and fall samples below ODWS and outside historical range
TW62-13S	Chloride	• Spring and fall samples below ODWS • Spring sample outside historical range

3.1.2.1.2 Organic Chemistry

Organic chemistry samples are collected for the Active Aquitard biennially, collected in odd years, as described further in Table 2.3, and were not collected in 2018. The next monitoring event for Active Aquitard organic chemistry is scheduled for spring 2019.

3.1.2.2 Interface Aquifer

3.1.2.2.1 Inorganic Chemistry

Inorganic chemistry within the Interface Aquifer includes sampling for general indicators, major and minor ions, and metals, as further described in Table 2.3.

Comparison to ODWS

Monitoring well locations in the Interface Aquifer exceeding the ODWS and are as shown in Table 3.8.

Table 3.8 Interface Aquifer Monitoring Wells with ODWS Exceedances

Monitoring Location		Exceeding ODWS										
		TDS (AO)		Alkalinity (OG)		Chloride (AO)		Sodium (AO)		Iron (AO)	Arsenic (IMAC)	Barium (MAC)
Location	Well ID	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Spring	Spring
ODWS (mg/L)		500		30-500		250		20/200		0.3	0.010	1.0
Located off the Facility Property	TW55-09D	x	x			$\underline{x}$	$\underline{x}$					
	TW56-11D	x	x			x	x			$\underline{x}$		
	TW57-11D	x	x			x	x			x		
	TW59-13D									x		
Along Property Boundary	OW32-90D	x	x			x	x			$\underline{x}$		
	OW35-05D	x	x			$\underline{x}$	$\underline{x}$			x		
	TW22-99D	x	x	x	x	x	x	x	x			
	TW30-99D	x	x			x						
	TW32-94-II	x				x		x				
	TW40-99D	x	x			x	x			x		
	TW41-99D	x	x									
	TW43-99D	x	x							x		
	TW45-99D	x	x	$\underline{x}$	x	x	x	x	x	x	$\underline{x}$	
	TW47-00D	x	x	x	x	x	x	x	x	x		x
	TW48-00D	x	x			x	x					
	TW49-00D											
	TW53-03D	x	x			x	x			x		
	TW60-13D	x	x	x		x	x	x	x			
Internal to Property	TW39-99D	x	x			x						
	TW46-99D	x	x							x		
	TW54-09D											
	TW61-13D	x	x									

Notes:

(1) Aesthetic objectives (AO) were developed based for parameters affecting the aesthetic quality of drinking water sources. They are not based on risks to human health.

(2) Operational guidelines (OG) were developed based for parameters that may cause operational issues in water distribution infrastructure. They are not based on risks to human health.

(3) Maximum allowable concentrations (MAC) were developed based on effects to human health.

(4) Interim maximum allowable concentrations (IMAC) were developed based on effects to human health.

x Identifies exceedances for the applicable monitoring well, parameter and sampling event

$\underline{x}$ Exceeding associated standard and the historical range

Samples from Interface Aquifer monitoring locations had exceedances of the ODWS for TDS, alkalinity, arsenic, barium, chloride, iron, and sodium. It should be noted the ODWS for these parameters were developed based on aesthetic or operational guidelines, with the exception of arsenic and barium which have standards based on risks to human health. Of these exceedances, chloride, sodium, and barium are considered indicator parameters.

TDS, sodium and chloride were detected above the ODWS consistently across the Site. As shown in Table 3.2, sodium and chloride were detected at high concentrations in baseline samples collected prior to landfilling disturbance. In the baseline samples, sodium and chloride were detected at higher concentrations with depth. This was historically attributed to naturally occurring soluble salts within the Kettle Point Formation shale. Sodium was detected above the ODWS at all Interface Aquifer monitoring locations, except for at TW30-99D (Fall only), TW41-99D (Fall only), TW43-99D, TW54-09D, TW59-13D, TW61-13D, and TW49-00D. The baseline samples (Table 3.2) also showed sodium concentrations above the ODWS. Sodium and chloride were detected within historical ranges, except for chloride at OW35-05D (Spring) and TW55-09D (Spring and Fall). Indicator parameters at OW35-05D did not show a statistically significant increasing trend and at TW55-09D, chloride concentrations have a statistically significant increasing trend.

TDS has historically been detected in exceedance of the ODWS across the Site. TDS was detected within historical ranges in 2018. Detections of TDS are likely attributed to natural conditions, based on pre-landfilling baseline water quality.

Arsenic was detected at a concentration above the ODWS and historical concentrations at TW45-99D in spring 2018. Since arsenic is not an indicator parameter, statistical analysis and concentration versus time plots were not developed. Chloride concentrations at TW45-99D identified a statistically significant increasing trend. It is expected that multiple statistically significant trends or elevated concentrations of other leachate indicator parameters would be apparent if arsenic was resultant from landfill impacts.

Barium was detected at concentrations above the ODWS at TW47-00D but within the historical range. Barium is considered an indicator parameter; however, concentrations of barium in baseline samples were similar to leachate samples (see Table 3.2 and 3.3). Elevated barium has historically been identified in groundwater samples collected from monitoring wells instrumented in the Kettle Point Shale formations. The historical borehole log for TW47-00D indicates a very thin basal till and that the majority of the screen is instrumented in the Kettle Point Shale. The elevated barium is likely caused by the background barium within the Kettle Point Shale. No statistically significant increasing trend was identified in barium concentrations at TW47-00D.

Iron was detected above the ODWS at monitoring locations located on and off Site. As described in Section 1.2.4, iron has been regionally detected above the ODWS. The detection of iron at on and off Site monitoring locations indicates the elevated iron concentrations may be the result of regional groundwater quality. TW56-11D and OW32-90D had iron concentrations above the ODWS and the historical range. Since iron is not an indicator parameter, statistical analysis and concentration versus time plots were not developed. Other indicator parameters at these two iron exceeding locations were not found to be significantly increasing. It is expected that statistically significant trends or elevated concentrations of other leachate indicator parameters would be apparent if iron was resultant from landfill impacts. Continued monitoring of at these locations will provide additional insight into long-term trends in groundwater quality.

Monitoring Locations Exceeding the Historical Range

In the Interface Aquifer the following locations had detections of parameters exceeding the historical range, but had detections below the respective ODWS and PWQO standards (if applicable). Most locations showed only slight exceedances of the historical range.

Table 3.9 Interface Aquifer Locations Exceeding the Historical Range

Monitoring Location		Parameters Exceeding Historical Range
Located off the Facility Property	TW55-09D	Alkalinity, pH
	TW56-11D	Alkalinity, pH
	TW59-13D	Chloride, pH
Along Property Boundary	OW35-05D	Electrical Conductivity
	TW22-99D	Toluene
	TW30-99D	pH
	TW41-99D	pH
	TW49-00D	pH, Alkalinity,
Internal to the Property	TW39-99D	Iron, pH
	TW54-09D	Chloride, pH
	TW61-13D	pH

Monitoring Locations with Increasing Trends

Statistical analysis was performed on indicator parameters for all wells in the Interface Aquifer to determine if detections exceeding the historical range exhibited statistically significant trends. The majority of monitoring locations showed no trend or decreasing trends for indicator parameters. Concentration versus time plots and detailed statistical UCL and linear regression for each location are summarized in Appendix D and Tables 14 and 15, respectively.

Increasing trends were observed at the following locations, as summarized in Table 3.10. The monitoring locations with increasing trends had concentrations within historical ranges. It is anticipated elevated concentrations and/or increasing trends of multiple indicator parameters would be evident if groundwater quality was impacted from the landfill. It is unlikely increasing trends presented in Table 3.10 are resultant of landfill impacts.

Table 3.10 Interface Aquifer Locations with Increasing Trends

Monitoring Location	Indicator Parameter with Increasing Trend	Notes
PW2-S(R11)	Sulfate	- Spring and fall samples were below the ODWS and within historical range
TW22-99D	Fluoride	- Trend result of increases in the laboratory detection limits. - No historical detections
TW41-99D	Chloride	- Spring and fall samples below the ODWS and within historical range
TW42-99D	Fluoride	- Trend result of increases in the laboratory detection limits. - No detections in 2018
TW45-99D	Chloride	- Spring and fall samples below the ODWS and within historical range
TW47-00D	Fluoride	- Trend result of increases in the laboratory detection limits. - No detections in 2018
TW55-09D	Chloride	- Spring and fall samples below ODWS - Spring sample outside historical range

3.1.2.2.2 Organic Chemistry

Samples collected for organic chemistry include VOCs, as described further in Table 2.3. VOC samples are collected annually for the Interface Aquifer. Table 3.11 shows the organic compounds detected in Interface Aquifer monitoring locations. Specific monitoring locations exceeded the ODWS for benzene and the PWQO for toluene.

Table 3.11 Interface Aquifer Monitoring Wells with VOC Detections

Monitoring Location		VOCs Detected			
Location	Well ID	Benzene	Trichloroethene	Toluene	Xylenes
Located off the Facility Property	TW57-11D	x[1]		x[2]	X
Internal to Property	TW61-13D	x			
Along Property Boundary	TW22-99D	x	x	x	
	TW32-94-II			x[2]	
	TW45-99D	x			
	TW48-00D			x	
	TW60-13D	x		x[2]	X

Notes:
(1) Benzene detection exceeded ODWS of 1 µg/L
(2) Toluene detection exceeded PWQO of 0.8 µg/L
x Concentrations identified above laboratory analytical detection limit
x Exceeding associated standard and the historical range

Samples from the Interface Aquifer have historically had detections of VOCs, including detections of benzene above the ODWS. VOCs from naturally-occurring petroleum hydrocarbons (benzene, toluene, ethylbenzene, and xylenes) are found regionally due to bitumen with the Kettle Point Formation shale. In 2018, benzene, toluene, and xylenes were detected in the Interface Aquifer both on and off Site. The benzene, toluene and xylene detections are not interpreted to be landfill related.

Trichloroethene (TCE) was detected at TW22-99D in 2018 below the ODWS and at the lower end of the historical range. TCE, trans-1,2-dichloroethene, and cis-1,2-dichloroethene have historically been detected at monitoring location TW22-99D and have not historically exceeded the ODWS for TCE (5 µg/L). Trans-1,2-dichloroethene and cis-1,2-dichloroethene are degradation products of TCE and do not have standards in accordance with the ODWS. TW22-99D is the only monitoring location where these VOC parameters have been detected. The historical analytical results for groundwater samples collected from TW22-99D are presented on Figure 13. The TCE contamination for TW22-99D appears to be the result of an event based exposure as the concentrations are sporadic and do not appear to be increasing. The source of the TCE contamination does not appear to be from leachate as no TCE was identified in the interface aquifer monitoring well TW61-13D located upgradient of the landfill. The TCE is not laterally extensive as TCE has not been identified in the interface aquifer monitoring well TW60-13D, instrumented immediately adjacent to TW22-99D. Based on the investigations conducted on this matter and the analytical data, the TCE was most likely induced into the monitoring well. GHD recommends to continue to sample for VOCs from the interface aquifer annually and continue to monitor and track the concentrations of TCE, trans-1,2-dichloroethene, and cis-1,2-dichloroethene to ensure the concentrations are consistent with an event based contamination source. No further investigation of the matter is proposed at this time.

In 2017, acetone and methyl ethyl ketone (MEK) were detected at TW48-00D and TW49-00D. Acetone and MEK have not been historically detected at either monitoring location. These parameters were detected at relatively high concentrations and the elevated concentrations were thought to be from cross contamination or external sources (likely within the analytical laboratory). In 2018, acetone and MEK were not detected in any of the samples submitted for laboratory analysis. On the basis of the 2018 results, the acetone and MEK detections reported in 2017 are interpreted to be anomalous.

Chloroform has sporadically been detected at monitoring location TW45-99D, most recently in fall 2014 and spring 2015. Chloroform was not detected at TW45-99D or any other monitoring well location in 2018.

3.2 Sub-Cell 3 Remedial Performance Monitoring Program

The Sub-Cell 3 remedial performance monitoring program was developed to determine the performance of the hydraulic and water-quality aspects of the remedial measures in Sub-Cell 3. The purpose of the hydraulic monitoring is to confirm an appropriate head difference between the HCL and Interface Aquifer is being maintained by the extraction wells. Discharge from the HCL extraction wells is treated as surface water at the Site and is sampled semi-annually.

The monitoring program conducted in Sub-Cell 3 included the collection of water level measurements and groundwater samples.

3.2.1 Water Level Data

Hydrographs generated for the six Sub-Cell 3 groundwater monitoring wells instrumented in the HCL and the two Interface Aquifer groundwater wells to the north (PW1-N) and south (PW2-S[R11]) of Sub-Cell 3 are presented in Appendix B as Figures B-15, B-16 and B-28 through B-32. The vertical gradient was calculated using the mean groundwater elevations of the HCL instrumented wells EW1b-13, EW1c-13, EW2a-01, EW2b-13 and EW2c-13 and the Interface Aquifer monitoring well PW1-N. The mean vertical gradient between the HCL and Interface Aquifer is presented with the individual hydrographs for Sub-Cell 3 as Figure 14.

A summary of the minimum and maximum vertical gradient calculations and groundwater elevations are presented in the Table 3.12:

Table 3.12 Summary of Vertical Gradients and Groundwater Elevations

Interface Aquifer Monitoring Well	Vertical Gradient		Groundwater Elevation (m AMSL)	
	Minimum	Maximum	Minimum	Maximum
Wells within the HCL of Sub-Cell 3				
EW1a-03	-	-	-	-
EW1b-13	-0.70	-0.46	187.45	190.68
EW1c-13	-0.64	-0.44	188.05	190.81
EW2a-03	-0.61	-0.25	187.98	193.67
EW2b-13	-0.58	-0.24	187.96	193.72
EW2c-13	-0.61	-0.25	188.03	193.78

Table 3.12 Summary of Vertical Gradients and Groundwater Elevations

Interface Aquifer Monitoring Well	Vertical Gradient		Groundwater Elevation (m AMSL)	
	Minimum	Maximum	Minimum	Maximum
Wells within the Interface Aquifer Adjacent to Sub-Cell 3				
PW1-N	N/A	N/A	198.06	198.75
PW2-S(R11)	N/A	N/A	197.93	199.24

Notes:
m AMSL = Metres above mean sea level
Transducer data not available for EW1a-03
Negative vertical gradient value reflects an upward gradient

Groundwater extraction from wells EW1a-03 and EW2a-03 in the HCL from January 1 to December 31, 2018 (end of reporting period) maintained a head pressure that was lower than the Interface Aquifer levels as measured at PW1-N and PW2-S(R11). Based on these observations, an upward vertical gradient from the Interface Aquifer to the HCL was maintained during 2018.

To ensure the performance and longevity of the Sub-Cell 3 groundwater extraction system, the development of an operational and maintenance procedure and an inspection checklist to be completed in tandem with groundwater monitoring events is recommended.

3.2.2 Water Quality

The following section discusses the results of the groundwater quality monitoring program conducted from Sub-Cell 3. The groundwater is assessed with respect to MECP criteria listed in the ODWS for comparative reference. The groundwater is also assessed with respect to MECP criteria listed in the PWQO as HCL extraction wells discharged groundwater goes to ground surface.

The laboratory analytical results for the two extraction wells (EW1a-01 and EW2a-01) and four monitoring wells (EW1b-13, EW1c-13, EW2b-13, and EW2c-13) screened within the HCL of Sub-Cell 3 and the two Interface Aquifer monitoring wells located to the north (PW1-N) and south (PW2-S[R11]) of Sub-Cell 3 are presented in Table 13.

Groundwater concentrations from the HCL and the Interface Aquifer monitoring well locations adjacent to Sub-Cell 3 were identified above the ODWS for TDS, chloride, iron, and sodium. Groundwater concentrations from the HCL and the Interface Aquifer monitoring wells locations adjacent to Sub-Cell 3 were identified above the PWQO for boron, chromium, and iron.

TDS, chloride and sodium concentrations are elevated in Active Aquitard and Interface Aquifer off Site monitoring wells that are representative of background conditions. Boron, chromium, and iron concentrations are elevated in the Interface Aquifer off Site monitoring wells that are representative of background conditions. The Sub-Cell 3 remedial system is designed to create an upward vertical gradient from the Interface Aquifer to the HCL and the groundwater quality is likely reflective of contributions to groundwater quality from both the Active Aquitard and Interface Aquifer.

Leachate from the surrounding cells does not appear to be infiltrating the HCL as analysis of historical leachate indicator parameters analytical results identified decreasing trends for chloride, sulfate, potassium, sodium, and fluoride and are summarized in the Table 3.13.

Table 3.13 HCL Leachate Indicator Parameter Trends

Monitoring Well	Chloride	Sulfate	Potassium	Sodium	Bromide	Fluoride	Barium	Boron
EW1a-01	**Deceasing**	**Deceasing**	**Deceasing**	**Deceasing**	No Trend	**Deceasing**	No Trend	No Trend
EW1b-13	No Trend	**Deceasing**	**Deceasing**	**Deceasing**	No Trend	**Deceasing**	No Trend	No Trend
EW1c-13	No Trend	**Deceasing**	**Deceasing**	**Deceasing**	No Trend	**Deceasing**	No Trend	No Trend
EW2a-01	No Trend	**Deceasing**	**Deceasing**	No Trend	No Trend	No Trend	No Trend	No Trend
EW2b-13	No Trend	**Deceasing**	**Deceasing**	**Deceasing**	No Trend	No Trend	No Trend	No Trend
EW2c-13	No Trend	**Deceasing**	**Deceasing**	**Deceasing**	No Trend	**Deceasing**	No Trend	No Trend

3.2.3 Compliance

The vertical gradients calculated from the potentiometric head of the Interface Aquifer and the HCL indicate that an upwards gradient was maintained from January 1 to December 31, 2018 (the reporting period). On the basis of this observation, the operation of the Sub-Cell 3 remedial system is operating effectively.

Leachate from the surrounding Cells does not appear to be infiltrating the HCL as analysis of leachate indicator parameters identified decreasing trends for chloride, sulfate, potassium, sodium, and fluoride.

3.3 Performance of Engineered Landfill System

The engineered landfill system performance monitoring consists of two systems, the perimeter leachate collection system and monitoring well transect, and the southern berm.

The first engineered landfill system performance monitoring consists of comparing the perimeter leachate collection system water level monitoring data with the perimeter monitoring program water level data to determine the horizontal gradient between the leachate collection system and the Site property boundary. A horizontal transect is currently used to evaluate the effectiveness of the leachate collection system along the west side of the leachate collection system. The transect consists of one leachate collection system standpipe well (LCSOW02-15), five perimeter groundwater monitoring wells instrumented in the Active Aquitard (TW64-16-I through TW64-16IV, and TW48-16S), and one perimeter groundwater monitoring well instrumented in the Interface Aquifer (TW48-00D). The Performance Monitoring of Engineered Landfill System groundwater monitoring network is shown on Figure 7.

The second engineered landfill system performance monitoring consists of comparing water level data for the southern berm and to the north of the southern berm. The three pairs of monitoring wells, TW50-02A/B, TW51-02A/B, and TW52-02A/B instrumented in the Active Aquitard assess the groundwater mounding induced by southern berm and are sampled to assess the groundwater quality along the southern toe of the landfill. The southern berm monitoring wells are shown on Figure 3.

3.3.1 Transect Water Level Data

Hydrographs generated for the single leachate collection system standpipe and the six perimeter groundwater monitoring wells within the transect are presented in Appendix B as Figures B-6, B-10 through B-13, B-23, and B-33. The individual hydrographs are presented as a group with a geologic cross-section of the Transect on Figure 15. Hydrographs from monitoring wells TW64-16-II, TW64-16-III and TW64-16-IV are presented along with hourly precipitation in millimetres (mm) collected from an on-Site weather station on Figure 16.

3.3.1.1 Leachate Collection System Standpipe – LCSOW02-15

The leachate collection system standpipe monitoring wells LCSOW01-15 through LCSOW4-15 are instrumented in the gravel trench of the leachate collection system. Hydrographs generated using 2018 groundwater pressure transducer data and manual groundwater monitoring measurements are presented in Appendix B as Figures B-33 though B-35.

3.3.1.2 Active Aquitard

The groundwater monitoring wells instrumented in the Active Aquitard are influenced by the groundwater recharge through precipitation events, snowmelt, and surface water infiltration through the adjacent stormwater ditches and surface water ponds. The influence of the groundwater recharge within the transect Active Aquitard groundwater wells is expected to decrease with increased well screen depth. Leachate from the Sub-Cell 19 may influence the groundwater elevations if leachate is identified to be migrating off Site.

3.3.1.2.1 Active Aquitard Groundwater Gradient

Groundwater elevations for the shallowest monitoring well located adjacent to the toe of the landfill (TW64-16-IV) appears to be highly influenced by an external groundwater recharge source. Groundwater elevations calculated from the pressure transducers installed in well TW64-16-IV identified numerous groundwater elevation increases that coincide with heavy rain events on Site throughout 2018 when the water level is above 199 m AMSL. When the water level is below, the same response is does not occur. Calculated groundwater elevations from the pressure transducer installed in wells TW64-16-II and TW64-16-III, screened below TW64-16-IV, were not as influenced by the precipitation events.

From the beginning of May to the beginning of November 2018, groundwater elevations in TW64-16-IV steadily decreased. The groundwater elevation decline could be the result of seasonal fluctuations in groundwater recharge to the shallow Active Aquitard, a decrease in surface water levels within the adjacent surface water pond and/or ditch, or through drawdown from the leachate collection system as the leachate collection system trench is situated at approximately 195 to 200 m AMSL and operates between 196 and 197 m AMSL. The screen interval at TW64-16-IV is 196.31 to 199.36 m AMSL. From the beginning of November to the end of the December (the end of the reporting period), the groundwater elevations increased to levels similar to the previous winter and spring and were likely influenced by significate precipitation events occurring throughout the end of October to the beginning of December.

Leachate levels within the leachate collection system sumps PTS-02 and PTS-03 (located north and south of the leachate collection system standpipe LCSOW02-15, respectively), and the leachate standpipe LCSOW2-15 located in the Transect were maintained below the groundwater elevation in TW64-16-IV throughout 2018, with the exception of a few days in August (between August 8 and 9, and on August 18 and 21, 2018).

The groundwater elevation in the Active Aquitard located along the Site property boundary at TW48-16S was above the groundwater elevation at TW64-16-IV and leachate elevations within the leachate collection sumps PTS-02 and PTS-03 and standpipe LCSOW2-15. Thus, an inward gradient was maintained from the property boundary to the transect wells at the toe of the landfill.

Therefore, on the basis of the horizontal hydraulic gradients measured along the western leachate collection system transect, leachate migration beyond the collection system trench was not possible during 2018 other than during a few days in August 2018, however leachate migration would not be able to reach the Site boundary during these few days.

In the 2017 Annual Groundwater Monitoring Report, GHD recommended lowering the operating level of the leachate collection system through a reduction of the pump on set point on a monthly basis to assess the influence of the leachate collection system on the groundwater within the Active Aquitard within the transect. The lowered leachate collection system setting during the 2018 reporting period maintained the inward groundwater gradient within the vertical transect.

To properly assess the groundwater recharge influences on Site and if the groundwater within the Active Aquitard at the toe of the landfill can be maintained to create an inward gradient towards the landfill along the southern extent, the installation of water level monitoring station with pressure transducer within the west surface water pond is recommended to provide additional information with regard the shallow groundwater patterns and impacts.

3.3.1.3 Leachate Collection System Standpipe Monitoring

Hydrographs generated for the three leachate collection system standpipe, LCSOW02-15 through LCSOW04-15 are presented in Appendix B as Figures B-33 through B-35, respectively.

The hydrographs indicate that after April 4, 2018, transducers LCSOW03-15 and LCSOW04-15 were no longer submerged in leachate within the standpipe. Based on the 2017 and 2018 data from the Leachate Collection Standpipes and the Leachate Pumping Sump levels, the Leachate Collection System Standpipes leachate levels are nearly identical to the Leachate Collection System Sump levels. The transducer LCSOW02-15 is currently situated at the bottom of the standpipe and no data was available from August 31, 2018 to the end of the reporting period. It is recommended that transducers LCSOW03-15 and LCSOW04-15 be instrumented at the bottom of the standpipe. During the 2018 groundwater monitoring events, the transducer direct read cables for LCSOW01-15, LCSOW03-15, and LCSOW04-15 no longer transmitted the transducer data and the transducers situated within LSC01-15 and monitoring barometric pressure failed. It is recommended Clean Harbors replace the three direct read cables for LCSOW01-15, LCSOW03-15 and LCSOW04-15 and the transducers for LCSOW01-15 and the barometric pressure logger.

3.3.2 Southern Berm

Hydrographs generated for the southern berm groundwater monitoring well TW52-02A and the leachate collection system standpipes LCSOW03-15 and LCSOW04-15 are presented in Appendix B as Figures B-7, B-33 and B-34, respectively. Hydrographs of historical groundwater measurements for the monitoring wells instrumented within and below the southern berm are presented in Appendix C as Figures C-4 through C-6.

3.3.2.1 Water Level Mounding

The Active Aquitard is monitored beneath the southern berm (TW50-02B, TW51-02B and TW52-02B) and to the north of the southern berm near the surface water drainage ditch (TW50-02A, TW51-02A and TW52-02A). The monitoring wells are screened at similar elevations within the Active Aquitard. Groundwater flow along the southern property boundary is influenced by the groundwater recharge through the surface water ditch along the southern Site perimeter, the mounding below the southern berm, and the leachate collection system.

The groundwater elevations from monitoring wells located within the southern berm in 2018 were mounded compared to groundwater elevations along the surface water ditch for monitoring well nests TW50-02A/B and TW51-02A/B. The groundwater elevations identified within the southern berm for TW52-02B were approximately 0.29 m lower and 0.02 m higher than the groundwater elevations for TW52-02A, located to the north along the surface water ditch in April and October 2018, respectively.

Based on the current and historical groundwater elevations, the groundwater mounding is effective along the western portion of the Southern Bern, and appears to be less pronounced along the central portion of the Southern Berm and was not mounded along the eastern portion of the Southern Berm in 2018.

It should be noted that the water level monitoring data clearly indicates the well purging events conducted for sample collection.

3.3.2.2 Leachate Collection System Influence on Southern Property Boundary

Monitoring wells TW50-02A/B, TW51-02A/B, and TW52-02A/B are instrumented with monitoring wells screens at approximately 195.6 to 199.4 m AMSL, and located along the southern property boundary at the toe of the landfill. The screens are situated at a similar elevation to LCSOW03-15 and LCSOW04-15, instrumented at 196.44 to 199.48 m AMSL.

The pre-purge groundwater elevations for the six monitoring wells instrumented within and to the north of the southern berm, the leachate elevations from the leachate collection system standpipes LCSOW03-15 and LCOW04-15 and sump leachate levels for PTS-03 and PTS-04, located along the southern portion of the Site, are presented in Table 3.14.

Table 3.14 Southern Berm Groundwater Elevations and Southern Leachate Collection System Leachate Elevations

Monitoring Location	Groundwater/Leachate Elevation (m AMSL)	
	April	October
Southern Berm Active Aquitard Groundwater Elevations		
TW50-02A	200.08	200.02
TW50-02B	203.02	203.20
TW51-02A	200.29	200.20
TW51-02B	200.41	200.56
TW52-02A	200.29	200.35

Table 3.14 Southern Berm Groundwater Elevations and Southern Leachate Collection System Leachate Elevations

Monitoring Location	Groundwater/Leachate Elevation (m AMSL)	
	April	October
TW52-02B	200.00	200.37
Southern Leachate Collection System Standpipe Elevations		
LCSOW03-15	197.35-197.36	<197.35
LCSOW04-15	197.33-197.43	<197.12
Southern Leachate Collection System Sump Elevations		
PTS-03	197.39-197.55	196.48-196.57
PTS-04	197.35-197.52	196.49-196.57

Notes:
m AMSL = Metres above mean sea level

The hydrograph generated using 2018 groundwater pressure transducer data for TW52-02A and TW52-02B are presented in Appendix B as Figure B-7 and B-8. Groundwater elevations generally ranged from approximately 199.5 to 200.5 m AMSL, except following the groundwater purging activities conducted for groundwater sampling activities between April and June and October and November 2018. The hydrographs and the leachate data from PTS-04 are presented as Figure 17.

Groundwater at TW52-02A and TW52-02B was elevated above the leachate sump levels at PTS-04 for 2018 and an inward gradient was maintained. GHD recommends the installation of groundwater elevations transducer in the four groundwater monitoring wells, TW50-02A/B, and TW51-02A/B to continually monitor the groundwater and any effect of the Leachate Collection System on groundwater along the southern portion of the Site in the absence of MECP approval for proposed construction of surface water ponds along the Southern Berm.

3.3.2.3 Water Quality

The following section discusses the results of the groundwater quality monitoring program conducted along the Southern Berm. The groundwater is assessed with respect to MECP criteria listed in the ODWS for comparative reference. The groundwater is also assessed with respect to MECP criteria listed in the PWQO as shallow groundwater has the potential in infiltrate into surface water ditches.

The laboratory analytical results for the six groundwater monitoring wells situated within and to the north of the southern berm (TW50-02A/B, TW51-02A/B, and TW52-02A/B) screened within the Active Aquitard are presented in Table 8.

Groundwater concentrations from the Southern Berm monitoring well locations were identified above the ODWS for TDS, alkalinity, lead, sulfate and sodium. Groundwater concentrations from the Southern Berm monitoring wells were identified above the PWQO for boron, chromium, and iron.

TDS and sodium concentrations are elevated in Active Aquitard and Interface Aquifer off Site monitoring wells that are representative of background conditions. Boron, chromium, and iron concentrations are elevated in the Active Aquitard off Site monitoring wells that are representative of background conditions. Leachate from the surrounding cells does not appear to be infiltrating the Southern Berm as analysis of historical leachate indicator parameters analytical results identified decreasing trends for chloride, sulfate, and fluoride.

3.3.3 Compliance

The groundwater elevations in TW64-16-IV located within the Active Aquitard at the toe of Cell 19 were above the monitored leachate levels identified in leachate collection sumps PTS-01 and PTS-02 and leachate collection trench standpipe LCSOW2-15 for 2018, with the exception of a of a period between August 8 and 9, and on August 18 and 21, 2018. The groundwater elevations in TW48-16S within the Active Aquitard along the property boundary was above the monitored leachate levels. An inward gradient was maintained within the Transect throughout 2018 from the Site property boundary to the toe of the Landfill.

Based on the current and historical groundwater elevations, the groundwater mounding is effective along the western portion of the Southern Bern, and appears to be less pronounced along the central portion of the Southern Berm and was not mounded along the eastern portion of the Southern Berm in 2018.

Groundwater elevations at TW52-02A/B monitored by waterlevel transducers were elevated above the Leachate elevations monitored by the leachate sump at PTS-04 for 2018 and an inward gradient was maintained in this area.

The leachate system indicates an inward gradient from the Active Aquitard and is maintaining control of the leachate at the perimeter of the landfill. Historic issues with leachate migration along the southern perimeter of the waste disposal are controlled by the leachate collection system and historical impacts are decreasing as noted by decreasing trends in chloride, sulfate, and fluoride in the south berm monitoring wells.

4. Compliance

4.1 Groundwater Reasonable Use Criteria Assessment

MECP Guideline B-7, entitled *Incorporation of the Reasonable Use Concept into the MOEE Groundwater Management Activities*, regulates the allowable effects, which a landfill site can have on groundwater in the surrounding environment (MOEE, 1994). The Reasonable Use Concept (RUC) maximum concentration of a particular contaminant that is acceptable in the groundwater beneath the adjacent property (to the Site) is calculated in accordance with the following relationship as outlined in related Guideline B-7-1 (*Determination of Contaminant Limits and Attenuation Zones)*:

$$MABC = Cb + x(Cr - Cb)$$

Where:

MABC = Maximum Acceptable Boundary Concentration acceptable in groundwater on adjacent property (the term Cm, maximum acceptable concentration, is used in Guideline B-7-1)

Cb	=	background concentration of a particular groundwater contaminant before it has been affected by human activity
Cr	=	maximum allowable concentration in groundwater as per Ontario's water management guideline deemed appropriate for reasonable use at the site in question; this is the ODWS (ODWO before August 2000) of the particular contaminant
X	=	0.25 for health related parameters, 0.5 for non-health related and other parameters

Therefore, the allowable concentrations for groundwater leaving a site determined through the MABC calculation are site-specific. Guideline B-7 also states that if background water quality is higher than ODWS guidelines where the water may be used for consumption, the landowner or user is responsible to ensure water quality is not impacted beyond what is already present.

MABC values have not been determined for Operational Guidelines parameters (alkalinity, hardness, and pH), as well as temperature, as the ODWS limits apply more specifically to water treatment facilities and not groundwater sampled from monitoring wells. Applicable MABC values have been included in Table 16 through 18 for wells to which these criteria apply.

As previously mentioned because of their upgradient position and the historic analytical results, Active Aquitard monitoring wells TW55-09S. TW56-11S, TW57-11S, and TW59-13S and Interface Aquifer monitoring wells TW55-09D, TW56-11D, TW57-11D, and TW59-13D are considered representative of background water quality for the groundwater in the vicinity of the Facility. The mean background concentration for the Active Aquitard and Interface Aquifer groundwater parameters from the 2010 to 2015 historical analytical data were obtained from tables H-4.7-1 through H-4.7-5 enclosed in the report entitled "2016 Groundwater and Landfill Performance Monitoring Program, Clean Harbors Lambton Facility Landfill[2]" completed by RWDI. MABC values were re-calculated for parameters to incorporate changes to the ODWS standards. The MABC for all AO, MAC, and Interim Maximum Acceptable Concentrations (IMAC) parameters should be updated every 5 years to account for natural fluctuations in the background groundwater conditions. It is recommended that the MABC be recalculated for the 2020 Annual Report.

4.1.1 Reasonable Use Criteria Exceedances

The calculated RUC values were compared to the laboratory analytical groundwater results from monitoring wells located along the property boundary for the spring and fall 2018 sampling events. Fourteen Active Aquitard and fourteen Interface Aquifer monitoring wells were compared to the RUC standards. The exceedances identified in the Active Aquitard and Interface Aquifer monitoring wells are presented in Tables 4.1 and 4.2, respectively, and discussed in the following sections.

4.1.1.1 Active Aquitard RUC Exceedances

The RUC for TDS is the ODWS aesthetic objective (AO) for dissolved inorganic compounds in drinking water. The exceedances for TDS are fairly consistent across the monitoring well network, including ODWS exceedances at locations located off the Facility property. Although detected above the RUC/ODWS within the Active Aquitard, TDS was detected within the historical range, with the

2 2016 Groundwater and Landfill Performance Monitoring Report, Clean Harbors Lambton Facility Landfill. March 8, 2017

exception of at monitoring locations TW42-99S and TW48-16S. TDS has historically been detected across the monitoring well network due to screened intervals within the clay based stratigraphy. These detections are likely attributed to characteristics of the local geology and are not likely resultant of landfill impacts.

Table 4.1 Active Aquitard RUC Exceedances and Indicator Parameters with Increasing Trends

Monitoring Wells		RUC Exceedances						Statistical Significant Increasing Trend Parameters
		Alkalinity		Iron		Sulfate		
Location	Well ID	Spring	Fall	Spring	Fall	Spring	Fall	
RUC (mg/L)		438		0.16		466		
Downgradient of Northern Berm	OW35-90S					x	x	-
	TW21-94-II		x					-
	TW22-94	x	x			x	x	-
	TW53-03S					x		-
Along Property Boundary	TW30-94			x				Sulfate
	TW41-99S	x	x			x		Sulfate
	TW42-99S					x	x	Fluoride*

Notes:

x Identifies exceedances for the applicable monitoring well, parameter and sampling event

TDS has been excluded from the RUC as it has been identified to occur naturally above the ODWS standard

* Statistically significant increasing trend the result of a raised detection limit

On the basis of the pattern of water quality observed, the above-noted RUC exceedances for alkalinity, iron, and sulfate are not interpreted to be landfill-related as statistically significant increasing trends of multiple indicator parameters would be present if the source of the impacts was the landfill.

4.1.1.2 Interface Aquifer RUC Exceedances

The mean background groundwater concentrations of off Site Interface Aquifer groundwater wells identified elevated concentration of chloride, iron, sodium and benzene above the OWDS. It is thus inappropriate to calculate RUC standards for these parameters. The elevated background concentrations are the result of naturally occurring minerals within the Kettle Point Formation shale underlying the Interface Aquifer. These parameters have been excluded from the RUC summary of exceedance Table 4.2.

Table 4.2 Interface Aquifer RUC Exceedances

Monitoring Location		Exceeding RUC							Statistical Significant Increasing Trend Parameters
		Alkalinity		Arsenic	Barium	Boron	Trichloroethene		
Location	Well ID	Spring	Fall	Spring	Spring	Spring	Spring	Fall	
RUC (mg/L)		416		0.0032	0.35	2.68	1.46		
Along property boundary	TW22-99D	x	x		x	x	x		
	TW45-99D	x	x	x		x			Chloride
	TW47-00D	x	x		x	x			
	TW60-13D	x	x			x			

Notes:

x Identifies exceedances for the applicable monitoring well, parameter and sampling event

Exceedances of benzene, chloride and sodium have been excluded as the background concentration exceeds the ODWS

TCE concentrations were identified above the RUC at monitoring well TW22-99D in 2018. As discussed previously in Section 3.1.2.2.2, the landfill is not interpreted to be the source of TCE detections at TW22-99D. No VOC detections were reported in the Spring 2018 sample from monitoring well TW60-13D, screened at similar depths and located immediately south of TW22-99D, which provides further supporting evidence that the source of TCE at TW22-99D is localized and unlikely to be the landfill.

On the basis of the pattern of water quality observed, the above-noted RUC exceedances for alkalinity, arsenic, barium, and boron are not interpreted to be landfill-related as statistically significant increasing trends of multiple indicator parameters would be present if the source of the impacts was the landfill.

4.2 Sub-Cell 3 Remedial Performance Monitoring Program

The vertical gradient calculated from the potentiometric head of the Interface Aquifer and the HCL indicate that an upwards gradient was maintained from January 1 to December 31, 2018. The operation of the remedial system is effectively managing an upward gradient.

Leachate from the surrounding Cells does not appear to be infiltrating the HCL as analysis of leachate indicator parameters identified decreasing trends for chloride, sulfate, potassium, sodium, and fluoride.

4.3 Performance Monitoring of Engineered Landfill System

The groundwater elevations in TW64-16-IV located within the Active Aquitard at the toe of Cell 19 were above the monitored leachate levels identified in leachate collection sumps PTS-01 and PTS-02 and leachate collection trench standpipe LCSOW2-15 for 2018, with the exception of a of a period between August 8 and 9, and on August 18 and 21, 2018. The groundwater elevations in TW48-16S within the Active Aquitard along the property boundary was above the monitored leachate levels. An inward gradient was maintained within the Transect throughout 2018 from the Site property boundary to the toe of the Landfill.

Based on the current and historical groundwater elevations, the groundwater mounding is effective along the western portion of the Southern Bern, and appears to be less pronounced along the central portion of the Southern Berm and was not mounded along the eastern portion of the Southern Berm in 2018.

Groundwater elevations at TW52-02A/B monitored by waterlevel transducers were elevated above the Leachate elevations monitored by the leachate sump at PTS-04 for 2018 and an inward gradient was maintained in this area.

The leachate system indicates an inward gradient from the Active Aquitard and is maintaining control of the leachate at the perimeter of the landfill. Historic issues with leachate migration along the southern perimeter of the waste disposal are controlled by the leachate collection system and historical impacts are decreasing as noted by decreasing trends in chloride, sulfate, and fluoride in the south berm monitoring wells.

5. Conclusions

Based on the 2018 groundwater monitoring and sampling events completed on Site, the following conclusions are presented:

5.1 Perimeter Groundwater Monitoring Program

- Groundwater is mounded within and beneath the northern berm. This groundwater mounding induces an inward hydraulic gradient from the berm to the landfill footprint. Groundwater along the outside of the northern berm remains stable compared to historical measurements.
- Groundwater contours of the Interface Aquifer illustrate a potentiometric high in the northwest portion of the property consistent with historical groundwater patterns.
- Statistical analysis was performed on indicator parameters for all wells in the Active Aquitard and Interface Aquifer to determine if detections exhibited statistically significant trends. The majority of monitoring locations showed no trend or decreasing trends for indicator parameters. The majority of monitoring locations with increasing trends had concentrations below the ODWS and within historical ranges. It is anticipated that elevated concentrations and/or increasing trends of multiple indicator parameters would be evident if groundwater quality was impacted from the landfill. It is unlikely increasing trends are the result of landfill impacts.
- The PWQO for boron, chromium, iron and nickel were exceeded at various locations screened in the Active Aquitard. Detections of boron and/or nickel above the PWQO were within historical ranges. Iron exceeded the PWQO in the groundwater sampled collected from TW57-11S in spring 2018. Historically, iron concentrations for TW57-11S have been below the laboratory detection limit. TW57-11S is located off-Site and the elevated concentration is not related to landfilling. The exceedances for chromium are fairly consistent across the monitoring well network including at locations located off the Facility property. On the basis of the pattern of chromium exceedances observed, the landfill is not considered to be a likely source of chromium reported in Active Aquitard monitoring well groundwater samples.

5.2 Sub-Cell 3 Remedial Performance Monitoring Program

- The operation of the remedial system is effectively managing an upward gradient from the Interface Aquifer to the Hydraulic Control Layer within Sub-Cell 3.
- No statistically significant increasing trends of leachate indicator parameters were identified from the spring and fall 2018 groundwater samples collected within the HCL.
- Statistically significant decreasing trends were identified for leachate indicated parameters including chloride, sulfate, potassium, sodium, and fluoride from monitoring wells within the HCL.
- Leachate from the surrounding Cells does not appear to be infiltrating the HCL.

5.3 Performance of Engineered Landfill System

- The groundwater elevations in TW64-16-IV located within the Active Aquitard at the toe of Cell 19 were above the monitored leachate levels identified in leachate collection sumps PTS-01 and PTS-02 and leachate collection trench standpipe LCSOW2-15 for 2018, with the exception of a period between August 8 and 9, and on August 18 and 21, 2018. An inward gradient from the Active Aquitard at the location of the southern berm was maintained for the majority of 2018.
- The groundwater elevations in TW48-16S located within the Active Aquitard along the western property boundary were above the monitored leachate levels. An inwards gradient was maintained within the transect throughout 2018 from the Site property boundary to the toe of the Landfill.
- Groundwater at TW52-02A and TW52-02B along the southern property boundary are being drawn down by the leachate collection system sumps and PTS-04.
- The leachate system indicates an inward gradient from the Active Aquitard and is maintaining control of the leachate at the perimeter of the landfill. Historic issues with leachate migration along the southern perimeter of the waste disposal are controlled by the leachate collection system and historical impacts are decreasing as noted by decreasing trends in chloride, sulfate, and fluoride in the south berm monitoring wells.
- Based on the current and historical groundwater elevations, the groundwater mounding is effective along the western portion of the Southern Bern, and appears to be less pronounced along the central portion of the Southern Berm and was not mounded along the eastern portion of the Southern Berm in 2018.

6. Recommendations

Based on the 2018 groundwater monitoring and sampling events completed on Site, the following conclusions are presented:

6.1 Perimeter Groundwater Monitoring Program

- Redevelop monitoring well TW45-99D to assess if the screen and sandpack can be rehabilitated in 2019.

- Conduct static groundwater level monitoring of OW32-90D, TW22-99D, TW41-99D, TW43-99D, TW45-99D, TW47-00D, TW55-09D, TW56-11D,TW57-11D, TW59-13D, and TW60-13D prior to the spring and fall pre-purging activities to properly assess horizontal and vertical gradients utilizing static water levels.
- Consideration should be given to instrumenting TW60-13 D or TW22-99D with a transducer in order to understand the well recharge patterns and static groundwater conditions within the Interface Aquifer to the west of the northern berm in this area.
- In consideration of pending changes to the Site's surface water management and leachate collection systems, it is recommended that the groundwater monitoring program be rationalized in 2019 to ensure that the Site's environmental performance is properly monitored and reported.

6.2 Sub-Cell 3 Remedial Performance Monitoring Program

- Development of a Sub-Cell 3 groundwater remedial system operational and maintenance procedure and developing an inspection checklist to be completed in tandem with groundwater monitoring events

6.3 Performance of Engineered Landfill System

- To properly assess potential changes to leachate conditions over time for the Site, the collection and submission of leachate samples for analytical testing starting in the spring of 2019 from the leachate pumping station is recommended. The analytical data will be used to assess the current state of the leachate within the perimeter leachate collection system, identify potential seasonal variability, and reassess the current leachate indicator parameters. The recommend sampling and analysis plan for leachate samples from the leachate collection system is based on the parameters and frequency of the Active Aquitards sampling and analysis plan.
- Install a water level monitoring station with a pressure transducer within the west surface water pond and incorporate the water level data in the transect assessment. The installation of the transducer should coincide with the proposed amendments to the surface water management system that is currently before the MECP.
- Transducers LCSOW03-15 and LCSOW04-15 should be instrumented at the bottom of these standpipes. The transducer direct read cables for LCSOW01-15, LCSOW03-15, and LCSOW04-15 and the transducers for LCSOW01-15 and the Barometric Pressure Logger should be replaced.
- Transducers should be installed in groundwater monitoring wells TW50-02A/B and TW51-02A/B to continually monitor the horizontal gradient along the southern portion of the Site to assess the effect of the leachate collection sumps PTS-03 and PTS-04 on the Active Aquitard groundwater elevations near the south Site boundary.

7. References

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RWDI Air Inc. Geology and Hydrogeology Existing Conditions Final Report – Lambton Landfill Expansion Environmental Assessment. October 2014

RWDI Air Inc. Final Draft – Groundwater and Landfill Performance Monitoring Programs. December 9, 2017

GHD

All of which is respectfully submitted,

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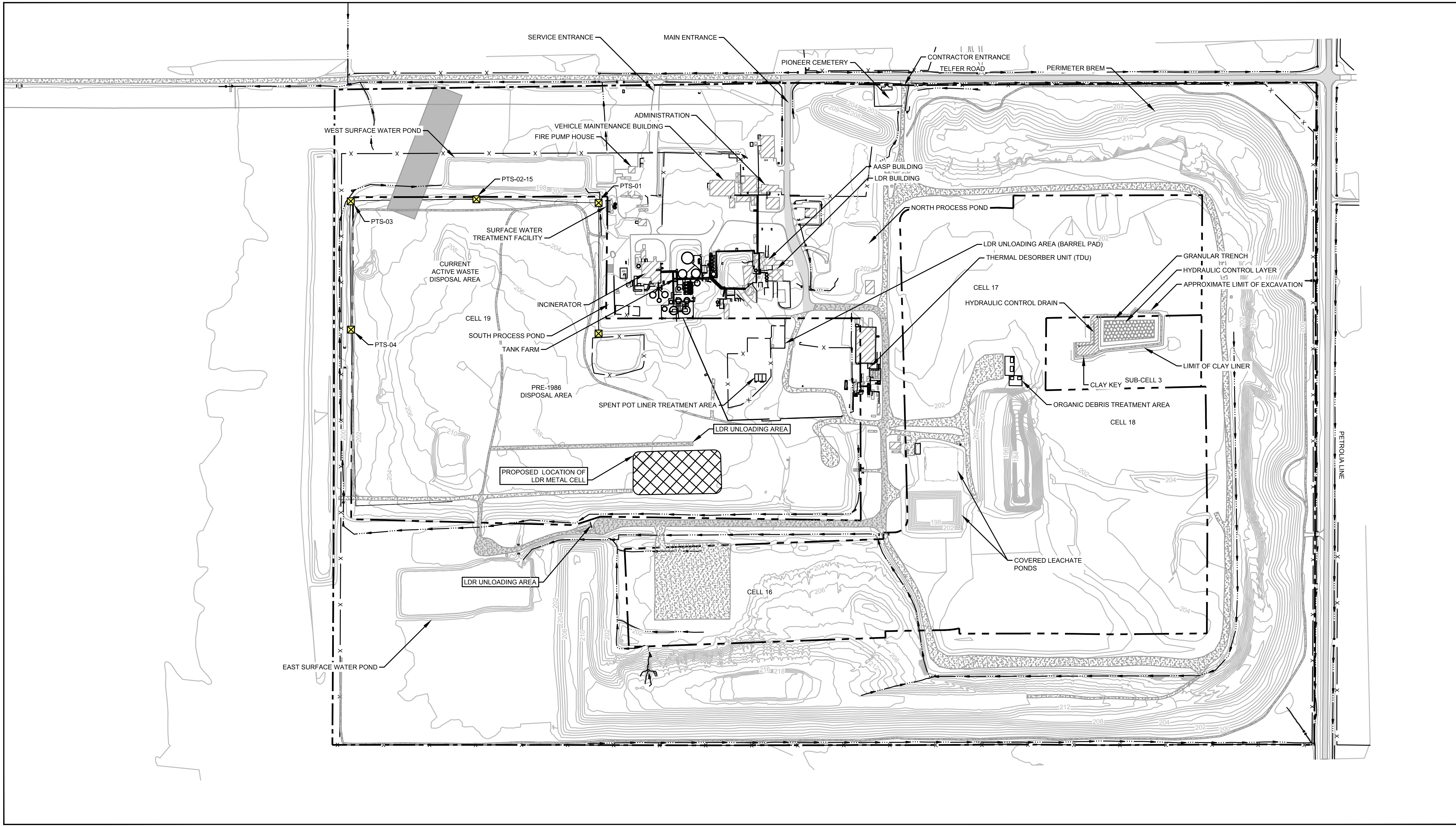

Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 50 100 150m

LEGEND:

EXISTING GROUND CONTOUR	PAVED ROADWAY
PROPERTY BOUNDARY	GRAVEL ROADWAY
LIMIT OF WASTE	BUILDING / STRUCTURE
DRAINAGE SWALE	CLEAN INTERNAL HAUL ROAD
FENCELINE	TRANSECT CELL 19-1

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CLEAN HARBORS CANADA INC.
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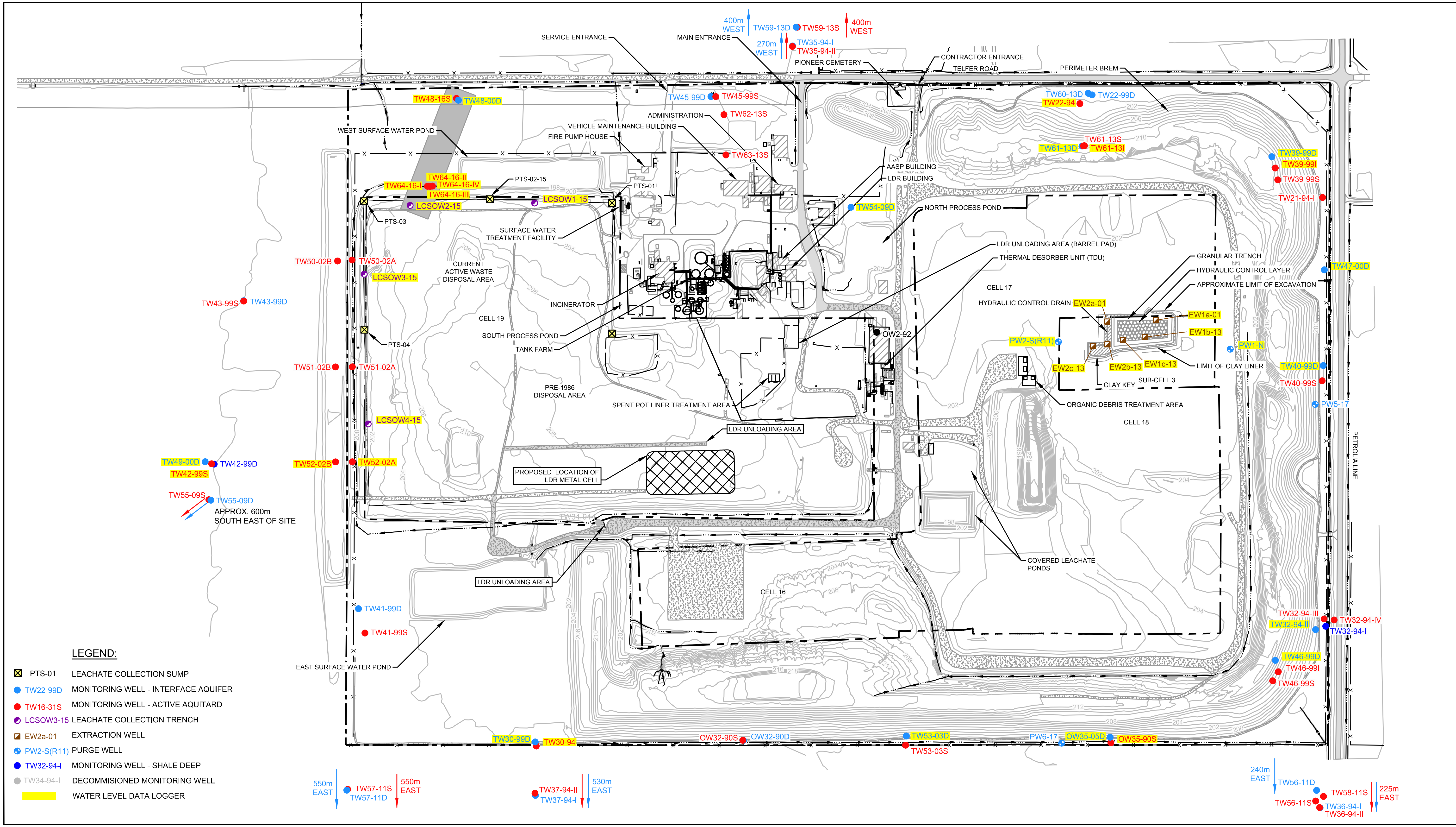
44985-40
Jan 24, 2019

SITE PLAN

FIGURE 2

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA001.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 50 100 150m

LEGEND:

EXISTING GROUND CONTOUR	PAVED ROADWAY
PROPERTY BOUNDARY	GRAVEL ROADWAY
LIMIT OF WASTE	BUILDING / STRUCTURE
DRAINAGE SWALE	CLEAN INTERNAL HAUL ROAD
FENCELINE	TRANSECT CELL 19-1

LAMBTON FACILITY
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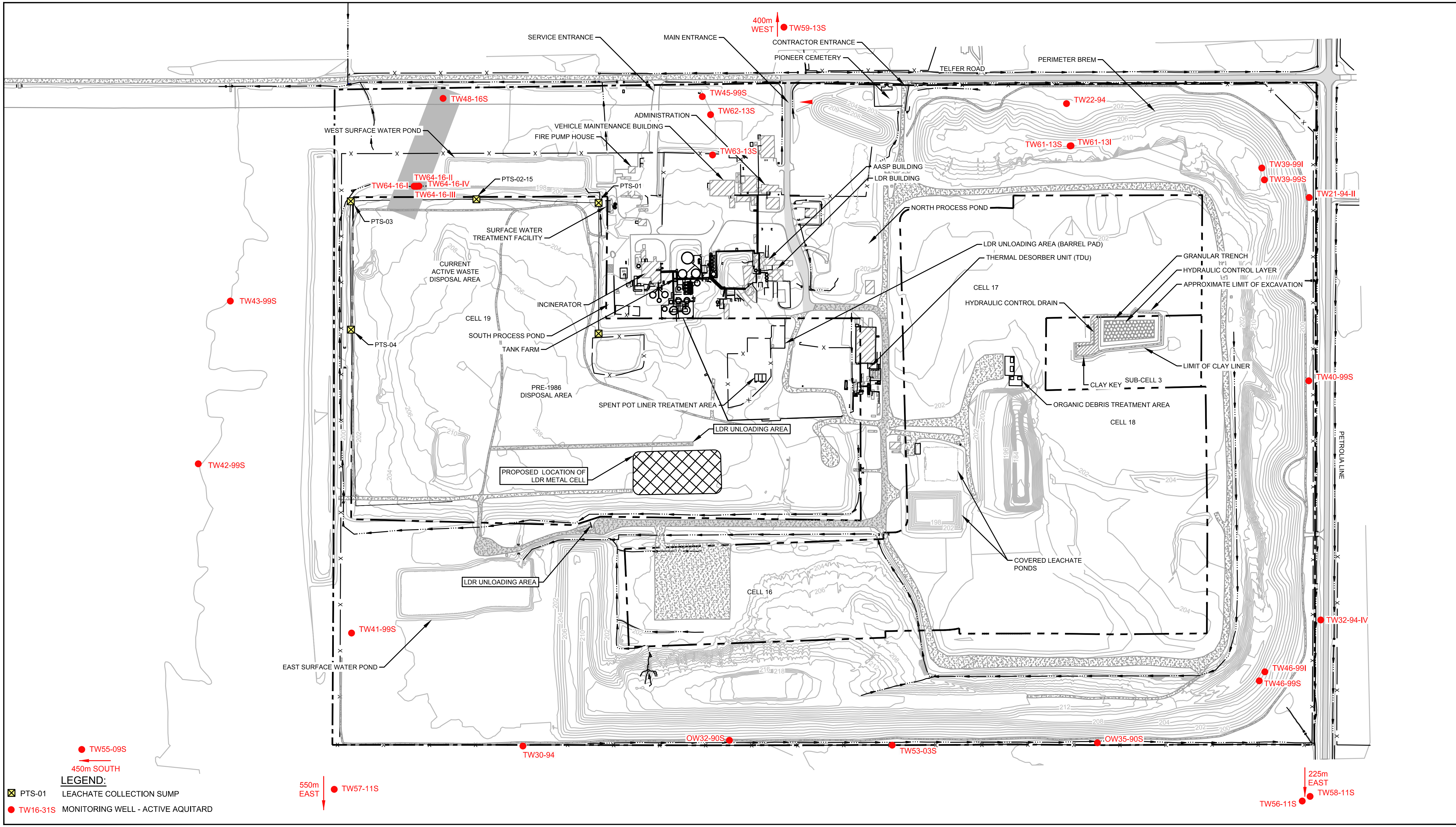
2018 ANNUAL GROUNDWATER MONITORING REPORT

44985-40
Feb 13, 2019

MONITORING WELL NETWORK

FIGURE 3

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA002.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 50 100 150m

LEGEND:

EXISTING GROUND CONTOUR
PROPERTY BOUNDARY
LIMIT OF WASTE
DRAINAGE SWALE
FENCELINE
PAVED ROADWAY
GRAVEL ROADWAY
BUILDING / STRUCTURE
CLEAN INTERNAL HAUL ROAD
TRANSECT CELL 19-1

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CLEAN HARBORS CANADA INC.
2018 ANNUAL GROUNDWATER MONITORING REPORT

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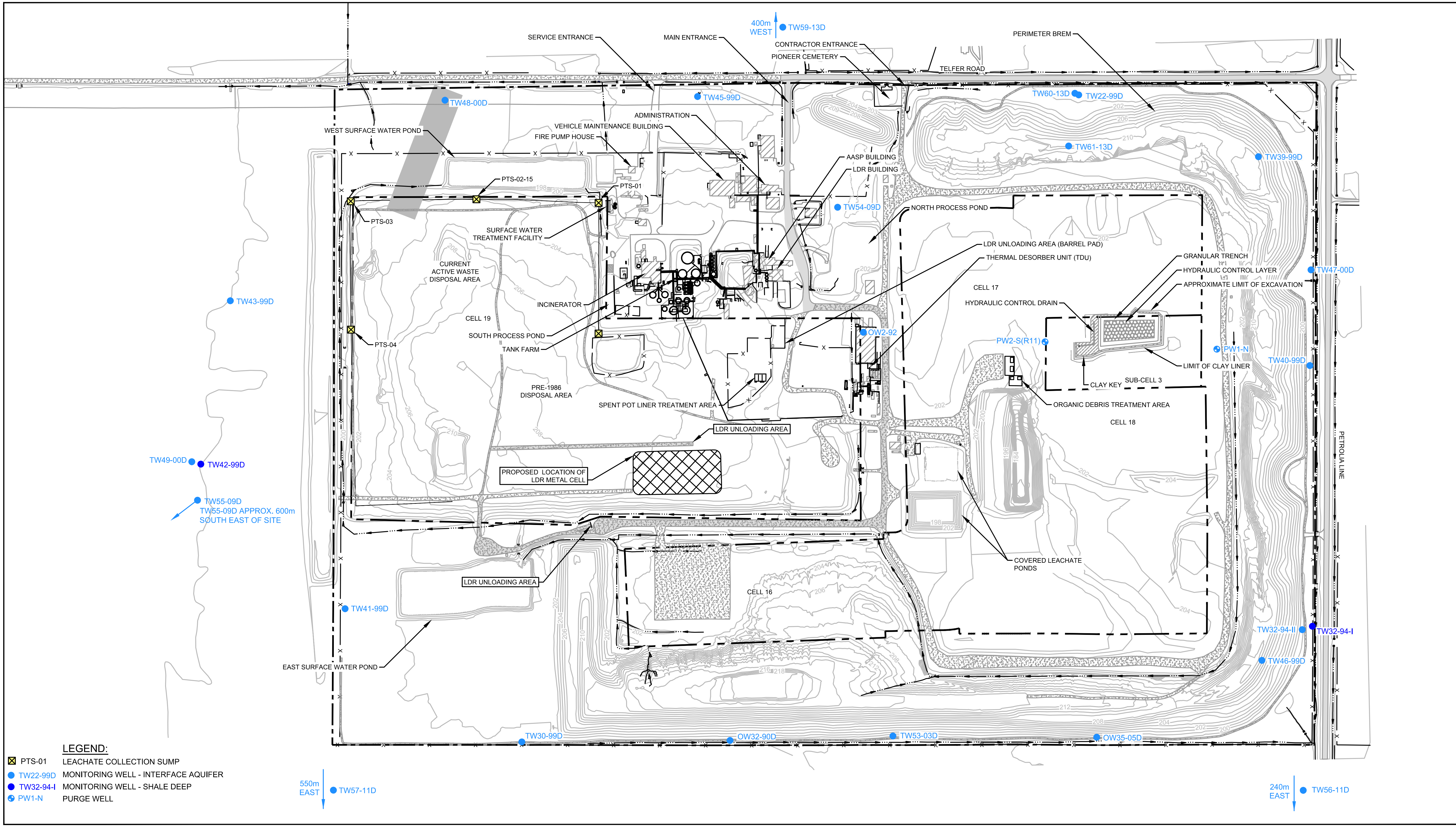
Feb 13, 2019

PERIMETER ACTIVE AQUITARD MONITORING WELL NETWORK

FIGURE 4

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA003.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 50 100 150m

LEGEND:

EXISTING GROUND CONTOUR	PAVED ROADWAY
PROPERTY BOUNDARY	GRAVEL ROADWAY
LIMIT OF WASTE	BUILDING / STRUCTURE
DRAINAGE SWALE	CLEAN INTERNAL HAUL ROAD
FENCELINE	TRANSECT CELL 19-1

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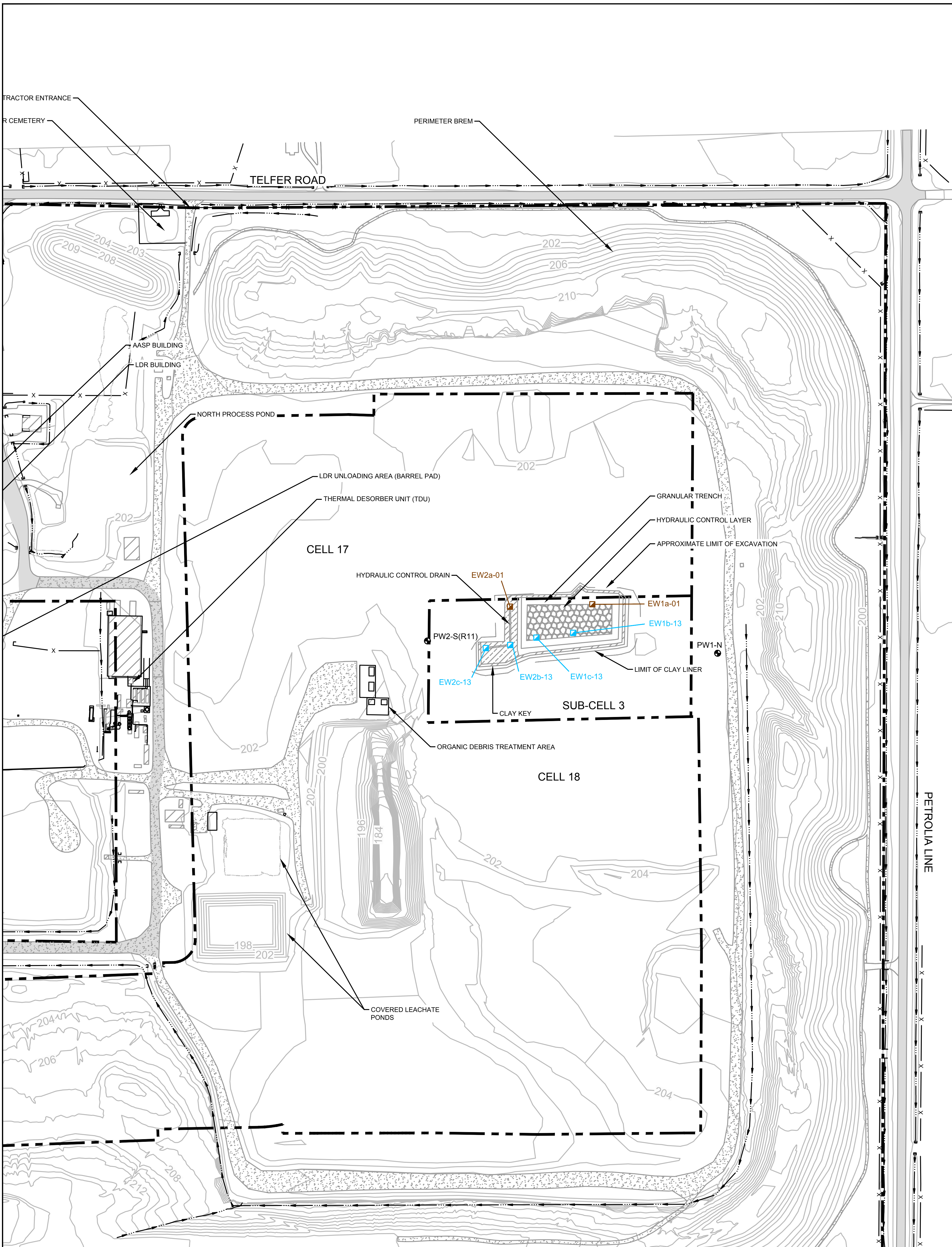
PERIMETER INTERFACE AQUIFER AND KETTLE POINT SHALE MONITORING WELL NETWORK

44985-40
Jan 10, 2019

FIGURE 5

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA004.dwg



LEGEND:

EW1a-01 HYDRAULIC CONTROL LAYER EXTRACTION WELL

EW1b-13 HYDRAULIC CONTROL LAYER MONITORING WELL

PW2-S(R11) INTERFACE AQUIFER PURGE WELL

LEGEND:

EXISTING GROUND CONTOUR

PROPERTY BOUNDARY

LIMIT OF WASTE

DRAINAGE SWALE

FENCELINE

PAVED ROADWAY

GRAVEL ROADWAY

BUILDING / STRUCTURE

CLEAN INTERNAL HAUL ROAD

Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 30 60 90m

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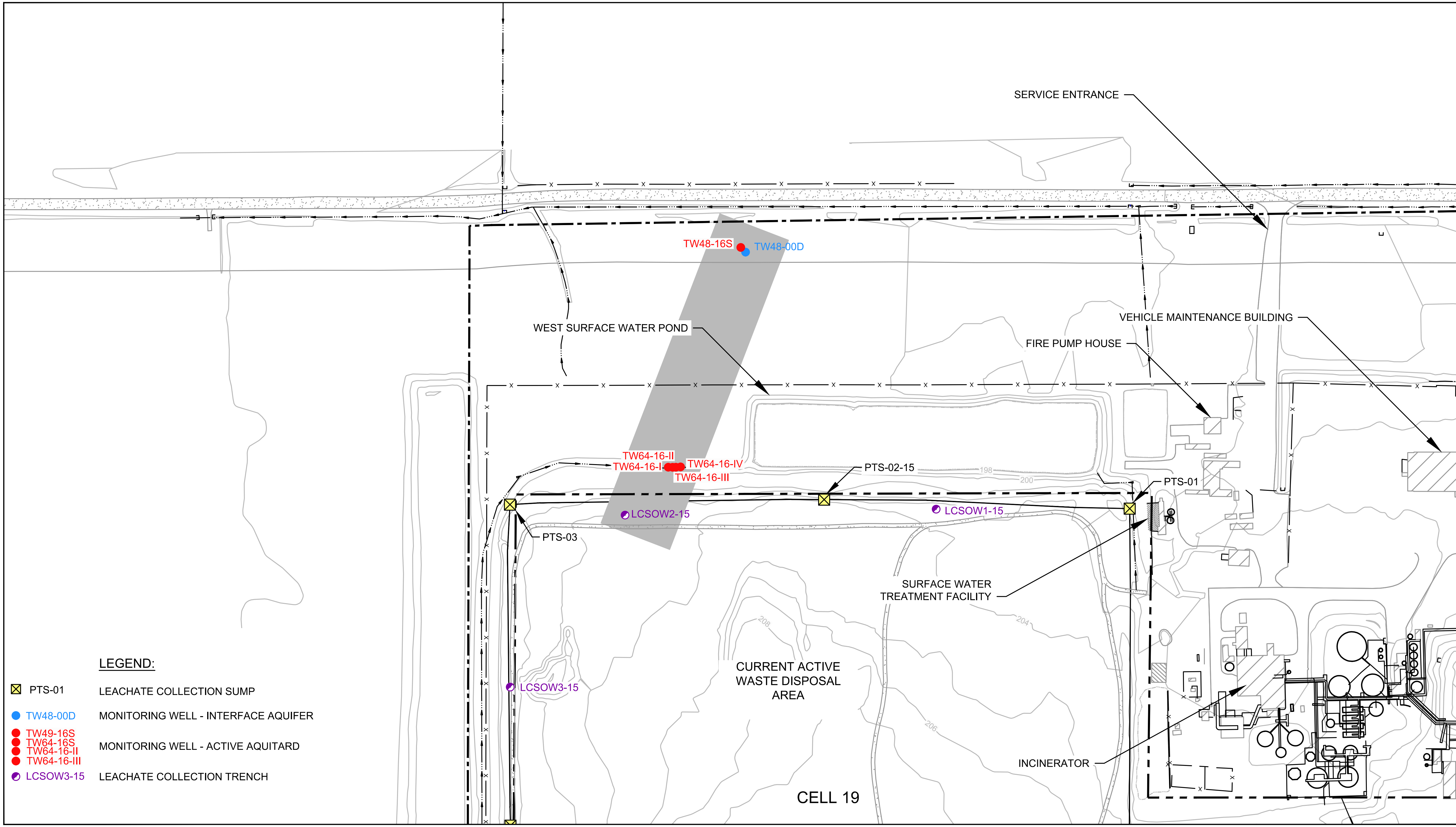
44985-40
Jan 10, 2019

SUB-CELL 3 MONITORING WELL NETWORK

FIGURE 6

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA005.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 20 40 60m

LEGEND:

208.0	EXISTING GROUND CONTOUR
	PROPERTY BOUNDARY
	LIMIT OF WASTE
	DRAINAGE SWALE
x x	FENCELINE
	PAVED ROADWAY
	GRAVEL ROADWAY
	BUILDING / STRUCTURE
	CLEAN INTERNAL HAUL ROAD
	TRANSECT CELL 19-1

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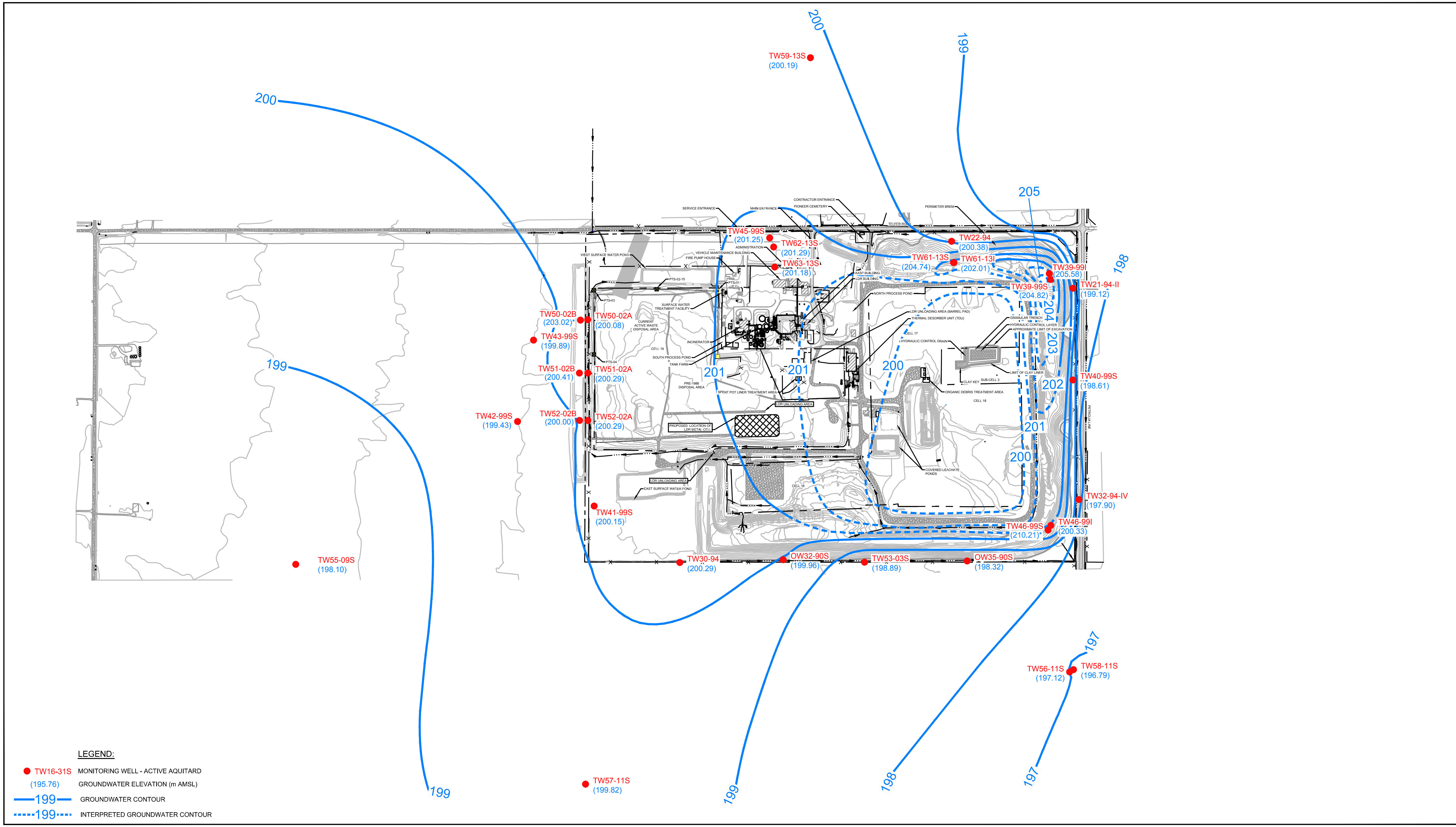
PERFORMANCE MONITORING OF ENGINEERED LANDFILL SYSTEMS MONITORING WELL NETWORK

44985-40

Jan 31, 2019

FIGURE 7

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA006.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 100 200 300m

LEGEND:

EXISTING GROUND CONTOUR	PAVED ROADWAY
PROPERTY BOUNDARY	GRAVEL ROADWAY
LIMIT OF WASTE	BUILDING / STRUCTURE
DRAINAGE SWALE	CLEAN INTERNAL HAUL ROAD
FENCELINE	TRANSECT CELL 19-1

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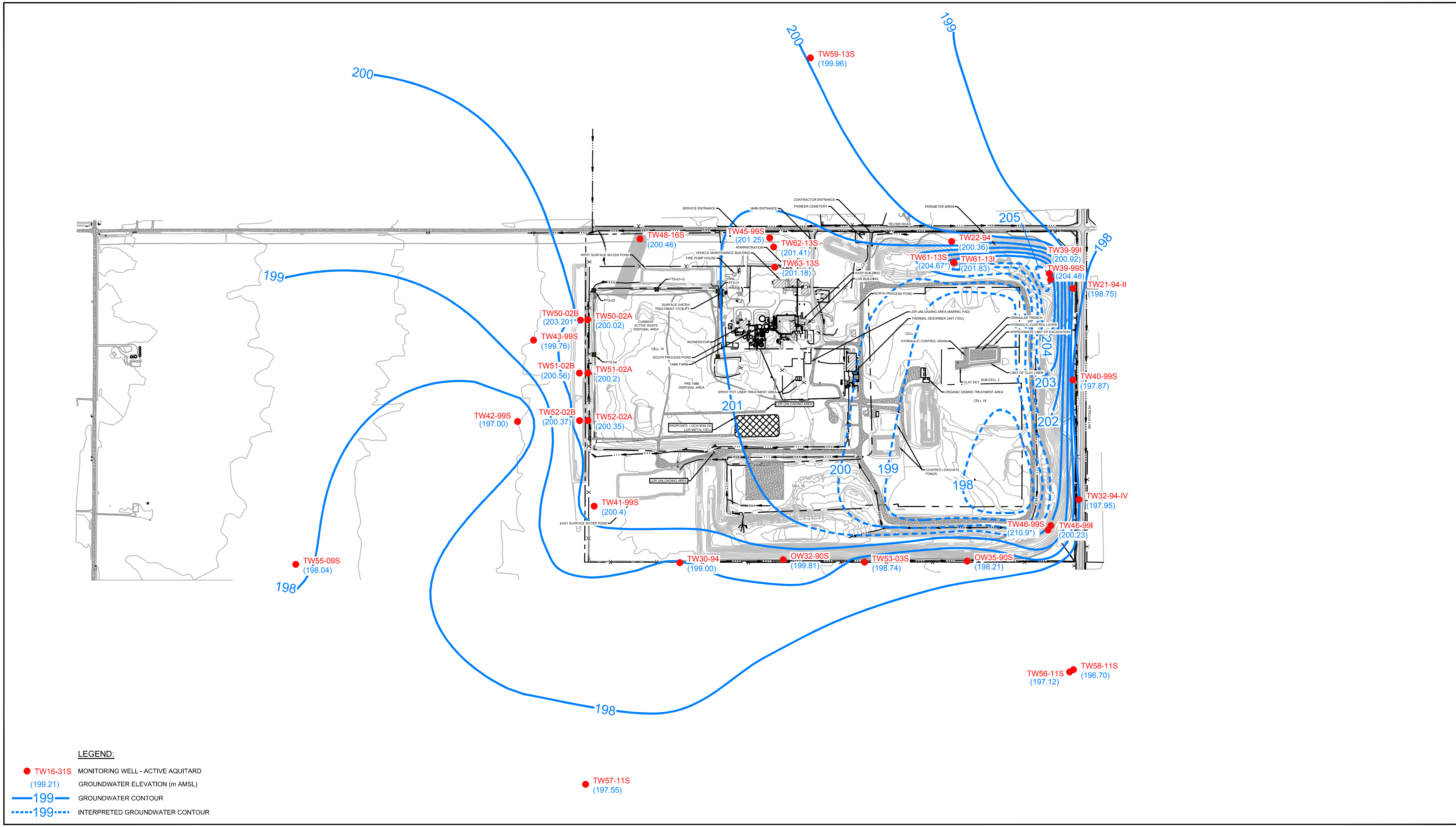
2018 ANNUAL GROUNDWATER MONITORING REPORT

GROUNDWATER ELEVATIONS ACTIVE AQUITARD
APRIL 2018

44985-40
Mar 5, 2019

FIGURE 8

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA007.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 100 200 300m

LEGEND:

	EXISTING GROUND CONTOUR		PAVED ROADWAY
	PROPERTY BOUNDARY		GRAVEL ROADWAY
	LIMIT OF WASTE		BUILDING / STRUCTURE
	DRAINAGE SWALE		CLEAN INTERNAL HAUL ROAD
x	FENCELINE		TRANSECT CELL 19-1

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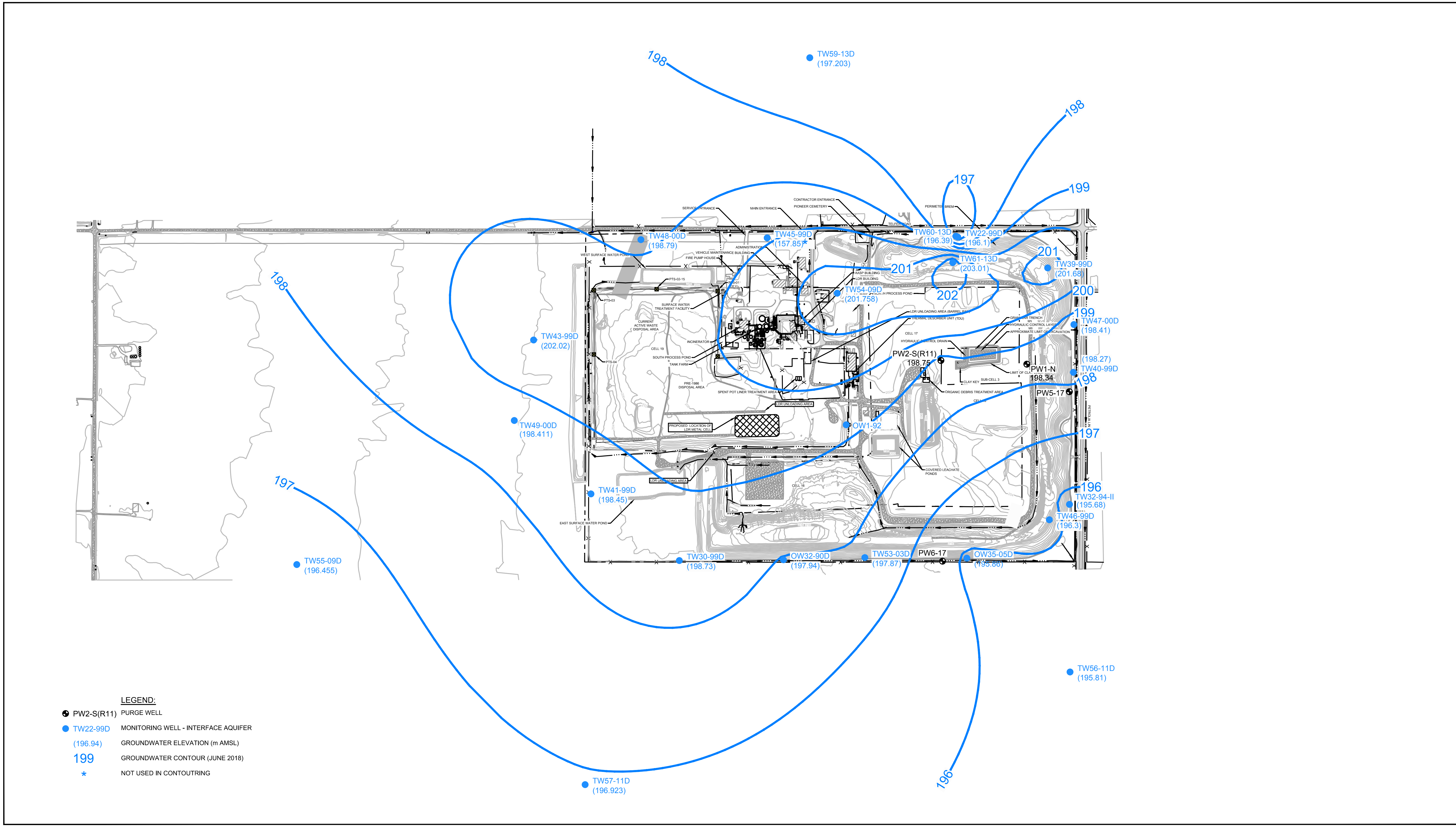
2018 ANNUAL GROUNDWATER MONITORING REPORT

GROUNDWATER ELEVATIONS ACTIVE AQUITARD
OCTOBER 2018

44985-40
Mar 5, 2019

FIGURE 9

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA008.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 100 200 300m

LEGEND:

EXISTING GROUND CONTOUR	PAVED ROADWAY
PROPERTY BOUNDARY	GRAVEL ROADWAY
LIMIT OF WASTE	BUILDING / STRUCTURE
DRAINAGE SWALE	CLEAN INTERNAL HAUL ROAD
FENCELINE	TRANSECT CELL 19-1

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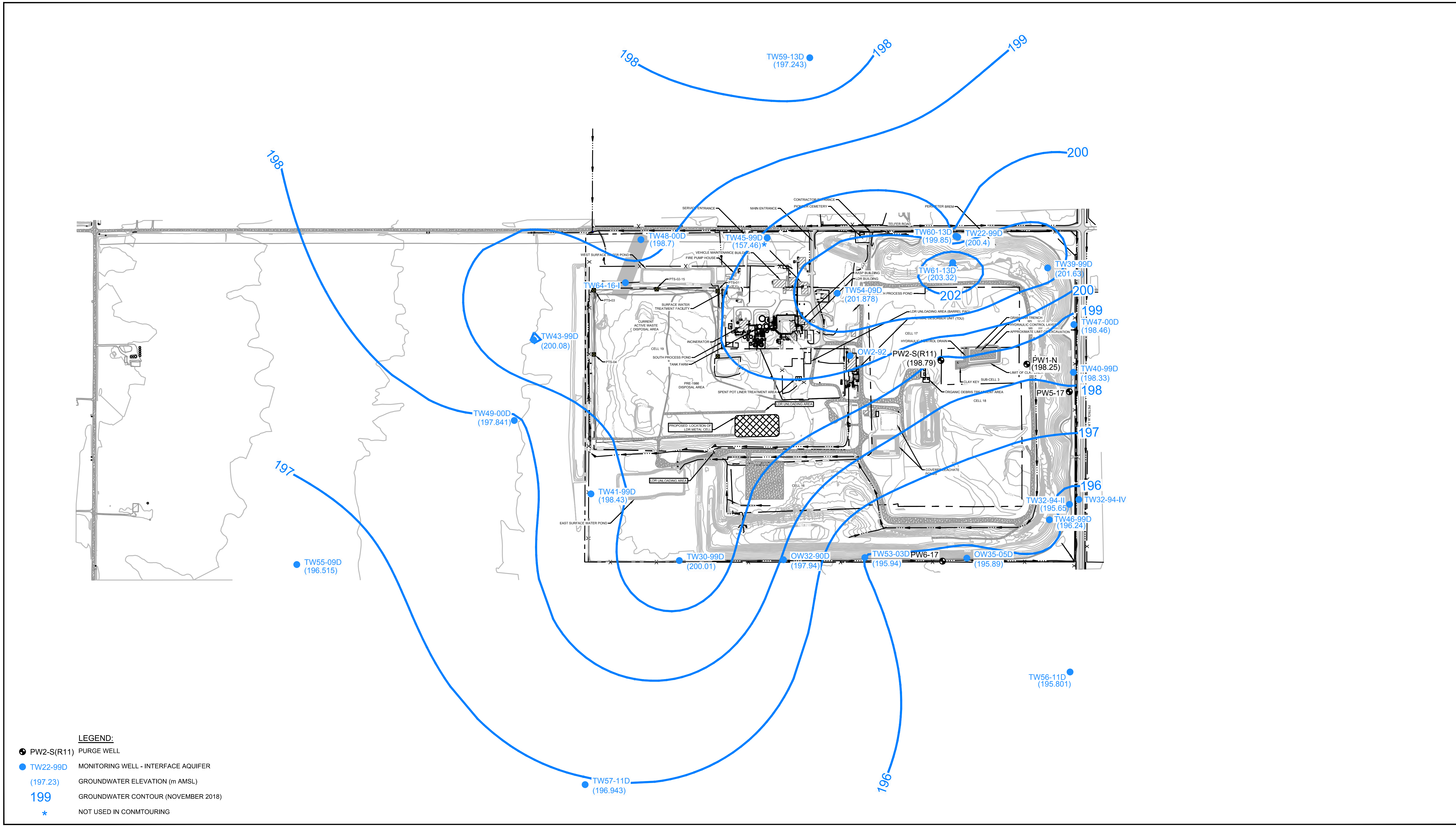
2018 ANNUAL GROUNDWATER MONITORING REPORT

GROUNDWATER ELEVATION CONTOURS INTERFACE AQUIFER JUNE 2018

44985-40
Feb 13, 2019

FIGURE 10

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA009.dwg



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 100 200 300m

LEGEND:

EXISTING GROUND CONTOUR	PAVED ROADWAY
PROPERTY BOUNDARY	GRAVEL ROADWAY
LIMIT OF WASTE	BUILDING / STRUCTURE
DRAINAGE SWALE	CLEAN INTERNAL HAUL ROAD
FENCELINE	TRANSECT CELL 19-1

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CLEAN HARBORS CANADA INC.
2018 ANNUAL GROUNDWATER MONITORING REPORT

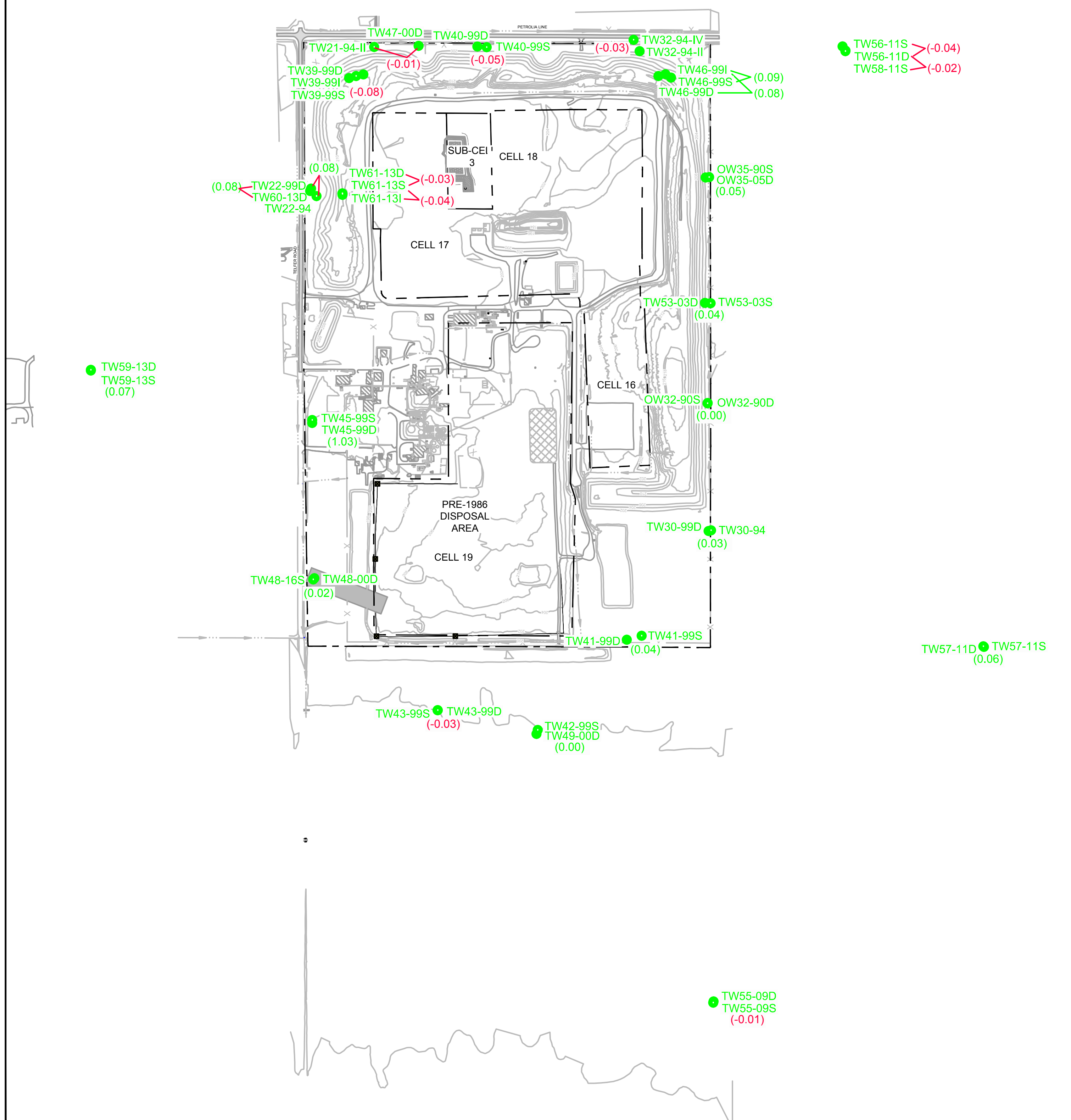
GROUNDWATER ELEVATION CONTOURS INTERFACE AQUIFER NOVEMBER 2018

44985-40
Feb 13, 2019

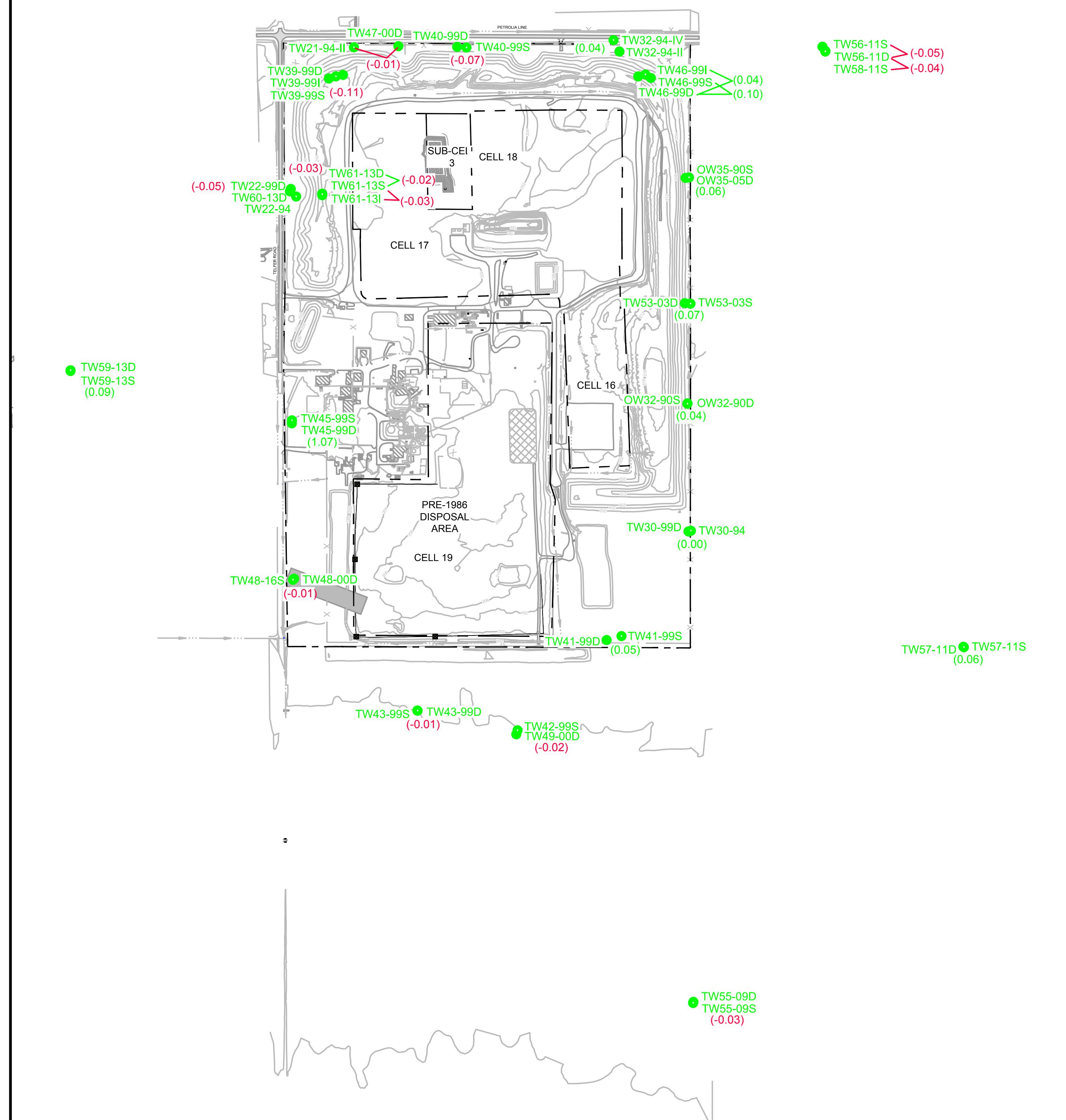
FIGURE 11

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA010.dwg

SPRING 2018



FALL 2018



Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

0 6 12 18m

N

LEGEND

TW45-99S	MONITORING WELL LOCATION
(0.03)	DOWNWARD HYDRAULIC GRADIENT
(0.00)	NO VERTICAL GRADIENT
(-0.08)	UPWARD HYDRAULIC GRADIENT

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LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2018 ANNUAL GROUNDWATER MONITORING REPORT

DISTRIBUTION OF VERTICAL GRADIENTS BETWEEN ACTIVE AQUITARD AND INTERFACE AQUIFER

44985-40
Feb 13, 2019

FIGURE 12

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA012.dwg

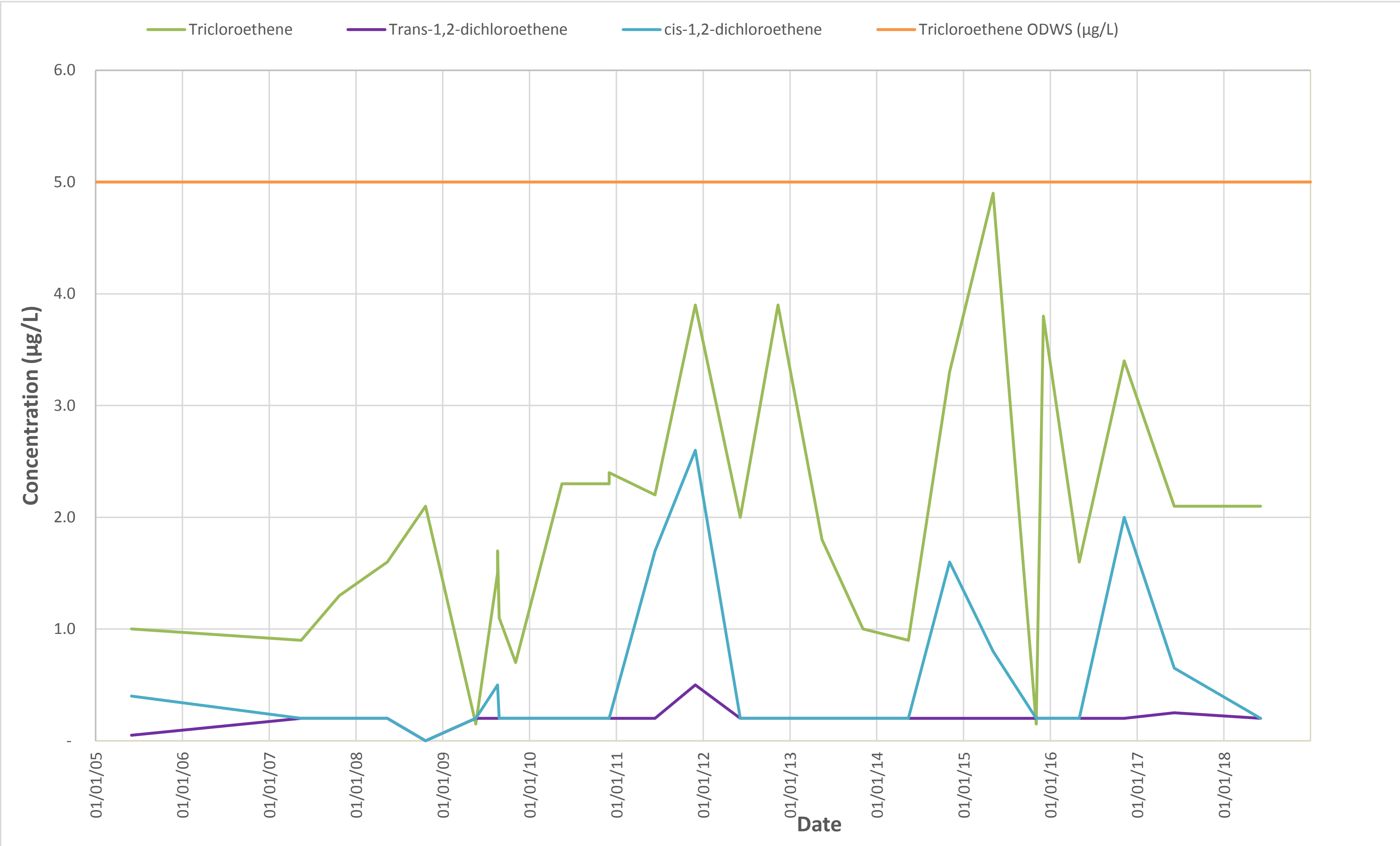


Figure 13

TRICHLOROETHENE AND DEGRADATION PRODUCTS CONCENTRATION VERSES TIME

2018 ANNUAL GROUNDWATER MONITORING REPORT

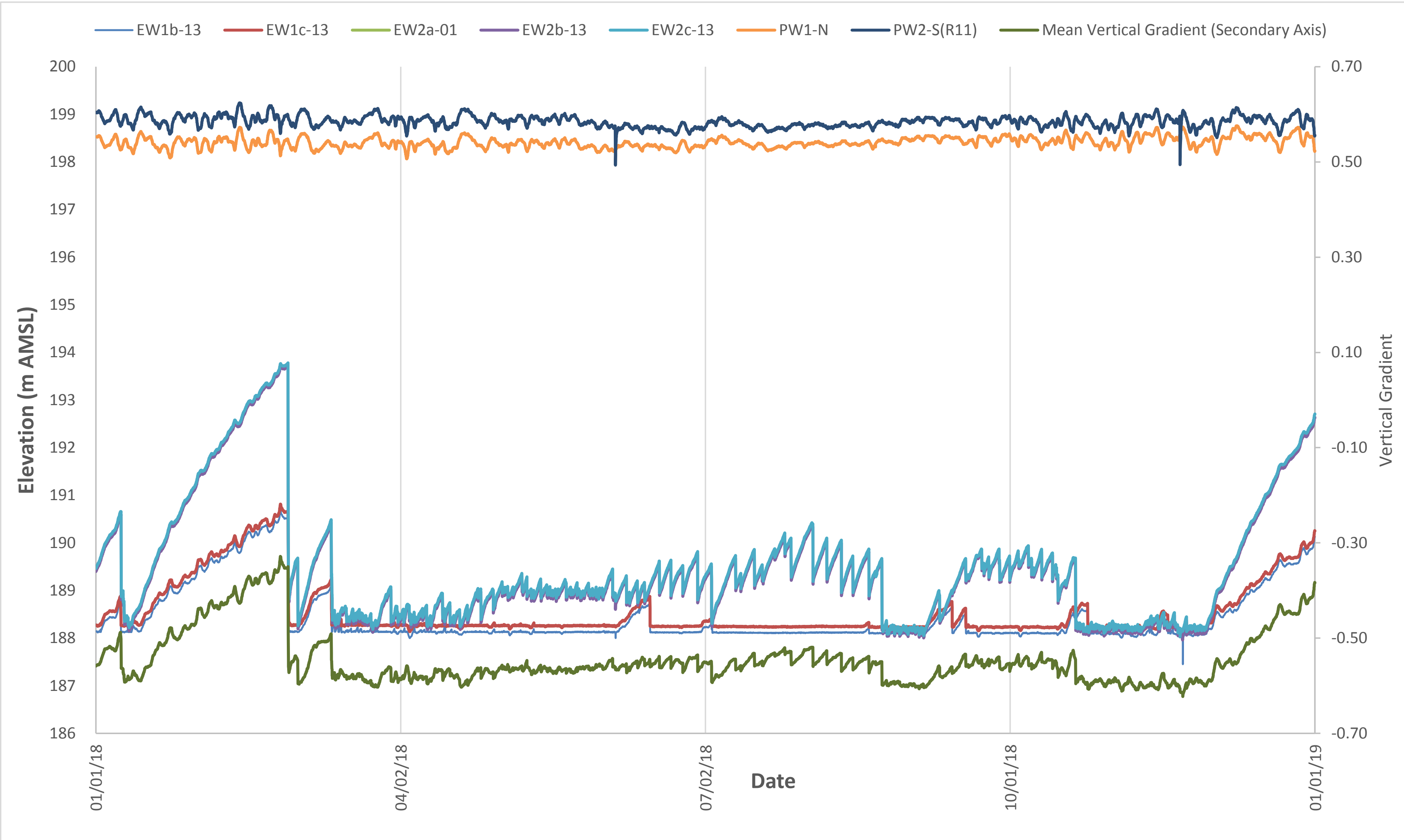
CLEAN HARBORS CANADA INC.

Lambton Facility

Notes: 0.3 µg/L Trichloroethene Laboratory Detection

Concentration of half the detection limit used for non-detect laboratory analytical results

Trans1,2 Dichloroethene and Cis 1,2 Dichloroethene Laboratory Detection Limits have ranged from 0.2 to 0.4 µg/L



Notes: Mean vertical gradient calculated from hydraul control layer wells EW1b-13, EW1c-13, EW2a-13, EW2b-13, EW2c-13 and Interface Aquifer Well PW1

-EW1b-13, EW1c-13, EW2a-13, EW2b-13, EW2c-13 are Active Aquitard Wells

-PW1-N and PW2-S(R11) are Interface Aquifer Wells

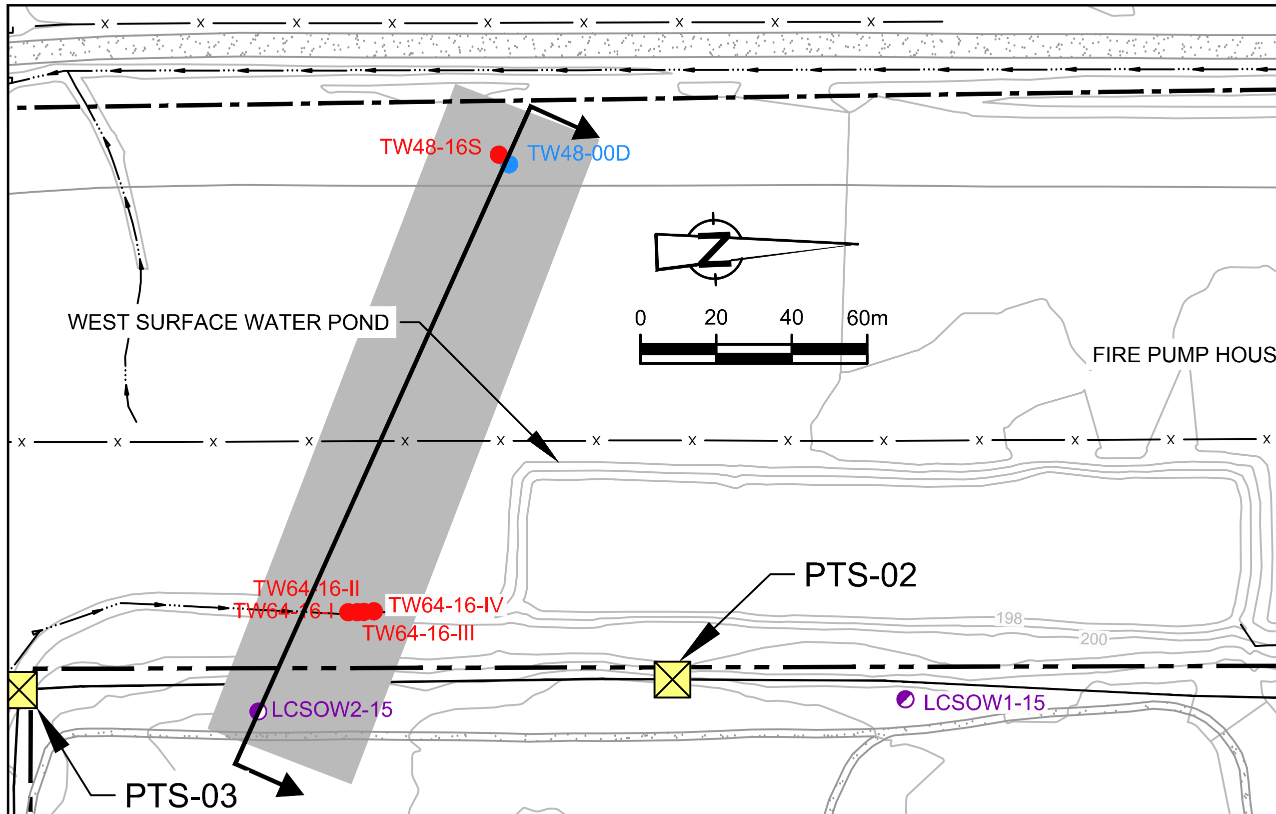
Figure 14

SUB-CELL 3 GROUP HYDROGRAPH

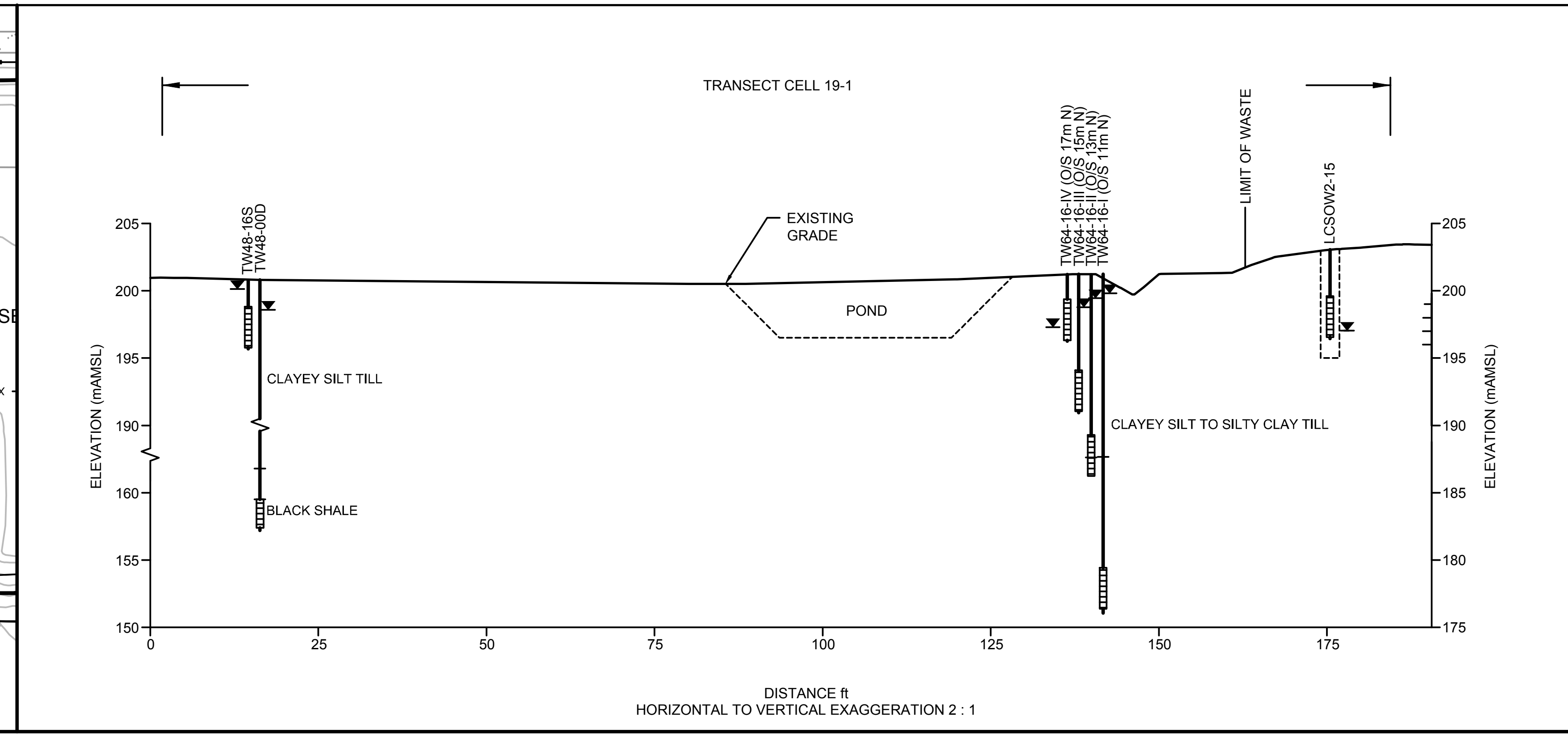
GROUNDWATER MONITORING PROGRAM

2018 ANNUAL GROUNDWATER MONITORING REPORT

Lambton Facility, Clean Harbors



PLAN VIEW

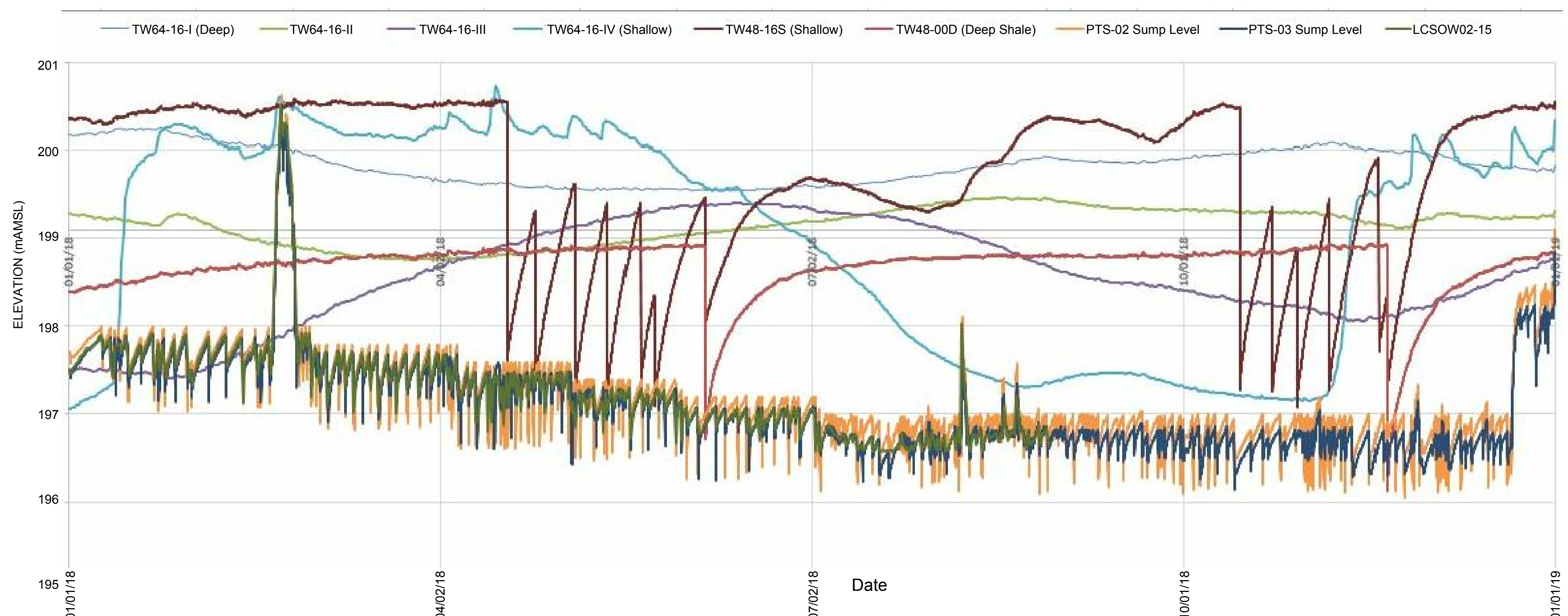


CROSS SECTION

LEGEND:

PTS-01	LEACHATE COLLECTION SUMP
TW22-99D	MONITORING WELL - INTERFACE AQUIFER
TW16-31S	MONITORING WELL - ACTIVE AQUITARD
LCSOW3-15	LEACHATE COLLECTION TRENCH

NOTE: GROUNDWATER/LEACHATE ELEVATION FROM AUGUST 22, 2018



TRANSECT GROUP HYDROGRAPH AND LEACHATE PUMPING RATES

Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

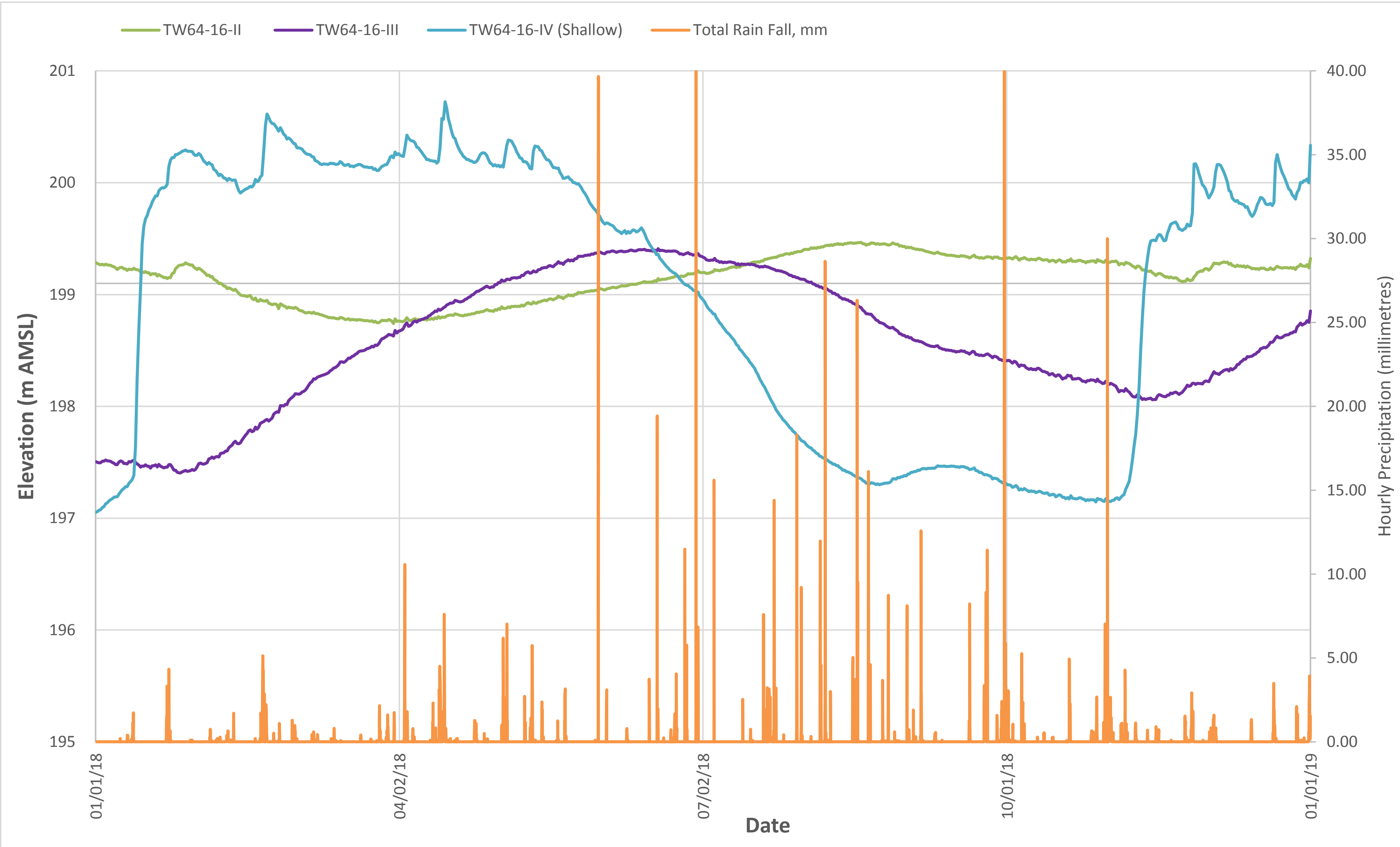
LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2018 ANNUAL GROUNDWATER MONITORING REPORT

PERFORMANCE OF ENGINEERED LANDFILL SYSTEM TRANSECT

44985-40
Feb 14, 2019

FIGURE 15

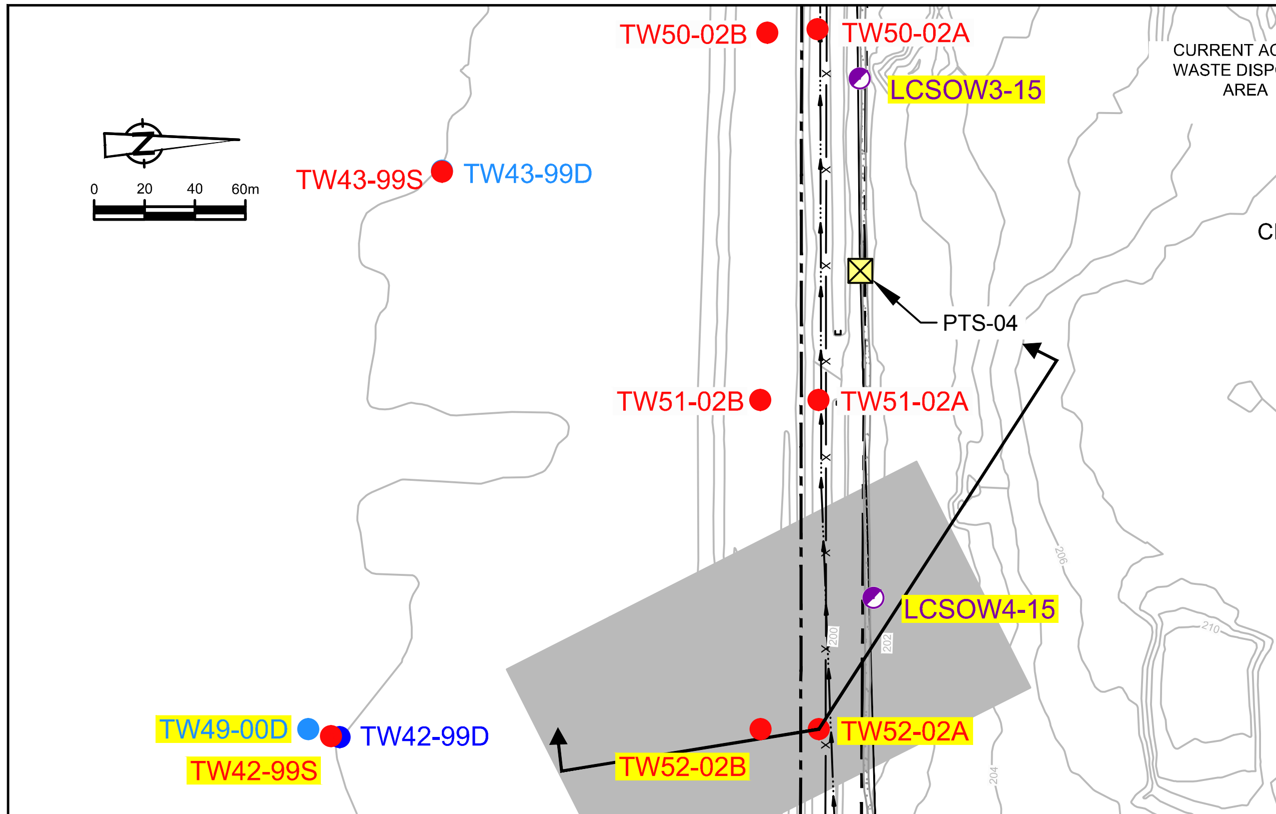
CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA011.dwg



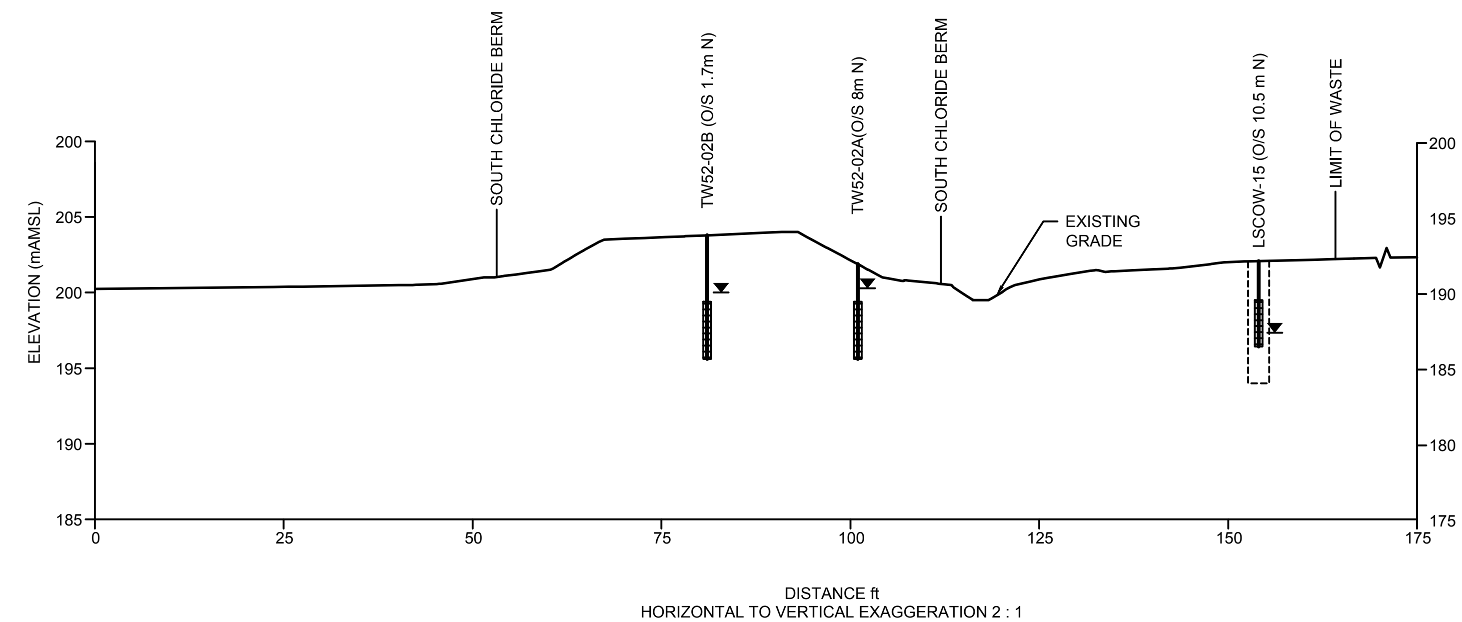
Notes: Precitation data collected from an on-Site weather station

Figure 16

TRANSECT GROUP HYDROGRAPH AND SITE HOURLY PRECIPITATION
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility



PLAN VIEW

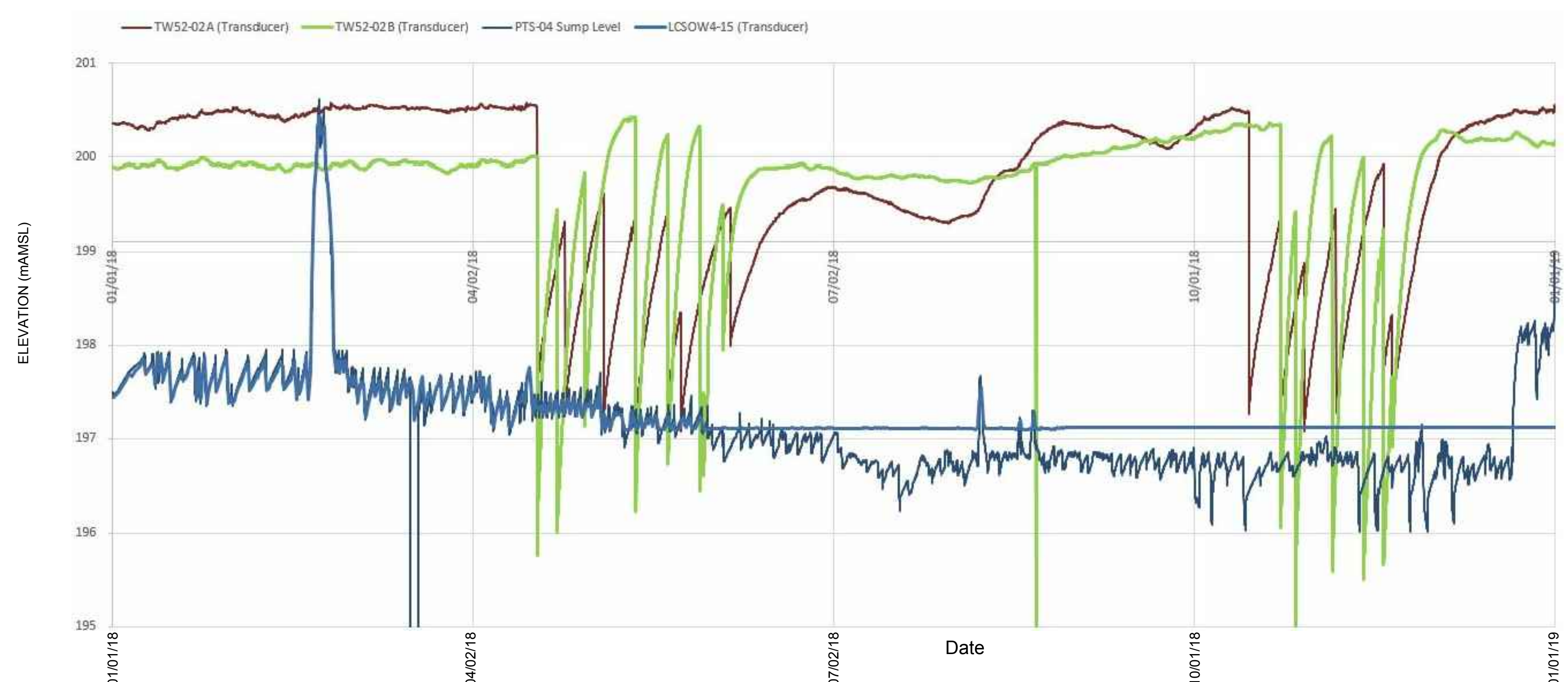


CROSS SECTION

LEGEND:

⊠	PTS-01	LEACHATE COLLECTION SUMP
●	TW16-31S	MONITORING WELL - ACTIVE AQUITARD
◐	LCSOW3-15	LEACHATE COLLECTION TRENCH

Note: GROUNDWATER/LEACHATE ELEVATION FROM AUGUST 22, 2018



SOUTHERN BERM HYDROGRAPH AND LEACHATE ELEVATIONS

Source: EXISTING TOPOGRAPHIC FEATURES FROM TETRA TECH, DRAWING 5 STORMWATER MANAGEMENT DATED FEBRUARY 23, 2015. EXISTING TOPOGRAPHIC SURVEY COMPLETED IN 2012

LAMBTON FACILITY
CLEAN HARBORS CANADA INC.
2018 ANNUAL GROUNDWATER MONITORING REPORT
SOUTHERN BERM TRANSECT

44985-40
Feb 14, 2019

FIGURE 17

CAD File: P:\drawings\44000s\44985\44985-REPORTS\44985-40(039)\44985-40(039)GN\44985-40(039)GN-WA014.dwg

Table 1

Well Completion Details
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Well ID	Easting	Northing	Survey Date	Ground Elevation (m AMSL)	Reference Elevation (m AMSL)	Hydraulic Conductivity (K m/s)	Top Elevation	Bottom Elevation
Active Aquitard								
OW32-90S	394484.28	4748064.15	13-Dec-90	200.25	201.28	-	198.72	194.12
OW35-90S	394507.41	4748570.04	13-Dec-90	198.42	199.26	-	196.90	192.30
TW21-94-II	393769.34	4748890.36	05-Apr-94	199.30	200.08	-	197.85	194.88
TW22-94	393627.30	4748561.65	06-Oct-94	200.51	201.31	3.20E-07	160.24	158.89
TW30-94	394481.04	4747779.85	29-Jun-94	200.51	201.35	6.80E-05	158.18	157.26
TW32-94-IV	394350.52	4748883.71	26-Jul-94	198.04	198.80	-	195.61	192.64
TW39-99I	393726.35	4748826.82	24-Feb-99	211.89	212.65	1.00E-10	199.52	196.78
TW39-99S	393742.71	4748829.70	25-Feb-99	211.84	212.58	3.20E-10	203.10	200.36
TW40-99S	394021.18	4748880.00	03-Feb-99	198.77	199.49	1.20E-09	196.97	194.22
TW41-99S	394316.59	4747550.26	03-Oct-99	200.34	201.01	4.10E-10	198.46	195.72
TW42-99S	394075.87	4747348.61	10-Nov-14	199.76	200.64	1.00E-10	198.08	195.33
TW43-99S	393853.94	4747401.36	16-Mar-99	200.03	200.73	2.20E-10	198.07	195.33
TW45-99S	393598.22	4748061.38	03-Dec-99	201.38	202.25	7.10E-09	199.09	196.36
TW46-99I	394418.85	4748804.01	08-Sep-99	211.95	212.84	8.40E-07	196.76	194.02
TW46-99S	394430.91	4748795.86	08-Sep-99	212.04	212.85	7.70E-10	201.45	198.71
TW48-16S	393586.74	4747704.73	12-Jan-16	200.71	201.56	-	198.81	195.76
TW50-02A	393803.30	4747552.56	20-Mar-13	200.47	201.15	1.40E-09	199.40	195.60
TW50-02B	393803.89	4747532.57	20-Mar-13	203.17	203.92	3.44E-09	199.40	195.60
TW51-02A	393950.17	4747547.19	20-Mar-13	200.53	201.26	6.35E-10	199.40	195.60
TW51-02B	393949.32	4747523.98	20-Mar-13	203.17	203.81	2.00E-09	199.40	195.60
TW52-02A	394080.64	4747542.20	20-Mar-13	200.43	201.16	1.43E-09	199.40	195.60
TW52-02B	394079.82	4747519.09	20-Mar-13	203.30	204.25	1.89E-09	199.40	195.60
TW53-03S	394499.68	4748287.76	19-Aug-03	198.94	199.74	1.20E-09	198.24	195.15
TW55-09S	394444.74	4746723.41	01-Dec-09	198.57	199.36	1.42E-08	195.83	192.79
TW56-11S	394823.27	4748839.80	11-Dec-11	197.53	198.54	2.60E-10	195.27	191.31
TW57-11S	395080.12	4747496.72	11-Dec-11	200.29	201.20	2.60E-08	198.21	195.16
TW58-11S	394817.26	4748850.82	11-Dec-11	197.83	198.81	4.80E-10	195.57	192.52
TW59-13S	393107.46	4748192.76	20-Mar-13	201.36	202.04	5.90E-08	198.61	195.56
TW61-13I	393685.64	4748564.37	10-Jul-13	209.69	210.67	1.50E-08	199.94	196.89
TW61-13S	393685.57	4748565.70	10-Jul-13	209.72	210.63	5.70E-10	203.93	200.88
TW62-13S	393623.54	4748071.66	13-Dec-13	201.47	202.39	-	199.03	195.99
TW63-13S	393678.97	4748072.29	13-Dec-13	201.54	202.36	-	199.03	195.98
TW64-16-I	393706.00	4747660.15	07-Jan-16	201.22	202.21	-	179.43	176.38
TW64-16-II	393706.11	4747662.56	08-Jan-16	201.19	202.08	-	189.3	186.25
TW64-16-III	393706.15	4747664.34	11-Jan-16	201.23	202.24	-	194.09	191.04
TW64-16-IV	393706.07	4747666.93	11-Jan-16	201.21	202.12	-	199.36	196.31

Note:

* Decommissioned
- No calculated hydraulic conductivity

Table 1

Well Completion Details
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Well ID	Easting	Northing	Survey Date	Ground Elevation (m AMSL)	Reference Elevation (m AMSL)	Hydraulic Conductivity (K m/s)	Top Elevation	Bottom Elevation
Interface Aquifer								
OW1-92*	394120.20	4748252.20	16-Oct-92	201.30	202.22	-	161.94	160.42
OW32-90D	394484.50	4748065.00	13-Dec-90	200.25	201.46	8.00E-10	158.42	156.92
OW35-05D	394499.70	4748569.40	01-Mar-05	198.58	199.63	1.40E-06	158.08	155.08
PW1-N	393972.85	4748755.29	-Mar-00[(a)]/21-Jul-1!	201.00[(a)]	202.82[(b)]	-	162.00	158.89
PW2-S(R11)	393953.61	4748519.39	-Dec-11[(a)]/21-Jul-1!	202.53[(a)]	203.52[(b)]	5.00E-06	--	--
TW22-99D	393616.00	4748579.00	18-Feb-99	200.65	201.38	3.20E-07	160.24	158.89
TW30-99D	394475.41	4747778.55	03-Apr-99	200.62	201.35	6.80E-05	158.18	157.26
TW32-94-II	394362.90	4748857.70	07-Dec-94	198.09	198.65	2.00E-08	157.00	155.48
TW39-99D	393710.60	4748822.80	23-Feb-99	211.92	212.63	4.70E-08	161.75	160.42
TW40-99D	394000.30	4748882.30	03-Feb-99	198.78	199.51	7.80E-07	158.70	157.40
TW41-99D	394282.82	4747542.67	03-Sep-99	200.42	201.18	7.20E-05	157.43	156.07
TW43-99D	393853.56	4747401.44	16-Mar-99	200.21	200.99	3.20E-06	160.43	157.69
TW45-99D	393597.90	4748054.80	03-Dec-99	201.45	202.39	3.70E-09	159.35	153.73
TW46-99D	394402.90	4748800.60	08-Sep-99	212.02	212.80	7.10E-09	155.94	154.64
TW47-00D	393868.90	4748889.00	22-Jun-00	199.59	200.43	3.90E-10	162.41	159.54
TW48-00D	393589.40	4747707.29	18-Jan-16	200.68	201.40	3.20E-07	160.27	157.40
TW49-00D	394072.73	4747339.78	10-Nov-14	199.87	200.77	8.10E-10	159.99	157.12
TW53-03D	394487.10	4748289.20	18-Aug-03	198.96	199.86	7.20E-06	159.25	156.00
TW54-09D	393757.50	4748241.40	01-Dec-09	202.42	203.34	1.01E-08	160.35	158.83
TW55-09D	394445.49	4746726.11	01-Dec-09	198.66	199.47	8.64E-08	153.34	151.82
TW56-11D	394823.57	4748841.11	11-Dec-11	197.51	198.54	1.20E-05	155.62	154.10
TW57-11D	395081.21	4747495.47	11-Dec-11	200.38	201.27	1.30E-06	158.02	156.49
TW59-13D	393107.43	4748191.18	20-Mar-13	201.35	202.10	1.11E-03	155.23	153.71
TW60-13D	393613.59	4748573.73	10-Jul-13	200.55	201.55	8.30E-06	160.01	158.49
TW61-13D	393685.69	4748562.38	10-Jul-13	209.68	210.56	2.80E-10	160.17	158.66
PW5	--	--	03-Nov-17	198.72	199.67	-	160.24	157.20
PW6	--	--	03-Nov-17	198.83	199.73	-	157.69	154.64
Shale Aquitard								
TW32-94-I	-	-	-	-	-	-	152.93	151.41
TW42-99D	394076.47	4747352.06	10-Nov-14	199.78	200.62	2.20E-09	157.99	155.25
TW38-94-I*	-	-	-	-	-	-	174.98	146.46
Sub-Cell 3 Wells								
EW1a-01	393928.93	4748654.82	11-Dec-11	201.53	203.45	-	--	--
EW1b-13	393951.62	4748638.32	10-Jul-13	201.57	203.13	-	--	--
EW1c-13	393954.34	4748608.23	10-Jul-13	201.54	203.22	-	--	--
EW2a-01	393928.31	4748587.69	11-Dec-11	201.27	202.77	-	--	--
EW2b-13	393959.52	4748586.67	10-Jul-13	201.57	203.20	-	--	--
EW2c-13	393961.22	4748566.69	10-Jul-13	201.57	203.23	-	--	--

Note:

* Decommissioned
- No calculated hydraulic conductivity
-- No data available

Table 1

Well Completion Details
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Well ID	Easting	Northing	Survey Date	Ground Elevation (m AMSL)	Reference Elevation (m AMSL)	Hydraulic Conductivity (K m/s)	Top Elevation	Bottom Elevation
Leachate Collection Trench								
LCSOW1-15	393734.76	4747806.59	18-Dec-15	204.52	205.61	-	199.95	196.9
LCSOW2-15	393731.36	4747635.38	18-Dec-15	204.16	205.37	-	199.59	196.54
LCSOW3-15	393823.46	4747568.54	19-Dec-15	202.99	204.02	-	199.48	196.44
LCSOW4-15	394029.44	4747565.88	19-Dec-15	201.52	202.57	-	199.49	196.44
Leachate Monitoring Wells								
LM10-11	394098.74	4748724.15	11-Dec-11	202.25	201.40	-	--	--
LM1-11	393762.16	4747873.31	11-Dec-11	202.78	203.61	-	--	--
LM2-11	394098.45	4747729.04	11-Dec-11	206.72	207.45	-	--	--
LM3-11	394105.30	4748091.26	11-Dec-11	205.97	207.11	-	--	--
LM4-11	394243.26	4747958.70	11-Dec-11	201.86	203.66	-	--	--
LM5-11	394236.97	4748253.38	11-Dec-11	202.42	204.70	-	--	--
LM6-11	394029.51	4748347.56	11-Dec-11	201.35	202.19	-	--	--
LM7-11	393788.91	4748463.96	11-Dec-11	201.41	202.55	-	--	--
LM8-11	393871.17	4748621.66	11-Dec-11	201.54	202.78	-	--	--
LM9-11	393814.32	4748689.00	11-Dec-11	201.67	202.35	-	--	--
Other Monitoring Wells								
OW2-92	393930.71	4748270.14	10-Aug-92	201.98	202.84	-	161.94	160.42
PW4-03	394114.31	4748259.27	19-Dec-03	201.26	202.07	-	156.9	155.4
TW15-94	393803.31	4747570.39	29-Jun-94	201.19	202.01	-	198.04	196.2
TW33-94-I*	393740.26	4747956.91	05-Dec-94	201.85	202.60	-	160.19	159.89
TW34-94-I*	394177.29	4747877.52	05-Sep-94	201.57	202.23	-	159.66	157.68
TW35-94-I	393262.97	4748180.22	30-May-94	202.27	203.06	-	157.4	157.1
TW35-94-II	393263.59	4748179.96	30-May-94	202.37	203.16	-	200.59	197.62
TW36-94-I	394832.80	4748845.46	06-Jun-94	197.38	198.16	-	156.11	154.73
TW36-94-II	394832.39	4748845.03	06-Mar-94	197.38	198.22	-	195.14	192.17
TW37-94-I	395078.41	4747755.41	06-Sep-94	199.72	200.54	-	157.98	157.8
TW37-94-II	395075.42	4747754.91	06-Sep-94	199.78	200.55	-	198.08	195.13
TW44-99S*	393597.51	4747735.07	18-Mar-99	200.81	201.52	1.00E-10	198.57	195.83

Notes:

* Decommissioned
- No calculated hydraulic conductivity
-- No data available

Table 2

Monitoring Methodology for Perimeter Monitoring Wells at Lambton Property
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Monitor	Water Level Measurement		Groundwater Sample Collection	
	Semi-Annual Manual Measurement	Quarterly Manual and Continuous (Pressure Transducer)	Continuous Volume	Low Flow
Shallow Wells (Active Aquitard)				
OW32-90S	√		√	
OW35-90S		√	√	
TW21-94-II	√		√	
TW22-94		√	√	
TW30-94		√	√	
TW32-94-IV	√		√	
TW39-99I		√	√	
TW39-99S	√		√	
TW40-99S	√		√	
TW41-99S	√		√	
TW42-99S		√	√	
TW43-99S	√		√	
TW45-99S	√		√	
TW46-99I	√		√	
TW46-99S	√		√	
TW48-16S		√	√	
TW50-02A	√		√	
TW50-02B	√		√	
TW51-02A	√		√	
TW51-02B	√		√	
TW52-02A		√	√	
TW52-02B		√	√	
TW53-03S	√		√	
TW55-09S	√		√	
TW56-11S	√		√	
TW57-11S	√		√	
TW58-11S	√		√	
TW59-13S	√		√	
TW61-13I		√	√	
TW61-13S	√		√	
TW62-13S	√		√	
TW63-13S	√		√	
TW64-16-I		√		
TW64-16-II		√		
TW64-16-III		√		
TW64-16-IV		√		
Deep Wells (Interface Aquifer)				
OW32-90D	√			√
OW35-05D		√		√
PW1-N		√		√
PW2-S(R11)		√		√
TW22-99D	√			√
TW30-99D		√		√
TW32-94-II		√		√
TW39-99D		√		√
TW40-99D		√		√
TW41-99D	√			√
TW43-99D	√			√

Table 2

Monitoring Methodology for Perimeter Monitoring Wells at Lambton Property
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Monitor	Water Level Measurement		Groundwater Sample Collection	
	Semi-Annual Manual Measurement	Quarterly Manual and Continuous (Pressure Transducer)	Continuous Volume	Low Flow
TW45-99D	√			√
TW46-99D		√		√
TW47-00D		√		√
TW48-00D		√		√
TW49-00D		√		√
TW53-03D		√		√
TW54-09D		√		√
TW55-09D		√		√
TW56-11D	√			√
TW57-11D	√			√
TW59-13D	√			√
TW60-13D	√			√
TW61-13D		√		√
Deep Shale Wells (Shale Aquitard)				
TW32-94-I				
TW42-99D				
Deep Hydraulic Control Layer Wells (Sub-Cell 3)				
EW1a-01		√		√
EW1b-13		√		√
EW1c-13		√		√
EW2a-01		√		√
EW2b-13		√		√
EW2c-13		√		√
Leachate Collection Trench				
LCSOW1-15		√		
LCSOW2-15		√		
LCSOW3-15		√		
LCSOW4-15		√		

Notes:
Manual water level measurements collected semi-annually with the exception of deep shale monitoring wells monitored bi-annually.
Continuous water level measurements collected hourly. Dataloggers downloaded quarterly.

Table 3

Groundwater Elevations
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Well ID	Date Measured	Water Level Depth (m BTOR)	Water Level Elevation (m AMSL)
Shallow Monitoring Wells			
OW32-90S	16-Apr-18	1.32	199.96
	4-Jun-18	3.37	197.91
	16-Oct-18	1.47	199.81
	21-Nov-18	1.65	199.63
OW35-90S	15-Feb-18	1.18	198.08
	16-Apr-18	0.94	198.32
	4-Jun-18	1.66	197.60
	22-Aug-18	1.01	198.25
	16-Oct-18	1.05	198.21
	21-Nov-18	1.07	198.19
TW21-94-II	16-Apr-18	0.96	199.12
	6-Jun-18	2.12	197.96
	16-Oct-18	1.33	198.75
	19-Nov-18	1.94	198.14
TW22-94	15-Feb-18	0.98	200.33
	16-Apr-18	0.93	200.38
	5-Jun-18	2.05	199.26
	22-Aug-18	1.02	200.29
	16-Oct-18	0.95	200.36
	19-Nov-18	2.64	198.67
TW30-94	15-Feb-18	1.78	199.57
	16-Apr-18	1.06	200.29
	4-Jun-18	1.5	199.85
	22-Aug-18	2.18	199.17
	16-Oct-18	2.35	199.00
	21-Nov-18	1.34	200.01
TW32-94-IV	16-Apr-18	0.9	197.90
	4-Jun-18	4.42	194.38
	16-Oct-18	0.85	197.95
	19-Nov-18	1.46	197.34
TW39-99I	15-Feb-18	11.48	201.17
	16-Apr-18	14.07	198.58
	6-Jun-18	13.99	198.66
	22-Aug-18	11.89	200.76
	16-Oct-18	11.73	200.92
	20-Nov-18	15.19	197.46
TW39-99S	16-Apr-18	7.76	204.82
	6-Jun-18	10.85	201.73
	16-Oct-18	8.1	204.48
	20-Nov-18	11.27	201.31
TW40-99S	15-Feb-18	1.26	198.23
	16-Apr-18	0.88	198.61
	4-Jun-18	3.28	196.21
	16-Oct-18	1.62	197.87
	19-Nov-18	3.79	195.70
TW41-99S	18-Apr-18	0.86	200.15
	4-Jun-18	0.85	200.16
	16-Oct-18	0.61	200.40
	21-Nov-18	0.64	200.37
TW42-99S	15-Feb-18	3.12	197.52
	23-Apr-18	1.21	199.43
	6-Jun-18	2.16	198.48
	22-Aug-18	3.58	197.06
	16-Oct-18	3.64	197.00
	19-Nov-18	3.51	197.13
TW43-99S	23-Apr-18	0.84	199.89
	6-Jun-18	1.72	199.01
	16-Oct-18	0.97	199.76
	19-Nov-18	1.08	199.65

Notes:

m BTOR Metres below top of riser
m AMSL Metres above mean sea-level
Active Aquitard June and November water levels may not be representative of static water level due to pre-purging

Table 3

Groundwater Elevations
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Clean Harbors Canada Inc.
Lambton Facility

Well ID	Date Measured	Water Level Depth (m BTOR)	Water Level Elevation (m AMSL)
Shallow Monitoring Wells			
TW45-99S	18-Apr-18	1	201.25
	6-Jun-18	1.94	200.31
	16-Oct-18	1	201.25
	20-Nov-18	1.03	201.22
TW46-99I	16-Apr-18	12.51	200.33
	4-Jun-18	14.1	198.74
	16-Oct-18	12.61	200.23
	19-Nov-18	15.13	197.71
TW46-99S	16-Apr-18	2.64	210.21
	4-Jun-18	12.3	200.55
	16-Oct-18	1.95	210.90
	19-Nov-18	12.24	200.61
TW48-16S	15-Feb-18	1.17	200.39
	18-Apr-18	1.05	200.51
	6-Jun-18	2.1	199.46
	22-Aug-18	1.44	200.12
	16-Oct-18	1.1	200.46
	20-Nov-18	3.29	198.27
TW50-02A	18-Apr-18	1.07	200.08
	29-May-18	1.38	199.77
	16-Oct-18	1.13	200.02
	20-Nov-18	1.3	199.85
TW50-02B	18-Apr-18	0.9	203.02
	29-May-18	2.55	201.37
	16-Oct-18	0.72	203.20
	20-Nov-18	0.92	203.00
TW51-02A	18-Apr-18	0.97	200.29
	29-May-18	3.19	198.07
	16-Oct-18	1.06	200.20
	20-Nov-18	4.13	197.13
TW51-02B	23-Apr-18	3.4	200.41
	29-May-18	5.01	198.80
	16-Oct-18	3.25	200.56
	20-Nov-18	7.18	196.63
TW52-02A	15-Feb-18	1.02	200.14
	18-Apr-18	0.87	200.29
	29-May-18	1.44	199.72
	22-Aug-18	0.89	200.27
	16-Oct-18	0.81	200.35
	20-Nov-18	2.05	199.11
TW52-02B	15-Feb-18	4.37	199.88
	18-Apr-18	4.25	200.00
	29-May-18	4.38	199.87
	22-Aug-18	4.28	199.97
	16-Oct-18	3.88	200.37
	20-Nov-18	6.5	197.75
TW53-03S	16-Apr-18	0.85	198.89
	4-Jun-18	1.98	197.76
	16-Oct-18	1	198.74
	21-Nov-18	1.07	198.67
TW55-09S	23-Apr-18	1.26	198.10
	6-Jun-18	3.12	196.24
	16-Oct-18	1.32	198.04
	19-Nov-18	4.2	195.16
TW56-11S	23-Apr-18	1.42	197.12
	7-Jun-18	4.21	194.33
	16-Oct-18	1.42	197.12
	19-Nov-18	4.64	193.90

Notes:

m BTOR Metres below top of riser
m AMSL Metres above mean sea-level
Active Aquitard June and November water levels may not be representative of static water level due to pre-purging

Table 3

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Well ID	Date Measured	Water Level Depth (m BTOR)	Water Level Elevation (m AMSL)
Shallow Monitoring Wells			
TW57-11S	23-Apr-18	1.38	199.82
	7-Jun-18	2	199.20
	16-Oct-18	3.65	197.55
	19-Nov-18	1.87	199.33
TW58-11S	23-Apr-18	2.02	196.79
	7-Jun-18	3.64	195.17
	16-Oct-18	2.11	196.70
	19-Nov-18	4.66	194.15
TW59-13S	18-Apr-18	1.85	200.19
	6-Jun-18	1.68	200.36
	16-Oct-18	2.08	199.96
	19-Nov-18	1.01	201.03
TW61-13I	15-Feb-18	8.76	201.91
	16-Apr-18	8.66	202.01
	5-Jun-18	8.75	201.92
	22-Aug-18	8.91	201.76
	16-Oct-18	8.84	201.83
	20-Nov-18	8.61	202.06
TW61-13S	16-Apr-18	5.89	204.74
	5-Jun-18	7.46	203.17
	16-Oct-18	5.96	204.67
	20-Nov-18	8.11	202.52
TW62-13S	18-Apr-18	1.1	201.29
	6-Jun-18	1.69	200.70
	16-Oct-18	0.98	201.41
	20-Nov-18	1.03	201.36
TW63-13S	18-Apr-18	1.18	201.18
	6-Jun-18	1.3	201.06
	16-Oct-18	1.18	201.18
	20-Nov-18	1.27	201.09
Deep Monitoring Wells			
OW32-90D	4-Jun-18	3.52	197.94
	21-Nov-18	3.52	197.94
OW35-05D	15-Feb-18	3.73	195.90
	4-Jun-18	3.77	195.86
	22-Aug-18	3.70	195.93
	21-Nov-18	3.74	195.89
PW1-N	15-Feb-18	4.53	198.29
	6-Jun-18	4.48	198.34
	22-Aug-18	4.47	198.35
	21-Nov-18	4.57	198.25
PW2-S(R11)	15-Feb-18	5.19	198.33
	6-Jun-18	4.77	198.75
	22-Aug-18	4.86	198.66
	21-Nov-18	4.73	198.79
TW22-99D	15-Feb-18	5.98	195.40
	5-Jun-18	5.28	196.10
	22-Aug-18	1.02	200.36
	20-Nov-18	0.98	200.40
TW30-99D	15-Feb-18	2.6	198.75
	4-Jun-18	2.62	198.73
	22-Aug-18	2.66	198.69
	21-Nov-18	1.34	200.01

Notes:

m BTOR Metres below top of riser
m AMSL Metres above mean sea-level
Active Aquitard June and November water levels may not be representative of static water level due to pre-purging

Table 3

Groundwater Elevations
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Lambton Facility

Well ID	Date Measured	Water Level Depth (m BTOR)	Water Level Elevation (m AMSL)
Deep Monitoring Wells			
TW32-94-II	15-Feb-18	2.99	195.66
	4-Jun-18	2.97	195.68
	22-Aug-18	2.98	195.67
	19-Nov-18	3.00	195.65
TW39-99D	15-Feb-18	10.93	201.70
	6-Jun-18	10.95	201.68
	22-Aug-18	10.93	201.70
	20-Nov-18	11	201.63
TW40-99D	15-Feb-18	1.26	198.25
	4-Jun-18	1.24	198.27
	22-Aug-18	1.22	198.29
	19-Nov-18	1.18	198.33
TW41-99D	4-Jun-18	2.73	198.45
	21-Nov-18	2.75	198.43
TW43-99D	6-Jun-18	0.97	200.02
	19-Nov-18	0.91	200.08
TW45-99D	6-Jun-18	44.84	157.55
	20-Nov-18	44.93	157.46
TW46-99D	15-Feb-18	16.53	196.27
	4-Jun-18	16.5	196.30
	22-Aug-18	16.57	196.23
	19-Nov-18	16.56	196.24
TW47-00D	15-Feb-18	2.055	198.38
	4-Jun-18	2.02	198.41
	22-Aug-18	2.00	198.43
	19-Nov-18	2.97	197.46
TW48-00D	15-Feb-18	2.9	198.50
	6-Jun-18	2.61	198.79
	22-Aug-18	2.81	198.59
	20-Nov-18	2.7	198.70
TW49-00D	15-Feb-18	3.55	197.22
	6-Jun-18	2.36	198.41
	22-Aug-18	3.29	197.48
	19-Nov-18	2.93	197.84
TW53-03D	15-Feb-18	3.905	195.96
	4-Jun-18	3.9	195.96
	22-Aug-18	3.9	195.96
	21-Nov-18	3.92	195.94
TW54-09D	15-Feb-18	1.65	201.69
	6-Jun-18	1.58	201.76
	22-Aug-18	1.48	201.86
	20-Nov-18	1.46	201.88
TW55-09D	6-Jun-18	3.01	196.46
	19-Nov-18	2.95	196.52
TW56-11D	7-Jun-18	2.76	195.78
	19-Nov-18	2.74	195.80
TW57-11D	7-Jun-18	4.35	196.92
	19-Nov-18	4.33	196.94
TW59-13D	6-Jun-18	4.9	197.20
	19-Nov-18	4.86	197.24
TW60-13D	6-Jun-18	5.16	196.39
	20-Nov-18	1.7	199.85
TW61-13D	15-Feb-18	7.47	203.09
	5-Jun-18	7.55	203.01
	22-Aug-18	7.66	202.90
	20-Nov-18	7.24	203.32

Notes:

m BTOR Metres below top of riser
m AMSL Metres above mean sea-level

Table 3

Groundwater Elevations
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Clean Harbors Canada Inc.
Lambton Facility

Well ID	Date Measured	Water Level Depth (m BTOR)	Water Level Elevation (m AMSL)
Sub-Cell 3 Wells			
EW1a-01	15-Feb-18	13.34	190.11
	22-Aug-18	15.27	188.18
EW1b-13	15-Feb-18	12.89	190.24
	6-Jun-18	14.87	188.26
	22-Aug-18	14.90	188.23
	21-Nov-18	15.02	188.11
EW1c-13	15-Feb-18	12.96	190.26
	6-Jun-18	14.93	188.29
	22-Aug-18	14.96	188.26
	21-Nov-18	15.07	188.15
EW2a-01	15-Feb-18	10.04	192.73
	22-Aug-18	13.44	189.33
EW2b-13	15-Feb-18	10.41	192.79
	6-Jun-18	14.42	188.78
	22-Aug-18	13.83	189.37
	21-Nov-18	15.1	188.10
EW2c-13	15-Feb-18	10.44	192.79
	6-Jun-18	14.32	188.91
	22-Aug-18	13.85	189.38
	21-Nov-18	15.08	188.15
Leachate Collection Trench			
LCSOW1-15	15-Feb-18	6.85	198.76
	22-Nov-18	8.5	197.11
LCSOW2-15	15-Feb-18	7.73	197.64
	22-Nov-18	8.8	196.57
LCSOW3-15	15-Feb-18	6.42	197.60
	22-Nov-18	7.5	196.52
LCSOW4-15	15-Feb-18	4.94	197.63
	22-Nov-18	5.88	196.69
Transect Active Aquifer Monitoring Wells			
TW64-16-I	15-Feb-18	2.21	200.00
	22-Aug-18	2.39	199.82
	20-Nov-18	2.3	199.91
TW64-16-II	15-Feb-18	3.1	198.98
	22-Aug-18	2.64	199.44
	20-Nov-18	2.97	199.11
TW64-16-III	15-Feb-18	4.5	197.74
	22-Aug-18	3.46	198.78
	20-Nov-18	4.08	198.16
TW64-16-IV	15-Feb-18	2.15	199.97
	22-Aug-18	4.82	197.30
	20-Nov-18	2.5	199.62

Notes:

m BTOR	Metres below top of riser
m AMSL	Metres above mean sea-level

Table 4

Groundwater Chemisty - Shallow Wells Located Off the Facility Property (Active Aquitard)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					**TW55-09S**			**TW56-11S**			**TW57-11S**			**TW58-11S**			**TW59-13S**		
Sample ID:						**55S**	**55S**		**56S**	**56S**		**57S**	**57S**		**58S**	**58S**		**59S**	**59S**
Sample Date:			**ODWS**		**05/26/2010 - 11/16/2017**	**6/6/2018**	**11/19/2018**	**06/13/2012 - 11/16/2017**	**6/7/2018**	**11/19/2018**	**06/12/2012 - 11/15/2017**	**6/7/2018**	**11/19/2018**	**06/13/2012 - 11/16/2017**	**6/7/2018**	**11/19/2018**	**05/21/2013 - 11/16/2017**	**6/6/2018**	**11/19/2018**
		ODWS	**SOURCE**	**PWQO**	**Historical Range**			**Historical Range**			**Historical Range**			**Historical Range**			**Historical Range**		
Parameters	**Units**	**a**		**b**															
Field Parameters																			
Conductivity, field	uS/cm	-	-	-	1240 - 1330	1280	**1360**[c]	2140 - 2160	**2280**[c]	**2170**[c]	1600 - 1660	**1690**[c]	**1520**[c]	3080 - 3170	**3320**[c]	**3030**[c]	764 - 950	**1130**[c]	**990**[c]
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.55 - 7.78	**6.73**[c]	**7.27**[c]	7.42 - 7.52	**6.53**[c]	**7.21**[c]	7.43 - 7.52	**6.7**[c]	**7.03**[c]	7.24 - 7.48	**6.49**[abc]	**6.88**[c]	7.44 - 7.57	**6.76**[c]	**7.3**[c]
Temperature, field	Deg C	15	AO	-	10.7 - 11.8	**12.3**[c]	11.04	10.8 - 11.8	10.9	**12.35**[c]	10.2 - 10.7	**11.8**[c]	**11.62**[c]	11.5 - 11.8	**10.8**[c]	**11.27**[c]	10.5 - 10.8	10.6	**11.57**[c]
General Indicators																			
Conductivity, electrical	uS/cm	-	-	-	1180 - 1440	1200	1300	1960 - 2400	2100	2250	1290 - 2240	1560	1580	2930 - 3470	2970	3200	850 - 994	882	915
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.81 - 8.29	**7.8**[c]	7.9	7.69 - 8.13	**7.65**[c]	7.87	7.58 - 8.06	7.76	7.98	7.64 - 8.03	7.79	7.9	7.82 - 8.22	7.84	7.99
Total dissolved solids (TDS)	mg/L	500	AO	-	818 - 1080	**786**[ac]	**856**[a]	1400 - 2050	**1780**[a]	**1790**[a]	838 - 1790	**1140**[a]	**1010**[a]	2080 - 3250	**2550**[a]	**2450**[a]	506 - 631	**528**[a]	**514**[a]
Minor Ions - Anions																			
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	272 - 327	**335**[c]	325	317 - 362	346	347	459 - 506	**522**[ac]	**550**[ac]	469 - 544	**513**[a]	481	358 - 400	**408**[c]	390
Chloride	mg/L	250	AO	-	13.4 - 16	**16.8**[c]	14.3	55.5 - 64	62.1	**67.3**[c]	23 - 31	25.5	**19.1**[c]	278 - 355	**343**[a]	**283**[a]	11 - 13	**17.7**[c]	**16.5**[c]
Sulfate	mg/L	500	AO	-	408 - 521	418	444	845 - 1050	**1100**[ac]	**1060**[ac]	267 - 912	**514**[a]	427	935 - 1240	**1210**[a]	**1190**[a]	103 - 164	121	108
Major Ions - Cations																			
Calcium (dissolved)	mg/L	-	-	-	130 - 170	**119**[c]	**120**[c]	240 - 336	**219**[c]	**232**[c]	152 - 319	195	**130**[c]	287 - 385	**275**[c]	**261**[c]	91 - 104	93.3	**84.7**[c]
Magnesium (dissolved)	mg/L	-	-	-	64.8 - 87	**56.5**[c]	**58.3**[c]	125 - 161	**113**[c]	**116**[c]	86 - 174	109	**76.1**[c]	218 - 280	222	**211**[c]	48 - 57	52	**45.1**[c]
Potassium (dissolved)	mg/L	-	-	-	2.67 - 3	**2.48**[c]	2.69	3 - 4	3.05	3.4	3 - 5	3.46	**2.64**[c]	4 - 7	4.65	5.01	2 - 3	2.23	2
Sodium (dissolved)	mg/L	20/200	AO	-	41 - 59	**47.1**[a]	**44**[a]	79 - 90	**68**[ac]	**74.5**[ac]	39 - 69	**43.3**[a]	**57.2**[a]	106 - 138	**105**[ac]	**107**[a]	27.8 - 52	**27.3**[ac]	**21.6**[ac]
Major Ions - Nutrients																			
Ammonia-N	mg/L	-	-	-	ND(0.02) - 0.16	ND (0.02)	ND (0.02)	ND(0.02) - 0.32	ND (0.02)	ND (0.02)	0.02 - 0.23	ND (0.02)	**1.02**[c]	ND(0.02) - 0.38	ND (0.02)	ND (0.02)	0.02 - 12	ND (0.02)	ND (0.02)
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.1) - 0.54	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.5)	ND (1)	ND (0.5)	0.1 - ND(0.5)	ND (0.5)	ND (0.25)	0.1 - ND(1)	ND (1)	ND (1)	ND(0.1) - 1.26	0.36	0.32
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.5)	ND (1)	ND (0.5)	ND(0.1) - ND(0.5)	ND (0.5)	ND (0.25)	ND(0.1) - ND(1)	ND (1)	ND (1)	ND(0.1) - 1.5	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																			
Bromide	mg/L	-	-	-	ND(0.25)	ND (0.25)	ND (0.25)	ND(0.25) - ND(0.5)	ND (1)	ND (0.5)	ND(0.25) - ND(0.5)	ND (0.5)	ND (0.25)	ND(0.25) - ND(1)	ND (1)	ND (1)	ND(0.25)	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.01)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.01)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	ND(0.25) - 1	ND (0.25)	0.4	ND(0.5) - 0.95	ND (1)	ND (0.5)	ND(0.5) - 1.48	ND (0.5)	0.52	0.55 - 1.06	ND (1)	ND (1)	ND(0.25) - 1.13	ND (0.25)	0.6
Metals																			
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.02 - 0.05	**0.018**[c]	-	0.01 - 0.04	0.013	-	0.02 - 0.03	**0.031**[c]	-	0.01 - 0.05	0.011	-	0.037 - 0.08	**0.033**[c]	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	0.17 - 0.42	**0.214**[b]	-	0.32 - 0.43	**0.342**[b]	-	0.13 - 0.25	0.139	-	0.2 - 0.32	**0.26**[b]	-	0.1 - 0.15	0.113	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	139	-	-	273	-	-	186	-	-	319	-	-	92.8	-
Chromium	mg/L	0.05	MAC	0.001	**0.004**[b]	**0.005**[bc]	-	**0.007**[b]	**0.004**[bc]	-	**0.005**[b]	ND (0.003)	-	**0.006**[b]	**0.013**[bc]	-	**0.005**[b]	**0.005**[b]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.01) - ND(0.03)	ND (0.01)	-	ND(0.01) - ND(0.03)	ND (0.01)	-	ND(0.01) - ND(0.03)	**0.759**[abc]	-	ND(0.01) - ND(0.03)	ND (0.01)	-	ND(0.01) - ND(0.03)	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	0.001	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.003) - 0.006	ND (0.003)	-	0.003 - 0.015	0.004	-	ND(0.003) - ND(0.005)	0.005	-	0.004 - 0.014	0.004	-	ND(0.003) - ND(0.005)	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.005) - 0.02	ND (0.005)	-	ND(0.005) - 0.04	ND (0.005)	-	ND(0.005) - 0.02	0.008	-	0.008 - 0.02	ND (0.005)	-	ND(0.005) - 0.01	ND (0.005)	-

Notes:

- a — Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
- b — Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
- c — Analytical result outside of the historical concentration range for the parameter.
- ND — Not detected at the associated reporting limit.
- J — Estimated concentration.
- **4.90** — Detected result exceeds associated standard.
- OG — Operational Guideline
- AO — Aesthetic Objective
- MAC — Maximum Acceptable Concentration
- IMAC — Interim Maximum Acceptable Concentration
- \- — Not applicable or not analysed.

Table 5

Groundwater Chemistry - Shallow Wells Installed in the North Berm (Active Aquitard)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW39-99I			TW39-99S			TW46-99I			TW46-99S			TW61-13I				TW61-13S		
Sample ID:						39I	39I		39S	39S		46I	46I		46S	46S		61I	61I	DUP2		61S	61S
Sample Date:			ODWS		06/09/1999 - 11/20/2017	6/5/2018	11/20/2018	06/09/1999 - 11/20/2017	6/5/2018	11/20/2018	11/03/1999 - 11/16/2017	6/4/2018	11/19/2018	11/03/1999 - 11/20/2017	6/4/2018	11/19/2018	11/05/2013 - 11/15/2017	6/5/2018	11/20/2018	11/20/2018	11/07/2013 - 11/15/2017	6/5/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range			Historical Range			Duplicate	Historical Range		
Parameters	Units	a		b																			
Field Parameters																							
Conductivity, field	uS/cm	-	-	-	1020 - 1500	1480	**1570[c]**	997 - 1300	**1310[c]**	1240	973 - 1700	1440	1410	1030 - 2070	1870	1910	980 - 1000	**1260[c]**	**1070[c]**	**1070[c]**	1230 - 1290	**1320[c]**	**1310[c]**
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.43 - 8.37	**6.49[abc]**	7.62	7.17 - 8.15	**6.57[c]**	7.18	7.3 - 7.88	**6.79[c]**	**7.1[c]**	7.28 - 7.65	**6.75[c]**	**7.03[c]**	7.04 - 7.53	**6.58[c]**	**7.71[c]**	**7.71[c]**	7.14 - 7.47	**6.48[abc]**	**7.54[c]**
Temperature, field	Deg C	15	AO	-	7.3 - 16.2	12.2	9.23	6.6 - 15	12.1	9.11	10.5 - 15.6	13.8	12.28	10 - 16.4	14.4	12.18	10.6 - 11.5	**12.78[c]**	**12.34[c]**	**12.34[c]**	11.8 - 12.6	12.15	**11.17[c]**
General Indicators																							
Conductivity, electrical	uS/cm	-	-	-	1100 - 1700	1410	1480	1080 - 1500	1230	1270	1060 - 1560	1380	1460	1310 - 2400	1850	1930	899 - 1100	1050	1070	1060	1150 - 1370	1210	1260
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.5 - 8.33	7.87	8	7.5 - 8.24	7.8	7.96	7.3 - 8.2	7.77	7.92	7.3 - 8.21	7.69	7.9	7.7 - 8.27	**7.63[c]**	7.91	7.99	7.64 - 8.25	7.78	7.96
Total dissolved solids (TDS)	mg/L	500	AO	-	848 - 1340	**930[a]**	**914[a]**	748 - 1420	**824[a]**	**788[a]**	772 - 1130	**994[a]**	**960[a]**	917 - 1980	**1520[a]**	**1450[a]**	620 - 660	**696[ac]**	**658[a]**	**654[a]**	768 - 890	**780[a]**	**766[ac]**
Minor Ions - Anions																							
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	410 - 598	**588[a]**	**565[a]**	357 - 487	467	433	332 - 417	417	406	270 - 375	342	354	329 - 372	355	347	340	368 - 457	**469[c]**	455
Chloride	mg/L	250	AO	-	17 - 28.8	20	17	17.5 - 24	23.9	20.1	28.6 - 41.7	**44.6[c]**	40.1	23 - 100	57	25.6	21.8 - 24	**24.8[c]**	22	22.2	19.9 - 21	**22.6[c]**	**18.8[c]**
Sulfate	mg/L	500	AO	-	287 - 389	332	324	256 - 477	303	280	213 - 447	435	429	356 - 949	**956[ac]**	**820[a]**	189 - 212	**280[c]**	**243[c]**	**246[c]**	263 - 313	295	**262[c]**
Major Ions - Cations																							
Calcium (dissolved)	mg/L	-	-	-	82 - 123	94.6	83.7	100 - 128	100	**89.2[c]**	121 - 173	135	128	78 - 243	188	178	106 - 128	110	**101[c]**	**98.8[c]**	118 - 140	**115[c]**	**108[c]**
Magnesium (dissolved)	mg/L	-	-	-	27 - 124	101	93.4	62 - 90	75.8	66.4	66.4 - 97	78.5	75.3	33 - 110	83.8	80.4	51.3 - 63	53.3	**48.4[c]**	**47.5[c]**	62.5 - 74	**61.1[c]**	**55.8[c]**
Potassium (dissolved)	mg/L	-	-	-	1 - 2.2	1.48	1.03	1 - 3	1.15	1.04	1 - 3	1.96	1.5	5 - 19	6.97	8.07	0.9 - 1	0.92	**0.73[c]**	**0.62[c]**	2.36 - 3	**2.35[c]**	**1.78[c]**
Sodium (dissolved)	mg/L	20/200	AO	-	20 - 94	**65.9[a]**	**59.7[a]**	50 - 88	**57.2[a]**	**49.6[ac]**	37.6 - 57	**45.9[a]**	**41.9[a]**	89 - 320	**103[a]**	**78.5[ac]**	23 - 30	**30.2[ac]**	**27.3[a]**	**26.4[a]**	62.7 - 68	**61[ac]**	**55.5[ac]**
Major Ions - Nutrients																							
Ammonia-N	mg/L	-	-	-	0.02 - 1.35	ND (0.02)	ND (0.02)	0.02 - 0.09	ND (0.02)	ND (0.02)	0.02 - 0.35	ND (0.02)	ND (0.02)	0.02 - 0.36	ND (0.02)	ND (0.02)	ND(0.02) - 0.1	ND (0.02)	ND (0.02)	ND (0.02)	0.02 - 0.05	ND (0.02)	ND (0.02)
Nitrate (as N)	mg/L	10.0	MAC	-	0.074 - ND(1)	ND (0.5)	ND (0.25)	ND(0.1) - ND(1)	ND (0.25)	ND (0.25)	ND(0.01) - 0.26	ND (0.25)	ND (0.25)	ND(0.1) - 0.88	ND (0.5)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND (0.25)	0.11 - 0.89	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.01) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - 0.5	ND (0.5)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																							
Bromide	mg/L	-	-	-	0.18 - ND(3.5)	ND (0.5)	ND (0.25)	0.22 - ND(3.5)	ND (0.25)	ND (0.25)	ND(0.05) - 0.37	ND (0.25)	ND (0.25)	0.12 - 1.3	ND (0.5)	ND (0.5)	ND(0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND(0.25) - 0.62	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	ND(0.25) - 1.5	ND (0.5)	0.58	ND(0.25) - 1.3	ND (0.25)	0.44	ND(0.25) - 1.2	ND (0.25)	ND (0.25)	ND(0.05) - 1.5	ND (0.5)	ND (0.5)	ND(0.25) - 0.48	ND (0.25)	ND (0.25)	ND (0.25)	ND(0.25) - 0.99	ND (0.25)	0.44
Metals																							
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	0.001 - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	0.001 - ND(0.003)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	-	ND(0.001) - ND(0.003)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.038 - 0.07	**0.032[c]**	-	0.027 - 0.05	0.029	-	0.03 - 0.08	0.032	-	0.015 - 0.068	0.015	-	0.057 - 0.07	**0.053[c]**	-	-	0.04 - 0.08	0.04	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	0.04 - 0.197	0.163	-	0.19 - 0.387	**0.27[b]**	-	0.087 - 0.16	0.14	-	0.81 - 31	**2.91[b]**	-	0.08 - 0.44	0.145	-	-	0.317 - 0.4	**0.302[bc]**	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - 0.004	ND (0.001)	-	ND(0.0001) - ND(0.003)	ND (0.001)	-	ND(0.0001) - ND(0.003)	ND (0.001)	-	ND(0.0001) - ND(0.003)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	112	-	-	113	-	-	156	-	-	228	-	-	125	-	-	-	131	-
Chromium	mg/L	0.05	MAC	0.001	**0.004[b]**	**0.008[bc]**	-	**0.004[b]**	**0.007[bc]**	-	**0.007[b]**	**0.008[bc]**	-	**0.005[b]**	**0.008[bc]**	-	**0.009[b]**	**0.006[bc]**	-	-	**0.008[b]**	**0.008[b]**	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.005) - 1.52	0.16	-	ND(0.005) - ND(0.05)	ND (0.01)	-	ND(0.005) - ND(0.05)	ND (0.01)	-	ND(0.005) - ND(0.05)	ND (0.01)	-	0.022 - ND(0.03)	ND (0.01)	-	-	ND(0.01) - ND(0.03)	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.0001) - ND(0.002)	ND (0.001)	-	ND(0.0001) - ND(0.002)	ND (0.001)	-	ND(0.0001) - 0.002	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	-	ND(0.001) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001) - 0.0003	ND (0.0001)	-	ND(0.0001) - 0.0008	ND (0.0001)	-	ND(0.0001) - ND(0.001)	ND (0.0001)	-	ND(0.0001) - ND(0.001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	0.004 - 0.012	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	-	ND(0.003) - 0.006	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.005) - 0.084	0.006	-	0.004 - 0.04	ND (0.005)	-	0.003 - 0.04	ND (0.005)	-	ND(0.003) - 0.04	ND (0.005)	-	ND(0.005) - 0.03	ND (0.005)	-	-	ND(0.005) - 0.01	ND (0.005)	-

Notes:

a	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
b	Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
c	Analytical result outside of the historical concentration range for the parameter.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.

Table 6

Groundwater Chemistry - Shallow Wells along Perimeter of Facility Property, Downgradient of North Berm (Active Aquitard)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					OW32-90S			OW35-90S			TW21-94-II			
Sample ID:						32S	32S		35S	35S		21II	21II	DUP1
Sample Date:			ODWS		06/19/1991 - 11/17/2017	6/4/2018	11/21/2018	06/20/1991 - 11/16/2017	6/4/2018	11/21/2018	08/22/1994 - 11/16/2017	6/5/2018	11/19/2018	11/19/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Duplicate
Parameters	Units	a		b										
Field Parameters														
Conductivity, field	uS/cm	-	-	-	802 - 1240	**1290[c]**	1240	1000 - 1270	**1490[c]**	**1370[c]**	810 - 1030	**1270[c]**	**1200[c]**	**1200[c]**
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.2 - 7.86	**7.04[c]**	7.67	7.41 - 8.03	**6.93[c]**	7.67	7.13 - 8.06	**6.44[abc]**	**7.09[c]**	**7.09[c]**
Temperature, field	Deg C	15	AO	-	8.9 - 16	12.1	10.08	10.9 - 15.8	12.6	**10.27[c]**	11.1 - 15.6	**10.5[c]**	11.22	11.22
General Indicators														
Conductivity, electrical	uS/cm	-	-	-	889 - 1430	1240	1280	804 - 1500	1410	1420	742 - 1400	1180	1220	1220
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.2 - 8.18	7.84	8	7.5 - 8.33	7.76	7.91	7.49 - 8.22	7.77	8.04	7.92
Total dissolved solids (TDS)	mg/L	500	AO	-	578 - 1100	**906[a]**	**878[a]**	631 - 1100	**1090[a]**	**1010[a]**	400 - 900	**832[a]**	**812[a]**	**760[a]**
Minor Ions - Anions														
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	200 - 360	335	355	200 - 321	**338[c]**	**332[c]**	210 - 489	406	**494[c]**	**495[c]**
Chloride	mg/L	250	AO	-	10 - 45.1	13.8	**9.23[c]**	7 - 36.6	11.7	7.83	6 - 16	7.24	**5.34[c]**	**5.24[c]**
Sulfate	mg/L	500	AO	-	235 - 495	457	393	152 - 569	**628[ac]**	**536[a]**	85 - 422	368	257	249
Major Ions - Cations														
Calcium (dissolved)	mg/L	-	-	-	110 - 191	156	151	21.7 - 178	163	146	71.6 - 191	165	148	137
Magnesium (dissolved)	mg/L	-	-	-	38.3 - 71	54.3	54.1	8 - 84	75.6	66	36 - 68	53.8	46.9	43.3
Potassium (dissolved)	mg/L	-	-	-	2 - 6	**1.89[c]**	**1.49[c]**	0.8 - 5.4	2.79	2.31	0.91 - 3.2	0.98	**0.51[c]**	**0.67[c]**
Sodium (dissolved)	mg/L	20/200	AO	-	23 - 69.1	**21[ac]**	**20.2[ac]**	33 - 306	**35.2[a]**	**28.7[ac]**	21 - 46	**20.7[ac]**	**17.2[c]**	**15.7[c]**
Major Ions - Nutrients														
Ammonia-N	mg/L	-	-	-	0.02 - 0.26	ND (0.02)	ND (0.02)	0.02 - 0.44	ND (0.02)	ND (0.02)	ND(0.02) - 0.24	ND (0.02)	ND (0.02)	ND (0.02)
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.03) - 2.63	ND (0.25)	ND (0.25)	ND(0.03) - 1.02	ND (0.25)	ND (0.25)	ND(0.086) - ND(5)	ND (0.25)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous														
Bromide	mg/L	-	-	-	ND(0.05) - ND(3.5)	ND (0.25)	ND (0.25)	ND(0.02) - ND(0.35)	ND (0.25)	ND (0.25)	ND(0.02) - ND(3.5)	ND (0.25)	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	0.002 - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	ND(0.25) - ND(1)	ND (0.25)	ND (0.25)	ND(0.25) - 1	ND (0.25)	ND (0.25)	0.22 - 1	ND (0.25)	ND (0.25)	ND (0.25)
Metals														
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.06)	ND (0.003)	-	ND(0.001) - ND(0.06)	ND (0.003)	-	ND(0.001) - ND(0.06)	ND (0.003)	-	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.02 - 0.06	0.03	-	0.02 - 0.29	0.028	-	0.04 - 0.073	0.047	-	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	0.21 - 3.71	**0.213[b]**	-	0.083 - 2.46	**0.285[b]**	-	ND(0.03) - 0.309	0.09	-	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - ND(0.005)	ND (0.001)	-	0.0001 - ND(0.005)	ND (0.001)	-	ND(0.0001) - ND(0.005)	ND (0.001)	-	-
Calcium	mg/L	-	-	-	-	186	-	-	192	-	-	182	-	-
Chromium	mg/L	0.05	MAC	0.001	**0.004[b]**	**0.006[bc]**	-	**0.006[b]**	**0.009[bc]**	-	**0.003[b]**	**0.006[bc]**	-	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.005) - 0.05	ND (0.01)	-	ND(0.005) - 0.17	ND (0.01)	-	ND(0.005) - 0.062	ND (0.01)	-	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.0005) - ND(0.05)	ND (0.001)	-	ND(0.0005) - ND(0.05)	ND (0.001)	-	ND(0.0005) - ND(0.025)	ND (0.001)	-	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001) - 0.00018	ND (0.0001)	-	ND(0.0001) - 0.00016	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.001) - 0.01	ND (0.003)	-	ND(0.003) - ND(0.01)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.003) - 0.05	ND (0.005)	-	0.005 - 0.09	ND (0.005)	-	ND(0.005) - 0.045	ND (0.005)	-	-

Sample Location:		TW22-94			TW32-94-IV			TW40-99S			TW53-03S		
Sample ID:			22	22		32IV	32IV		40S	40S		53S	53S
Sample Date:		08/13/1994 - 11/15/2017	6/5/2018	11/19/2018	08/05/1994 - 11/16/2017	6/4/2018	11/19/2018	06/08/1999 - 11/16/2017	6/4/2018	11/19/2018	10/28/2003 - 11/16/2017	6/4/2018	11/21/2018
		Historical Range			Historical Range			Historical Range			Historical Range		
Parameters	Units												
Field Parameters													
Conductivity, field	uS/cm	1140 - 1800	1690	**1860[c]**	869 - 1440	1080	876	813 - 9490	1190	1270	912 - 1240	**1340[c]**	**1320[c]**
pH, field	s.u.	7.43 - 8.09	**6.61[c]**	**7.15[c]**	7.41 - 8.2	**6.77[c]**	**7[c]**	7.37 - 8.12	**6.71[c]**	**7.28[c]**	7.26 - 7.57	**6.87[c]**	**7.58[c]**
Temperature, field	Deg C	10.5 - 18.4	11	11.57	8.9 - 15.9	13.5	10.99	9.8 - 17.5	11.3	11.95	10.5 - 16.9	11.7	10.57
General Indicators													
Conductivity, electrical	uS/cm	1029 - 1850	1590	1800	915 - 1600	1040	936	780 - 1230	1110	**1300[c]**	860 - 1550	1280	1340
pH	s.u.	7.48 - 8.2	7.87	7.96	7.63 - 8.39	7.88	8.03	7.6 - 8.27	7.92	8.13	7.7 - 8.21	7.8	8.02
Total dissolved solids (TDS)	mg/L	692 - 1520	**1140[a]**	**1220[a]**	595 - 1200	**626[a]**	**522[ac]**	533 - 955	**750[a]**	**874[a]**	ND(5) - 1110	**944[a]**	**932[a]**
Minor Ions - Anions													
Alkalinity, total (as CaCO3)	mg/L	340 - 472	452	**487[c]**	260 - 428	386	379	334 - 422	415	415	299 - 449	390	405
Chloride	mg/L	30 - 74.3	64.8	58.6	17.2 - 260	24.3	18.2	17 - 26	21.2	19.7	4.96 - 13	5.83	**4.1[c]**
Sulfate	mg/L	282 - 692	**537[a]**	**585[a]**	ND(1) - 564	236	133	126 - 243	**277[c]**	**348[c]**	173 - 516	481	402
Major Ions - Cations													
Calcium (dissolved)	mg/L	102 - 178	140	132	15 - 195	77	68.8	77.7 - 106	94.6	97.7	100 - 258	171	161
Magnesium (dissolved)	mg/L	73.3 - 121	93	91.1	7 - 88.5	51.5	36.3	52.5 - 74	65.9	70	40 - 85	61.4	58.6
Potassium (dissolved)	mg/L	1.69 - 4.4	1.85	1.82	0.54 - 4	1.46	0.68	2 - 3	**1.64[c]**	2.01	0.95 - 3	0.95	0.95
Sodium (dissolved)	mg/L	58.7 - 109	**79.7[a]**	**72.8[a]**	50.3 - 256	**55.9[a]**	**30.1[ac]**	40 - 54.9	**45[a]**	**44.1[a]**	22.2 - 90	**20.3[ac]**	**17.1[c]**
Major Ions - Nutrients													
Ammonia-N	mg/L	0.02 - 0.14	ND (0.02)	ND (0.02)	0.02 - 0.4	ND (0.02)	ND (0.02)	0.02 - 0.16	ND (0.02)	ND (0.02)	0.02 - 0.28	ND (0.02)	ND (0.02)
Nitrate (as N)	mg/L	ND(0.01) - ND(2)	ND (0.5)	ND (0.5)	ND(0.01) - ND(2)	ND (0.25)	ND (0.25)	0.072 - 3.23	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.5)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	ND(0.01) - ND(0.25)	ND (0.5)	ND (0.5)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous													
Bromide	mg/L	ND(0.05) - ND(3.5)	ND (0.5)	ND (0.5)	ND(0.02) - ND(3.5)	ND (0.25)	ND (0.25)	ND(0.05) - ND(3.5)	ND (0.25)	ND (0.25)	ND(0.05) - ND(1.8)	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)
Fluoride	mg/L	ND(0.25) - 1.3	ND (0.5)	ND (0.5)	ND(0.25) - 1.35	ND (0.25)	ND (0.25)	ND(0.25) - 1.4	ND (0.25)	0.66	ND(0.25) - 0.97	ND (0.25)	ND (0.25)
Metals													
Arsenic (dissolved)	mg/L	ND(0.001) - ND(0.06)	ND (0.003)	-	ND(0.001) - ND(0.06)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-
Barium (dissolved)	mg/L	ND(0.002) - 0.058	0.018	-	0.01 - 0.19	0.021	-	0.028 - 0.06	0.029	-	0.03 - 0.068	0.031	-
Boron (dissolved)	mg/L	ND(0.03) - 0.295	0.175	-	0.12 - 1.8	0.171	-	0.15 - 0.24	0.18	-	0.09 - 0.19	0.147	-
Cadmium (dissolved)	mg/L	ND(0.0001) - ND(0.005)	ND (0.001)	-	ND(0.0001) - ND(0.005)	ND (0.001)	-	ND(0.0001) - 0.005	ND (0.001)	-	ND(0.0001) - ND(0.001)	ND (0.001)	-
Calcium	mg/L	-	158	-	-	95.7	-	-	106	-	-	201	-
Chromium	mg/L	ND(0.003)	**0.007[bc]**	-	**0.004[b]**	**0.004[b]**	-	ND(0.003)	**0.004[bc]**	-	**0.004[b]**	**0.006[bc]**	-
Iron (dissolved)	mg/L	ND(0.005) - 0.46	ND (0.01)	-	ND(0.005) - 0.682	ND (0.01)	-	ND(0.005) - ND(0.05)	ND (0.01)	-	ND(0.01) - ND(0.05)	ND (0.01)	-
Lead (dissolved)	mg/L	ND(0.0005) - ND(0.025)	ND (0.001)	-	ND(0.0005) - ND(0.025)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	ND(0.0001)	ND (0.0001)	-	ND(0.0001) - 0.0005	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - 0.02	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-
Zinc (dissolved)	mg/L	ND(0.003) - 0.097	ND (0.005)	-	ND(0.005) - 0.04	0.008	-	ND(0.003) - 0.067	ND (0.005)	-	ND(0.005) - 0.02	ND (0.005)	-

Notes:

- [a] Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
- [b] Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
- [c] Analytical result outside of the historical concentration range for the parameter.
- ND Not detected at the associated reporting limit.
- J Estimated concentration.
- **4.90** Detected result exceeds associated standard.
- OG Operational Guideline
- AO Aesthetic Objective
- MAC Maximum Acceptable Concentration
- IMAC Interim Maximum Acceptable Concentration
- \- Not applicable or not analysed.

Table 7

Groundwater Chemistry - Shallow Wells along Perimeter of Facility Property, Removed from North Berm (Active Aquitard
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Parameters	Units	ODWS a	ODWS SOURCE	PWQO b	TW30-94			TW41-99S			TW42-99S			TW43-99S			TW45-99S			TW48-16S			TW62-13S		
						30	30		41S	41S		42S	42S		43S	43S		45S	45S		48S	48S		62S	62S
Sample Date:					06/07/1999 - 11/17/2017 Historical Range	6/4/2018	11/21/2018	06/07/1999 - 11/17/2017 Historical Range	6/4/2018	11/21/2018	06/07/1999 - 06/05/2017 Historical Range	6/6/2018	11/19/2018	06/07/1999 - 11/16/2017 Historical Range	6/6/2018	11/19/2018	06/09/1999 - 11/20/2017 Historical Range	6/6/2018	11/20/2018	05/06/2016 - 11/20/2017 Historical Range	6/6/2018	11/20/2018	11/12/2013 - 11/20/2017 Historical Range	6/6/2018	11/20/2018
Field Parameters																									
Conductivity, field	uS/cm	-	-	-	658 - 883	**900**[c]	**931**[c]	1080 - 1590	1560	1560	1610 - 2730	**3450**[c]	2020	571 - 1263	755	830	687 - 1140	1010	910	861 - 1010	**1070**[c]	920	830 - 1000	1000	1000
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.26 - 7.81	**7.01**[c]	7.34	7.06 - 7.81	**6.6**[c]	7.61	7.02 - 7.34	**6.51**[c]	7.21	6.93 - 7.98	**6.8**[c]	7.2	7.03 - 7.92	**6.49**[abc]	**6.58**[c]	7.76 - 7.9	**6.68**[c]	**7.68**[c]	7.63 - 7.92	**7.02**[c]	**7.6**[c]
Temperature, field	Deg C	15	AO	-	11.7 - 14.1	**10.4**[c]	**10.5**[c]	9.9 - 16.8	11.3	9.95	10.3 - 16.3	10.8	**10.19**[c]	11.3 - 19.7	**10.5**[c]	**9.53**[c]	10.4 - 18.1	10.9	11.67	9.8 - 10.7	9.8	10.07	11.4 - 11.9	**11.1**[c]	**12.1**[c]
General Indicators																									
Conductivity, electrical	uS/cm	-	-	-	645 - 1010	867	880	1220 - 1720	1500	1640	724 - 3400	2880	2950	599 - 1350	655	718	618 - 1400	976	924	1040 - 1170	**1030**[c]	1040	959 - 1100	966	1020
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.14 - 8.4	7.89	8.14	7.4 - 8.14	7.68	7.99	7.4 - 8.25	7.73	7.78	7.4 - 8.29	7.74	7.97	7.58 - 8.26	7.8	7.83	7.67 - 8.13	7.88	8.04	7.92 - 8.26	**7.55**[c]	7.94
Total dissolved solids (TDS)	mg/L	500	AO	-	420 - 630	500	**502**[a]	793 - 1250	**1110**[a]	**1090**[a]	471 - 2880	**2970**[ac]	**2500**[a]	350 - 995	356	390	430 - 830	**588**[a]	**508**[a]	592 - 696	**626**[a]	**596**[a]	590 - 690	**640**[a]	**606**[a]
Minor Ions - Anions																									
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	349 - 468	396	386	386 - 608	486	**506**[a]	183 - 429	353	354	259 - 363	306	308	260 - 542	374	403	397 - 408	**420**[c]	399	315 - 355	335	328
Chloride	mg/L	250	AO	-	4 - 6.16	5.78	4.42	7 - 60	38	32.9	3 - 57	36.6	37.1	7.28 - 16	13.2	12	10.9 - 240	58.9	30.2	19 - 21.3	**23.7**[c]	**21.5**[c]	25 - 34.8	**37**[c]	32.5
Sulfate	mg/L	500	AO	-	90 - 160	141	117	238 - 603	499	434	162 - 1800	**1980**[ac]	**1660**[a]	64 - 455	65.1	66.8	2.5 - 190	134	66.6	181 - 194	**206**[c]	**167**[c]	177 - 226	203	184
Major Ions - Cations																									
Calcium (dissolved)	mg/L	-	-	-	77.9 - 106	82.1	**74**[c]	151 - 236	185	179	68 - 509	430	331	0.001 - 172	79.1	83.2	13 - 144	115	94.3	96.9 - 119	**95.7**[c]	**89.4**[c]	93.2 - 118	94.5	**79.6**[c]
Magnesium (dissolved)	mg/L	-	-	-	48 - 62.1	53.3	49.4	46 - 100	73.7	65.5	24 - 229	206	154	22 - 77.6	23.5	23.4	4.5 - 51	39.5	31.6	54.3 - 64	**52.9**[c]	**50**[c]	39.8 - 48	39.9	**34.4**[c]
Potassium (dissolved)	mg/L	-	-	-	1 - 4	2.2	1.57	1 - 4	1.98	1.39	1 - 8	4.44	3.25	1 - 3.4	1.59	1.58	1 - 3	2.13	1.5	2.22 - 3	**1.99**[c]	**1.8**[c]	2 - 4	2.1	**1.95**[c]
Sodium (dissolved)	mg/L	20/200	AO	-	27 - 49	**33.4**[a]	**35.7**[a]	43 - 65	**44.2**[a]	**41**[ac]	37 - 105	**58.9**[a]	**54.8**[a]	27.8 - 56	**22.2**[ac]	**26.6**[ac]	32.4 - 260	**37.9**[a]	**28**[ac]	38.3 - 50	**35.5**[ac]	**32.9**[ac]	52 - 66	**56.8**[a]	**48.3**[ac]
Major Ions - Nutrients																									
Ammonia-N	mg/L	-	-	-	0.02 - 0.49	ND (0.02)	ND (0.02)	ND(0.02) - 0.18	ND (0.02)	ND (0.02)	ND(0.02) - 0.47	ND (0.02)	ND (0.02)	0.02 - 0.37	ND (0.02)	ND (0.02)	0.02 - 0.26	ND (0.02)	ND (0.02)	ND(0.02) - ND(0.05)	ND (0.02)	ND (0.02)	ND(0.02) - 0.32	ND (0.02)	**0.4**[c]
Nitrate (as N)	mg/L	10.0	MAC	-	0.093 - 1.28	ND (0.25)	ND (0.25)	0.069 - 0.26	ND (0.25)	ND (0.25)	0.045 - ND(1)	ND (1)	ND (1)	0.1 - ND(0.25)	ND (0.25)	ND (0.1)	0.066 - 0.33	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - 0.26	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(1)	ND (1)	ND (1)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.1)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																									
Bromide	mg/L	-	-	-	ND(0.05) - ND(0.5)	ND (0.25)	ND (0.25)	ND(0.05) - 1.24	ND (0.25)	ND (0.25)	ND(0.05) - 1.39	ND (1)	ND (1)	ND(0.05) - 36.5	ND (0.25)	ND (0.1)	ND(0.05) - 0.6	ND (0.25)	ND (0.25)	ND(0.25)	ND (0.25)	ND (0.25)	ND(0.25)	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.05)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	0.003	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	ND(0.25) - 1.74	ND (0.25)	0.62	ND(0.25) - 1.3	ND (0.25)	ND (0.25)	0.41 - 1.16	ND (1)	ND (1)	ND(0.1) - 1.1	ND (0.25)	0.16	ND(0.25) - 1.3	ND (0.25)	ND (0.25)	ND(0.25) - 1.2	ND (0.25)	0.51	ND(0.25) - 0.93	ND (0.25)	0.43
Metals																									
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.029 - 0.058	0.033	-	0.018 - 0.05	0.025	-	0.019 - ND(0.1)	**0.014**[c]	-	0.02 - 0.063	0.034	-	0.05 - 0.14	0.059	-	0.03 - 0.032	**0.038**[c]	-	0.04 - 0.09	**0.038**[c]	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	ND(0.03) - 0.18	0.145	-	0.06 - 0.342	0.145	-	0.12 - 0.3	**0.229**[b]	-	0.05 - 0.358	0.054	-	0.05 - 0.206	0.084	-	0.2 - 0.3	**0.213**[b]	-	0.12 - 0.18	0.163	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - 0.005	ND (0.001)	-	ND(0.0001) - ND(0.003)	ND (0.001)	-	ND(0.0001) - ND(0.003)	ND (0.001)	-	ND(0.0001) - 0.004	ND (0.001)	-	ND(0.0001) - 0.003	ND (0.001)	-	ND(0.0001)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	78	-	-	218	-	-	472	-	-	79.5	-	-	115	-	-	114	-	-	95.3	-
Chromium	mg/L	0.05	MAC	0.001	**0.004**[b]	**0.006**[bc]	-	**0.006**[b]	**0.005**[bc]	-	**0.004**[b]	ND (0.003)	-	**0.003**[b]	**0.003**[b]	-	**0.008**[b]	**0.007**[bc]	-	**0.004**[b]	**0.005**[bc]	-	ND(0.003)	**0.007**[bc]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.005) - 0.304	0.165	-	ND(0.005) - ND(0.05)	**0.058**[c]	-	ND(0.005) - ND(0.3)	ND (0.01)	-	ND(0.005) - 0.07	ND (0.01)	-	ND(0.005) - 2.52	ND (0.01)	-	ND(0.01) - ND(0.03)	ND (0.01)	-	ND(0.01) - ND(0.03)	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.0005) - ND(0.01)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.05)	ND (0.001)	-	ND(0.001) - ND(0.05)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001) - 0.00044	ND (0.0001)	-	ND(0.0001) - 0.0013	ND (0.0001)	-	ND(0.0001) - 0.0012	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	0.005 - ND(0.05)	**0.004**[c]	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.003) - 0.039	ND (0.005)	-	ND(0.003) - 0.061	ND (0.005)	-	0.008 - ND(0.1)	ND (0.005)	-	ND(0.005) - 0.039	ND (0.005)	-	ND(0.003) - 0.037	ND (0.005)	-	ND(0.005) - ND(0.01)	ND (0.005)	-	ND(0.005) - 0.02	ND (0.005)	-

Notes:

- a — Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
- b — Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
- c — Analytical result outside of the historical concentration range for the parameter.
- ND — Not detected at the associated reporting limit.
- J — Estimated concentration.
- **4.90** — Detected result exceeds associated standard.
- OG — Operational Guideline
- AO — Aesthetic Objective
- MAC — Maximum Acceptable Concentration
- IMAC — Interim Maximum Acceptable Concentration
- \- — Not applicable or not analysed.

Table 8

Groundwater Chemistry - Shallow Wells Internal to Facility Property South Berm (Active Aquitard)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW50-02A			TW50-02B			TW51-02A			TW51-02B				TW52-02A			TW52-02B		
Sample ID:						50A	50A		50B	50B		51A	51A		51B	511B	51B		52A	52A		52B	52B
Sample Date:			ODWS		10/28/2002 - 11/17/2017	6/4/2018	11/20/2018	10/28/2002 - 11/17/2017	6/4/2018	11/20/2018	10/28/2002 - 11/17/2017	6/4/2018	11/20/2018	10/28/2002 - 11/17/2017	6/4/2018	6/4/2018	11/20/2018	10/28/2002 - 11/17/2017	6/4/2018	11/20/2018	10/28/2002 - 11/17/2017	6/4/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range		Duplicate		Historical Range			Historical Range		
Parameters	Units	a		b																			
Field Parameters																							
Conductivity, field	uS/cm	-	-	-	1260 - 1549	1520	1540	864 - 2340	1030	1020	690 - 1220	**1250**[c]	**1260**[c]	1080 - 1602	1570	1570	1530	1300 - 1860	1710	1680	995 - 1260	**1290**[c]	1180
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.22 - 7.68	**6.35**[abc]	**7.77**[c]	7.34 - 7.71	**6.37**[abc]	**7.72**[c]	7.29 - 7.89	**6.47**[abc]	7.85	7.45 - 7.81	**6.32**[abc]	**6.32**[abc]	7.8	7.35 - 7.56	**6.38**[abc]	**7.77**[c]	7.4 - 7.9	**6.44**[abc]	7.71
Temperature, field	Deg C	15	AO	-	11.1 - 13.2	**10.9**[c]	11.66	10.4 - 12.7	10.7	10.72	11.2 - 12.9	11.3	11.76	9.7 - 11.5	**11.7**[c]	**11.7**[c]	11.01	10.8 - 13.7	11	11.58	10.3 - 14.4	12.2	**10.08**[c]
General Indicators																							
Conductivity, electrical	uS/cm	-	-	-	1290 - 1730	1440	1610	958 - 1220	974	1000	1040 - 1440	1240	1280	1280 - 1680	1460	1480	1570	1470 - 1920	1590	1760	971 - 1390	1200	1260
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.78 - 8.09	**7.69**[c]	7.88	7.85 - 8	**7.73**[c]	7.92	7.83 - 7.99	**7.68**[c]	7.94	7.73 - 8.02	7.75	7.87	8	7.73 - 8.22	7.81	8.02	7.71 - 8.27	7.83	8.14
Total dissolved solids (TDS)	mg/L	500	AO	-	1040 - 1120	**1090**[a]	**1140**[ac]	598 - 793	**612**[a]	**604**[a]	715 - 876	**924**[ac]	**866**[a]	1010 - 1050	**1070**[ac]	**1090**[ac]	**1060**[ac]	1030 - 1340	**1220**[a]	**1200**[a]	631 - 920	**818**[a]	**762**[a]
Minor Ions - Anions																							
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	404 - 426	426	412	405 - 557	462	472	312 - 343	329	313	427 - 440	**463**[c]	**462**[c]	436	430 - 579	**505**[a]	**552**[a]	407 - 440	**453**[c]	435
Chloride	mg/L	250	AO	-	16 - 37	21.1	**15.9**[c]	2 - 27.8	5.15	5.11	12.2 - 18.4	14.6	**10.9**[c]	17 - 20	**23**[c]	**22.8**[c]	18.1	21 - 97	28	21.5	5 - 13	12.6	9.46
Sulfate	mg/L	500	AO	-	437 - 543	**555**[ac]	**561**[ac]	93 - 259	166	106	298 - 442	**496**[c]	420	401 - 474	**534**[ac]	**523**[ac]	464	426 - 665	**593**[a]	499	150 - 308	**343**[c]	295
Major Ions - Cations																							
Calcium (dissolved)	mg/L	-	-	-	166 - 184	**154**[c]	**149**[c]	124 - 163	146	130	129 - 140	**124**[c]	**120**[c]	133 - 151	**129**[c]	**126**[c]	**115**[c]	150 - 204	169	165	102 - 171	106	**91.9**[c]
Magnesium (dissolved)	mg/L	-	-	-	86.5 - 110	**85.7**[c]	**78.4**[c]	37.5 - 74	44.3	37.5	69 - 73.9	70.2	**65**[c]	83.9 - 89	**83.5**[c]	**81.7**[c]	**72.2**[c]	93 - 123	105	100	42 - 75	67.4	58.1
Potassium (dissolved)	mg/L	-	-	-	2 - 3.23	2.88	2.39	1.84 - 3	2.44	2.37	2 - 2.47	2.12	2.01	3 - 4	3.26	3.2	**2.89**[c]	1.73 - 3	**1.55**[c]	**1.44**[c]	2 - 3	2.91	2.34
Sodium (dissolved)	mg/L	20/200	AO	-	51.4 - 66	**49.6**[ac]	**43.4**[ac]	9.57 - 126	15.4	11.3	28 - 38.1	**33.5**[a]	**32.2**[a]	71 - 93	**81.4**[a]	**79.9**[a]	**72.3**[a]	56 - 91	**50.2**[ac]	**45.5**[ac]	11 - 74	**64.3**[a]	**57.2**[a]
Major Ions - Nutrients																							
Ammonia-N	mg/L	-	-	-	ND(0.02) - 0.11	ND (0.02)	**0.48**[c]	ND(0.02) - 0.23	ND (0.02)	ND (0.02)	ND(0.02) - 0.18	ND (0.02)	ND (0.02)	ND(0.02) - 0.13	ND (0.02)	ND (0.02)	ND (0.02)	ND(0.02) - 0.11	ND (0.02)	ND (0.02)	ND(0.02) - 0.17	ND (0.02)	ND (0.02)
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																							
Bromide	mg/L	-	-	-	ND(0.25)	ND (0.25)	ND (0.5)	ND(0.25)	ND (0.25)	ND (0.25)	ND(0.25)	ND (0.25)	ND (0.25)	ND(0.25)	ND (0.5)	ND (0.5)	ND (0.25)	ND(0.25)	ND (0.25)	ND (0.25)	ND(0.25)	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	ND(0.25) - 1.11	ND (0.25)	ND (0.5)	ND(0.25) - 1.23	ND (0.25)	ND (0.25)	ND(0.25) - 0.9	ND (0.25)	0.44	ND(0.25) - 1.07	ND (0.5)	ND (0.5)	0.62	ND(0.25) - 1.19	ND (0.25)	ND (0.25)	0.17 - 1.36	ND (0.25)	0.69
Metals																							
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.013 - 0.02	**0.012**[c]	-	0.02 - 0.027	0.022	-	0.05 - 0.06	**0.045**[c]	-	0.02 - 0.024	0.023	0.021	-	0.01 - 0.02	0.018	-	0.016 - 0.07	0.017	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	0.22 - 0.312	**0.315**[bc]	-	0.1 - 0.3	0.113	-	0.16 - 0.161	**0.147**[c]	-	0.388 - 0.39	**0.384**[bc]	**0.394**[bc]	-	0.16 - 0.32	**0.223**[b]	-	0.09 - 0.28	**0.227**[b]	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001)	ND (0.001)	-	ND(0.0001)	ND (0.001)	-	ND(0.0001)	ND (0.001)	-	ND(0.0001)	ND (0.001)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	175	-	-	148	-	-	149	-	-	150	149	-	-	194	-	-	117	-
Chromium	mg/L	0.05	MAC	0.001	ND(0.003)	**0.007**[bc]	-	ND(0.003)	**0.005**[bc]	-	ND(0.003)	**0.004**[bc]	-	ND(0.003)	**0.007**[bc]	**0.009**[bc]	-	ND(0.003)	**0.005**[bc]	-	ND(0.003)	**0.004**[bc]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.01) - ND(0.03)	ND (0.01)	-	ND(0.03) - 0.823	0.092	-	ND(0.01) - ND(0.03)	ND (0.01)	-	ND(0.01) - ND(0.03)	ND (0.01)	ND (0.01)	-	ND(0.01) - ND(0.03)	ND (0.01)	-	ND(0.01) - 1.43	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.005) - ND(0.01)	ND (0.005)	-	ND(0.005) - ND(0.01)	ND (0.005)	-	0.005 - ND(0.01)	ND (0.005)	-	0.006 - ND(0.01)	ND (0.005)	ND (0.005)	-	ND(0.005) - 0.01	ND (0.005)	-	0.006 - 0.02	0.006	-

Notes:

a	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
b	Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
c	Analytical result outside of the historical concentration range for the parameter.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.

Table 9

Groundwater Chemistry - Shallow Wells Internal to Facility Property
Influenced by Waste Handling/Disposal (Active Aquitard)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW63-13S		
Sample ID:						63S	63S
Sample Date:			ODWS		11/12/2013 - 11/20/2017	6/6/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range		
Parameters	Units	a		b			
Field Parameters							
Conductivity, field	uS/cm	-	-	-	2360 - 2440	**2600**[c]	**2230**[c]
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.42 - 7.52	**6.73**[c]	**6.52**[c]
Temperature, field	Deg C	15	AO	-	11.6 - 12.3	**11.5**[c]	**9.38**[c]
General Indicators							
Conductivity, electrical	uS/cm	-	-	-	2290 - 2840	2320	2360
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.58 - 8.1	7.66	7.91
Total dissolved solids (TDS)	mg/L	500	AO	-	1330 - 2250	**1480**[a]	**1380**[a]
Minor Ions - Anions							
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	389 - 439	**442**[c]	417
Chloride	mg/L	250	AO	-	549 - 668	**593**[a]	**553**[a]
Sulfate	mg/L	500	AO	-	64 - 80	67.7	72
Major Ions - Cations							
Calcium (dissolved)	mg/L	-	-	-	177 - 236	**166**[c]	**146**[c]
Magnesium (dissolved)	mg/L	-	-	-	82.1 - 106	**74.5**[c]	**67.2**[c]
Potassium (dissolved)	mg/L	-	-	-	3 - 5	3	**2.9**[c]
Sodium (dissolved)	mg/L	20/200	AO	-	166 - 196	**152**[ac]	**138**[ac]
Major Ions - Nutrients							
Ammonia-N	mg/L	-	-	-	ND(0.02) - 0.11	ND (0.02)	ND (0.02)
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.1) - ND(0.5)	ND (1)	ND (0.5)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.1) - ND(0.5)	ND (1)	ND (0.5)
Major Ions - Miscellaneous							
Bromide	mg/L	-	-	-	0.94 - 2.54	ND (1)	2.2
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	0.37 - 0.76	ND (1)	ND (0.5)
Metals							
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.01)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.129 - 0.19	**0.125**[c]	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	0.2 - 0.38	**0.247**[b]	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	0.0001 - ND(0.0004)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	195	-
Chromium	mg/L	0.05	MAC	0.001	**0.004**[b]	**0.012**[bc]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.01) - ND(0.03)	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.001) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	0.077 - 0.092	**0.082**[b]	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	0.005 - 0.02	ND (0.005)	-

Notes:

- a — Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
- b — Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
- c — Analytical result outside of the historical concentration range for the parameter.
- ND — Not detected at the associated reporting limit.
- J — Estimated concentration.
- **4.90** — Detected result exceeds associated standard.
- OG — Operational Guideline
- AO — Aesthetic Objective
- MAC — Maximum Acceptable Concentration
- IMAC — Interim Maximum Acceptable Concentration
- \- — Not applicable or not analysed.

Table 10

Groundwater Chemistry - Deep Wells Located Off the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW55-09D			TW56-11D			TW57-11D			TW59-13D		
Sample ID:						55D	55D		56D	56D		57D	57D		59D	59D
Sample Date:			ODWS		05/26/2010 - 11/16/2017	6/6/2018	11/19/2018	06/13/2012 - 11/16/2017	6/7/2018	11/19/2018	06/12/2012 - 11/15/2017	6/7/2018	11/19/2018	05/16/2013 - 11/16/2017	6/6/2018	11/19/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range		
Parameters	Units	a		b												
Field Parameters																
Conductivity, field	uS/cm	-	-	-	1850 - 2210	1850	1990	1590 - 1940	1610	1670	1680 - 2040	**2170**[c]	**2980**[c]	1040 - 1270	**931**[c]	**1010**[c]
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.6 - 7.66	**6.93**[c]	**7.51**[c]	7.7 - 8.04	**7.63**[c]	**7.59**[c]	7.37 - 7.68	**7.2**[c]	7.37	7.73 - 7.98	**7.25**[c]	**7.64**[c]
Temperature, field	Deg C	15	AO	-	10.4 - 10.6	**11.8**[c]	**9.99**[c]	10.6 - 11.7	**13.3**[c]	**9.99**[c]	10.3 - 10.7	**12**[c]	**7.8**[c]	10.3 - 11.2	11.2	**9.65**[c]
General Indicators																
Conductivity, electrical	uS/cm	-	-	-	1620 - 1940	1800	1790	1410 - 1770	1500	1500	1360 - 2310	1830	1900	791 - 983	905	876
pH	s.u.	6.5-8.5	OG	6.5-8.5	8.12 - 8.53	**7.84**[c]	8.26	8.12 - 8.42	**7.87**[c]	8.13	7.84 - 8.44	8.15	8.02	8.13 - 8.37	**7.97**[c]	**8.01**[c]
Total dissolved solids (TDS)	mg/L	500	AO	-	880 - 1220	**896**[a]	**890**[a]	580 - 1150	**738**[a]	**754**[a]	690 - 1500	**898**[a]	**966**[a]	410 - 610	452	436
Minor Ions - Anions																
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	272 - 302	**310**[c]	292	329 - 353	**357**[c]	345	289 - 432	372	371	242 - 293	276	270
Chloride	mg/L	250	AO	-	344 - 411	**451**[ac]	**412**[ac]	282 - 334	**315**[a]	**301**[a]	299 - 448	**418**[a]	**398**[a]	110 - 132	**136**[c]	122
Sulfate	mg/L	500	AO	-	0.72 - 27	ND (1)	ND (1)	ND(0.5) - 7	ND (1)	ND (0.5)	ND(0.5) - 4	ND (1)	ND (1)	ND(0.5) - 15	ND (0.5)	ND (0.5)
Major Ions - Cations																
Calcium (dissolved)	mg/L	-	-	-	14 - 22	18.3	18.4	21 - 31	**17.8**[c]	**20.6**[c]	15 - 24	17.7	18.4	14.1 - 18	14.8	14.5
Magnesium (dissolved)	mg/L	-	-	-	6 - 8	6.36	6.14	8 - 11	**6.95**[c]	**7.47**[c]	6 - 9	6.96	7.13	4.68 - 6	4.96	4.83
Potassium (dissolved)	mg/L	-	-	-	2 - 4	3.05	2.81	1 - 3	2.12	1.89	1 - 3	1.99	1.71	1 - 3	1.92	1.74
Sodium (dissolved)	mg/L	20/200	AO	-	316 - 385	**301**[ac]	**294**[ac]	283 - 366	**264**[ac]	**247**[ac]	291 - 474	**360**[a]	**349**[a]	165 - 192	**167**[a]	**157**[ac]
Major Ions - Nutrients																
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																
Bromide	mg/L	-	-	-	ND(0.25) - 2.96	ND (0.5)	ND (0.5)	ND(0.25) - 1.73	ND (0.5)	ND (0.25)	ND(0.25) - 4.11	ND (0.5)	ND (0.5)	ND(0.25) - 0.77	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.01)	ND (0.002)	ND (0.002)	ND(0.002) - 0.006	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	0.74 - 1.88	ND (0.5)	ND (0.5)	ND(0.25) - 1.48	ND (0.5)	0.69	0.56 - 1.69	ND (0.5)	ND (0.5)	0.67 - 1.65	ND (0.25)	1.01
Metals																
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.01)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.14 - 0.29	0.224	-	0.12 - 0.25	**0.117**[c]	-	0.083 - 0.14	0.109	-	0.094 - 0.18	0.103	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	1.3 - 1.9	**1.68**[b]	-	1.94 - 2.5	**1.85**[bc]	-	1.6 - 2.4	**1.83**[b]	-	1.2 - 1.4	**1.12**[bc]	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	21.3	-	-	21.6	-	-	18.1	-	-	15.3	-
Chromium	mg/L	0.05	MAC	0.001	**0.005**[b]	**0.004**[bc]	-	ND(0.003)	**0.01**[bc]	-	**0.005**[b]	**0.008**[bc]	-	ND(0.003)	**0.003**[b]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.01) - 0.47	0.19	-	ND(0.03) - 0.768	**1.08**[abc]	-	0.23 - 7.5	**2.08**[ab]	-	ND(0.03) - 0.369	**0.36**[ab]	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.003) - 0.006	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - 0.013	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.005) - 0.04	ND (0.005)	-	ND(0.005) - 0.04	ND (0.005)	-	ND(0.005) - 0.02	ND (0.005)	-	ND(0.005) - 0.03	ND (0.005)	-
Volatile Organic Compounds																
1,1,1,2-Tetrachloroethane	ug/L	-	-	20	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-
1,1,1-Trichloroethane	ug/L	-	-	10	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	-	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (1.2)	-
1,1,2,2-Tetrachloroethane	ug/L	-	-	70	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-
1,1,2-Trichloroethane	ug/L	-	-	800	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	-	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.8)	-
1,1-Dichloroethane	ug/L	-	-	200	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	-	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (1.2)	-
1,1-Dichloroethene	ug/L	14	MAC	40	ND(0.3) - ND(0.5)	ND (0.3)	-	ND(0.3) - ND(0.5)	-	-	ND(0.3) - ND(0.5)	ND (0.3)	-	ND(0.3) - ND(0.5)	ND (1.2)	-
1,2,4-Trichlorobenzene	ug/L	-	-	0.5	ND(0.3)	ND (0.3)	-	ND(0.3)	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (1.2)	-
1,2-Dibromoethane (Ethylene dibromid	ug/L	-	-	5	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.2)	-	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.4)	-
1,2-Dichlorobenzene	ug/L	200	MAC	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.4)	-
1,2-Dichloroethane	ug/L	5	IMAC	100	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2)	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.8)	-
1,2-Dichloropropane	ug/L	-	-	0.7	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-
1,3-Dichlorobenzene	ug/L	-	-	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.4)	-

Table 10

Groundwater Chemistry - Deep Wells Located Off the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW55-09D			TW56-11D			TW57-11D			TW59-13D		
Sample ID:						55D	55D		56D	56D		57D	57D		59D	59D
Sample Date:			ODWS		05/26/2010 - 11/16/2017	6/6/2018	11/19/2018	06/13/2012 - 11/16/2017	6/7/2018	11/19/2018	06/12/2012 - 11/15/2017	6/7/2018	11/19/2018	05/16/2013 - 11/16/2017	6/6/2018	11/19/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range		
Parameters	Units	a		b												
1,3-Dichloropropene	ug/L	-	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (1.2)	-
1,4-Dichlorobenzene	ug/L	5	MAC	4	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.4)	-
2-Butanone (Methyl ethyl ketone) (MEK	ug/L	-	-	400	ND(1)	ND (1)	-	ND(1)	-	-	ND(1)	ND (1)	-	ND(1)	ND (4)	-
2-Hexanone	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	-	-	ND(1)	ND (1)	-	ND(1)	ND (4)	-
4-Methyl-2-pentanone (Methyl isobutyl	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	-	-	ND(1)	ND (1)	-	ND(1)	ND (4)	-
Acetone	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	-	-	ND(1)	ND (1)	-	ND(1)	ND (4)	-
Benzene	ug/L	1	MAC	100	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - 0.6	-	-	2.1 - 8.1	**5**[a]	-	ND(0.5) - 3.6	ND (0.8)	-
Bromodichloromethane	ug/L	-	-	200	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	-	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.8)	-
Bromoform	ug/L	-	-	60	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.4)	-
Bromomethane (Methyl bromide)	ug/L	-	-	0.9	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-
Carbon tetrachloride	ug/L	2	MAC	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2)	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.8)	-
Chlorobenzene	ug/L	80	MAC	15	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	-	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.4)	-
Chloroethane	ug/L	-	-	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2)	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.8)	-
Chloroform (Trichloromethane)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-
Chloromethane (Methyl chloride)	ug/L	-	-	700	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(0.4)	-	-	ND(0.2) - ND(0.4)	ND (0.4)	-	ND(0.2) - ND(0.4)	ND (1.6)	-
cis-1,2-Dichloroethene	ug/L	-	-	200	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	-	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.8)	-
cis-1,3-Dichloropropene	ug/L	-	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.8)	-
Dibromochloromethane	ug/L	-	-	40	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	-	-	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.4)	-
Dichlorodifluoromethane (CFC-12)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-
Ethylbenzene	ug/L	140	MAC	8	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-
Hexane	ug/L	-	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.8)	-
m&p-Xylenes	ug/L	-	-	2	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(0.5)	-	-	ND(0.2) - ND(0.5)	0.31	-	ND(0.2) - ND(0.5)	ND (0.8)	-
Methyl tert butyl ether (MTBE)	ug/L	15	AO	200	ND(0.2)	ND (0.2)	-	ND(0.2)	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.8)	-
Methylene chloride	ug/L	50	MAC	100	ND(0.3) - ND(4)	ND (0.3)	-	ND(0.3) - ND(4)	-	-	ND(0.3) - ND(4)	ND (0.3)	-	ND(0.3) - ND(4)	ND (1.2)	-
o-Xylene	ug/L	-	-	40	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	-	-	ND(0.1) - ND(0.5)	0.15	-	ND(0.1) - ND(0.5)	ND (0.4)	-
Styrene	ug/L	-	-	4	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-
Tetrachloroethene	ug/L	10	MAC	50	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	-	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.8)	-
Toluene	ug/L	60	MAC	0.8	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	-	-	ND(0.2) - ND(0.5)	**1**[bc]	-	0.41 - ND(0.5)	ND (0.8)	-
trans-1,2-Dichloroethene	ug/L	-	-	200	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	-	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.8)	-
trans-1,3-Dichloropropene	ug/L	-	-	7	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	-	-	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (1.2)	-
Trichloroethene	ug/L	5	MAC	20	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	-	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.8)	-
Trichlorofluoromethane (CFC-11)	ug/L	-	-	-	ND(0.4) - ND(0.5)	ND (0.4)	-	ND(0.4) - ND(0.5)	-	-	ND(0.4) - ND(0.5)	ND (0.4)	-	ND(0.4) - ND(0.5)	ND (1.6)	-
Vinyl chloride	ug/L	1	MAC	600	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.17) - ND(0.2)	-	-	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.68)	-
Xylenes (total)	ug/L	90	MAC	-	ND(0.2) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1)	-	-	ND(0.2) - ND(1)	0.46	-	ND(0.2) - ND(1)	ND (0.8)	-

Notes:

a	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
b	Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
c	Analytical result outside of the historical concentration range for the parameter.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.

Table 11

Groundwater Chemistry - Deep Wells Internal to the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW39-99D			TW46-99D			TW54-09D			TW61-13D		
Sample ID:						39D	39D		46D	46D		54D	54D		61D	61D
Sample Date:			ODWS		06/09/1999 - 11/20/2017	6/5/2018	11/20/2018	11/03/1999 - 11/15/2017	6/4/2018	11/19/2018	11/03/2009 - 11/20/2017	6/5/2018	11/20/2018	11/07/2013 - 11/20/2017	6/5/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range		
Parameters	Units	a		b												
Field Parameters																
Conductivity, field	uS/cm	-	-	-	1240 - 1860	1420	1520	901 - 1630	1220	1350	960 - 1360	**910**[c]	1010	1060 - 1350	**1010**[c]	1210
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	6.96 - 8.3	**6.85**[c]	7.07	7.46 - 8.05	**7.11**[c]	**7.15**[c]	7.81 - 7.98	**7.38**[c]	**7.59**[c]	6.6 - 7.68	6.94	7.37
Temperature, field	Deg C	15	AO	-	9.7 - 19.9	11.5	**9.69**[c]	9.5 - 16.5	13.3	9.98	11.2 - 11.5	11.2	**10.44**[c]	9.9 - 12	**13.6**[c]	**8.12**[c]
General Indicators																
Conductivity, electrical	uS/cm	-	-	-	1420 - 2400	**1390**[c]	**1370**[c]	1000 - 1400	1210	1210	880 - 1010	945	951	934 - 1320	992	1020
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.74 - 8.54	**7.71**[c]	7.89	7.68 - 8.71	7.79	7.98	8.06 - 8.64	**7.78**[c]	8.06	8.02 - 8.53	**7.6**[c]	**7.94**[c]
Total dissolved solids (TDS)	mg/L	500	AO	-	752 - 1230	**734**[ac]	**702**[ac]	290 - 845	**620**[a]	**630**[a]	458 - 620	492	472	490 - 858	**512**[a]	**502**[a]
Minor Ions - Anions																
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	312 - 421	343	325	300 - 356	333	320	245 - 289	282	270	206 - 313	259	247
Chloride	mg/L	250	AO	-	274 - 528	**286**[a]	**242**[c]	153 - 292	222	205	116 - 144	**154**[c]	140	128 - 225	157	143
Sulfate	mg/L	500	AO	-	0.49 - 10	ND (1)	ND (0.5)	0.47 - 11	ND (0.5)	ND (0.5)	ND(0.5) - 12	ND (0.5)	ND (0.5)	12 - 67	43	38.8
Major Ions - Cations																
Calcium (dissolved)	mg/L	-	-	-	18 - 36.1	23	21.8	14 - 23	14.7	**13.3**[c]	15 - 18	15.8	**14.4**[c]	17 - 27	20.6	18
Magnesium (dissolved)	mg/L	-	-	-	7 - 18.3	**6.95**[c]	**6.2**[c]	4.8 - 7.1	**4.67**[c]	**4.61**[c]	5 - 7	5.43	**4.77**[c]	5 - 7	6.83	6.39
Potassium (dissolved)	mg/L	-	-	-	1 - 2.1	1.49	1.39	1 - 4	1.59	1.57	1.71 - 3	1.75	**1.24**[c]	1 - 2	1.48	1.3
Sodium (dissolved)	mg/L	20/200	AO	-	262 - 415	**246**[ac]	**220**[ac]	212 - 290	**218**[a]	**201**[ac]	161 - 196	**175**[a]	**150**[ac]	170 - 275	**176**[a]	**168**[ac]
Major Ions - Nutrients																
Ammonia-N	mg/L	-	-	-	-	-	-	0.15 - 0.37	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	10.0	MAC	-	0.015 - ND(1)	ND (0.5)	ND (0.25)	ND(0.021) - 0.46	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.01) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																
Bromide	mg/L	-	-	-	ND(0.25) - ND(3.5)	ND (0.5)	ND (0.25)	ND(0.25) - 2.61	ND (0.25)	ND (0.25)	ND(0.25) - 1.1	ND (0.25)	ND (0.25)	ND(0.25) - 0.64	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.01)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	ND(0.25) - 2	ND (0.5)	0.9	ND(0.25) - 1.8	ND (0.25)	0.79	0.91 - 1.77	ND (0.25)	0.95	0.66 - 1.69	ND (0.25)	0.77
Metals																
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.01)	ND (0.003)	-	0.001 - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.1)	ND (0.003)	-	0.003 - 0.004	0.003	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.1 - 0.312	0.137	-	0.08 - 0.2	0.105	-	0.11 - 0.3	0.113	-	0.045 - 0.13	0.046	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	1.7 - 2.4	**1.67**[bc]	-	1.5 - 2.09	**1.82**[b]	-	1.4 - 1.7	**1.42**[b]	-	1.4 - 1.6	**1.45**[b]	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - 0.003	ND (0.001)	-	ND(0.0001) - 0.003	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	26.5	-	-	17	-	-	16.1	-	-	23.2	-
Chromium	mg/L	0.05	MAC	0.001	**0.004**[b]	**0.01**[bc]	-	ND(0.003)	**0.012**[bc]	-	**0.007**[b]	**0.006**[bc]	-	ND(0.003)	**0.007**[bc]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	0.008 - 0.279	**0.284**[c]	-	0.018 - 0.59	**0.473**[ab]	-	ND(0.03) - 0.23	0.154	-	0.022 - 0.1	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001) - 0.00048	ND (0.0001)	-	ND(0.0001) - ND(0.001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - 0.01	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	0.005 - 0.096	ND (0.005)	-	ND(0.003) - 0.19	ND (0.005)	-	ND(0.005) - 0.04	ND (0.005)	-	0.006 - 0.02	ND (0.005)	-
Volatile Organic Compounds																
1,1,1,2-Tetrachloroethane	ug/L	-	-	20	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
1,1,1-Trichloroethane	ug/L	-	-	10	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.2) - ND(0.4)	ND (1.2)	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-
1,1,2,2-Tetrachloroethane	ug/L	-	-	70	ND(0.1) - ND(0.6)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
1,1,2-Trichloroethane	ug/L	-	-	800	ND(0.2) - ND(0.8)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.8)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-
1,1-Dichloroethane	ug/L	-	-	200	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.1) - ND(0.7)	ND (1.2)	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-
1,1-Dichloroethene	ug/L	14	MAC	40	ND(0.1) - ND(1.2)	ND (0.3)	-	ND(0.1) - ND(0.5)	ND (1.2)	-	ND(0.3) - ND(0.5)	ND (0.3)	-	ND(0.3) - ND(0.5)	ND (0.3)	-
1,2,4-Trichlorobenzene	ug/L	-	-	0.5	ND(1.2)	ND (0.3)	-	ND(0.3)	ND (1.2)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-
1,2-Dibromoethane (Ethylene dibromid	ug/L	-	-	5	ND(0.2) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.4)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-
1,2-Dichlorobenzene	ug/L	200	MAC	2.5	ND(0.002) - ND(2)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.4)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
1,2-Dichloroethane	ug/L	5	IMAC	100	ND(0.002) - ND(2)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.8)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
1,2-Dichloropropane	ug/L	-	-	0.7	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
1,3-Dichlorobenzene	ug/L	-	-	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.4)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
1,3-Dichloropropene	ug/L	-	-	-	ND(1.2)	ND (0.3)	-	ND(0.3)	ND (1.2)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-

Table 11

Groundwater Chemistry - Deep Wells Internal to the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW39-99D			TW46-99D			TW54-09D			TW61-13D		
Sample ID:						39D	39D		46D	46D		54D	54D		61D	61D
Sample Date:			ODWS		06/09/1999 - 11/20/2017	6/5/2018	11/20/2018	11/03/1999 - 11/15/2017	6/4/2018	11/19/2018	11/03/2009 - 11/20/2017	6/5/2018	11/20/2018	11/07/2013 - 11/20/2017	6/5/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range		
Parameters	Units	a		b												
1,4-Dichlorobenzene	ug/L	5	MAC	4	ND(0.002) - ND(2)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.4)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
2-Butanone (Methyl ethyl ketone) (MEK	ug/L	-	-	400	ND(4) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (4)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-
2-Hexanone	ug/L	-	-	-	ND(4)	ND (1)	-	ND(1)	ND (4)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-
4-Methyl-2-pentanone (Methyl isobutyl	ug/L	-	-	-	ND(4) - ND(5)	ND (1)	-	ND(0.1) - ND(1)	ND (4)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-
Acetone	ug/L	-	-	-	ND(4) - ND(10)	ND (1)	-	ND(0.1) - ND(1)	ND (4)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-
Benzene	ug/L	1	MAC	100	ND(0.001) - ND(1)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-	ND(0.2) - 0.7	ND (0.2)	-	ND(0.2) - 5.6	0.41	-
Bromodichloromethane	ug/L	-	-	200	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-
Bromoform	ug/L	-	-	60	ND(0.2) - 0.4	ND (0.1)	-	ND(0.1) - 0.4	ND (0.4)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
Bromomethane (Methyl bromide)	ug/L	-	-	0.9	ND(0.5) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.8)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Carbon tetrachloride	ug/L	2	MAC	-	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
Chlorobenzene	ug/L	80	MAC	15	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.4)	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-
Chloroethane	ug/L	-	-	-	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
Chloroform (Trichloromethane)	ug/L	-	-	-	ND(0.2) - ND(0.8)	ND (0.2)	-	0.1 - ND(0.5)	ND (0.8)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Chloromethane (Methyl chloride)	ug/L	-	-	700	ND(0.2) - ND(1.6)	ND (0.4)	-	ND(0.2) - ND(1)	ND (1.6)	-	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(0.4)	ND (0.4)	-
cis-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.8)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-
cis-1,3-Dichloropropene	ug/L	-	-	-	ND(0.2) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.8)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
Dibromochloromethane	ug/L	-	-	40	ND(0.2) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.4)	-	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-
Dichlorodifluoromethane (CFC-12)	ug/L	-	-	-	ND(0.5) - ND(0.8)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.8)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Ethylbenzene	ug/L	140	MAC	8	ND(0.001) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Hexane	ug/L	-	-	-	ND(0.8)	ND (0.2)	-	ND(0.2)	ND (0.8)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
m&p-Xylenes	ug/L	-	-	2	ND(0.1) - ND(10)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Methyl tert butyl ether (MTBE)	ug/L	15	AO	200	ND(0.2) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.8)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
Methylene chloride	ug/L	50	MAC	100	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.3) - ND(5)	ND (1.2)	-	ND(0.3) - ND(4)	ND (0.3)	-	ND(0.3) - ND(4)	ND (0.3)	-
o-Xylene	ug/L	-	-	40	ND(0.1) - ND(10)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Styrene	ug/L	-	-	4	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Tetrachloroethene	ug/L	10	MAC	50	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.8)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-
Toluene	ug/L	60	MAC	0.8	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.2) - 1.2	ND (0.8)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - 0.8	ND (0.2)	-
trans-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.9)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.8)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-
trans-1,3-Dichloropropene	ug/L	-	-	7	ND(0.2) - ND(1.2)	ND (0.3)	-	ND(0.2) - ND(10)	ND (1.2)	-	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (0.3)	-
Trichloroethene	ug/L	5	MAC	20	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.8)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-
Trichlorofluoromethane (CFC-11)	ug/L	-	-	-	ND(0.2) - ND(1.6)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (1.6)	-	ND(0.4) - ND(0.5)	ND (0.4)	-	ND(0.4) - ND(0.5)	ND (0.4)	-
Vinyl chloride	ug/L	1	MAC	600	ND(0.2) - ND(0.68)	ND (0.17)	-	ND(0.1) - ND(0.2)	ND (0.68)	-	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.17)	-
Xylenes (total)	ug/L	90	MAC	-	ND(0.01) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.8)	-	ND(0.2) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-

Notes:

- a Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
- b Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO).
  With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
- c Analytical result outside of the historical concentration range for the parameter.
- ND Not detected at the associated reporting limit.
- J Estimated concentration.
- 4.90 Detected result exceeds associated standard.
- OG Operational Guideline
- AO Aesthetic Objective
- MAC Maximum Acceptable Concentration
- IMAC Interim Maximum Acceptable Concentration
- \- Not applicable or not analysed.

Table 12

Groundwater Chemistry - Deep Wells along the Perimeter of the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					OW32-90D			OW35-05D				TW22-99D			TW30-99D		
Sample ID:						32D	32D		35D	35D	DUP3		22D	22D		30D	30D
Sample Date:			ODWS		06/19/1991 - 11/17/2017	6/4/2018	11/21/2018	05/31/2005 - 11/16/2017	6/4/2018	11/21/2018	11/21/2018	06/21/1994 - 11/15/2017	6/5/2018	11/20/2018	06/07/1999 - 11/17/2017	6/4/2018	11/21/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Duplicate	Historical Range			Historical Range		
Parameters	Units	a		b													
Field Parameters																	
Conductivity, field	uS/cm	-	-	-	1040 - 1930	1400	1520	954 - 1760	1360	1650	1650	3110 - 5010	4780	4960	1030 - 1630	1210	1360
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.22 - 8.28	7.56	7.53	7.73 - 7.83	**7.45**[c]	**7.56**[c]	**7.56**[c]	6.44 - 8	6.86	7.33	7.04 - 8.04	7.5	7.7
Temperature, field	Deg C	15	AO	-	6.5 - 17.1	12.8	9.92	10.4 - 14.9	12.5	**9.37**[c]	**9.37**[c]	10 - 16.5	12.1	**9.36**[c]	10.2 - 14.2	10.8	**9.28**[c]
General Indicators																	
Conductivity, electrical	uS/cm	-	-	-	647 - 1580	1410	1420	1130 - 1490	1330	1480	**1520**[c]	1100 - 5410	4500	4770	1040 - 1600	1220	1250
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.61 - 8.4	7.7	7.99	7.6 - 8.43	7.73	8.07	8.12	7.49 - 8.48	8.08	8.28	7.8 - 8.57	**7.73**[c]	8.1
Total dissolved solids (TDS)	mg/L	500	AO	-	462 - 949	**718**[a]	**682**[a]	682 - 897	**658**[ac]	**738**[a]	**690**[a]	2300 - 3220	**2440**[a]	**2510**[a]	588 - 1010	**598**[a]	**606**[a]
Minor Ions - Anions																	
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	188 - 263	261	244	255 - 334	272	274	288	320 - 766	**763**[a]	**746**[a]	243 - 312	265	258
Chloride	mg/L	250	AO	-	42.4 - 400	**337**[a]	**294**[a]	234 - 290	**300**[ac]	**299**[ac]	**327**[ac]	932 - 1690	**1220**[a]	**1110**[a]	208 - 365	**270**[a]	240
Sulfate	mg/L	500	AO	-	ND(0.5) - 95.2	ND (0.5)	ND (0.5)	ND(0.5) - 11	ND (0.5)	ND (0.5)	ND (0.5)	ND(0.1) - 22	ND (5)	ND (5)	ND(0.5) - 11	ND (0.5)	ND (0.5)
Major Ions - Cations																	
Calcium (dissolved)	mg/L	-	-	-	19.6 - 66	**19.1**[c]	19.9	17 - 28	18.9	19.1	19.3	21 - 67	28.5	30.1	18 - 32	20.4	18.9
Magnesium (dissolved)	mg/L	-	-	-	6 - 22	7.21	6.93	6 - 9	6.75	6.43	6.38	8 - 19.2	12.7	12.7	7 - 14	7.66	**6.89**[c]
Potassium (dissolved)	mg/L	-	-	-	1.5 - 5.2	2.27	1.94	1.95 - 2.4	**1.89**[c]	**1.57**[c]	**1.29**[c]	2 - 4	2.91	2.3	ND(1) - 3	2.42	1.97
Sodium (dissolved)	mg/L	20/200	AO	-	62 - 280	**254**[a]	**217**[a]	218 - 310	**225**[a]	**208**[ac]	**207**[ac]	250 - 1250	**866**[a]	**872**[a]	195 - 320	**207**[a]	**182**[ac]
Major Ions - Nutrients																	
Ammonia-N	mg/L	-	-	-	-	-	-	0.28 - 0.3	-	-	-	0.44 - 0.57	-	-	0.32 - 0.4	-	-
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.002) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND (0.25)	0.016 - ND(2.5)	ND (2.5)	ND (2.5)	0.018 - ND(0.5)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(2.5)	ND (2.5)	ND (2.5)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																	
Bromide	mg/L	-	-	-	0.16 - 3.7	ND (0.25)	ND (0.25)	0.15 - 2.11	ND (0.25)	ND (0.25)	ND (0.25)	0.2 - 8	ND (2.5)	ND (2.5)	0.15 - 1.81	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.05)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	0.5 - 1.6	ND (0.25)	0.87	ND(0.25) - 1.55	ND (0.25)	0.73	0.67	ND(0.05) - 3.2	ND (2.5)	ND (2.5)	ND(0.25) - 1.62	ND (0.25)	0.79
Metals																	
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.06)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	-	0.001 - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.072 - 0.23	0.106	-	0.11 - 0.22	0.128	-	-	0.29 - 0.597	0.364	-	0.29 - 0.46	0.327	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	0.97 - 2.1	**1.69**[b]	-	1.4 - 1.9	**1.66**[b]	-	-	3.09 - 5.6	**3.87**[b]	-	1.4 - 2	**1.7**[b]	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - 0.005	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	-	ND(0.0001) - ND(0.003)	ND (0.001)	-	ND(0.0001) - ND(0.003)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	22.7	-	-	22.9	-	-	-	33.1	-	-	23.1	-
Chromium	mg/L	0.05	MAC	0.001	**0.008**[b]	**0.011**[bc]	-	ND(0.003)	**0.012**[bc]	-	-	**0.004**[b]	**0.011**[bc]	-	ND(0.003)	**0.013**[bc]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.005) - 0.57	**0.815**[abc]	-	ND(0.03) - 0.67	**0.553**[ab]	-	-	ND(0.005) - 2.66	ND (0.01)	-	ND(0.01) - 0.304	0.277	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.0005) - ND(0.05)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	-	ND(0.0005) - ND(0.01)	ND (0.001)	-	ND(0.0005) - 0.003	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	0.0001 - 0.0013	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	-	ND(0.0001) - 0.0007	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	0.003 - ND(0.05)	ND (0.003)	-	ND(0.001) - ND(0.005)	ND (0.003)	-	-	ND(0.001) - ND(0.05)	0.004	-	ND(0.001) - ND(0.01)	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.003) - 0.04	ND (0.005)	-	ND(0.005) - 0.06	ND (0.005)	-	-	ND(0.003) - 0.11	ND (0.005)	-	ND(0.003) - 0.09	ND (0.005)	-
Volatile Organic Compounds																	
1,1,1,2-Tetrachloroethane	ug/L	-	-	20	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
1,1,1-Trichloroethane	ug/L	-	-	10	ND(0.2) - ND(0.4)	ND (0.3)	-	ND(0.2) - ND(0.4)	ND (0.3)	-	-	ND(0.2) - ND(0.4)	ND (0.3)	-	ND(0.2) - ND(0.4)	ND (0.3)	-
1,1,2,2-Tetrachloroethane	ug/L	-	-	70	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
1,1,2-Trichloroethane	ug/L	-	-	800	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-
1,1-Dichloroethane	ug/L	-	-	200	ND(0.1) - ND(0.7)	ND (0.3)	-	ND(0.1) - ND(0.4)	ND (0.3)	-	-	ND(0.1) - ND(0.7)	ND (0.3)	-	ND(0.1) - ND(0.7)	ND (0.3)	-
1,1-Dichloroethene	ug/L	14	MAC	40	ND(0.1) - ND(0.5)	ND (0.3)	-	ND(0.1) - ND(0.5)	ND (0.3)	-	-	ND(0.1) - ND(0.5)	ND (0.3)	-	ND(0.1) - ND(0.5)	ND (0.3)	-
1,2,4-Trichlorobenzene	ug/L	-	-	0.5	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-
1,2-Dibromoethane (Ethylene dibromid	ug/L	-	-	5	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-
1,2-Dichlorobenzene	ug/L	200	MAC	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
1,2-Dichloroethane	ug/L	5	IMAC	100	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-
1,2-Dichloropropane	ug/L	-	-	0.7	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
1,3-Dichlorobenzene	ug/L	-	-	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
1,3-Dichloropropene	ug/L	-	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-
1,4-Dichlorobenzene	ug/L	5	MAC	4	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-

Groundwater Chemistry - Deep Wells along the Perimeter of the Facility Property (Interface Aquifer)
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Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					**OW32-90D**			**OW35-05D**				**TW22-99D**			**TW30-99D**		
Sample ID:						**32D**	**32D**		**35D**	**35D**	**DUP3**		**22D**	**22D**		**30D**	**30D**
Sample Date:			**ODWS**		**06/19/1991 - 11/17/2017**	**6/4/2018**	**11/21/2018**	**05/31/2005 - 11/16/2017**	**6/4/2018**	**11/21/2018**	**11/21/2018**	**06/21/1994 - 11/15/2017**	**6/5/2018**	**11/20/2018**	**06/07/1999 - 11/17/2017**	**6/4/2018**	**11/21/2018**
		ODWS	**SOURCE**	**PWQO**	**Historical Range**			**Historical Range**			**Duplicate**	**Historical Range**			**Historical Range**		
Parameters	**Units**	**a**		**b**													
2-Butanone (Methyl ethyl ketone) (MEK	ug/L	-	-	400	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (1)	-	-	ND(1) - ND(10)	ND (1)	-	ND(1) - ND(5)	ND (1)	-
2-Hexanone	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-
4-Methyl-2-pentanone (Methyl isobutyl	ug/L	-	-	-	ND(0.1) - ND(1)	ND (1)	-	ND(0.1) - ND(1)	ND (1)	-	-	ND(0.1) - ND(10)	ND (1)	-	ND(0.1) - ND(1)	ND (1)	-
Acetone	ug/L	-	-	-	ND(0.1) - ND(1)	ND (1)	-	ND(0.1) - ND(1)	ND (1)	-	-	ND(0.1) - ND(30)	ND (1)	-	ND(0.1) - ND(1)	ND (1)	-
Benzene	ug/L	1	MAC	100	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	-	ND(0.2) - 3.8	0.31	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Bromodichloromethane	ug/L	-	-	200	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Bromoform	ug/L	-	-	60	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - 1.4	ND (0.1)	-	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
Bromomethane (Methyl bromide)	ug/L	-	-	0.9	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-
Carbon tetrachloride	ug/L	2	MAC	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Chlorobenzene	ug/L	80	MAC	15	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-
Chloroethane	ug/L	-	-	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-
Chloroform (Trichloromethane)	ug/L	-	-	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - 0.7	ND (0.2)	-
Chloromethane (Methyl chloride)	ug/L	-	-	700	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(1)	ND (0.4)	-	-	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(1)	ND (0.4)	-
cis-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.2)	-	-	0.4 - 2.6	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.2)	-
cis-1,3-Dichloropropene	ug/L	-	-	-	ND(0.1) - ND(0.2)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.2)	-	-	ND(0.1) - ND(0.2)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.2)	-
Dibromochloromethane	ug/L	-	-	40	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-	-	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-
Dichlorodifluoromethane (CFC-12)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Ethylbenzene	ug/L	140	MAC	8	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Hexane	ug/L	-	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
m&p-Xylenes	ug/L	-	-	2	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-
Methyl tert butyl ether (MTBE)	ug/L	15	AO	200	ND(0.1) - ND(0.2)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.2)	-	-	ND(0.1) - ND(2)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.2)	-
Methylene chloride	ug/L	50	MAC	100	ND(0.3) - ND(5)	ND (0.3)	-	ND(0.3) - ND(5)	ND (0.3)	-	-	ND(0.3) - ND(5)	ND (0.3)	-	ND(0.3) - ND(5)	ND (0.3)	-
o-Xylene	ug/L	-	-	40	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Styrene	ug/L	-	-	4	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Tetrachloroethene	ug/L	10	MAC	50	ND(0.1) - ND(0.3)	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.2)	-	-	ND(0.1) - 0.3	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.2)	-
Toluene	ug/L	60	MAC	0.8	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	-	ND(0.2) - ND(0.5)	**0.77**[c]	-	ND(0.2) - ND(0.5)	ND (0.2)	-
trans-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.2)	-	-	ND(0.1) - 0.5	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.2)	-
trans-1,3-Dichloropropene	ug/L	-	-	7	ND(0.2) - ND(10)	ND (0.3)	-	ND(0.2) - ND(10)	ND (0.3)	-	-	ND(0.2) - ND(10)	ND (0.3)	-	ND(0.2) - ND(10)	ND (0.3)	-
Trichloroethene	ug/L	5	MAC	20	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	-	ND(0.3) - 4.9	2.1	-	ND(0.2) - ND(0.3)	ND (0.2)	-
Trichlorofluoromethane (CFC-11)	ug/L	-	-	-	ND(0.1) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.4)	-	-	ND(0.1) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.4)	-
Vinyl chloride	ug/L	1	MAC	600	ND(0.1) - ND(0.2)	ND (0.17)	-	ND(0.1) - ND(0.2)	ND (0.17)	-	-	ND(0.1) - ND(0.2)	ND (0.17)	-	ND(0.1) - ND(0.2)	ND (0.17)	-
Xylenes (total)	ug/L	90	MAC	-	ND(0.2) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.2)	-	-	ND(0.2) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.2)	-

Notes:

a	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
b	Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
c	Analytical result outside of the historical concentration range for the parameter.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.

Table 12

Groundwater Chemistry - Deep Wells along the Perimeter of the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location: / Sample ID: / Sample Date: / Parameters	Units	ODWS a	ODWS SOURCE	PWQO b	TW32-94-II 08/05/1994 - 11/16/2017 Historical Range	TW32-94-II 32II 6/4/2018	TW40-99D 06/08/1999 - 11/16/2017 Historical Range	TW40-99D 40D 6/4/2018	TW40-99D 40D 11/19/2018	TW41-99D 06/07/1999 - 11/17/2017 Historical Range	TW41-99D 41D 6/4/2018	TW41-99D 411D 6/4/2018 Duplicate	TW41-99D 41D 11/21/2018	TW43-99D 06/07/1999 - 11/16/2017 Historical Range	TW43-99D 43D 6/6/2018	TW43-99D 43D 11/19/2018	TW45-99D 06/09/1999 - 11/20/2017 Historical Range	TW45-99D 45D 6/6/2018	TW45-99D 45D 11/20/2018
Field Parameters																			
Conductivity, field	uS/cm	-	-	-	938 - 2170	1980	1060 - 1830	1400	1590	919 - 1550	1130	1130	**1560[c]**	922 - 1580	1170	1310	1120 - 4220	3740	3700
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.93 - 8.38	**7.53[c]**	7.65 - 8.29	**7.24[c]**	**7.57[c]**	7.45 - 8.34	**7.36[c]**	**7.36[c]**	7.61	7.02 - 8.34	7.25	7.54	6.81 - 8.36	7.63	7.6
Temperature, field	Deg C	15	AO	-	10 - 17.9	11.2	6.1 - 18.4	11.8	10.17	8.1 - 16.8	10.5	10.5	9.95	10.5 - 12.2	10.9	**9.45[c]**	10.7 - 18.1	13.4	**9.54[c]**
General Indicators																			
Conductivity, electrical	uS/cm	-	-	-	1190 - 6790	1900	1190 - 3340	1390	1440	978 - 1400	1150	1140	1170	1090 - 1310	1190	1220	770 - 4690	4280	3500
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.6 - 8.52	7.88	7.8 - 8.37	**7.72[c]**	7.96	7.9 - 8.6	**7.68[c]**	**7.79[c]**	8.08	7.7 - 8.49	7.86	8.13	7.8 - 8.58	8.3	8.36
Total dissolved solids (TDS)	mg/L	500	AO	-	309 - 4410	**956[a]**	690 - 2170	**702[a]**	**716[a]**	540 - 895	**588[a]**	**594[a]**	**574[a]**	580 - 833	**600[a]**	**592[a]**	500 - 2470	**2470[a]**	**1850[a]**
Minor Ions - Anions																			
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	234 - 384	286	238 - 327	257	254	288 - 358	307	307	293	240 - 294	290	271	264 - 1010	**1030[ac]**	**899[a]**
Chloride	mg/L	250	AO	-	24 - 1940	**502[a]**	247 - 819	**330[a]**	**309[a]**	45.8 - 278	219	221	197	204 - 367	243	223	13 - 956	**947[a]**	**634[a]**
Sulfate	mg/L	500	AO	-	1 - 380	ND (1)	ND(0.5) - 6	ND (0.5)	ND (0.5)	ND(0.5) - 11	ND (0.5)	ND (0.5)	ND (0.5)	0.14 - ND(5)	ND (0.5)	ND (0.5)	0.63 - 120	ND (5)	ND (2)
Major Ions - Cations																			
Calcium (dissolved)	mg/L	-	-	-	11.6 - 120	14.8	26 - 78	**25.3[c]**	26	12 - 19.7	14.4	14	13	19 - 33	23.7	22.4	4 - 75	7.3	5.43
Magnesium (dissolved)	mg/L	-	-	-	6 - 81	10.5	9 - 28	9.45	9.91	5 - 7.2	5.09	5.03	**4.55[c]**	7 - 11	8.42	8.59	1 - 34	4.21	3.31
Potassium (dissolved)	mg/L	-	-	-	1 - 5	2.42	1.9 - 4	2.28	2.11	1 - 3.3	1.7	1.5	1.29	1 - 3	1.78	1.54	1 - 3	2.16	1.42
Sodium (dissolved)	mg/L	20/200	AO	-	75 - 1380	**341[a]**	227 - 572	**222[ac]**	**223[ac]**	208 - 320	**206[ac]**	**208[a]**	**181[ac]**	197 - 259	**189[ac]**	**191[ac]**	42 - 1020	**862[a]**	**705[a]**
Major Ions - Nutrients																			
Ammonia-N	mg/L	-	-	-	-	-	0.18 - 0.2	-	-	0.26	-	-	-	0.2 - 0.24	-	-	0.22	-	-
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.01) - ND(5)	ND (0.5)	ND(0.021) - ND(1)	ND (0.25)	ND (0.25)	ND(0.01) - 0.3	ND (0.25)	ND (0.25)	ND (0.25)	0.016 - ND(1)	ND (0.25)	ND (0.25)	0.023 - ND(2.5)	ND (2.5)	ND (1)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.01) - ND(0.5)	ND (0.5)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.25)	ND (0.25)	ND(0.01) - ND(2.5)	ND (2.5)	ND (1)
Major Ions - Miscellaneous																			
Bromide	mg/L	-	-	-	ND(0.05) - 4.31	ND (0.5)	ND(0.05) - 3.99	ND (0.25)	ND (0.25)	ND(0.25) - 1.8	ND (0.25)	ND (0.25)	ND (0.25)	0.11 - ND(3.5)	ND (0.25)	ND (0.25)	ND(0.1) - 3.08	ND (2.5)	ND (1)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.02)	ND (0.002)	ND(0.002) - ND(0.05)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.05)	ND (0.002)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.05)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	ND(0.5) - 1.7	ND (0.5)	ND(0.25) - 1.41	ND (0.25)	0.67	ND(0.25) - 1.55	ND (0.25)	ND (0.25)	0.76	0.18 - 1.6	ND (0.25)	0.62	0.3 - ND(2.5)	ND (2.5)	ND (1)
Metals																			
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.06)	ND (0.003)	0.001 - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	0.001 - ND(0.1)	**0.014[ab]**	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.013 - 1	0.25	0.19 - 0.37	**0.186[c]**	-	0.077 - 0.93	0.084	0.083	-	0.139 - 0.3	0.2	-	0.069 - 0.32	0.249	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	0.27 - 3.83	**2.08[b]**	1.4 - 2.4	**1.47[b]**	-	1.5 - 2.1	**1.79[b]**	**1.85[b]**	-	1 - 1.7	**1.29[b]**	-	0.9 - 3.8	**2.69[b]**	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - ND(0.005)	ND (0.001)	ND(0.0001) - 0.005	ND (0.001)	-	ND(0.0001) - 0.006	ND (0.001)	ND (0.001)	-	ND(0.0001) - ND(0.003)	ND (0.001)	-	ND(0.0001) - 0.006	ND (0.001)	-
Calcium	mg/L	-	-	-	-	18.5	-	31.8	-	-	16.4	16.3	-	-	28.1	-	-	8.05	-
Chromium	mg/L	0.05	MAC	0.001	ND(0.003)	**0.003[b]**	ND(0.003)	**0.004[bc]**	-	**0.003[b]**	**0.012[bc]**	**0.011[bc]**	-	**0.003[b]**	**0.012[bc]**	-	**0.004[b]**	**0.015[bc]**	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.005) - ND(0.3)	ND (0.01)	ND(0.013) - 1.87	**0.935[ab]**	-	ND(0.02) - 4.9	0.048	0.056	-	ND(0.01) - 0.591	**0.399[ab]**	-	ND(0.005) - 4.56	**2.98[ab]**	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.0005) - ND(0.025)	ND (0.001)	ND(0.0005) - 0.002	ND (0.001)	-	ND(0.0005) - 0.0073	ND (0.001)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001) - 0.0003	ND (0.0001)	0.0001	ND (0.0001)	-	ND(0.0001) - 0.00035	ND (0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001) - 0.0007	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.001) - ND(0.05)	ND (0.003)	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.003) - ND(0.1)	ND (0.005)	ND(0.005) - 0.516	ND (0.005)	-	ND(0.005) - 0.53	ND (0.005)	ND (0.005)	-	0.004 - 0.06	ND (0.005)	-	ND(0.003) - 0.036	**0.031[b]**	-
Volatile Organic Compounds																			
1,1,1,2-Tetrachloroethane	ug/L	-	-	20	ND(0.1) - ND(0.5)	ND (0.1)	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.2)	-
1,1,1-Trichloroethane	ug/L	-	-	10	ND(0.2) - ND(0.4)	ND (0.3)	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.1) - ND(0.8)	ND (0.3)	ND (0.3)	-	ND(0.1) - ND(0.4)	ND (0.3)	-	ND(0.2) - ND(0.4)	ND (0.6)	-
1,1,2,2-Tetrachloroethane	ug/L	-	-	70	ND(0.1) - ND(0.5)	ND (0.1)	ND(0.1) - ND(0.6)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.2)	-
1,1,2-Trichloroethane	ug/L	-	-	800	ND(0.2) - ND(0.4)	ND (0.2)	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.8)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.4)	-
1,1-Dichloroethane	ug/L	-	-	200	ND(0.1) - ND(0.7)	ND (0.3)	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.1) - ND(0.8)	ND (0.3)	ND (0.3)	-	ND(0.1) - ND(0.7)	ND (0.3)	-	ND(0.1) - ND(0.7)	ND (0.6)	-
1,1-Dichloroethene	ug/L	14	MAC	40	ND(0.1) - ND(0.5)	ND (0.3)	ND(0.1) - ND(0.6)	ND (0.3)	-	ND(0.1) - ND(1)	ND (0.3)	ND (0.3)	-	ND(0.1) - ND(0.5)	ND (0.3)	-	ND(0.1) - ND(0.5)	ND (0.6)	-
1,2,4-Trichlorobenzene	ug/L	-	-	0.5	ND(0.3)	ND (0.3)	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.6)	-
1,2-Dibromoethane (Ethylene dibromid	ug/L	-	-	5	ND(0.1) - ND(1)	ND (0.1)	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.2)	-
1,2-Dichlorobenzene	ug/L	200	MAC	2.5	ND(0.1) - ND(0.4)	ND (0.1)	ND(0.002) - ND(2)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.2)	-
1,2-Dichloroethane	ug/L	5	IMAC	100	ND(0.1) - ND(0.5)	ND (0.2)	ND(0.002) - ND(2)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.4)	-
1,2-Dichloropropane	ug/L	-	-	0.7	ND(0.2) - ND(0.5)	ND (0.2)	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.4)	-
1,3-Dichlorobenzene	ug/L	-	-	2.5	ND(0.1) - ND(0.4)	ND (0.1)	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.2)	-
1,3-Dichloropropene	ug/L	-	-	-	ND(0.3)	ND (0.3)	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.6)	-
1,4-Dichlorobenzene	ug/L	5	MAC	4	ND(0.1) - ND(0.4)	ND (0.1)	ND(0.002) - ND(2)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.2)	-

Table 12

Groundwater Chemistry - Deep Wells along the Perimeter of the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW32-94-II		TW40-99D			TW41-99D				TW43-99D			TW45-99D		
Sample ID:						32II		40D	40D		41D	411D	41D		43D	43D		45D	45D
Sample Date:			ODWS		08/05/1994 - 11/16/2017	6/4/2018	06/08/1999 - 11/16/2017	6/4/2018	11/19/2018	06/07/1999 - 11/17/2017	6/4/2018	6/4/2018	11/21/2018	06/07/1999 - 11/16/2017	6/6/2018	11/19/2018	06/09/1999 - 11/20/2017	6/6/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range		Historical Range			Historical Range		Duplicate		Historical Range			Historical Range		
Parameters	Units	a		b															
2-Butanone (Methyl ethyl ketone) (MEK	ug/L	-	-	400	ND(1) - ND(5)	ND (1)	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (1)	ND (1)	-	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (2)	-
2-Hexanone	ug/L	-	-	-	ND(1)	ND (1)	ND(1)	ND (1)	-	ND(1)	ND (1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (2)	-
4-Methyl-2-pentanone (Methyl isobutyl	ug/L	-	-	-	ND(0.1) - ND(1)	ND (1)	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (1)	ND (1)	-	ND(1) - ND(5)	ND (1)	-	ND(0.1) - ND(1)	ND (2)	-
Acetone	ug/L	-	-	-	ND(0.1) - ND(1)	ND (1)	ND(1) - ND(10)	ND (1)	-	ND(1) - ND(10)	ND (1)	ND (1)	-	ND(1) - ND(10)	ND (1)	-	ND(0.1) - ND(1)	ND (2)	-
Benzene	ug/L	1	MAC	100	ND(0.2) - ND(0.5)	ND (0.2)	ND(0.001) - ND(1)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.1) - 0.7	ND (0.2)	-	ND(0.2) - 1.6	0.94	-
Bromodichloromethane	ug/L	-	-	200	ND(0.2) - ND(0.5)	ND (0.2)	ND(0.1) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.4)	-
Bromoform	ug/L	-	-	60	ND(0.1) - 0.5	ND (0.1)	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.2)	-
Bromomethane (Methyl bromide)	ug/L	-	-	0.9	ND(0.1) - ND(0.5)	ND (0.2)	ND(0.2) - ND(0.7)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.4)	-
Carbon tetrachloride	ug/L	2	MAC	-	ND(0.2) - ND(0.5)	ND (0.2)	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.4)	-
Chlorobenzene	ug/L	80	MAC	15	ND(0.1) - ND(0.2)	ND (0.1)	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.2)	-
Chloroethane	ug/L	-	-	-	ND(0.2) - ND(1)	ND (0.2)	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.2) - ND(2)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.4)	-
Chloroform (Trichloromethane)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	ND(0.2) - 2.1	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - 8.8	ND (0.4)	-
Chloromethane (Methyl chloride)	ug/L	-	-	700	ND(0.2) - ND(1)	ND (0.4)	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(2)	ND (0.4)	ND (0.4)	-	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - 6	ND (0.8)	-
cis-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.4)	ND (0.2)	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.8)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.4)	-
cis-1,3-Dichloropropene	ug/L	-	-	-	ND(0.1) - ND(0.2)	ND (0.2)	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.4)	-
Dibromochloromethane	ug/L	-	-	40	ND(0.1) - ND(0.3)	ND (0.1)	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.6)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.2)	-
Dichlorodifluoromethane (CFC-12)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.4)	-
Ethylbenzene	ug/L	140	MAC	8	ND(0.1) - ND(0.5)	ND (0.1)	ND(0.001) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.2)	-
Hexane	ug/L	-	-	-	ND(0.2)	ND (0.2)	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.4)	-
m&p-Xylenes	ug/L	-	-	2	ND(0.1) - ND(1)	ND (0.2)	ND(0.1) - ND(10)	ND (0.2)	-	ND(0.1) - ND(2)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.4)	-
Methyl tert butyl ether (MTBE)	ug/L	15	AO	200	ND(0.1) - ND(0.2)	ND (0.2)	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.1) - ND(0.2)	ND (0.4)	-
Methylene chloride	ug/L	50	MAC	100	ND(0.3) - ND(5)	ND (0.3)	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.3) - ND(8)	ND (0.3)	ND (0.3)	-	ND(0.3) - ND(4)	ND (0.3)	-	ND(0.3) - ND(5)	ND (0.6)	-
o-Xylene	ug/L	-	-	40	ND(0.1) - ND(0.5)	ND (0.1)	ND(0.1) - ND(10)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.2)	-
Styrene	ug/L	-	-	4	ND(0.1) - ND(0.5)	ND (0.1)	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.2)	-
Tetrachloroethene	ug/L	10	MAC	50	ND(0.1) - ND(0.3)	ND (0.2)	ND(0.1) - ND(0.3)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.4)	-
Toluene	ug/L	60	MAC	0.8	ND(0.2) - ND(0.5)	**2.1**[bc]	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.4)	-
trans-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.4)	ND (0.2)	ND(0.1) - ND(0.9)	ND (0.2)	-	ND(0.1) - ND(0.8)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.4)	-
trans-1,3-Dichloropropene	ug/L	-	-	7	ND(0.2) - ND(10)	ND (0.3)	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.4)	ND (0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(10)	ND (0.6)	-
Trichloroethene	ug/L	5	MAC	20	ND(0.2) - ND(0.3)	ND (0.2)	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.4)	-
Trichlorofluoromethane (CFC-11)	ug/L	-	-	-	ND(0.1) - ND(0.5)	ND (0.4)	ND(0.2) - ND(0.5)	ND (0.4)	-	ND(0.2) - ND(1)	ND (0.4)	ND (0.4)	-	ND(0.2) - ND(0.5)	ND (0.4)	-	ND(0.1) - ND(0.5)	ND (0.8)	-
Vinyl chloride	ug/L	1	MAC	600	ND(0.1) - ND(0.2)	ND (0.17)	ND(0.17) - ND(0.5)	ND (0.17)	-	ND(0.17) - ND(0.4)	ND (0.17)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.1) - ND(0.2)	ND (0.34)	-
Xylenes (total)	ug/L	90	MAC	-	ND(0.2) - ND(1.5)	ND (0.2)	ND(0.01) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.4)	-

Notes:

a Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).

b Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO).
With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.

c Analytical result outside of the historical concentration range for the parameter.

ND Not detected at the associated reporting limit.

J Estimated concentration.

4.90 Detected result exceeds associated standard.

OG Operational Guideline

AO Aesthetic Objective

MAC Maximum Acceptable Concentration

IMAC Interim Maximum Acceptable Concentration

\- Not applicable or not analysed.

Table 12

Groundwater Chemistry - Deep Wells along the Perimeter of the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW47-00D			TW48-00D			TW49-00D			TW53-03D			TW60-13D		
Sample ID:						47D	47D		48D	48D		49D	49D		53D	53D		60D	60D
Sample Date:			ODWS		11/13/2000 - 11/16/2017	6/4/2018	11/19/2018	06/11/2001 - 11/20/2017	6/6/2018	11/20/2018	06/11/2001 - 11/16/2017	6/6/2018	11/19/2018	10/28/2003 - 11/16/2017	6/4/2018	11/21/2018	11/05/2013 - 11/15/2017	6/5/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range			Historical Range		
Parameters	Units	a		b															
Field Parameters																			
Conductivity, field	uS/cm	-	-	-	1200 - 11000	4750	4270	1660 - 2410	1710	1810	472 - 1160	805	854	1340 - 1970	1940	1770	2930 - 3480	3200	3360
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	6.94 - 8.49	7.11	7.41	7.8 - 8.31	**7.38**[c]	**7.7**[c]	7.32 - 8.43	**7.13**[c]	7.4	7.56 - 7.71	**7.29**[c]	**7.5**[c]	7.14 - 7.56	**7.6**[c]	7.31
Temperature, field	Deg C	15	AO	-	9.7 - 14.1	11.7	10.48	8.9 - 14.4	10.9	9.54	10.3 - 15	14.3	10.8	10.4 - 16.2	11.4	**9.54**[c]	10.4 - 11.4	**12.6**[c]	**9.36**[c]
General Indicators																			
Conductivity, electrical	uS/cm	-	-	-	1100 - 12200	4590	5000	1640 - 2670	1670	1690	600 - 2010	756	756	1300 - 4920	1600	1660	2840 - 4630	3270	3100
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.75 - 8.52	7.99	8.23	7.8 - 8.54	7.97	8.18	7.87 - 8.57	**7.8**[c]	7.95	7.9 - 8.53	**7.78**[c]	8.03	7.92 - 8.44	8.14	8.07
Total dissolved solids (TDS)	mg/L	500	AO	-	680 - 7930	**2430**[a]	**2570**[a]	848 - 1600	**868**[a]	**850**[a]	360 - 551	384	378	480 - 3200	**816**[a]	**774**[a]	1450 - 3010	**1640**[a]	**1560**[a]
Minor Ions - Anions																			
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	270 - 1360	**626**[a]	**623**[a]	254 - 494	375	366	206 - 267	**268**[c]	256	250 - 607	303	291	458 - 746	**544**[a]	494
Chloride	mg/L	250	AO	-	240 - 3150	**1380**[a]	**1260**[a]	305 - 610	**371**[a]	**325**[a]	83 - 99	97.6	89	253 - 1210	**398**[a]	**340**[a]	696 - 1120	**858**[a]	**728**[a]
Sulfate	mg/L	500	AO	-	0.44 - ND(5)	ND (5)	ND (5)	ND(0.5) - 12	ND (1)	ND (0.5)	ND(0.2) - 43.4	ND (0.5)	ND (0.2)	0.45 - 22	ND (1)	ND (0.5)	ND(1) - 4.9	ND (2)	3.6
Major Ions - Cations																			
Calcium (dissolved)	mg/L	-	-	-	17 - 104	58.6	51	12 - 34.9	22.7	20.9	9 - 28.9	21	19.6	19 - 65	24.6	23.1	23.5 - 39	**23.4**[c]	**21.1**[c]
Magnesium (dissolved)	mg/L	-	-	-	ND(0.1) - 47	25.4	23.6	7 - 14.8	8.02	7.45	3.7 - 7.6	5.43	5.48	7 - 25	8.66	8.22	9.22 - 14	**8.85**[c]	**8**[c]
Potassium (dissolved)	mg/L	-	-	-	1.3 - 10	4.13	3.2	2 - 4	2.4	**1.9**[c]	1 - 2	1.37	1.34	2 - 4	2.19	**1.74**[c]	2.28 - 4	2.52	**1.76**[c]
Sodium (dissolved)	mg/L	20/200	AO	-	250 - 3040	**820**[a]	**776**[a]	303 - 510	**293**[ac]	**260**[ac]	124 - 166	**134**[a]	**144**[a]	242 - 853	**269**[a]	**249**[a]	557 - 1010	**561**[a]	**498**[ac]
Major Ions - Nutrients																			
Ammonia-N	mg/L	-	-	-	0.62 - 1.24	-	-	0.26	-	-	0.18	-	-	0.34 - 0.42	-	-	-	-	-
Nitrate (as N)	mg/L	10.0	MAC	-	0.011 - ND(2.5)	ND (2.5)	ND (2.5)	0.012 - 0.35	ND (0.5)	ND (0.25)	ND(0.01) - ND(0.2)	ND (0.25)	ND (0.1)	ND(0.05) - ND(1)	ND (0.5)	ND (0.25)	ND(0.1) - ND(1)	ND (1)	ND (1)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.01) - ND(2.5)	ND (2.5)	ND (2.5)	ND(0.01) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.01) - ND(0.2)	ND (0.25)	ND (0.1)	ND(0.01) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.1) - ND(1)	ND (1)	ND (1)
Major Ions - Miscellaneous																			
Bromide	mg/L	-	-	-	0.09 - 4.77	ND (2.5)	ND (2.5)	0.17 - 3.2	ND (0.5)	ND (0.25)	0.08 - 0.8	ND (0.25)	0.57	0.19 - ND(3.5)	ND (0.5)	ND (0.25)	ND(0.25) - 1.66	ND (1)	ND (1)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.05)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	0.49 - ND(2.5)	ND (2.5)	ND (2.5)	ND(0.25) - 1.89	ND (0.5)	0.98	ND(0.01) - 1.7	ND (0.25)	1.09	ND(0.25) - 1.54	ND (0.5)	0.84	0.58 - ND(1)	ND (1)	ND (1)
Metals																			
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	0.001 - ND(0.01)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	0.001 - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.2 - 3.4	**1.57**[a]	-	0.16 - 0.63	0.185	-	0.06 - 0.8	0.093	-	0.15 - 1.03	0.189	-	0.196 - 0.49	0.235	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	2 - 6	**2.87**[b]	-	0.3 - 3.5	**2.05**[b]	-	0.9 - 1.5	**1.07**[b]	-	1.3 - 3.6	**1.79**[b]	-	3.17 - 5.6	**3.09**[bc]	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - ND(0.001)	ND (0.001)	-	ND(0.0001) - ND(0.001)	ND (0.001)	-	ND(0.0001) - ND(0.001)	ND (0.001)	-	ND(0.0001) - ND(0.001)	ND (0.001)	-	ND(0.0001) - ND(0.001)	ND (0.001)	-
Calcium	mg/L	-	-	-	-	73	-	-	27.2	-	-	21.1	-	-	29.4	-	-	27.8	-
Chromium	mg/L	0.05	MAC	0.001	**0.006**[b]	**0.011**[bc]	-	**0.003**[b]	**0.004**[bc]	-	**0.005**[b]	ND (0.003)	-	ND(0.003)	**0.012**[bc]	-	**0.003**[b]	**0.007**[bc]	-
Iron (dissolved)	mg/L	0.30	AO	0.3	ND(0.019) - 6.79	**1.45**[ab]	-	0.014 - 0.37	0.199	-	ND(0.03) - 1.2	0.1	-	0.025 - 0.592	**0.551**[ab]	-	0.04 - 1.6	0.095	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.0005) - ND(0.01)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.0005) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.01)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	0.0001	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.001) - ND(0.05)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.001) - ND(0.01)	ND (0.003)	-	ND(0.003) - 0.05	ND (0.003)	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.001) - 0.2	ND (0.005)	-	ND(0.005) - 0.042	ND (0.005)	-	ND(0.005) - 0.08	ND (0.005)	-	ND(0.005) - 0.73	ND (0.005)	-	ND(0.005) - ND(0.1)	ND (0.005)	-
Volatile Organic Compounds																			
1,1,1,2-Tetrachloroethane	ug/L	-	-	20	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
1,1,1-Trichloroethane	ug/L	-	-	10	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.1) - ND(0.8)	ND (0.3)	-	ND(0.1) - ND(0.8)	ND (0.3)	-	ND(0.01) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-
1,1,2,2-Tetrachloroethane	ug/L	-	-	70	ND(0.1) - ND(0.6)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.6)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
1,1,2-Trichloroethane	ug/L	-	-	800	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.8)	ND (0.2)	-	ND(0.2) - ND(0.8)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-
1,1-Dichloroethane	ug/L	-	-	200	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.1) - ND(0.8)	ND (0.3)	-	ND(0.1) - ND(0.8)	ND (0.3)	-	ND(0.01) - ND(0.7)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-
1,1-Dichloroethene	ug/L	14	MAC	40	ND(0.1) - ND(0.6)	ND (0.3)	-	ND(0.1) - ND(1)	ND (0.3)	-	ND(0.1) - ND(1)	ND (0.3)	-	ND(0.1) - ND(0.6)	ND (0.3)	-	ND(0.3) - ND(0.5)	ND (0.3)	-
1,2,4-Trichlorobenzene	ug/L	-	-	0.5	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-
1,2-Dibromoethane (Ethylene dibromid	ug/L	-	-	5	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-
1,2-Dichlorobenzene	ug/L	200	MAC	2.5	ND(0.002) - ND(2)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.002) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
1,2-Dichloroethane	ug/L	5	IMAC	100	ND(0.002) - ND(2)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.002) - ND(0.5)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
1,2-Dichloropropane	ug/L	-	-	0.7	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
1,3-Dichlorobenzene	ug/L	-	-	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
1,3-Dichloropropene	ug/L	-	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-
1,4-Dichlorobenzene	ug/L	5	MAC	4	ND(0.002) - ND(2)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.002) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-

Table 12

Groundwater Chemistry - Deep Wells along the Perimeter of the Facility Property (Interface Aquifer)
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					TW47-00D			TW48-00D			TW49-00D			TW53-03D			TW60-13D		
Sample ID:						47D	47D		48D	48D		49D	49D		53D	53D		60D	60D
Sample Date:			ODWS		11/13/2000 - 11/16/2017	6/4/2018	11/19/2018	06/11/2001 - 11/20/2017	6/6/2018	11/20/2018	06/11/2001 - 11/16/2017	6/6/2018	11/19/2018	10/28/2003 - 11/16/2017	6/4/2018	11/21/2018	11/05/2013 - 11/15/2017	6/5/2018	11/20/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range			Historical Range			Historical Range			Historical Range		
Parameters	Units	a		b															
2-Butanone (Methyl ethyl ketone) (MEK	ug/L	-	-	400	ND(1) - ND(5)	ND (1)	-	ND(5) - 7.7	ND (1)	-	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(10)	ND (1)	-
2-Hexanone	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-
4-Methyl-2-pentanone (Methyl isobutyl	ug/L	-	-	-	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(5)	ND (1)	-	ND(1) - ND(10)	ND (1)	-
Acetone	ug/L	-	-	-	ND(1) - ND(10)	ND (1)	-	ND(10) - 85	ND (1)	-	ND(10) - 35	ND (1)	-	ND(1) - ND(10)	ND (1)	-	ND(1) - ND(30)	ND (1)	-
Benzene	ug/L	1	MAC	100	ND(0.001) - 6.3	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	0.2 - ND(1)	ND (0.2)	-	ND(0.001) - 1.6	ND (0.2)	-	ND(0.2) - 7	0.39	-
Bromodichloromethane	ug/L	-	-	200	ND(0.1) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	-	ND(0.1) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-
Bromoform	ug/L	-	-	60	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.1) - ND(0.8)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-
Bromomethane (Methyl bromide)	ug/L	-	-	0.9	ND(0.2) - ND(0.7)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(0.7)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Carbon tetrachloride	ug/L	2	MAC	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
Chlorobenzene	ug/L	80	MAC	15	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-
Chloroethane	ug/L	-	-	-	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.2) - ND(2)	ND (0.2)	-	ND(0.2) - ND(2)	ND (0.2)	-	ND(0.01) - ND(1)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
Chloroform (Trichloromethane)	ug/L	-	-	-	ND(0.2) - ND(0.6)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	0.1 - ND(1)	ND (0.2)	-	ND(0.2) - 0.7	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Chloromethane (Methyl chloride)	ug/L	-	-	700	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(2)	ND (0.4)	-	ND(0.2) - ND(2)	ND (0.4)	-	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(0.4)	ND (0.4)	-
cis-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-
cis-1,3-Dichloropropene	ug/L	-	-	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
Dibromochloromethane	ug/L	-	-	40	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.6)	ND (0.1)	-	ND(0.1) - ND(0.6)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-
Dichlorodifluoromethane (CFC-12)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-
Ethylbenzene	ug/L	140	MAC	8	ND(0.001) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.001) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Hexane	ug/L	-	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-
m&p-Xylenes	ug/L	-	-	2	ND(0.1) - ND(10)	ND (0.2)	-	ND(0.1) - ND(2)	ND (0.2)	-	ND(0.1) - ND(2)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.2)	-	ND(0.2) - ND(0.5)	0.22	-
Methyl tert butyl ether (MTBE)	ug/L	15	AO	200	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2) - ND(2)	ND (0.2)	-
Methylene chloride	ug/L	50	MAC	100	ND(0.01) - ND(10)	ND (0.3)	-	ND(0.3) - ND(8)	ND (0.3)	-	ND(0.3) - ND(8)	ND (0.3)	-	ND(0.01) - ND(4)	ND (0.3)	-	ND(0.3) - ND(4)	ND (0.3)	-
o-Xylene	ug/L	-	-	40	ND(0.1) - ND(10)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Styrene	ug/L	-	-	4	ND(0.1) - 0.528	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-
Tetrachloroethene	ug/L	10	MAC	50	ND(0.1) - ND(0.3)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	-	ND(0.1) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-
Toluene	ug/L	60	MAC	0.8	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.2) - ND(1)	0.41	-	ND(0.2) - ND(1)	ND (0.2)	-	ND(0.01) - ND(0.5)	ND (0.2)	-	ND(0.2) - 1.5	**1.2**[b]	-
trans-1,2-Dichloroethene	ug/L	-	-	200	ND(0.1) - ND(0.9)	ND (0.2)	-	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.8)	ND (0.2)	-	ND(0.1) - ND(0.9)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-
trans-1,3-Dichloropropene	ug/L	-	-	7	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.4)	ND (0.3)	-	ND(0.2) - ND(0.4)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (0.3)	-
Trichloroethene	ug/L	5	MAC	20	ND(0.01) - ND(10)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	-	ND(0.1) - ND(0.6)	ND (0.2)	-	ND(0.01) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-
Trichlorofluoromethane (CFC-11)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.4)	-	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(1)	ND (0.4)	-	ND(0.2) - ND(0.5)	ND (0.4)	-	ND(0.4) - ND(0.5)	ND (0.4)	-
Vinyl chloride	ug/L	1	MAC	600	ND(0.17) - ND(0.5)	ND (0.17)	-	ND(0.17) - ND(0.4)	ND (0.17)	-	ND(0.17) - ND(0.4)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.17)	-
Xylenes (total)	ug/L	90	MAC	-	ND(0.01) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1.5)	ND (0.2)	-	ND(0.01) - ND(1.5)	ND (0.2)	-	ND(0.2) - ND(1)	0.22	-

Notes:

a	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
b	Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
c	Analytical result outside of the historical concentration range for the parameter.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.

Table 13

Groundwater Chemistry - Wells Located in Sub-Cell 3, Cell 18
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					EW1b-13			EW1c-13				EW2b-13			EW2c-13			PW1-N			PW2-S(R11)			
Sample ID:						EW1B	EW1B		EW1C	EW11C	EW1C		EW2B	EW2B		EW2C	EW2C		PW1	PW1		PW2	PW2	DUP4
Sample Date:			ODWS		05/15/2014 - 11/21/2017	6/5/2018	11/22/2018	05/15/2014 - 11/21/2017	6/5/2018	6/5/2018	11/22/2018	05/15/2014 - 11/21/2017	6/5/2018	11/22/2018	05/15/2014 - 11/21/2017	6/5/2018	11/21/2018	11/14/2001 - 11/21/2017	6/5/2018	11/22/2018	06/16/2011 - 11/20/2017	6/5/2018	11/21/2018	11/21/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range		Duplicate		Historical Range			Historical Range			Historical Range			Historical Range			Duplicate
Parameters	Units	a		b																				
Field Parameters																								
Conductivity, field	uS/cm	-	-	-	1790 - 2060	**1730**[c]	1860	1770 - 2060	**1710**[c]	**1710**[c]	**1010**[c]	460 - 1100	779	848	457 - 1080	**5760**[c]	829	1360 - 1880	1690	1600	1960 - 2000	**910**[c]	**1720**[c]	**1720**[c]
pH, field	s.u.	6.5-8.5	OG	6.5-8.5	7.14 - 7.52	7.27	7.41	6.74 - 7.5	7.18	7.18	7.36	7.44 - 7.54	7.47	**7.68**[c]	7.44 - 7.78	**7.25**[c]	7.64	7.57 - 8.37	**7.38**[c]	8.35	6.13 - 8.8	7.38	7.97	7.97
Temperature, field	Deg C	15	AO	-	11.3 - 15.4	13.6	**9.91**[c]	11.4 - 14.7	13.5	13.5	**10.4**[c]	11.4 - 16.4	13.3	**9.96**[c]	11.6 - 13.8	13.3	**10.72**[c]	8.8 - 18.3	11.8	10.22	11.3 - 11.6	**11.2**[c]	**9.05**[c]	**9.05**[c]
General Indicators																								
Conductivity, electrical	uS/cm	-	-	-	1700 - 1930	**1650**[c]	1740	1670 - 1900	**1640**[c]	**1630**[c]	1720	729 - 847	734	746	722 - 859	**720**[c]	731	1400 - 1920	1660	1490	1580 - 2770	**1560**[c]	**1570**[c]	1580
pH	s.u.	6.5-8.5	OG	6.5-8.5	7.89 - 8.23	**7.83**[c]	8.07	7.82 - 8.22	7.84	**7.81**[c]	8.08	8.05 - 8.37	**7.8**[c]	8.09	8.04 - 8.28	**7.73**[c]	8.14	7.99 - 8.54	**7.97**[c]	8.25	8.16 - 8.72	**7.97**[c]	**8.12**[c]	8.17
Total dissolved solids (TDS)	mg/L	500	AO	-	930 - 1230	**940**[a]	**910**[ac]	920 - 1180	**906**[ac]	**942**[a]	**912**[ac]	370 - 521	378	370	374 - 540	**358**[c]	**358**[c]	750 - 1250	**840**[a]	**746**[ac]	802 - 1800	**790**[ac]	**760**[ac]	**780**[ac]
Minor Ions - Anions																								
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	-	279 - 321	302	286	283 - 326	306	302	298	225 - 257	243	232	208 - 248	237	228	197 - 355	326	330	42 - 454	336	330	326
Chloride	mg/L	250	AO	-	302 - 345	**356**[ac]	**312**[a]	281 - 329	**348**[ac]	**348**[ac]	**303**[a]	95 - 104	**105**[c]	95	92 - 109	104	94.2	315 - 408	**388**[a]	**267**[ac]	277 - 600	**336**[a]	**296**[a]	**297**[a]
Sulfate	mg/L	500	AO	-	128 - 147	135	**125**[c]	120 - 165	133	133	**116**[c]	4.04 - 52	**4.02**[c]	**3.74**[c]	1.14 - 72	**0.81**[c]	**0.82**[c]	1 - 49	5.3	6.6	ND(0.5) - 24	7.3	3.76	3.61
Major Ions - Cations																								
Calcium (dissolved)	mg/L	-	-	-	87.7 - 109	**77.3**[c]	**70.5**[c]	85.9 - 108	**76.4**[c]	**76.3**[c]	**69.1**[c]	34 - 51	**33.6**[c]	**31.7**[c]	32.5 - 54	**32.2**[c]	**30.2**[c]	19 - 159	**16.5**[c]	**10.8**[c]	14 - 33	16	14.6	14
Magnesium (dissolved)	mg/L	-	-	-	48.4 - 62	**44.4**[c]	**40.6**[c]	47.8 - 57	**42.9**[c]	**43**[c]	**41**[c]	15.3 - 21	**14.9**[c]	**14.2**[c]	14.8 - 22	**14.4**[c]	**13.9**[c]	6.64 - 50	7.03	**4.17**[c]	6 - 16	7.11	6.81	6.4
Potassium (dissolved)	mg/L	-	-	-	4.77 - 6	**4.48**[c]	**4.08**[c]	4.74 - 6	**4.39**[c]	**4.46**[c]	**3.98**[c]	2.63 - 3	2.68	**2.27**[c]	2.42 - 3	2.54	**2.22**[c]	ND(1) - 45	2.14	1.88	2 - 23	2.16	**1.84**[c]	**1.83**[c]
Sodium (dissolved)	mg/L	20/200	AO	-	182 - 211	**171**[ac]	**157**[ac]	179 - 202	**168**[ac]	**167**[ac]	**156**[ac]	93.6 - 106	**93.5**[ac]	**89.1**[ac]	93.5 - 103	**93.1**[ac]	**87.9**[ac]	92 - 391	**303**[a]	**243**[a]	310 - 579	**285**[ac]	**270**[ac]	**258**[ac]
Major Ions - Nutrients																								
Ammonia-N	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ND(0.05) - 0.27	-	-	ND(0.05) - 0.39	-	-	-
Nitrate (as N)	mg/L	10.0	MAC	-	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND (0.25)	ND(0.1)	ND (0.25)	ND (0.1)	ND(0.1)	ND (0.25)	ND (0.1)	0.065 - ND(1)	ND (0.5)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	-	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.1) - ND(0.25)	ND (0.5)	ND (0.5)	ND (0.25)	ND(0.1)	ND (0.25)	ND (0.1)	ND(0.1)	ND (0.25)	ND (0.1)	ND(0.01) - ND(0.25)	ND (0.5)	ND (0.25)	ND(0.01) - ND(0.25)	ND (0.5)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																								
Bromide	mg/L	-	-	-	1.81 - 2.98	**0.8**[c]	2.93	1.65 - 2.96	1.9	2	2.67	0.56 - 1.18	ND (0.25)	1.03	0.68 - 1.03	ND (0.25)	0.94	0.2 - ND(3.5)	ND (0.5)	ND (0.25)	ND(0.25) - 2.37	ND (0.5)	ND (0.25)	ND (0.25)
Cyanide (free)	mg/L	-	-	0.005	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.005)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.02)	ND (0.002)	ND (0.002)	ND(0.002) - ND(0.01)	ND (0.002)	ND (0.002)	ND (0.002)
Fluoride	mg/L	1.5	MAC	-	0.74 - 1.51	ND (0.5)	0.91	0.72 - 1.54	ND (0.5)	ND (0.5)	0.79	0.81 - 1.36	ND (0.25)	1.02	0.84 - 1.45	ND (0.25)	0.98	0.45 - 14	ND (0.5)	**0.39**[c]	0.44 - 8.2	ND (0.5)	0.54	0.55
Metals																								
Arsenic (dissolved)	mg/L	0.010	IMAC	0.005	ND(0.001) - ND(0.005)	ND (0.003)	-	0.002 - ND(0.005)	ND (0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	ND(0.001) - ND(0.003)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	0.001 - ND(0.01)	ND (0.003)	-	-
Barium (dissolved)	mg/L	1.0	MAC	-	0.048 - 0.07	0.05	-	0.049 - 0.06	0.052	0.054	-	0.12 - 0.14	0.127	-	0.11 - 0.14	**0.141**[c]	-	0.179 - 0.57	**0.17**[c]	-	0.17 - 0.41	**0.136**[c]	-	-
Boron (dissolved)	mg/L	5.0	IMAC	0.2	1.2 - 1.4	**1.24**[b]	-	1.1 - 1.4	**1.19**[b]	**1.18**[b]	-	1.1 - 1.3	**1.12**[b]	-	1.1 - 1.26	**1.15**[b]	-	1.6 - 2.7	**1.75**[b]	-	2.1 - 3.6	**2.17**[b]	-	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0002	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.0004)	ND (0.001)	-	ND(0.0001) - ND(0.001)	ND (0.001)	-	ND(0.0001) - ND(0.001)	ND (0.001)	-	-
Calcium	mg/L	-	-	-	-	90.3	-	-	90.2	89.5	-	-	33.6	-	-	32.4	-	87	**18.4**[c]	-	74	**17.8**[c]	-	-
Chromium	mg/L	0.05	MAC	0.001	ND(0.003)	ND (0.003)	-	ND(0.003)	ND (0.003)	ND (0.003)	-	ND(0.003)	**0.003**[b]	-	ND(0.003)	**0.003**[b]	-	0.003 - 0.005	**0.004**[b]	-	ND(0.003) - 0.005	**0.005**[b]	-	-
Iron (dissolved)	mg/L	0.30	AO	0.3	0.11 - 0.67	**0.661**[ab]	-	0.04 - 0.54	**0.503**[ab]	**0.518**[ab]	-	ND(0.01) - 0.08	ND (0.01)	-	ND(0.01) - 0.22	ND (0.01)	-	ND(0.019) - 0.527	**0.452**[ab]	-	ND(0.01) - 0.64	0.072	-	-
Lead (dissolved)	mg/L	0.01	MAC	0.005	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.001) - ND(0.002)	ND (0.001)	-	ND(0.0005) - ND(0.01)	0.004	-	ND(0.001) - ND(0.01)	ND (0.001)	-	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0002	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	ND(0.0001)	ND (0.0001)	-	-
Nickel (dissolved)	mg/L	-	-	0.025	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.003) - ND(0.005)	ND (0.003)	-	ND(0.001) - ND(0.05)	ND (0.003)	-	ND(0.003) - ND(0.05)	ND (0.003)	-	-
Zinc (dissolved)	mg/L	5.0	AO	0.03	ND(0.005) - 0.01	ND (0.005)	-	ND(0.005) - 0.01	ND (0.005)	ND (0.005)	-	ND(0.005) - ND(0.01)	ND (0.005)	-	ND(0.005) - 0.01	ND (0.005)	-	ND(0.005) - ND(0.1)	0.019	-	ND(0.005) - ND(0.1)	0.007	-	-

Table 13

Groundwater Chemistry - Wells Located in Sub-Cell 3, Cell 18
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc. - Lambton Facility

Sample Location:					EW1b-13			EW1c-13				EW2b-13			EW2c-13			PW1-N			PW2-S(R11)			
Sample ID:						EW1B	EW1B		EW1C	EW11C	EW1C		EW2B	EW2B		EW2C	EW2C		PW1	PW1		PW2	PW2	DUP4
Sample Date:			ODWS		05/15/2014 - 11/21/2017	6/5/2018	11/22/2018	05/15/2014 - 11/21/2017	6/5/2018	6/5/2018	11/22/2018	05/15/2014 - 11/21/2017	6/5/2018	11/22/2018	05/15/2014 - 11/21/2017	6/5/2018	11/21/2018	11/14/2001 - 11/21/2017	6/5/2018	11/22/2018	06/16/2011 - 11/20/2017	6/5/2018	11/21/2018	11/21/2018
		ODWS	SOURCE	PWQO	Historical Range			Historical Range		Duplicate		Historical Range			Historical Range			Historical Range			Historical Range			Duplicate
Parameters	Units	a		b																				
Volatile Organic Compounds																								
1,1,1,2-Tetrachloroethane	ug/L	-	-	20	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.4)	-	ND(0.1) - ND(1)	ND (0.4)	-	-
1,1,1-Trichloroethane	ug/L	-	-	10	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.01) - ND(10)	ND (1.2)	-	ND(0.3) - ND(1)	ND (1.2)	-	-
1,1,2,2-Tetrachloroethane	ug/L	-	-	70	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
1,1,2-Trichloroethane	ug/L	-	-	800	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(2)	ND (0.8)	-	ND(0.2) - ND(2)	ND (0.8)	-	-
1,1-Dichloroethane	ug/L	-	-	200	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.3) - ND(0.4)	ND (0.3)	-	ND(0.01) - ND(10)	ND (1.2)	-	ND(0.3) - ND(1)	ND (1.2)	-	-
1,1-Dichloroethene	ug/L	14	MAC	40	ND(0.3) - ND(0.5)	ND (0.3)	-	ND(0.3) - ND(0.5)	ND (0.3)	ND (0.3)	-	ND(0.3) - ND(0.5)	ND (0.3)	-	ND(0.3) - ND(0.5)	ND (0.3)	-	ND(0.1) - ND(1)	ND (1.2)	-	ND(0.3) - ND(1)	ND (1.2)	-	-
1,2,4-Trichlorobenzene	ug/L	-	-	0.5	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.1) - ND(0.3)	ND (1.2)	-	ND(0.1) - ND(0.3)	ND (1.2)	-	-
1,2-Dibromoethane (Ethylene dibromid	ug/L	-	-	5	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
1,2-Dichlorobenzene	ug/L	200	MAC	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.002) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
1,2-Dichloroethane	ug/L	5	IMAC	100	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.002) - ND(2)	ND (0.8)	-	ND(0.2) - ND(2)	ND (0.8)	-	-
1,2-Dichloropropane	ug/L	-	-	0.7	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
1,3-Dichlorobenzene	ug/L	-	-	2.5	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
1,3-Dichloropropene	ug/L	-	-	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (0.3)	-	ND(0.3)	ND (1.2)	-	ND(0.3)	ND (1.2)	-	-
1,4-Dichlorobenzene	ug/L	5	MAC	4	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.002) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
2-Butanone (Methyl ethyl ketone) (MEK	ug/L	-	-	400	ND(1)	ND (1)	-	ND(1)	ND (1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	ND(1) - ND(50)	ND (4)	-	ND(1) - ND(50)	ND (4)	-	-
2-Hexanone	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	ND (1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (4)	-	ND(1)	ND (4)	-	-
4-Methyl-2-pentanone (Methyl isobutyl	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	ND (1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	ND(1) - ND(50)	ND (4)	-	ND(1) - ND(50)	ND (4)	-	-
Acetone	ug/L	-	-	-	ND(1)	ND (1)	-	ND(1)	ND (1)	ND (1)	-	ND(1)	ND (1)	-	ND(1)	ND (1)	-	ND(1) - ND(100)	ND (4)	-	ND(1) - ND(100)	ND (4)	-	-
Benzene	ug/L	1	MAC	100	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.001) - 1.9	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
Bromodichloromethane	ug/L	-	-	200	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
Bromoform	ug/L	-	-	60	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
Bromomethane (Methyl bromide)	ug/L	-	-	0.9	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(5)	ND (0.8)	-	ND(0.2) - ND(5)	ND (0.8)	-	-
Carbon tetrachloride	ug/L	2	MAC	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
Chlorobenzene	ug/L	80	MAC	15	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(0.2)	ND (0.1)	-	ND(0.1) - ND(1)	ND (0.4)	-	ND(0.1) - ND(1)	ND (0.4)	-	-
Chloroethane	ug/L	-	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.01) - ND(10)	ND (0.8)	-	ND(0.2) - ND(2)	ND (0.8)	-	-
Chloroform (Trichloromethane)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - 23.8	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
Chloromethane (Methyl chloride)	ug/L	-	-	700	ND(0.2) - ND(0.4)	ND (0.4)	-	ND(0.2) - ND(0.4)	ND (0.4)	ND (0.4)	-	ND(0.2) - ND(0.4)	ND (0.4)	-	ND(0.2) - ND(0.4)	ND (0.4)	-	ND(0.2) - ND(1)	ND (1.6)	-	ND(0.2) - ND(1)	ND (1.6)	-	-
cis-1,2-Dichloroethene	ug/L	-	-	200	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
cis-1,3-Dichloropropene	ug/L	-	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2) - ND(2)	ND (0.8)	-	ND(0.2) - ND(2)	ND (0.8)	-	-
Dibromochloromethane	ug/L	-	-	40	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(0.3)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
Dichlorodifluoromethane (CFC-12)	ug/L	-	-	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(5)	ND (0.8)	-	ND(0.2) - ND(5)	ND (0.8)	-	-
Ethylbenzene	ug/L	140	MAC	8	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.001) - ND(1)	ND (0.4)	-	ND(0.1) - ND(1)	ND (0.4)	-	-
Hexane	ug/L	-	-	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2) - ND(5)	ND (0.8)	-	ND(0.2) - ND(5)	ND (0.8)	-	-
m&p-Xylenes	ug/L	-	-	2	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(10)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
Methyl tert butyl ether (MTBE)	ug/L	15	AO	200	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2)	ND (0.2)	-	ND(0.2) - ND(2)	ND (0.8)	-	ND(0.2) - ND(2)	ND (0.8)	-	-
Methylene chloride	ug/L	50	MAC	100	ND(0.3) - ND(4)	ND (0.3)	-	ND(0.3) - ND(4)	ND (0.3)	ND (0.3)	-	ND(0.3) - ND(4)	ND (0.3)	-	ND(0.3) - ND(4)	ND (0.3)	-	ND(0.01) - ND(10)	ND (1.2)	-	ND(0.3) - ND(5)	ND (1.2)	-	-
o-Xylene	ug/L	-	-	40	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(0.4)	ND (0.1)	-	ND(0.1) - ND(10)	ND (0.4)	-	ND(0.1) - ND(1)	ND (0.4)	-	-
Styrene	ug/L	-	-	4	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(0.5)	ND (0.1)	-	ND(0.1) - ND(2)	ND (0.4)	-	ND(0.1) - ND(2)	ND (0.4)	-	-
Tetrachloroethene	ug/L	10	MAC	50	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
Toluene	ug/L	60	MAC	0.8	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.01) - ND(10)	ND (0.8)	-	ND(0.2) - ND(2)	ND (0.8)	-	-
trans-1,2-Dichloroethene	ug/L	-	-	200	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.2) - ND(0.4)	ND (0.2)	-	ND(0.1) - ND(1)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
trans-1,3-Dichloropropene	ug/L	-	-	7	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(0.3)	ND (0.3)	-	ND(0.2) - ND(2)	ND (1.2)	-	ND(0.2) - ND(2)	ND (1.2)	-	-
Trichloroethene	ug/L	5	MAC	20	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.2) - ND(0.3)	ND (0.2)	-	ND(0.01) - ND(10)	ND (0.8)	-	ND(0.2) - ND(1)	ND (0.8)	-	-
Trichlorofluoromethane (CFC-11)	ug/L	-	-	-	ND(0.4) - ND(0.5)	ND (0.4)	-	ND(0.4) - ND(0.5)	ND (0.4)	ND (0.4)	-	ND(0.4) - ND(0.5)	ND (0.4)	-	ND(0.4) - ND(0.5)	ND (0.4)	-	ND(0.2) - ND(2)	ND (1.6)	-	ND(0.4) - ND(2)	ND (1.6)	-	-
Vinyl chloride	ug/L	1	MAC	600	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.17)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.17) - ND(0.2)	ND (0.17)	-	ND(0.17) - ND(2)	ND (0.68)	-	ND(0.17) - ND(2)	ND (0.68)	-	-
Xylenes (total)	ug/L	90	MAC	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.2) - ND(0.5)	ND (0.2)	-	ND(0.01) - ND(1.5)	ND (0.8)	-	ND(0.2) - ND(1.5)	ND (0.8)	-	-

Notes:

a	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
b	Indicates value exceeds Policy and Guidelines - Provincial Water Quality Guidelines. The Ontario Ministry of the Environment and Energy, July 1994 (PWQO). With the exception of Mercury, the PWQO criteria for metals apply to unfiltered sample. Protocol requires that all groundwater samples were filtered, and this factor should be recognized when reviewing the findings.
c	Analytical result outside of the historical concentration range for the parameter.
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL [1]
EW1a-01	Chloride	mg/L	2004 - 2008	8	0%	306	364	382
	Sulfate	mg/L	2004 - 2008	8	0%	67	136	185
	Potassium (dissolved)	mg/L	2004 - 2008	8	0%	3.7	8	9.2
	Sodium (dissolved)	mg/L	2004 - 2008	8	0%	242	300	321
	Bromide	mg/L	2004 - 2008	8	13%	0.96	3.5 U	2.3
	Fluoride	mg/L	2004 - 2008	8	0%	1.44	2	2.2
	Barium (dissolved)	mg/L	2006 - 2013	8	13%	0.1 U	0.11	0.14
	Boron (dissolved)	mg/L	2006 - 2013	8	0%	1	1.9	2.2
EW1b-13	Chloride	mg/L	2014 - 2017	8	0%	302	345	370
	Sulfate	mg/L	2014 - 2017	8	0%	128	147	160
	Potassium (dissolved)	mg/L	2014 - 2017	8	0%	4.77	6	6.7
	Sodium (dissolved)	mg/L	2014 - 2017	8	0%	182	211	225
	Bromide	mg/L	2014 - 2017	8	0%	1.81	2.98	3.9
	Fluoride	mg/L	2014 - 2017	8	0%	0.74	1.51	2.2
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.048	0.07	0.09
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1.2	1.4	1.5
EW1c-13	Chloride	mg/L	2014 - 2017	8	0%	281	329	360
	Sulfate	mg/L	2014 - 2017	8	0%	120	165	183
	Potassium (dissolved)	mg/L	2014 - 2017	8	0%	4.74	6	6.2
	Sodium (dissolved)	mg/L	2014 - 2017	8	0%	179	202	217
	Bromide	mg/L	2014 - 2017	8	0%	1.65	2.96	3.8
	Fluoride	mg/L	2014 - 2017	8	0%	0.72	1.54	2.2
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.049	0.06	0.07
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1.1	1.4	1.7
EW2a-01	Chloride	mg/L	2001 - 2005	8	0%	129	220	251
	Sulfate	mg/L	2001 - 2005	8	0%	110	150	177
	Potassium (dissolved)	mg/L	2001 - 2005	8	0%	3.7	8.1	9.8
	Sodium (dissolved)	mg/L	2001 - 2005	8	0%	83	100	111
	Bromide	mg/L	2003 - 2006	8	13%	1.8 U	1.7	2.2
	Fluoride	mg/L	2003 - 2006	8	0%	0.9	1.38	1.6
	Barium (dissolved)	mg/L	2003 - 2011	8	0%	0.08	0.11	0.12
	Boron (dissolved)	mg/L	2003 - 2011	8	0%	0.83	1.15	1.3
EW2b-13	Chloride	mg/L	2014 - 2017	8	0%	95	104	110
	Sulfate	mg/L	2014 - 2017	8	0%	4.04	52	75
	Potassium (dissolved)	mg/L	2014 - 2017	8	0%	2.63	3	3.4
	Sodium (dissolved)	mg/L	2014 - 2017	8	0%	93.6	106	113
	Bromide	mg/L	2014 - 2017	8	0%	0.56	1.18	1.5
	Fluoride	mg/L	2014 - 2017	8	0%	0.81	1.36	1.7
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.12	0.14	0.16
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1.1	1.3	1.5

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
EW2c-13	Chloride	mg/L	2014 - 2017	8	0%	92	109	116
	Sulfate	mg/L	2014 - 2017	8	0%	1.14	72	118
	Potassium (dissolved)	mg/L	2014 - 2017	8	0%	2.42	3	3.6
	Sodium (dissolved)	mg/L	2014 - 2017	8	0%	93.5	103	110
	Bromide	mg/L	2014 - 2017	8	0%	0.68	1.03	1.3
	Fluoride	mg/L	2014 - 2017	8	0%	0.84	1.45	1.8
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.11	0.141	0.167
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1.1	1.26	1.4
OW1-92	Chloride	mg/L	1993 - 1996	8	0%	335	490	597
	Sulfate	mg/L	1993 - 1996	8	50%	0.05 U	7.6	9.7
	Potassium (dissolved)	mg/L	1993 - 1996	8	0%	0.4	3.3	5.4
	Sodium (dissolved)	mg/L	1993 - 1996	8	0%	277	416	499
	Bromide	mg/L	1996 - 2000	8	50%	0.35 U	1.4	2.1
	Fluoride	mg/L	1996 - 1999	8	0%	0.92	1.9	2.4
	Barium (dissolved)	mg/L	1993 - 1997	8	0%	0.088	0.32	0.420
	Boron (dissolved)	mg/L	1993 - 1999	8	13%	0.03 U	2.61	4.4
OW32-90D	Chloride	mg/L	1991 - 1994	8	0%	276	365	443
	Sulfate	mg/L	1991 - 1994	8	0%	3.19	10.6	13
	Potassium (dissolved)	mg/L	1991 - 1994	8	0%	2.4	5.2	6.0
	Sodium (dissolved)	mg/L	1991 - 1994	8	0%	228	274	296
	Bromide	mg/L	1996 - 2000	8	38%	0.35 U	0.7	1.1
	Fluoride	mg/L	1996 - 2000	8	0%	1.21	1.5	1.7
	Barium (dissolved)	mg/L	1991 - 1994	8	0%	0.094	0.177	0.238
	Boron (dissolved)	mg/L	1991 - 1994	8	0%	1.43	2.1	2.3
OW32-90S	Chloride	mg/L	1991 - 1994	8	0%	32	45	53
	Sulfate	mg/L	1991 - 1994	8	0%	271	395	482
	Potassium (dissolved)	mg/L	1991 - 1994	8	0%	3.3	4.487	5.0
	Sodium (dissolved)	mg/L	1991 - 1994	8	0%	42	68	79
	Bromide	mg/L	1996 - 2000	8	50%	0.35 U	0.9	1.0
	Fluoride	mg/L	1996 - 2000	8	0%	0.26	0.9	1.4
	Barium (dissolved)	mg/L	1991 - 1994	8	0%	0.039	0.049	0.053
	Boron (dissolved)	mg/L	1991 - 1994	8	0%	1.4	3.71	5.0
OW35-05D	Chloride	mg/L	2005 - 2008	8	0%	244	261	264
	Sulfate	mg/L	2005 - 2008	8	13%	0.5 U	3	5.3
	Potassium (dissolved)	mg/L	2005 - 2008	8	0%	2.0	2.4	2.5
	Sodium (dissolved)	mg/L	2005 - 2008	8	0%	232	310	330
	Bromide	mg/L	2005 - 2008	8	0%	0.15	0.90	1.3
	Fluoride	mg/L	2005 - 2008	8	0%	1.11	1.5	1.7
	Barium (dissolved)	mg/L	2005 - 2011	8	0%	0.11	0.22	0.3
	Boron (dissolved)	mg/L	2005 - 2011	8	0%	1.4	1.9	2.1

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
OW35-90S	Chloride	mg/L	1991 - 1995	8	0%	19	37	40
	Sulfate	mg/L	1991 - 1995	8	0%	152	235	272
	Potassium (dissolved)	mg/L	1991 - 1994	8	0%	1.4	3.5	4.7
	Sodium (dissolved)	mg/L	1991 - 1994	8	0%	45.5	53.5	58.6
	Bromide	mg/L	1996 - 2000	8	88%	0.02 U	0.25	0.4
	Fluoride	mg/L	1996 - 2000	8	0%	0.64	1	1.3
	Barium (dissolved)	mg/L	1991 - 1994	8	0%	0.033	0.109	0.123
	Boron (dissolved)	mg/L	1991 - 1994	8	0%	0.56	1.3	1.5
PW1-N	Chloride	mg/L	2001 - 2005	8	0%	340	388	410
	Sulfate	mg/L	2001 - 2005	8	75%	1 U	5 U	3.2
	Potassium (dissolved)	mg/L	2001 - 2005	8	0%	1.9	2.7	2.9
	Sodium (dissolved)	mg/L	2001 - 2005	8	0%	300	350	366
	Bromide	mg/L	2003 - 2006	8	13%	0.6	3.5 U	2.1
	Fluoride	mg/L	2003 - 2006	8	0%	0.94	1.3	1.6
	Barium (dissolved)	mg/L	2003 - 2010	8	0%	0.25	0.34	0.364
	Boron (dissolved)	mg/L	2003 - 2010	8	0%	1.9	2.2	2.5
PW2-S(R11)	Chloride	mg/L	2011 - 2014	8	0%	277	600	762
	Sulfate	mg/L	2011 - 2014	8	63%	1 U	24	35.7
	Potassium (dissolved)	mg/L	2011 - 2014	8	0%	2	23	26.9
	Sodium (dissolved)	mg/L	2011 - 2014	8	0%	341	579	666
	Bromide	mg/L	2011 - 2014	8	13%	0.25 U	2.37	3.0
	Fluoride	mg/L	2011 - 2014	8	0%	0.94	8.2	9.5
	Barium (dissolved)	mg/L	2011 - 2015	8	0%	0.17	0.41	0.50
	Boron (dissolved)	mg/L	2011 - 2015	8	0%	2.1	3.6	4.3
TW21-94-II	Chloride	mg/L	1994 - 2000	8	0%	8.5	16	18
	Sulfate	mg/L	1994 - 2000	8	0%	85	189	255
	Potassium (dissolved)	mg/L	1994 - 2000	8	25%	1 U	3.2	4.8
	Sodium (dissolved)	mg/L	1994 - 2000	8	0%	28	43	53
	Bromide	mg/L	1994 - 2000	8	100%	0.02 U	0.5 U	0.37
	Fluoride	mg/L	1994 - 2000	8	0%	0.35	0.9	1.2
	Barium (dissolved)	mg/L	1994 - 2004	8	0%	0.051	0.073	0.083
	Boron (dissolved)	mg/L	1994 - 2004	8	13%	0.03 U	0.309	0.375
TW22-94	Chloride	mg/L	1994 - 2000	8	0%	30	66	88
	Sulfate	mg/L	1994 - 2000	8	0%	295	358	399
	Potassium (dissolved)	mg/L	1994 - 2000	8	0%	2	4.4	5.7
	Sodium (dissolved)	mg/L	1994 - 2000	8	0%	60.2	80	90
	Bromide	mg/L	1994 - 2000	8	88%	0.05 U	0.5 U	0.4
	Fluoride	mg/L	1994 - 2000	8	0%	0.79	1.3	1.6
	Barium (dissolved)	mg/L	1997 - 2004	8	13%	0.002 U	0.058	0.086
	Boron (dissolved)	mg/L	1997 - 2004	8	13%	0.03 U	0.295	0.383

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW22-99D	Chloride	mg/L	1999 - 2002	8	0%	1010	1690	1992
	Sulfate	mg/L	1999 - 2002	8	63%	0.5 U	3.6	5.2
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	2	3.2	3.9
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	820	1250	1371
	Bromide	mg/L	1999 - 2002	8	50%	0.2 U	4	6.1
	Fluoride	mg/L	1999 - 2002	8	13%	0.05 U	3.2	5.2
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.35	0.597	0.657
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	3.9	5.36	5.9
TW30-94	Chloride	mg/L	1999 - 2002	8	0%	4.6	5.6	5.9
	Sulfate	mg/L	1999 - 2002	8	0%	105	151	160
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1	3.829	4.9
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	31.2	49	53.4
	Bromide	mg/L	1999 - 2002	8	100%	0.2 U	0.5 U	0.3
	Fluoride	mg/L	1999 - 2002	8	0%	1	1.74	1.9
	Barium (dissolved)	mg/L	1999 - 2005	8	0%	0.029	0.058	0.076
	Boron (dissolved)	mg/L	1999 - 2005	8	13%	0.03 U	0.172	0.302
TW30-99D	Chloride	mg/L	1999 - 2002	8	0%	236	365	438
	Sulfate	mg/L	1999 - 2002	8	38%	1 U	3.3	4.9
	Potassium (dissolved)	mg/L	1999 - 2002	8	13%	1 U	3	4.6
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	231	320	355
	Bromide	mg/L	1999 - 2002	8	38%	0.35 U	0.86	1.5
	Fluoride	mg/L	1999 - 2002	8	0%	1.2	1.6	1.9
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.34	0.43	0.45
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	1.6	1.99	2.1
TW32-94-I	Chloride	mg/L	1994 - 2014	8	0%	4690	7720	8680
	Sulfate	mg/L	1994 - 2014	8	25%	0.5 U	15	18.4
	Potassium (dissolved)	mg/L	1994 - 2014	8	0%	8	17	22.3
	Sodium (dissolved)	mg/L	1994 - 2014	8	0%	4120	5345	6069
	Bromide	mg/L	1994 - 2014	8	88%	0.02 U	50 U	29.7
	Fluoride	mg/L	1994 - 2014	8	0%	0.55	9.5	11.1
	Barium (dissolved)	mg/L	1994 - 2017	8	0%	1.6	2.5	2.9
	Boron (dissolved)	mg/L	1994 - 2017	8	0%	7	10.0	10.9
TW32-94-II	Chloride	mg/L	1994 - 2000	8	0%	227	408	468
	Sulfate	mg/L	1994 - 2000	8	0%	1.8	7	8.3
	Potassium (dissolved)	mg/L	1994 - 2000	8	0%	1	4	5.9
	Sodium (dissolved)	mg/L	1994 - 2000	8	0%	243	307	337
	Bromide	mg/L	1994 - 2000	8	38%	0.35 U	1	1.5
	Fluoride	mg/L	1994 - 2000	8	0%	1.1	1.7	2.0
	Barium (dissolved)	mg/L	1994 - 2004	8	0%	0.013	0.19	0.20
	Boron (dissolved)	mg/L	1994 - 2004	8	0%	0.27	3.83	4.74

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL [1]
TW32-94-IV	Chloride	mg/L	1994 - 2000	8	0%	17.2	23.7	27.9
	Sulfate	mg/L	1994 - 2000	8	0%	196	564	701
	Potassium (dissolved)	mg/L	1994 - 2000	8	0%	1	4	5.6
	Sodium (dissolved)	mg/L	1994 - 2000	8	0%	68.2	98	106
	Bromide	mg/L	1994 - 2000	8	75%	0.02 U	0.5 U	0.37
	Fluoride	mg/L	1994 - 2000	8	0%	0.85	1.2	1.4
	Barium (dissolved)	mg/L	1997 - 2004	8	0%	0.014	0.19	0.22
	Boron (dissolved)	mg/L	1997 - 2004	8	0%	0.13	1.8	2.1
TW33-94-I	Chloride	mg/L	1994 - 2000	8	0%	212	344	406
	Sulfate	mg/L	1994 - 2000	8	25%	0.5 U	3.6	6.2
	Potassium (dissolved)	mg/L	1994 - 2000	8	13%	1 U	2.6	3.8
	Sodium (dissolved)	mg/L	1994 - 2000	8	0%	201	259	283
	Bromide	mg/L	1994 - 2000	8	50%	0.35 U	0.7	1.0
	Fluoride	mg/L	1994 - 2000	8	0%	0.9	1.3	1.6
	Barium (dissolved)	mg/L	1994 - 2004	8	0%	0.15	0.31	0.37
	Boron (dissolved)	mg/L	1994 - 2004	8	0%	1.7	2.3	2.4
TW34-94-I	Chloride	mg/L	1994 - 2000	8	0%	151	273	311
	Sulfate	mg/L	1994 - 2000	8	38%	0.5 U	3.1	5.2
	Potassium (dissolved)	mg/L	1994 - 2000	8	0%	1.7	3	3.8
	Sodium (dissolved)	mg/L	1994 - 2000	8	0%	181	268	298
	Bromide	mg/L	1994 - 2000	8	63%	0.35 U	0.6	0.9
	Fluoride	mg/L	1994 - 2000	8	0%	1.2	1.6	1.8
	Barium (dissolved)	mg/L	1994 - 2004	8	0%	0.183	0.45	0.59
	Boron (dissolved)	mg/L	1994 - 2004	8	0%	1.4	1.74	1.9
TW38-94-I	Chloride	mg/L	2013 - 2015	6	0%	16300	18000	18779
	Sulfate	mg/L	2013 - 2015	6	67%	1	10 U	8.7
	Potassium (dissolved)	mg/L	2013 - 2015	6	0%	24	42	53
	Sodium (dissolved)	mg/L	2013 - 2015	6	0%	10800	12200	13307
	Bromide	mg/L	2013 - 2015	6	67%	2.5 U	16.1	22.1
	Fluoride	mg/L	2013 - 2015	6	0%	0.66	0.77	0.83
	Barium (dissolved)	mg/L	2013 - 2015	3	0%	5.8	7.1	8.4
	Boron (dissolved)	mg/L	2013 - 2015	3	0%	5.6	6.7	8.1
TW39-99D	Chloride	mg/L	1999 - 2002	8	0%	315	528	658
	Sulfate	mg/L	1999 - 2002	8	13%	1 U	5.9	9.1
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1	2.1	3.0
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	289	397	425
	Bromide	mg/L	1999 - 2002	8	25%	0.35 U	3	4.0
	Fluoride	mg/L	1999 - 2002	8	0%	1.3	2	2.2
	Barium (dissolved)	mg/L	1999 - 2005	8	0%	0.18	0.312	0.35
	Boron (dissolved)	mg/L	1999 - 2005	8	0%	1.9	2.27	2.4

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW39-99I	Chloride	mg/L	1999 - 2002	8	0%	17	28.8	31.8
	Sulfate	mg/L	1999 - 2002	8	0%	315	389	408
	Potassium (dissolved)	mg/L	1999 - 2002	8	13%	1 U	2.2	3.0
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	68.1	94	103
	Bromide	mg/L	1999 - 2002	8	50%	0.2 U	0.38	0.5
	Fluoride	mg/L	1999 - 2002	8	0%	0.75	1.5	1.7
	Barium (dissolved)	mg/L	1999 - 2005	8	0%	0.042	0.066	0.078
	Boron (dissolved)	mg/L	1999 - 2005	8	0%	0.12	0.18	0.20
TW39-99S	Chloride	mg/L	1999 - 2002	8	0%	17.5	21.1	22.4
	Sulfate	mg/L	1999 - 2002	8	0%	298	477	511
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1.9	2.4	2.6
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	61	79.6	90.8
	Bromide	mg/L	1999 - 2002	8	38%	0.35 U	0.4	0.5
	Fluoride	mg/L	1999 - 2002	8	0%	0.6	1.3	1.5
	Barium (dissolved)	mg/L	1999 - 2005	8	0%	0.033	0.044	0.049
	Boron (dissolved)	mg/L	1999 - 2005	8	0%	0.211	0.289	0.327
TW40-99D	Chloride	mg/L	1999 - 2002	8	0%	247	480	538
	Sulfate	mg/L	1999 - 2002	8	0%	1.5	6	8.2
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1.9	3	3.7
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	232	333	378
	Bromide	mg/L	1999 - 2002	8	38%	0.35 U	3.2	4.1
	Fluoride	mg/L	1999 - 2002	8	0%	0.99	1.4	1.7
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.19	0.32	0.38
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	1.62	2.2	2.4
TW40-99S	Chloride	mg/L	1999 - 2002	8	0%	17	26	29
	Sulfate	mg/L	1999 - 2002	8	0%	126	144	155
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	2	3	3.4
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	42.2	54.9	62.5
	Bromide	mg/L	1999 - 2002	8	88%	0.2 U	0.2	0.3
	Fluoride	mg/L	1999 - 2002	8	0%	0.85	1.4	1.5
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.03	0.056	0.07
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	0.15	0.215	0.23
TW41-99D	Chloride	mg/L	1999 - 2002	8	0%	218	278	295
	Sulfate	mg/L	1999 - 2002	8	0%	1.6	6	8.2
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1.3	3.3	3.8
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	208	262	301
	Bromide	mg/L	1999 - 2002	8	25%	0.35 U	1.8	2.5
	Fluoride	mg/L	1999 - 2002	8	0%	1.1	1.5	1.7
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.077	0.93	1.3
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	1.8	2.1	2.3

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW41-99S	Chloride	mg/L	1999 - 2002	8	0%	10.9	15.3	16.3
	Sulfate	mg/L	1999 - 2002	8	0%	419	603	659
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	2	4	5.1
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	46.1	58.9	64.1
	Bromide	mg/L	1999 - 2002	8	88%	0.2 U	0.25	0.31
	Fluoride	mg/L	1999 - 2002	8	0%	0.72	1.3	1.6
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.018	0.05	0.07
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	0.16	0.342	0.4
TW42-99D	Chloride	mg/L	1999 - 2015	8	0%	2150	3730	4131
	Sulfate	mg/L	1999 - 2015	8	25%	1	6	8.1
	Potassium (dissolved)	mg/L	1999 - 2015	8	0%	3	8	11.2
	Sodium (dissolved)	mg/L	1999 - 2015	8	0%	1970	2620	2815
	Bromide	mg/L	1999 - 2015	8	50%	0.25 U	5.86	7.4
	Fluoride	mg/L	1999 - 2015	8	0%	0.67	6.4	9.7
	Barium (dissolved)	mg/L	1999 - 2017	7	0%	0.86	1.3	1.5
	Boron (dissolved)	mg/L	1999 - 2017	7	0%	4.9	6.6	7.5
TW42-99S	Chloride	mg/L	1999 - 2004	8	0%	11.8	42	55
	Sulfate	mg/L	1999 - 2004	8	0%	162	750	923
	Potassium (dissolved)	mg/L	1999 - 2004	8	0%	1	4	5.4
	Sodium (dissolved)	mg/L	1999 - 2004	8	0%	37.1	49.9	56.3
	Bromide	mg/L	1999 - 2004	8	100%	0.2 U	0.35 U	0.2
	Fluoride	mg/L	1999 - 2004	8	0%	0.56	1.1	1.3
	Barium (dissolved)	mg/L	1999 - 2007	8	0%	0.048	0.058	0.065
	Boron (dissolved)	mg/L	1999 - 2007	8	0%	0.12	0.2	0.25
TW43-99D	Chloride	mg/L	1999 - 2002	8	0%	229	300	318
	Sulfate	mg/L	1999 - 2002	8	63%	0.5 U	4.1	5.6
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1	2.6	3.6
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	197	250	269
	Bromide	mg/L	1999 - 2002	8	25%	0.35 U	2	2.7
	Fluoride	mg/L	1999 - 2002	8	0%	0.97	1.6	1.8
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.193	0.28	0.33
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	1.28	1.4	1.5
TW43-99S	Chloride	mg/L	1999 - 2002	8	0%	11.9	16	17.3
	Sulfate	mg/L	1999 - 2002	8	0%	336	455	513
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	2.7	3	3.3
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	33.5	56	67.9
	Bromide	mg/L	1999 - 2002	8	88%	0.2 U	36.5	43.3
	Fluoride	mg/L	1999 - 2002	8	13%	0.1 U	1.1	1.6
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.02	0.063	0.08
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	0.14	0.358	0.41

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW44-99S	Chloride	mg/L	1999 - 2002	8	0%	4	5.6	6.5
	Sulfate	mg/L	1999 - 2002	8	0%	134	259	315
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	2	3.1	3.9
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	43.2	52.9	58.5
	Bromide	mg/L	1999 - 2002	8	100%	0.2 U	0.35 U	0.2
	Fluoride	mg/L	1999 - 2002	8	0%	0.67	1	1.2
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.036	0.076	0.092
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	0.14	0.19	0.22
TW45-99D	Chloride	mg/L	1999 - 2002	8	0%	205	397	475
	Sulfate	mg/L	1999 - 2002	8	0%	1.2	5.4	6.7
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1	3	3.6
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	217	320	365
	Bromide	mg/L	1999 - 2002	8	25%	0.35 U	1.4	2.1
	Fluoride	mg/L	1999 - 2002	8	0%	1.2	1.5	1.7
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.069	0.222	0.289
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	1.7	2.61	2.9
TW45-99S	Chloride	mg/L	1999 - 2002	8	0%	10.9	16.2	18.8
	Sulfate	mg/L	1999 - 2002	8	0%	30.4	122	170
	Potassium (dissolved)	mg/L	1999 - 2002	8	0%	1	3	3.8
	Sodium (dissolved)	mg/L	1999 - 2002	8	0%	32.4	48.5	56.0
	Bromide	mg/L	1999 - 2002	8	88%	0.2 U	0.25	0.31
	Fluoride	mg/L	1999 - 2002	8	0%	0.67	1.2	1.4
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.057	0.095	0.112
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	0.1	0.206	0.268
TW46-99D	Chloride	mg/L	1999 - 2003	8	0%	153	265	294
	Sulfate	mg/L	1999 - 2003	8	25%	1 U	4.7	6.4
	Potassium (dissolved)	mg/L	1999 - 2003	8	0%	1.3	3	3.4
	Sodium (dissolved)	mg/L	1999 - 2003	8	0%	220	251	265
	Bromide	mg/L	1999 - 2003	8	13%	0.35 U	1.6	2.1
	Fluoride	mg/L	1999 - 2003	8	0%	1.2	1.8	2.0
	Barium (dissolved)	mg/L	1999 - 2005	8	0%	0.091	0.189	0.226
	Boron (dissolved)	mg/L	1999 - 2005	8	0%	1.5	2.09	2.2
TW46-99I	Chloride	mg/L	1999 - 2003	8	0%	28.6	32.6	35.1
	Sulfate	mg/L	1999 - 2003	8	0%	213	330	384
	Potassium (dissolved)	mg/L	1999 - 2003	8	0%	1.4	3	3.4
	Sodium (dissolved)	mg/L	1999 - 2003	8	0%	37.6	41.6	44.6
	Bromide	mg/L	1999 - 2003	8	88%	0.2 U	0.27	0.33
	Fluoride	mg/L	1999 - 2003	8	0%	0.49	1.2	1.4
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.04	0.068	0.079
	Boron (dissolved)	mg/L	1999 - 2006	8	0%	0.087	0.13	0.157

Note:

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Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW46-99S	Chloride	mg/L	1999 - 2003	8	0%	71	97.9	106
	Sulfate	mg/L	1999 - 2003	8	0%	675	949	1077
	Potassium (dissolved)	mg/L	1999 - 2003	8	0%	5	9	10.1
	Sodium (dissolved)	mg/L	1999 - 2003	8	0%	111	160	181
	Bromide	mg/L	1999 - 2003	8	13%	0.35 U	0.9	1.3
	Fluoride	mg/L	1999 - 2003	8	13%	0.05 U	1.5	2.1
	Barium (dissolved)	mg/L	1999 - 2006	8	0%	0.019	0.068	0.096
	Boron (dissolved)	mg/L	1999 - 2005	8	0%	0.81	31	39.6
TW47-00D	Chloride	mg/L	2000 - 2004	8	0%	240	347	383
	Sulfate	mg/L	2000 - 2004	8	38%	1 U	2.9	3.6
	Potassium (dissolved)	mg/L	2000 - 2004	8	0%	1.3	2.2	2.5
	Sodium (dissolved)	mg/L	2000 - 2004	8	0%	250	310	333
	Bromide	mg/L	2000 - 2004	8	0%	0.64	2.5	3.3
	Fluoride	mg/L	2000 - 2004	8	0%	1.1	1.5	1.7
	Barium (dissolved)	mg/L	2001 - 2008	8	0%	0.21	0.58	0.75
	Boron (dissolved)	mg/L	2001 - 2008	8	0%	2	2.65	3.1
TW48-00D	Chloride	mg/L	2001 - 2004	8	0%	433	610	708
	Sulfate	mg/L	2001 - 2004	8	13%	1 U	3	3.8
	Potassium (dissolved)	mg/L	2001 - 2004	8	0%	2.4	3.1	3.3
	Sodium (dissolved)	mg/L	2001 - 2004	8	0%	420	510	559
	Bromide	mg/L	2001 - 2004	8	0%	0.71	3.2	4.3
	Fluoride	mg/L	2001 - 2004	8	0%	1.2	1.6	1.9
	Barium (dissolved)	mg/L	2001 - 2008	8	0%	0.22	0.44	0.54
	Boron (dissolved)	mg/L	2001 - 2008	8	0%	2.7	2.9	3.0
TW49-00D	Chloride	mg/L	2001 - 2004	8	0%	83	92	97
	Sulfate	mg/L	2001 - 2004	8	0%	1.2	43.4	51.3
	Potassium (dissolved)	mg/L	2001 - 2004	8	13%	1 U	2	2.9
	Sodium (dissolved)	mg/L	2001 - 2004	8	0%	130	166	176
	Bromide	mg/L	2001 - 2004	8	0%	0.45	0.63	0.74
	Fluoride	mg/L	2001 - 2004	8	0%	1.1	1.7	2.2
	Barium (dissolved)	mg/L	2001 - 2008	8	0%	0.065	0.48	0.66
	Boron (dissolved)	mg/L	2001 - 2008	8	0%	1.02	1.3	1.4
TW50-02A	Chloride	mg/L	2002 - 2006	8	0%	16	20.7	23.5
	Sulfate	mg/L	2016 - 2017	4	0%	437	543	641
	Potassium (dissolved)	mg/L	2016 - 2017	4	0%	2	3.23	4.4
	Sodium (dissolved)	mg/L	2002 - 2006	8	0%	54	64	70.7
	Bromide	mg/L	2016 - 2018	6	100%	0.25 U	0.5 U	0.30
	Fluoride	mg/L	2016 - 2018	6	50%	0.25 U	1.11	1.6
	Barium (dissolved)	mg/L	2016 - 2017	2	0%	0.013	0.02	0.031
	Boron (dissolved)	mg/L	2016 - 2017	2	0%	0.22	0.312	0.461

Note:

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Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW50-02B	Chloride	mg/L	2002 - 2006	8	0%	21	27.8	29.6
	Sulfate	mg/L	2016 - 2018	6	0%	93	259	392
	Potassium (dissolved)	mg/L	2016 - 2018	6	0%	1.84	3	3.9
	Sodium (dissolved)	mg/L	2002 - 2006	8	0%	83	110	122
	Bromide	mg/L	2016 - 2018	7	100%	0.25 U	0.25 U	0.1
	Fluoride	mg/L	2016 - 2018	7	71%	0.25 U	1.23	1.5
	Barium (dissolved)	mg/L	2016 - 2018	3	0%	0.02	0.027	0.034
	Boron (dissolved)	mg/L	2016 - 2018	3	0%	0.1	0.3	0.5
TW51-02A	Chloride	mg/L	2002 - 2006	8	0%	15	18.4	19.5
	Sulfate	mg/L	2016 - 2018	6	0%	298	496	628
	Potassium (dissolved)	mg/L	2016 - 2018	6	0%	2	2.47	2.7
	Sodium (dissolved)	mg/L	2002 - 2006	8	0%	28	37	40.1
	Bromide	mg/L	2016 - 2018	6	100%	0.25 U	0.25 U	0.13
	Fluoride	mg/L	2016 - 2018	6	50%	0.25 U	0.9	1.5
	Barium (dissolved)	mg/L	2016 - 2018	3	0%	0.045	0.06	0.07
	Boron (dissolved)	mg/L	2016 - 2018	3	0%	0.147	0.161	0.179
TW51-02B	Chloride	mg/L	2002 - 2006	8	0%	17	20	21.4
	Sulfate	mg/L	2016 - 2018	6	0%	401	523	585
	Potassium (dissolved)	mg/L	2016 - 2018	6	0%	2.89	4	4.5
	Sodium (dissolved)	mg/L	2002 - 2006	8	0%	71	90	104
	Bromide	mg/L	2016 - 2018	6	100%	0.25 U	0.5 U	0.3
	Fluoride	mg/L	2016 - 2018	6	33%	0.25 U	1.07	1.7
	Barium (dissolved)	mg/L	2016 - 2018	3	0%	0.02	0.024	0.029
	Boron (dissolved)	mg/L	2016 - 2018	3	0%	0.388	0.394	0.400
TW52-02A	Chloride	mg/L	2002 - 2006	8	0%	40	97	132
	Sulfate	mg/L	2014 - 2018	8	0%	426	665	753
	Potassium (dissolved)	mg/L	2014 - 2018	8	0%	1.44	3	3.9
	Sodium (dissolved)	mg/L	2002 - 2006	8	0%	56	70	77.4
	Bromide	mg/L	2014 - 2018	8	100%	0.25 U	0.25 U	0.1
	Fluoride	mg/L	2014 - 2018	8	50%	0.25 U	1.19	2.0
	Barium (dissolved)	mg/L	2015 - 2018	4	0%	0.01	0.02	0.03
	Boron (dissolved)	mg/L	2015 - 2018	4	0%	0.16	0.32	0.43
TW52-02B	Chloride	mg/L	2002 - 2006	8	0%	9	10.3	11.0
	Sulfate	mg/L	2014 - 2018	8	0%	150	343	448
	Potassium (dissolved)	mg/L	2014 - 2018	8	0%	2	3	3.9
	Sodium (dissolved)	mg/L	2002 - 2006	8	0%	64	74	81
	Bromide	mg/L	2014 - 2018	8	100%	0.25 U	0.25 U	0.1
	Fluoride	mg/L	2014 - 2018	8	25%	0.25 U	1.36	2.2
	Barium (dissolved)	mg/L	2015 - 2018	4	0%	0.016	0.07	0.11
	Boron (dissolved)	mg/L	2015 - 2018	4	0%	0.09	0.28	0.46

Note:

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Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW53-03D	Chloride	mg/L	2003 - 2007	8	0%	274	520	585
	Sulfate	mg/L	2003 - 2007	8	13%	0.45	5	6.2
	Potassium (dissolved)	mg/L	2003 - 2007	8	0%	2	2.7	2.9
	Sodium (dissolved)	mg/L	2003 - 2007	8	0%	254	410	447
	Bromide	mg/L	2003 - 2007	8	13%	0.19	3.4	4.2
	Fluoride	mg/L	2003 - 2007	8	0%	1	1.5	1.9
	Barium (dissolved)	mg/L	2004 - 2009	8	0%	0.15	0.68	0.89
	Boron (dissolved)	mg/L	2004 - 2009	8	0%	1.35	3.6	4.1
TW53-03S	Chloride	mg/L	2003 - 2007	8	0%	11	13	13.9
	Sulfate	mg/L	2003 - 2007	8	0%	173	290	391
	Potassium (dissolved)	mg/L	2003 - 2007	8	0%	1	3	3.7
	Sodium (dissolved)	mg/L	2003 - 2007	8	0%	32	62	72.2
	Bromide	mg/L	2003 - 2007	8	63%	0.05 U	1.8 U	1.1
	Fluoride	mg/L	2003 - 2007	8	0%	0.52	0.97	1.2
	Barium (dissolved)	mg/L	2004 - 2011	8	0%	0.03	0.068	0.09
	Boron (dissolved)	mg/L	2004 - 2011	8	0%	0.09	0.19	0.26
TW54-09D	Chloride	mg/L	2009 - 2013	8	0%	116	144	161
	Sulfate	mg/L	2009 - 2013	8	0%	1	12	14.3
	Potassium (dissolved)	mg/L	2009 - 2013	8	0%	2	3	3.2
	Sodium (dissolved)	mg/L	2009 - 2013	8	0%	161	196	206
	Bromide	mg/L	2009 - 2013	8	0%	0.44	1.1	1.5
	Fluoride	mg/L	2009 - 2013	8	0%	1.43	1.59	1.7
	Barium (dissolved)	mg/L	2010 - 2017	8	0%	0.11	0.3	0.39
	Boron (dissolved)	mg/L	2010 - 2017	8	0%	1.4	1.7	1.9
TW55-09D	Chloride	mg/L	2010 - 2013	8	0%	362	411	425
	Sulfate	mg/L	2010 - 2013	8	0%	6	27	36
	Potassium (dissolved)	mg/L	2010 - 2013	8	0%	3	4	5.1
	Sodium (dissolved)	mg/L	2010 - 2013	8	0%	316	382	424
	Bromide	mg/L	2010 - 2013	8	13%	0.25 U	2.96	3.7
	Fluoride	mg/L	2010 - 2013	8	0%	1.54	1.8	2.0
	Barium (dissolved)	mg/L	2010 - 2017	8	0%	0.14	0.29	0.35
	Boron (dissolved)	mg/L	2010 - 2017	8	0%	1.3	1.9	2.3
TW55-09S	Chloride	mg/L	2010 - 2013	8	0%	14	15	16
	Sulfate	mg/L	2010 - 2013	8	0%	451	521	557
	Potassium (dissolved)	mg/L	2010 - 2013	8	0%	3	3	3.0
	Sodium (dissolved)	mg/L	2010 - 2013	8	0%	41	56	63
	Bromide	mg/L	2010 - 2013	8	100%	0.25 U	0.25 U	0.1
	Fluoride	mg/L	2010 - 2013	8	0%	0.73	0.98	1.1
	Barium (dissolved)	mg/L	2010 - 2017	8	0%	0.02	0.05	0.06
	Boron (dissolved)	mg/L	2010 - 2017	8	0%	0.17	0.42	0.49

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW56-11D	Chloride	mg/L	2012 - 2015	8	0%	282	334	355
	Sulfate	mg/L	2012 - 2015	8	0%	1	7	9.6
	Potassium (dissolved)	mg/L	2012 - 2015	8	0%	1	3	4.8
	Sodium (dissolved)	mg/L	2012 - 2015	8	0%	297	366	390
	Bromide	mg/L	2012 - 2015	8	0%	0.38	1.73	2.19
	Fluoride	mg/L	2012 - 2015	8	0%	1.21	1.48	1.62
	Barium (dissolved)	mg/L	2012 - 2018	7	0%	0.117	0.245	0.320
	Boron (dissolved)	mg/L	2012 - 2018	7	0%	1.85	2.5	2.8
TW56-11S	Chloride	mg/L	2012 - 2015	8	0%	58	64	67
	Sulfate	mg/L	2012 - 2015	8	0%	882	1050	1147
	Potassium (dissolved)	mg/L	2012 - 2015	8	0%	3	4	4.9
	Sodium (dissolved)	mg/L	2012 - 2015	8	0%	79	90	96
	Bromide	mg/L	2012 - 2015	8	100%	0.25 U	0.25 U	0.1
	Fluoride	mg/L	2012 - 2015	8	0%	0.73	0.95	1.1
	Barium (dissolved)	mg/L	2012 - 2018	7	0%	0.01	0.04	0.1
	Boron (dissolved)	mg/L	2012 - 2018	7	0%	0.32	0.43	0.5
TW57-11D	Chloride	mg/L	2012 - 2015	8	0%	299	448	538
	Sulfate	mg/L	2012 - 2015	8	75%	1 U	4	4.8
	Potassium (dissolved)	mg/L	2012 - 2015	8	0%	1	3	4.0
	Sodium (dissolved)	mg/L	2012 - 2015	8	0%	291	474	578
	Bromide	mg/L	2012 - 2015	8	0%	0.38	4.11	4.8
	Fluoride	mg/L	2012 - 2015	8	0%	1.22	1.69	1.9
	Barium (dissolved)	mg/L	2012 - 2018	7	0%	0.083	0.14	0.2
	Boron (dissolved)	mg/L	2012 - 2018	7	0%	1.6	2.4	2.9
TW57-11S	Chloride	mg/L	2012 - 2015	8	0%	23	31	36.1
	Sulfate	mg/L	2012 - 2015	8	0%	462	907	1274
	Potassium (dissolved)	mg/L	2012 - 2015	8	0%	4	5	6.2
	Sodium (dissolved)	mg/L	2012 - 2015	8	0%	39	68	89
	Bromide	mg/L	2012 - 2015	8	100%	0.25 U	0.25 U	0.13
	Fluoride	mg/L	2012 - 2015	8	0%	0.91	1.48	1.8
	Barium (dissolved)	mg/L	2012 - 2018	7	0%	0.02	0.031	0.04
	Boron (dissolved)	mg/L	2012 - 2018	7	0%	0.13	0.25	0.30
TW58-11S	Chloride	mg/L	2012 - 2015	8	0%	278	350	385
	Sulfate	mg/L	2012 - 2015	8	0%	992	1160	1257
	Potassium (dissolved)	mg/L	2012 - 2015	8	0%	4	7	8.8
	Sodium (dissolved)	mg/L	2012 - 2015	8	0%	106	138	158
	Bromide	mg/L	2012 - 2015	8	63%	0.25 U	0.43	0.58
	Fluoride	mg/L	2012 - 2015	8	0%	0.83	1.06	1.2
	Barium (dissolved)	mg/L	2012 - 2018	7	0%	0.01	0.05	0.06
	Boron (dissolved)	mg/L	2012 - 2018	7	0%	0.2	0.32	0.39

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL (1)
TW59-13D	Chloride	mg/L	2013 - 2016	8	0%	110	129	137
	Sulfate	mg/L	2013 - 2016	8	13%	ND(1)	15	21
	Potassium (dissolved)	mg/L	2013 - 2016	8	0%	1	3	3.6
	Sodium (dissolved)	mg/L	2013 - 2016	8	0%	170	192	207
	Bromide	mg/L	2013 - 2016	8	0%	0.28	0.65	0.79
	Fluoride	mg/L	2013 - 2016	8	0%	1.13	1.65	1.9
	Barium (dissolved)	mg/L	2013 - 2018	6	0%	0.094	0.18	0.22
	Boron (dissolved)	mg/L	2013 - 2018	6	0%	1.12	1.4	1.6
TW59-13S	Chloride	mg/L	2013 - 2016	8	0%	11	13	15
	Sulfate	mg/L	2013 - 2016	8	0%	103	164	188
	Potassium (dissolved)	mg/L	2013 - 2016	8	0%	2	3	3.6
	Sodium (dissolved)	mg/L	2013 - 2016	8	0%	28	52	62
	Bromide	mg/L	2013 - 2016	8	100%	0.25 U	0.25 U	0.13
	Fluoride	mg/L	2013 - 2016	8	0%	0.63	1.13	1.5
	Barium (dissolved)	mg/L	2013 - 2018	6	0%	0.033	0.08	0.11
	Boron (dissolved)	mg/L	2013 - 2018	6	0%	0.1	0.15	0.18
TW60-13D	Chloride	mg/L	2013 - 2017	8	0%	696	1120	1325
	Sulfate	mg/L	2013 - 2017	8	88%	1 U	4.9	5.7
	Potassium (dissolved)	mg/L	2013 - 2017	8	0%	2.28	4	5.2
	Sodium (dissolved)	mg/L	2013 - 2017	8	0%	557	1010	1347
	Bromide	mg/L	2013 - 2017	8	50%	0.25 U	1.52	2.5
	Fluoride	mg/L	2013 - 2017	8	13%	1 U	0.91	1.1
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.196	0.49	0.70
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	3.09	5.6	7.5
TW61-13D	Chloride	mg/L	2013 - 2017	8	0%	128	225	280
	Sulfate	mg/L	2013 - 2017	8	0%	12	67	83
	Potassium (dissolved)	mg/L	2013 - 2017	8	0%	1	2	2.9
	Sodium (dissolved)	mg/L	2013 - 2017	8	0%	170	275	320
	Bromide	mg/L	2013 - 2017	8	25%	0.25 U	0.64	1.0
	Fluoride	mg/L	2013 - 2017	8	0%	0.79	1.69	2.1
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.045	0.13	0.18
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1.4	1.6	1.8
TW61-13I	Chloride	mg/L	2013 - 2017	8	0%	22	24	25
	Sulfate	mg/L	2013 - 2017	8	0%	189	212	220
	Potassium (dissolved)	mg/L	2013 - 2017	8	50%	1 U	1	1.5
	Sodium (dissolved)	mg/L	2013 - 2017	8	0%	23	30	32
	Bromide	mg/L	2013 - 2017	8	100%	0.25 U	0.25 U	0.1
	Fluoride	mg/L	2013 - 2017	8	13%	0.25 U	0.48	0.68
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.053	0.07	0.09
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	0.08	0.44	0.63

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 14

Upper Confidence Limits Summary Table
Clean Harbors Canada , Inc.
Lambton County, Ontario

Well	Analyte	Unit	Date Range	Number of Samples	Percent Non-Detect	Minimum	Maximum	UCL [(1)]
TW61-13S	Chloride	mg/L	2013 - 2017	8	0%	20	21	21
	Sulfate	mg/L	2013 - 2017	8	0%	263	313	332
	Potassium (dissolved)	mg/L	2013 - 2017	8	0%	2.36	3	3.6
	Sodium (dissolved)	mg/L	2013 - 2017	8	0%	62.7	68	71
	Bromide	mg/L	2013 - 2017	8	13%	0.25 U	0.62	1.0
	Fluoride	mg/L	2013 - 2017	8	13%	0.25 U	0.99	1.6
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	0.04	0.08	0.11
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	0.302	0.4	0.46
TW62-13S	Chloride	mg/L	2013 - 2017	8	0%	25	34.8	39
	Sulfate	mg/L	2013 - 2017	8	0%	177	226	242
	Potassium (dissolved)	mg/L	2013 - 2017	8	0%	2	4	5
	Sodium (dissolved)	mg/L	2013 - 2017	8	0%	52	66	72.5
	Bromide	mg/L	2013 - 2017	8	100%	0.25 U	0.25 U	0.13
	Fluoride	mg/L	2013 - 2017	8	13%	0.25 U	0.93	1.6
	Barium (dissolved)	mg/L	2013 - 2018	6	0%	0.038	0.09	0.11
	Boron (dissolved)	mg/L	2013 - 2018	6	0%	0.12	0.18	0.22
TW63-13S	Chloride	mg/L	2013 - 2017	8	0%	552	668	712
	Sulfate	mg/L	2013 - 2017	8	0%	64	80	90
	Potassium (dissolved)	mg/L	2013 - 2017	8	0%	3	5	6.1
	Sodium (dissolved)	mg/L	2013 - 2017	8	0%	166	196	216
	Bromide	mg/L	2013 - 2017	8	0%	0.94	2.54	3.5
	Fluoride	mg/L	2013 - 2017	8	13%	0.5 U	0.76	1.2
	Barium (dissolved)	mg/L	2013 - 2018	6	0%	0.125	0.19	0.24
	Boron (dissolved)	mg/L	2013 - 2018	6	0%	0.2	0.38	0.45

Note:

(1) UCL - Upper Confidence Limit on the mean, using 95 percent confidence level.
UCLs were calculated using data from the initial 8 sampling events.
Non-detects were replaced by one-half the detection limit.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
EW1a-01	Chloride	mg/L	2014 - 2017	8	0%	-0.027	1498	1E-02	**Decreasing trend**
	Sulfate	mg/L	2014 - 2017	8	0%	-0.015	781	2E-05	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2017	8	0%	-0.001	59	0.015	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2017	8	0%	-0.016	894	0.017	**Decreasing trend**
	Bromide	mg/L	2014 - 2017	8	0%	-0.001	31	0.122	No trend
	Fluoride	mg/L	2014 - 2017	8	0%	-6E-04	25	0.010	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2017	4	0%	-2E-05	0.974	0.195	No trend
	Boron (dissolved)	mg/L	2014 - 2017	4	0%	1E-05	0.77	0.930	No trend
EW1b-13	Chloride	mg/L	2014 - 2018	10	0%	-0.005	554	0.631	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.011	615	0.003	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	41	0.007	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.026	1297	0.001	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	0%	-6E-04	27	0.186	No trend
	Fluoride	mg/L	2014 - 2018	10	10%	-6E-04	27	0.004	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.76	0.060	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-6E-05	3.76	0.442	No trend
EW1c-13	Chloride	mg/L	2014 - 2018	10	0%	0.006	61	0.629	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.022	1079	0.003	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	33	0.020	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.023	1169	0.002	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	0%	-2E-04	11	0.488	No trend
	Fluoride	mg/L	2014 - 2018	10	10%	-0.001	29	0.002	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-7E-06	0.360	0.113	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-5E-05	3.4	0.718	No trend
EW2a-01	Chloride	mg/L	2014 - 2017	8	0%	0.001	43	0.603	No trend
	Sulfate	mg/L	2014 - 2017	8	0%	-0.027	1183	0.040	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2017	8	0%	-3E-04	17	0.032	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2017	8	0%	-0.007	387	0.233	No trend
	Bromide	mg/L	2014 - 2017	8	0%	-8E-05	4.33	0.394	No trend
	Fluoride	mg/L	2014 - 2017	8	0%	-2E-04	8.50	0.103	No trend
	Barium (dissolved)	mg/L	2014 - 2017	4	0%	3E-05	-1.30	0.629	No trend
	Boron (dissolved)	mg/L	2014 - 2017	4	0%	5E-05	-0.85	0.832	No trend

Notes:

Linear regressions were performed using data from the last 5 years (2014 - 2018).
No test was performed on data sets with 100% non-detects.
Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.
(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
EW2b-13	Chloride	mg/L	2014 - 2018	10	0%	-0.001	163	0.521	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.028	1227	3E-04	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-04	19	0.002	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.009	476	5E-04	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	10%	-3E-04	12.5	0.152	No trend
	Fluoride	mg/L	2014 - 2018	10	10%	-4E-04	18	0.059	No trend
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	2E-06	0.035	0.804	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-6E-05	3.590	0.576	No trend
EW2c-13	Chloride	mg/L	2014 - 2018	10	0%	-0.003	230	0.346	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.049	2110	5E-06	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-5E-04	23	0.001	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.008	421	0.002	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	10%	-3E-04	11.54	0.127	No trend
	Fluoride	mg/L	2014 - 2018	10	10%	-5E-04	21	0.027	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	2E-05	-0.587	0.165	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	2E-05	0.47	0.792	No trend
OW1-92	Chloride	mg/L	2014 - 2016	5	0%	-0.021	1131	0.443	No trend
	Sulfate	mg/L	2014 - 2016	5	0%	-0.019	822	0.839	No trend
	Potassium (dissolved)	mg/L	2014 - 2016	5	0%	-2E-06	2.3	0.998	No trend
	Sodium (dissolved)	mg/L	2014 - 2016	5	0%	0.105	-4177	0.007	**Increasing trend**
	Bromide	mg/L	2014 - 2016	5	0%	-5E-04	22	0.601	No trend
	Fluoride	mg/L	2014 - 2016	5	0%	-4E-04	18	0.385	No trend
	Barium (dissolved)	mg/L	2014 - 2016	3	0%	-1E-04	4.18	0.334	No trend
	Boron (dissolved)	mg/L	2014 - 2016	3	0%	-1E-04	7.82	0.788	No trend
OW32-90D	Chloride	mg/L	2014 - 2018	10	0%	0.012	-192	0.248	No trend
	Sulfate	mg/L	2014 - 2018	10	100%	-2E-04	8.31	0.001	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	30	0.004	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	0.008	-116	0.531	No trend
	Bromide	mg/L	2014 - 2018	10	50%	-3E-04	13	0.022	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	10%	-7E-04	32	0.003	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-9E-05	3.88	0.019	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	7E-05	-1.31	0.688	No trend

Notes:

Linear regressions were performed using data from the last 5 years (2014 - 2018).
No test was performed on data sets with 100% non-detects.
Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.
(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
OW32-90S	Chloride	mg/L	2014 - 2018	10	0%	-0.002	94	0.167	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.043	-1436	0.148	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-2E-04	13	0.445	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.004	197	0.207	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-3E-04	14	0.001	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	0.538	0.325	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	1.254	0.154	No trend
OW35-05D	Chloride	mg/L	2014 - 2018	9	0%	0.024	-756	0.080	No trend
	Sulfate	mg/L	2014 - 2018	9	100%	-2E-04	9.06	0.006	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	9	0%	-3E-05	3.20	0.453	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	9	0%	0.001	208	0.928	No trend
	Bromide	mg/L	2014 - 2018	9	33%	-4E-04	17	0.005	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	9	22%	-0.001	41	2E-04	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	0.594	0.659	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-8E-05	4.9	0.614	No trend
OW35-90S	Chloride	mg/L	2014 - 2018	10	0%	-1E-05	10	0.991	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.081	-2984	0.108	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-04	21	0.108	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.009	427	0.020	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-4E-04	18	3E-04	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-6E-06	0.299	0.659	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-4E-05	2.06	0.620	No trend
PW1-N	Chloride	mg/L	2014 - 2018	10	0%	-0.042	2126	0.088	No trend
	Sulfate	mg/L	2014 - 2018	10	40%	-0.008	330	0.426	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	10%	3E-04	-10	0.538	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.063	2996	0.002	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	60%	-0.001	36	0.077	No trend
	Fluoride	mg/L	2014 - 2018	10	10%	-7E-04	32	5E-05	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	7	0%	-1E-04	5.1	0.202	No trend
	Boron (dissolved)	mg/L	2014 - 2018	7	0%	-2E-04	11	0.453	No trend

Notes:

Linear regressions were performed using data from the last 5 years (2014 - 2018).
No test was performed on data sets with 100% non-detects.
Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.
(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
PW2-S(R11)	Chloride	mg/L	2014 - 2018	10	0%	-0.041	2104	0.097	No trend
	Sulfate	mg/L	2014 - 2018	10	70%	0.003	-126	0.020	**Increasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-05	4.03	0.834	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.099	4582	0.001	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	60%	-5E-04	20	0.040	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	10%	-0.001	32	3E-04	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	7	0%	-6E-05	2.7	0.179	No trend
	Boron (dissolved)	mg/L	2014 - 2018	7	0%	-4E-04	20	0.181	No trend
TW21-94-II	Chloride	mg/L	2014 - 2018	10	0%	-1E-03	52	0.419	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.005	63	0.850	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	30%	6E-05	-1.4	0.883	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.004	204	0.366	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-2E-04	8.08	0.042	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-5E-06	0.251	0.516	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-5E-06	0.302	0.602	No trend
TW22-94	Chloride	mg/L	2014 - 2018	10	0%	-0.003	180	0.586	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.035	-965	0.243	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-1E-04	7.37	0.691	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.017	802	0.010	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	100%	7E-05	-2.65	0.025	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-7E-04	29	0.002	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.758	0.152	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1E-05	-0.41	0.368	No trend
TW22-99D	Chloride	mg/L	2014 - 2018	10	0%	0.063	-1568	0.181	No trend
	Sulfate	mg/L	2014 - 2018	10	100%	0.002	-66	0.001	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-04	20	0.284	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.058	3404	0.052	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	70%	5E-04	-19	0.136	(1)
	Fluoride	mg/L	2014 - 2018	10	40%	4E-04	-16	0.008	(1)
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-5E-05	2.37	0.203	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-4E-04	24	0.468	No trend

Notes:

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Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW30-94	Chloride	mg/L	2014 - 2018	10	0%	2E-04	-4.0	0.653	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.034	-1328	0.013	**Increasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-3E-04	16.7	0.489	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	0.005	-194	0.125	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	20%	-0.001	37	0.004	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-8E-06	0.365	0.302	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.94	0.314	No trend
TW30-99D	Chloride	mg/L	2014 - 2018	10	0%	0.017	-501	0.097	No trend
	Sulfate	mg/L	2014 - 2018	10	100%	-2E-04	8.84	0.001	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	2E-05	1.78	0.956	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.023	1208	0.006	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	-4E-04	15	0.007	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-8E-04	36	0.003	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-6E-05	3.00	0.017	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	6E-06	1.45	0.961	No trend
TW32-94-I	Chloride	mg/L	2014 - 2017	6	0%	-1.448	65587	0.477	No trend
	Sulfate	mg/L	2014 - 2017	6	67%	0.001	-41	0.754	No trend
	Potassium (dissolved)	mg/L	2014 - 2017	6	0%	-0.004	202	0.562	No trend
	Sodium (dissolved)	mg/L	2014 - 2017	6	0%	-1.89	83497	0.204	No trend
	Bromide	mg/L	2014 - 2017	6	67%	3E-04	-10	0.884	No trend
	Fluoride	mg/L	2014 - 2017	6	33%	0.001	-59	0.423	No trend
	Barium (dissolved)	mg/L	2014 - 2017	3	0%	3E-04	-11.93	0.466	No trend
	Boron (dissolved)	mg/L	2014 - 2017	3	0%	-0.001	52	0.515	No trend
TW32-94-II	Chloride	mg/L	2014 - 2018	8	0%	0.213	-8640	0.076	No trend
	Sulfate	mg/L	2014 - 2018	8	100%	0E+00	0.50	1.000	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	8	0%	5E-04	-18	0.163	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	8	0%	0.111	-4391	0.189	No trend
	Bromide	mg/L	2014 - 2018	8	29%	0.000	17	0.036	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	8	14%	-0.001	38	0.003	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	4E-05	-1.54	0.617	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	3E-04	-9.2	0.385	No trend

Notes:

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Table 15

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Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW32-94-IV	Chloride	mg/L	2014 - 2018	10	0%	-0.003	154	0.209	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.059	2787	0.283	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-04	19	0.433	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.016	739	0.087	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-4E-04	18	0.014	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-6E-06	0.276	0.414	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	3E-05	-1.221	0.067	No trend
TW33-94-I	Chloride	mg/L	2014 - 2016	5	0%	-0.005	403	0.546	No trend
	Sulfate	mg/L	2014 - 2016	5	80%	-0.001	24	0.181	No trend
	Potassium (dissolved)	mg/L	2014 - 2016	5	0%	5E-04	-21	0.558	No trend
	Sodium (dissolved)	mg/L	2014 - 2016	5	0%	0.006	-34	0.380	No trend
	Bromide	mg/L	2014 - 2016	5	20%	0.000	16	0.251	No trend
	Fluoride	mg/L	2014 - 2016	5	0%	-7E-04	31.94	0.071	No trend
	Barium (dissolved)	mg/L	2014 - 2016	3	0%	-2E-04	6.57	0.163	No trend
	Boron (dissolved)	mg/L	2014 - 2016	3	0%	4E-07	1.88	0.999	No trend
TW34-94-I	Chloride	mg/L	2014 - 2015	4	0%	-0.011	620	0.675	No trend
	Sulfate	mg/L	2014 - 2015	4	100%	0E+00	0.500	1.000	No detected results
	Potassium (dissolved)	mg/L	2014 - 2015	4	0%	0.000	2.0	1.000	No trend
	Sodium (dissolved)	mg/L	2014 - 2015	4	0%	-0.004	396	0.810	No trend
	Bromide	mg/L	2014 - 2015	4	25%	0.000	3.4	0.910	No trend
	Fluoride	mg/L	2014 - 2015	4	0%	-5E-04	23.68	0.051	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2015	2	0%	N/A	N/A	N/A	Insufficient Data
	Boron (dissolved)	mg/L	2014 - 2015	2	0%	N/A	N/A	N/A	Insufficient Data
TW38-94-I	Chloride	mg/L	2014 - 2015	4	0%	0.936	-22465	0.489	No trend
	Sulfate	mg/L	2014 - 2015	4	75%	0.003	-122	0.401	No trend
	Potassium (dissolved)	mg/L	2014 - 2015	4	0%	0.026	-1050	0.233	No trend
	Sodium (dissolved)	mg/L	2014 - 2015	4	0%	-2.242	105511	0.068	No trend
	Bromide	mg/L	2014 - 2015	4	75%	-0.022	945	0.272	No trend
	Fluoride	mg/L	2014 - 2015	4	0%	-1E-04	6.91	0.239	No trend
	Barium (dissolved)	mg/L	2014 - 2015	2	0%	N/A	N/A	N/A	Insufficient Data
	Boron (dissolved)	mg/L	2014 - 2015	2	0%	N/A	N/A	N/A	Insufficient Data

Notes:

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Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW39-99D	Chloride	mg/L	2014 - 2018	10	0%	-0.068	3202	0.005	**Decreasing trend**
	Sulfate	mg/L	2014 - 2018	10	100%	-1E-04	6.36	0.044	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-3E-04	16.8	0.003	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.093	4257	4E-05	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	-4E-04	17	0.021	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-7E-04	31	0.014	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-8E-05	3.74	0.036	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-3E-04	15.68	0.006	**Decreasing trend**
TW39-99I	Chloride	mg/L	2014 - 2018	10	0%	-3E-04	30	0.698	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.015	-348	0.090	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	6E-06	1.04	0.981	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.010	486	0.002	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	40%	-2E-04	7.58	0.008	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-5E-04	20	0.007	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	1.05	0.062	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	6E-06	-0.092	0.795	No trend
TW39-99S	Chloride	mg/L	2014 - 2018	10	0%	-2E-04	28	0.852	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.013	-267	0.124	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-04	17	0.376	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.011	532	0.076	No trend
	Bromide	mg/L	2014 - 2018	10	50%	-2E-04	10	0.001	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-5E-04	23	0.002	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-9E-06	0.430	0.050	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	1.27	0.644	No trend
TW40-99D	Chloride	mg/L	2014 - 2018	10	0%	-0.125	5683	0.001	**Decreasing trend**
	Sulfate	mg/L	2014 - 2018	10	100%	-2E-04	8.84	0.001	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-3E-04	15	0.297	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.109	4928	3E-04	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	-4E-04	18	0.012	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-6E-04	27	0.005	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-1E-04	5.99	0.012	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-5E-04	25	0.001	**Decreasing trend**

Notes:

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Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW40-99S	Chloride	mg/L	2014 - 2018	10	0%	0.001	-44	0.008	**Increasing trend**
	Sulfate	mg/L	2014 - 2018	10	0%	0.066	-2574	0.011	**Increasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-3E-04	14	0.450	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	102	0.576	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	20%	-6E-04	27	0.006	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	0.652	0.251	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1E-05	-0.288	0.686	No trend
TW41-99D	Chloride	mg/L	2014 - 2018	10	0%	0.013	-354	0.045	**Increasing trend**
	Sulfate	mg/L	2014 - 2018	10	90%	-3E-04	14	0.011	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-04	19	0.001	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.030	1506	0.002	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	60%	-3E-04	12	0.037	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-8E-04	35	0.003	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-4E-05	1.9	0.206	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	7E-06	1.5	0.971	No trend
TW41-99S	Chloride	mg/L	2014 - 2018	10	0%	0.004	-113	0.580	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.114	-4506	0.020	**Increasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	4E-04	-18	0.068	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.005	273	0.049	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	6E-05	-2.0	0.817	No trend
	Fluoride	mg/L	2014 - 2018	10	40%	-3E-04	15	0.001	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	0.492	0.175	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	2E-05	-0.768	0.683	No trend
TW42-99D	Chloride	mg/L	2014 - 2017	5	0%	0.423	-15506	0.104	No trend
	Sulfate	mg/L	2014 - 2017	5	60%	5E-04	-19	0.878	No trend
	Potassium (dissolved)	mg/L	2014 - 2017	5	0%	7E-04	-26	0.819	No trend
	Sodium (dissolved)	mg/L	2014 - 2017	5	0%	-0.008	2366	0.929	No trend
	Bromide	mg/L	2014 - 2017	5	60%	0.002	-64	0.224	No trend
	Fluoride	mg/L	2014 - 2017	5	20%	0.002	-68	0.052	(1)
	Barium (dissolved)	mg/L	2014 - 2017	3	0%	3E-04	-12	0.135	No trend
	Boron (dissolved)	mg/L	2014 - 2017	3	0%	-0.001	41	0.409	No trend

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Clean Harbors Canada , Inc.
Lambton County, Ontario

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TW42-99S	Chloride	mg/L	2014 - 2018	8	0%	0.006	-222	0.242	No trend
	Sulfate	mg/L	2014 - 2018	8	0%	0.313	-11701	0.007	**Increasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	8	0%	1E-04	-1.2	0.900	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	8	0%	-0.005	264	0.335	No trend
	Bromide	mg/L	2014 - 2018	7	100%	3E-04	-11	0.030	No detected results
	Fluoride	mg/L	2014 - 2018	7	38%	-2E-04	10	0.050	(1)
	Barium (dissolved)	mg/L	2014 - 2018	5	20%	-1E-05	0.637	0.342	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	3E-05	-1.1	0.563	No trend
TW43-99D	Chloride	mg/L	2014 - 2018	10	0%	0.012	-309	0.099	No trend
	Sulfate	mg/L	2014 - 2018	10	100%	-2E-04	8.8	0.001	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-2E-04	10	0.016	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.015	847	0.121	No trend
	Bromide	mg/L	2014 - 2018	10	60%	-2E-04	9	0.035	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-0.001	32	0.001	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-6E-05	2.7	0.239	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-3E-05	2.7	0.592	No trend
TW43-99S	Chloride	mg/L	2014 - 2018	10	0%	0.001	-31	0.523	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.010	561	0.851	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	7E-05	-1.2	0.861	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.006	283	0.285	No trend
	Bromide	mg/L	2014 - 2018	10	100%	-3E-05	1.4	0.119	No detected results
	Fluoride	mg/L	2014 - 2018	10	30%	-3E-04	15	0.059	No trend
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-9E-06	0.412	0.281	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	5E-05	-1.8	0.557	No trend
TW44-99S	Chloride	mg/L	2014 - 2015	4	0%	0.004	-179	0.201	No trend
	Sulfate	mg/L	2014 - 2015	4	0%	0.018	-634	0.359	No trend
	Potassium (dissolved)	mg/L	2014 - 2015	4	0%	0E+00	2.0	1.000	No trend
	Sodium (dissolved)	mg/L	2014 - 2015	4	0%	0.015	-581	0.300	No trend
	Bromide	mg/L	2014 - 2015	4	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2015	4	0%	-1E-04	5.8	0.462	No trend
	Barium (dissolved)	mg/L	2014 - 2015	2	0%	N/A	N/A	N/A	Insufficient Data
	Boron (dissolved)	mg/L	2014 - 2015	2	0%	N/A	N/A	N/A	Insufficient Data

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Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW45-99D	Chloride	mg/L	2014 - 2018	10	0%	0.302	-12226	0.035	**Increasing trend**
	Sulfate	mg/L	2014 - 2018	10	70%	-0.001	48	0.318	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	2E-04	-4.5	0.594	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	0.152	-5696	0.240	No trend
	Bromide	mg/L	2014 - 2018	10	90%	5E-04	-19	0.090	(1)
	Fluoride	mg/L	2014 - 2018	10	40%	2E-04	-9.3	0.262	(1)
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	1.0	0.728	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-3E-04	16	0.706	No trend
TW45-99S	Chloride	mg/L	2014 - 2018	10	0%	-0.015	700	0.158	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.014	-495	0.515	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-3E-04	15	0.403	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.005	261	0.198	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-3E-04	14	0.017	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-4E-05	1.9	0.177	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	2E-05	-0.791	0.062	No trend
TW46-99D	Chloride	mg/L	2014 - 2018	10	0%	0.006	-38	0.346	No trend
	Sulfate	mg/L	2014 - 2018	10	90%	-3E-04	14	0.011	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-3E-04	13	0.002	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.012	736	0.260	No trend
	Bromide	mg/L	2014 - 2018	10	50%	-4E-04	16	0.006	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-8E-04	33	0.005	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-4E-05	1.6	0.269	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	5E-05	-0.465	0.567	No trend
TW46-99I	Chloride	mg/L	2014 - 2018	10	0%	0.002	-24	0.120	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.042	-1403	0.003	**Increasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-2E-04	8.4	0.166	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.005	254	0.063	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-4E-04	19	5E-05	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.743	0.397	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	0.556	0.581	No trend

Notes:

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(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW46-99S	Chloride	mg/L	2014 - 2018	10	0%	0.002	-49	0.767	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.068	-2117	0.122	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.002	97	0.036	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.024	1142	0.004	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	80%	3E-05	-1.2	0.510	(1)
	Fluoride	mg/L	2014 - 2018	10	30%	-4E-04	17	3E-04	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-3E-05	1.22	0.036	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-0.001	39	0.156	No trend
TW47-00D	Chloride	mg/L	2014 - 2018	10	0%	-1.044	46467	0.001	**Decreasing trend**
	Sulfate	mg/L	2014 - 2018	10	90%	0.001	-42	0.094	(1)
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.002	75	0.051	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-1.062	46783	9E-04	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	60%	-2E-04	11	0.787	No trend
	Fluoride	mg/L	2014 - 2018	10	40%	3E-04	-14	0.048	(1)
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-5E-04	24	0.534	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-0.001	59	0.248	No trend
TW48-00D	Chloride	mg/L	2014 - 2018	10	0%	-0.052	2586	0.035	**Decreasing trend**
	Sulfate	mg/L	2014 - 2018	10	80%	-3E-04	13	0.057	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	27	0.143	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.107	4934	0.001	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	-4E-04	18	0.003	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-0.001	39	0.009	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-04	7.1	0.408	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-4E-04	19	0.321	No trend
TW49-00D	Chloride	mg/L	2014 - 2018	10	0%	0.002	4.2	0.337	No trend
	Sulfate	mg/L	2014 - 2018	10	90%	-3E-04	15	0.037	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	2E-05	0.550	0.931	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	193	0.699	No trend
	Bromide	mg/L	2014 - 2018	10	20%	7E-05	-2.7	0.493	No trend
	Fluoride	mg/L	2014 - 2018	10	10%	-6E-04	29	0.010	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-7E-05	3.2	0.256	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-7E-05	4.2	0.205	No trend

Notes:

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(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW50-02A	Chloride	mg/L	2016 - 2018	6	0%	-0.016	709	0.102	No trend
	Sulfate	mg/L	2016 - 2018	6	0%	0.111	-4244	0.055	No trend
	Potassium (dissolved)	mg/L	2016 - 2018	6	0%	3E-04	-11	0.640	No trend
	Sodium (dissolved)	mg/L	2016 - 2018	6	0%	-0.021	935	0.008	**Decreasing trend**
	Bromide	mg/L	2016 - 2018	6	100%	9E-05	-3.9	0.177	No detected results
	Fluoride	mg/L	2016 - 2018	6	50%	-0.001	32	0.139	No trend
	Barium (dissolved)	mg/L	2016 - 2018	3	0%	-1E-05	0.470	0.245	No trend
	Boron (dissolved)	mg/L	2016 - 2018	3	0%	1E-04	-5.1	0.301	No trend
TW50-02B	Chloride	mg/L	2014 - 2018	10	0%	-3E-05	7.5	0.985	No trend
	Sulfate	mg/L	2016 - 2018	6	0%	-0.129	5710	0.178	No trend
	Potassium (dissolved)	mg/L	2016 - 2018	6	0%	-0.001	30	0.333	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.004	176	0.789	No trend
	Bromide	mg/L	2016 - 2018	6	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2016 - 2018	6	67%	-0.001	42	0.087	No trend
	Barium (dissolved)	mg/L	2016 - 2018	3	0%	3E-06	-0.099	0.806	No trend
	Boron (dissolved)	mg/L	2016 - 2018	3	0%	-2E-04	11	0.355	No trend
TW51-02A	Chloride	mg/L	2016 - 2018	6	0%	-0.002	102	0.309	No trend
	Sulfate	mg/L	2016 - 2018	6	0%	0.179	-7286	0.049	**Increasing trend**
	Potassium (dissolved)	mg/L	2016 - 2018	6	0%	1E-04	-3.1	0.660	No trend
	Sodium (dissolved)	mg/L	2016 - 2018	6	0%	-0.005	258	0.091	No trend
	Bromide	mg/L	2016 - 2018	6	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2016 - 2018	6	50%	-0.001	28	0.178	No trend
	Barium (dissolved)	mg/L	2016 - 2018	3	0%	-2E-05	0.900	0.106	No trend
	Boron (dissolved)	mg/L	2016 - 2018	3	0%	-2E-05	0.877	0.389	No trend
TW51-02B	Chloride	mg/L	2016 - 2018	6	0%	0.001	-7.7	0.796	No trend
	Sulfate	mg/L	2016 - 2018	6	0%	0.103	-3970	0.045	**Increasing trend**
	Potassium (dissolved)	mg/L	2016 - 2018	6	0%	-0.001	34	0.198	No trend
	Sodium (dissolved)	mg/L	2016 - 2018	6	0%	-0.020	924	0.018	**Decreasing trend**
	Bromide	mg/L	2016 - 2018	6	100%	6E-05	-2.500	0.411	No detected results
	Fluoride	mg/L	2016 - 2018	6	33%	-0.001	30	0.168	No trend
	Barium (dissolved)	mg/L	2016 - 2018	3	0%	4E-06	-0.150	0.473	No trend
	Boron (dissolved)	mg/L	2016 - 2018	3	0%	5E-06	0.171	0.561	No trend

Notes:

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(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW52-02A	Chloride	mg/L	2014 - 2018	10	0%	-0.021	919	0.018	**Decreasing trend**
	Sulfate	mg/L	2014 - 2018	6	0%	0.127	-4903	0.196	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	6	0%	-0.001	34	0.238	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.018	839	2E-04	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	8	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	8	50%	-0.001	37	3E-04	**Decreasing trend**
	Barium (dissolved)	mg/L	2015 - 2018	4	0%	1E-06	-0.034	0.878	No trend
	Boron (dissolved)	mg/L	2015 - 2018	4	0%	3E-05	-0.97	0.792	No trend
TW52-02B	Chloride	mg/L	2014 - 2018	6	0%	-0.001	65	0.698	No trend
	Sulfate	mg/L	2014 - 2018	6	0%	0.021	-644	0.766	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	6	0%	-1E-04	7.5	0.819	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	8	0%	-0.001	121	0.933	No trend
	Bromide	mg/L	2014 - 2018	8	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	8	25%	-0.001	29	0.079	No trend
	Barium (dissolved)	mg/L	2015 - 2018	4	0%	-4E-05	1.9	0.201	No trend
	Boron (dissolved)	mg/L	2015 - 2018	4	0%	-2E-08	0.21	1.000	No trend
TW53-03D	Chloride	mg/L	2014 - 2018	10	0%	-0.005	597	0.777	No trend
	Sulfate	mg/L	2014 - 2018	10	100%	-1E-04	6.4	0.044	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-2E-04	10	0.513	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.063	2993	0.001	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	-4E-04	18	0.033	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-7E-04	31	0.005	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-5E-05	2.4	0.025	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-7E-05	4.7	0.571	No trend
TW53-03S	Chloride	mg/L	2014 - 2018	10	0%	-0.002	74	0.363	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.007	83	0.881	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	30%	2E-04	-9	0.661	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.006	282	0.346	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-3E-04	13	0.008	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-9E-06	0.433	0.224	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	3E-05	-1.15	0.161	No trend

Notes:

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Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW54-09D	Chloride	mg/L	2014 - 2018	10	0%	0.008	-201	0.107	No trend
	Sulfate	mg/L	2014 - 2018	10	90%	-3E-04	15	0.002	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-4E-04	17	0.005	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.014	758	0.051	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	40%	-3E-04	15	5E-04	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	10%	-8E-04	34	0.002	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-5E-05	2.2	0.052	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-1E-04	7.2	0.039	**Decreasing trend**
TW55-09D	Chloride	mg/L	2014 - 2018	10	0%	0.033	-992	0.048	**Increasing trend**
	Sulfate	mg/L	2014 - 2018	10	20%	-0.002	96	5E-04	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	1E-04	-2.3	0.741	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.049	2420	0.001	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	-2E-04	9	0.028	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-0.001	47	1E-05	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.90	0.427	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-5E-05	3.802	0.837	No trend
TW55-09S	Chloride	mg/L	2014 - 2018	10	0%	5E-07	15	0.999	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.013	972	0.401	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-3E-04	14	0.007	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.004	235	0.114	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	30%	-5E-04	24	0.003	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.851	0.057	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	1.22	0.656	No trend
TW56-11D	Chloride	mg/L	2014 - 2018	10	0%	0.012	-204	0.100	No trend
	Sulfate	mg/L	2014 - 2018	10	50%	-0.001	60	0.005	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	1E-04	-3.8	0.735	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.045	2239	0.011	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	50%	-2E-04	11	0.008	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-0.001	32	0.001	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-3E-05	1.52	0.140	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-4E-04	20	0.007	**Decreasing trend**

Notes:

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Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW56-11S	Chloride	mg/L	2014 - 2018	10	0%	-3E-04	72	0.914	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.044	-879	0.354	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-2E-04	11	0.487	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.008	405	0.027	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	100%	2E-04	-6.5	0.016	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-5E-04	20	0.001	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.939	0.082	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-3E-05	1.854	0.342	No trend
TW57-11D	Chloride	mg/L	2014 - 2018	10	0%	0.001	348	0.980	No trend
	Sulfate	mg/L	2014 - 2018	10	100%	-7E-05	3.3	0.317	No detected results
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-2E-04	11	0.347	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.047	2365	0.168	No trend
	Bromide	mg/L	2014 - 2018	10	50%	-3E-04	13	0.019	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	20%	-0.001	39	3E-05	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-3E-05	1.47	0.117	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-4E-04	19	0.108	No trend
TW57-11S	Chloride	mg/L	2014 - 2018	10	0%	-0.003	158	0.165	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.087	4368	0.555	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	32	0.224	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.002	137	0.768	No trend
	Bromide	mg/L	2014 - 2018	10	100%	5E-05	-1.96	0.119	No detected results
	Fluoride	mg/L	2014 - 2018	10	20%	-7E-04	30	0.003	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-06	0.116	0.721	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-5E-05	2.16	0.335	No trend
TW58-11S	Chloride	mg/L	2014 - 2018	10	0%	-0.012	829	0.459	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.103	-3269	0.074	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-1E-04	10	0.874	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.011	609	0.071	No trend
	Bromide	mg/L	2014 - 2018	10	80%	2E-04	-9.4	0.020	(1)
	Fluoride	mg/L	2014 - 2018	10	40%	-4E-04	17	0.002	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-7E-06	0.308	0.088	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	0.743	0.823	No trend

Notes:

Linear regressions were performed using data from the last 5 years (2014 - 2018).
No test was performed on data sets with 100% non-detects.
Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.
(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW59-13D	Chloride	mg/L	2014 - 2018	10	0%	0.005	-78	0.178	No trend
	Sulfate	mg/L	2014 - 2018	10	50%	-0.003	148	5E-04	**Decreasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	1E-04	-2.8	0.585	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.016	847	0.009	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	30%	-2E-04	7.8	0.155	No trend
	Fluoride	mg/L	2014 - 2018	10	10%	-7E-04	29	0.010	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-4E-05	1.9	0.192	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-2E-04	8.7	0.070	No trend
TW59-13S	Chloride	mg/L	2014 - 2018	10	0%	0.003	-127	0.004	**Increasing trend**
	Sulfate	mg/L	2014 - 2018	10	0%	5E-04	99	0.956	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	6E-05	-0.561	0.766	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.005	250	0.304	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	30%	-6E-04	27	0.007	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-3E-05	1.152	0.121	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	0.550	0.636	No trend
TW60-13D	Chloride	mg/L	2014 - 2018	10	0%	-0.193	9118	0.011	**Decreasing trend**
	Sulfate	mg/L	2014 - 2018	10	70%	0.002	-71	0.065	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	40	0.059	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.344	15450	2E-04	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	70%	-9E-05	4.5	0.726	No trend
	Fluoride	mg/L	2014 - 2018	10	40%	-2E-04	11	0.001	(1)
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-1E-04	6.6	0.169	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-0.001	59	0.189	No trend
TW61-13D	Chloride	mg/L	2014 - 2018	10	0%	-0.006	411	0.790	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.005	-188	0.458	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	1E-06	1.40	0.996	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.027	1364	0.237	No trend
	Bromide	mg/L	2014 - 2018	10	50%	-3E-04	12	0.014	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	10%	-0.001	33	0.001	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-4E-05	1.8	0.220	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-1E-05	2.032	0.898	No trend

Notes:

Linear regressions were performed using data from the last 5 years (2014 - 2018).
No test was performed on data sets with 100% non-detects.
Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.
(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 15

Linear Regression Results
Clean Harbors Canada , Inc.
Lambton County, Ontario

		Unit	Date Range	Number of Samples	Percent Non-Detect	Linear Regression Slope	Intercept	Probability	Conclusion
TW61-13I	Chloride	mg/L	2014 - 2018	10	0%	-4E-04	38	0.587	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.036	-1319	0.033	**Increasing trend**
	Potassium (dissolved)	mg/L	2014 - 2018	10	30%	-2E-05	1.8	0.871	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	5E-04	6.4	0.739	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0.125	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	40%	-2E-04	11	1E-04	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-7E-06	0.374	0.323	No trend
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-2E-04	6.6	0.296	No trend
TW61-13S	Chloride	mg/L	2014 - 2018	10	0%	2E-04	13	0.794	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	0.003	159	0.778	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	30	0.002	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.004	249	0.027	**Decreasing trend**
	Bromide	mg/L	2014 - 2018	10	40%	-4E-04	16	0.003	**Decreasing trend**
	Fluoride	mg/L	2014 - 2018	10	30%	-5E-04	23	0.004	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-3E-05	1.30	0.044	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	-6E-05	2.8	0.053	**Decreasing trend**
TW62-13S	Chloride	mg/L	2014 - 2018	10	0%	0.006	-239	0.003	**Increasing trend**
	Sulfate	mg/L	2014 - 2018	10	0%	-0.003	307	0.674	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-2E-04	11	0.514	No trend
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	7E-05	53	0.979	No trend
	Bromide	mg/L	2014 - 2018	10	100%	0E+00	0	1.000	No detected results
	Fluoride	mg/L	2014 - 2018	10	20%	-5E-04	21	0.005	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-2E-05	0.772	0.043	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1E-05	-0.305	0.556	No trend
TW63-13S	Chloride	mg/L	2014 - 2018	10	0%	-0.030	1869	0.179	No trend
	Sulfate	mg/L	2014 - 2018	10	0%	-0.005	291	0.071	No trend
	Potassium (dissolved)	mg/L	2014 - 2018	10	0%	-0.001	40	0.013	**Decreasing trend**
	Sodium (dissolved)	mg/L	2014 - 2018	10	0%	-0.019	997	0.084	No trend
	Bromide	mg/L	2014 - 2018	10	10%	-4E-04	20	0.285	No trend
	Fluoride	mg/L	2014 - 2018	10	40%	-3E-04	12	0.020	**Decreasing trend**
	Barium (dissolved)	mg/L	2014 - 2018	5	0%	-5E-05	2.20	0.014	**Decreasing trend**
	Boron (dissolved)	mg/L	2014 - 2018	5	0%	1E-05	-0.294	0.673	No trend

Notes:

Linear regressions were performed using data from the last 5 years (2014 - 2018).
No test was performed on data sets with 100% non-detects.
Probability of significance: A value less than 0.05 indicates greater than 95 percent confidence of a statistically significant trend.
(1) A trend was not calculated. Non-detect results have been reported in recent monitoring events with detection limits above previous detected results. This yields ambiguous data comparisons that may not be meaningfully assessed for temporal trend.

Table 16

Shallow Wells along Perimeter of Facility Property, Downgradient of North Berm
Reasonable Use Concept Derived Criteria
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Sample Location:					OW32-90S		OW35-90S		TW21-94-II			TW22-94		TW32-94-IV		TW40-99S		TW53-03S	
Sample ID:					32S	32S	35S	35S	21II	21II	DUP1	22	22	32IV	32IV	40S	40S	53S	53S
Sample Date:					6/4/2018	11/21/2018	6/4/2018	11/21/2018	6/5/2018	11/19/2018	11/19/2018 Duplicate	6/5/2018	11/19/2018	6/4/2018	11/19/2018	6/4/2018	11/19/2018	6/4/2018	11/21/2018
Parameters	**Units**	**ODWS**	**ODWS SOURCE**	**RUC**															
General Indicators																			
Total dissolved solids (TDS)	mg/L	500	AO	500*	**906**	**878**	**1090**	**1010**	**832**	**812**	**760**	**1140**	**1220**	**626**	**522**	**750**	**874**	**944**	**932**
Minor Ions - Anions																			
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	438	335	355	338	332	406	**494**	**495**	**452**	**487**	386	379	415	415	390	405
Chloride	mg/L	250	AO	139	13.8	9.23	11.7	7.83	7.24	5.34	5.24	64.8	58.6	24.3	18.2	21.2	19.7	5.83	4.1
Sulfate	mg/L	500	AO	466	457	393	**628**	**536**	368	257	249	**537**	**585**	236	133	277	348	**481**	402
Major Ions - Cations																			
Sodium (dissolved)	mg/L	20/200	AO	126	**21**	**20.2**	**35.2**	**28.7**	**20.7**	17.2	15.7	**79.7**	**72.8**	**55.9**	**30.1**	**45**	**44.1**	**20.3**	17.1
Major Ions - Nutrients																			
Nitrate (as N)	mg/L	10.0	MAC	2.63	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.5)	ND (0.5)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	0.29	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	**ND (0.5)**	**ND (0.5)**	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																			
Fluoride	mg/L	1.5	MAC	0.81	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.5)	ND (0.5)	ND (0.25)	ND (0.25)	ND (0.25)	0.66	ND (0.25)	ND (0.25)
Metals																			
Arsenic (dissolved)	mg/L	0.010	IMAC	0.0029	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-	-	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-
Barium (dissolved)	mg/L	1.0	MAC	0.27	0.03	-	0.028	-	0.047	-	-	0.018	-	0.021	-	0.029	-	0.031	-
Boron (dissolved)	mg/L	5.0	IMAC	1.44	0.213	-	0.285	-	0.09	-	-	0.175	-	0.171	-	0.18	-	0.147	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0013	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-
Chromium	mg/L	0.05	MAC	0.013	0.006	-	0.009	-	0.006	-	-	0.007	-	0.004	-	0.004	-	0.006	-
Iron (dissolved)	mg/L	0.30	AO	0.16	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-	-	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.0029	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0003	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-
Zinc (dissolved)	mg/L	5.0	AO	2.5	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-	-	ND (0.005)	-	0.008	-	ND (0.005)	-	ND (0.005)	-

Notes:

ODWS Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).

RUC
ND Not detected at the associated reporting limit.
J Estimated concentration.
4.90 Detected result exceeds associated RUC standard.
ND (0.3) Reporting limit exceeds associated RUC standard.
OG Operational Guideline
AO Aesthetic Objective
MAC Maximum Acceptable Concentration
IMAC Interim Maximum Acceptable Concentration
\- Not applicable or not analysed.
* Background concentration exceeds ODWS, RUC Standard Defaulted to ODWS

Table 17

Shallow Wells along Perimeter of Facility Property, Removed from North Berm
Reasonable Use Concept Derived Criteria
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Sample Location: Sample ID: Sample Date: Parameters	Units	ODWS	ODWS SOURCE	RUC	TW30-94 30 6/4/2018	TW30-94 30 11/21/2018	TW41-99S 41S 6/4/2018	TW41-99S 41S 11/21/2018	TW42-99S 42S 6/6/2018	TW42-99S 42S 11/19/2018	TW43-99S 43S 6/6/2018	TW43-99S 43S 11/19/2018	TW45-99S 45S 6/6/2018	TW45-99S 45S 11/20/2018	TW48-16S 48S 6/6/2018	TW48-16S 48S 11/20/2018	TW62-13S 62S 6/6/2018	TW62-13S 62S 11/20/2018
General Indicators																		
Total dissolved solids (TDS)	mg/L	500	AO	500*	500	**502**	**1110**	**1090**	**2970**	**2500**	356	390	**588**	**508**	**626**	**596**	**640**	**606**
Minor Ions - Anions																		
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	438	396	386	**486**	**506**	353	354	306	308	374	403	420	399	335	328
Chloride	mg/L	250	AO	139	5.78	4.42	38	32.9	36.6	37.1	13.2	12	58.9	30.2	23.7	21.5	37	32.5
Sulfate	mg/L	500	AO	466	141	117	**499**	434	**1980**	**1660**	65.1	66.8	134	66.6	206	167	203	184
Major Ions - Cations																		
Sodium (dissolved)	mg/L	20/200	AO	126	**33.4**	**35.7**	**44.2**	**41**	**58.9**	**54.8**	**22.2**	**26.6**	**37.9**	**28**	**35.5**	**32.9**	**56.8**	**48.3**
Major Ions - Nutrients																		
Nitrate (as N)	mg/L	10.0	MAC	2.63	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (1)	ND (1)	ND (0.25)	ND (0.1)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	0.29	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	**ND (1)**	**ND (1)**	ND (0.25)	ND (0.1)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																		
Fluoride	mg/L	1.5	MAC	0.81	ND (0.25)	0.62	ND (0.25)	ND (0.25)	**ND (1)**	**ND (1)**	ND (0.25)	0.16	ND (0.25)	ND (0.25)	ND (0.25)	0.51	ND (0.25)	0.43
Metals																		
Arsenic (dissolved)	mg/L	0.010	IMAC	0.0029	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-	**ND (0.003)**	-
Barium (dissolved)	mg/L	1.0	MAC	0.27	0.033	-	0.025	-	0.014	-	0.034	-	0.059	-	0.038	-	0.038	-
Boron (dissolved)	mg/L	5.0	IMAC	1.44	0.145	-	0.145	-	0.229	-	0.054	-	0.084	-	0.213	-	0.163	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0013	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-
Chromium	mg/L	0.05	MAC	0.013	0.006	-	0.005	-	ND (0.003)	-	0.003	-	0.007	-	0.005	-	0.007	-
Iron (dissolved)	mg/L	0.30	AO	0.16	**0.165**	-	0.058	-	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-	ND (0.01)	-
Lead (dissolved)	mg/L	0.01	MAC	0.0029	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0003	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-
Zinc (dissolved)	mg/L	5.0	AO	2.5	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-

Notes:

ODWS	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
RUC	
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated RUC standard.
ND (0.3)	Reporting limit exceeds associated RUC standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.
*	Background concentration exceeds ODWS, RUC Standard Defaulted to ODWS

Table 18

Deep Wells along the Perimeter of the Facility Property (Interface Aquifer)
Reasonable Use Concept Derived Criteria
2018 Annual Groundwater Monitoring Report
Clean Harbors Canada Inc.
Lambton Facility

Sample Location: Sample ID: Sample Date: Parameters	Units	ODWS	ODWS SOURCE	RUC	OW32-90D 32D 6/4/2018	OW32-90D 32D 11/21/2018	OW35-05D 35D 6/4/2018	OW35-05D 35D 11/21/2018	OW35-05D DUP3 11/21/2018 Duplicate	TW22-99D 22D 6/5/2018	TW22-99D 22D 11/20/2018	TW30-99D 30D 6/4/2018	TW30-99D 30D 11/21/2018	TW32-94-II 32II 6/4/2018	TW40-99D 40D 6/4/2018	TW40-99D 40D 11/19/2018
General Indicators																
Total dissolved solids (TDS)	mg/L	500	AO	500*	718	682	658	738	690	2440	2510	598	606	956	702	716
Minor Ions - Anions																
Alkalinity, total (as CaCO3)	mg/L	30-500	OG	416	261	244	272	274	288	763	746	265	258	286	257	254
Chloride	mg/L	250	AO	250	337	294	300	299	327	1220	1110	270	240	502	330	309
Sulfate	mg/L	500	AO	250	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	ND (5)	ND (0.5)	ND (0.5)	ND (1)	ND (0.5)	ND (0.5)
Major Ions - Cations																
Sodium (dissolved)	mg/L	20/200	AO	200	254	217	225	208	207	866	872	207	182	341	222	223
Major Ions - Nutrients																
Nitrate (as N)	mg/L	10.0	MAC	2.5	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (2.5)	ND (2.5)	ND (0.25)	ND (0.25)	ND (0.5)	ND (0.25)	ND (0.25)
Nitrite (as N)	mg/L	1.0	MAC	0.3	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (2.5)	ND (2.5)	ND (0.25)	ND (0.25)	ND (0.5)	ND (0.25)	ND (0.25)
Major Ions - Miscellaneous																
Fluoride	mg/L	1.5	MAC	1.14	ND (0.25)	0.87	ND (0.25)	0.73	0.67	ND (2.5)	ND (2.5)	ND (0.25)	0.79	ND (0.5)	ND (0.25)	0.67
Metals																
Arsenic (dissolved)	mg/L	0.010	IMAC	0.0032	ND (0.003)	-	ND (0.003)	-	-	ND (0.003)	-	ND (0.003)	-	ND (0.003)	ND (0.003)	-
Barium (dissolved)	mg/L	1.0	MAC	0.35	0.106	-	0.128	-	-	0.364	-	0.327	-	0.25	0.186	-
Boron (dissolved)	mg/L	5.0	IMAC	2.68	1.69	-	1.66	-	-	3.87	-	1.7	-	2.08	1.47	-
Cadmium (dissolved)	mg/L	0.005	MAC	0.0013	ND (0.001)	-	ND (0.001)	-	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	ND (0.001)	-
Chromium	mg/L	0.05	MAC	0.019	0.011	-	0.012	-	-	0.011	-	0.013	-	0.003	0.004	-
Iron (dissolved)	mg/L	0.30	AO	0.3	0.815	-	0.553	-	-	ND (0.01)	-	0.277	-	ND (0.01)	0.935	-
Lead (dissolved)	mg/L	0.01	MAC	0.003	ND (0.001)	-	ND (0.001)	-	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	ND (0.001)	-
Mercury (dissolved)	mg/L	0.001	MAC	0.0003	ND (0.0001)	-	ND (0.0001)	-	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	ND (0.0001)	-
Zinc (dissolved)	mg/L	5.0	AO	2.5	ND (0.005)	-	ND (0.005)	-	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	ND (0.005)	-
Volatile Organic Compounds																
1,1-Dichloroethene	ug/L	14	MAC	3.69	ND (0.3)	-	ND (0.3)	-	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	ND (0.3)	-
1,2-Dichlorobenzene	ug/L	200	MAC	50.15	ND (0.1)	-	ND (0.1)	-	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	ND (0.1)	-
1,2-Dichloroethane	ug/L	5	IMAC	1.33	ND (0.2)	-	ND (0.2)	-	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	ND (0.2)	-
1,4-Dichlorobenzene	ug/L	5	MAC	1.45	ND (0.1)	-	ND (0.1)	-	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	ND (0.1)	-
Benzene	ug/L	1	MAC	1*	ND (0.2)	-	ND (0.2)	-	-	0.31	-	ND (0.2)	-	ND (0.2)	ND (0.2)	-
Carbon tetrachloride	ug/L	2	MAC	0.58	ND (0.2)	-	ND (0.2)	-	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	ND (0.2)	-
Chlorobenzene	ug/L	80	MAC	20.08	ND (0.1)	-	ND (0.1)	-	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	ND (0.1)	-
Ethylbenzene	ug/L	140	MAC	0.93	ND (0.1)	-	ND (0.1)	-	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	ND (0.1)	-
Methyl tert butyl ether (MTBE)	ug/L	15	AO	7.55	ND (0.2)	-	ND (0.2)	-	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	ND (0.2)	-
Methylene chloride	ug/L	50	MAC	14	ND (0.3)	-	ND (0.3)	-	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	ND (0.3)	-
Tetrachloroethene	ug/L	10	MAC	2.61	ND (0.2)	-	ND (0.2)	-	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	ND (0.2)	-
Toluene	ug/L	60	MAC	12.13	ND (0.2)	-	ND (0.2)	-	-	0.77	-	ND (0.2)	-	2.1	ND (0.2)	-
Trichloroethene	ug/L	5	MAC	1.36	ND (0.2)	-	ND (0.2)	-	-	2.1	-	ND (0.2)	-	ND (0.2)	ND (0.2)	-
Vinyl chloride	ug/L	1	MAC	0.33	ND (0.17)	-	ND (0.17)	-	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	ND (0.17)	-
Xylenes (total)	ug/L	90	MAC	10.13	ND (0.2)	-	ND (0.2)	-	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	ND (0.2)	-

Sample Location: Sample ID: Sample Date: Parameters	TW41-99D 41D 6/4/2018	TW41-99D 411D 6/4/2018 Duplicate	TW41-99D 41D 11/21/2018	TW43-99D 43D 6/6/2018	TW43-99D 43D 11/19/2018	TW45-99D 45D 6/6/2018	TW45-99D 45D 11/20/2018	TW47-00D 47D 6/4/2018	TW47-00D 47D 11/19/2018	TW48-00D 48D 6/6/2018	TW48-00D 48D 11/20/2018	TW49-00D 49D 6/6/2018	TW49-00D 49D 11/19/2018	TW53-03D 53D 6/4/2018	TW53-03D 53D 11/21/2018	TW60-13D 60D 6/5/2018	TW60-13D 60D 11/20/2018
General Indicators																	
Total dissolved solids (TDS)	588	594	574	600	592	2470	1850	2430	2570	868	850	384	378	816	774	1640	1560
Minor Ions - Anions																	
Alkalinity, total (as CaCO3)	307	307	293	290	271	1030	899	626	623	375	366	268	256	303	291	544	494
Chloride	219	221	197	243	223	947	634	1380	1260	371	325	97.6	89	398	340	858	728
Sulfate	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (5)	ND (2)	ND (5)	ND (5)	ND (1)	ND (0.5)	ND (0.5)	ND (0.2)	ND (1)	ND (0.5)	ND (2)	3.6
Major Ions - Cations																	
Sodium (dissolved)	206	208	181	189	191	862	705	820	776	293	260	134	144	269	249	561	498
Major Ions - Nutrients																	
Nitrate (as N)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (2.5)	ND (1)	ND (2.5)	ND (2.5)	ND (0.5)	ND (0.25)	ND (0.25)	ND (0.1)	ND (0.5)	ND (0.25)	ND (1)	ND (1)
Nitrite (as N)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	ND (2.5)	ND (1)	ND (2.5)	ND (2.5)	ND (0.5)	ND (0.25)	ND (0.25)	ND (0.1)	ND (0.5)	ND (0.25)	ND (1)	ND (1)
Major Ions - Miscellaneous																	
Fluoride	ND (0.25)	ND (0.25)	0.76	ND (0.25)	0.62	ND (2.5)	ND (1)	ND (2.5)	ND (2.5)	ND (0.5)	0.98	ND (0.25)	1.09	ND (0.5)	0.84	ND (1)	ND (1)
Metals																	
Arsenic (dissolved)	ND (0.003)	ND (0.003)	-	ND (0.003)	-	0.014	-	ND (0.003)	-	ND (0.003)	-	ND (0.003)	-	ND (0.003)	-	ND (0.003)	-
Barium (dissolved)	0.084	0.083	-	0.2	-	0.249	-	1.57	-	0.185	-	0.093	-	0.189	-	0.235	-
Boron (dissolved)	1.79	1.85	-	1.29	-	2.69	-	2.87	-	2.05	-	1.07	-	1.79	-	3.09	-
Cadmium (dissolved)	ND (0.001)	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-
Chromium	0.012	0.011	-	0.012	-	0.015	-	0.011	-	0.004	-	ND (0.003)	-	0.012	-	0.007	-
Iron (dissolved)	0.048	0.056	-	0.399	-	2.98	-	1.45	-	0.199	-	0.1	-	0.551	-	0.095	-
Lead (dissolved)	ND (0.001)	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-	ND (0.001)	-
Mercury (dissolved)	ND (0.0001)	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-	ND (0.0001)	-
Zinc (dissolved)	ND (0.005)	ND (0.005)	-	ND (0.005)	-	0.031	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-	ND (0.005)	-
Volatile Organic Compounds																	
1,1-Dichloroethene	ND (0.3)	ND (0.3)	-	ND (0.3)	-	ND (0.6)	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	-
1,2-Dichlorobenzene	ND (0.1)	ND (0.1)	-	ND (0.1)	-	ND (0.2)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-
1,2-Dichloroethane	ND (0.2)	ND (0.2)	-	ND (0.2)	-	ND (0.4)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-
1,4-Dichlorobenzene	ND (0.1)	ND (0.1)	-	ND (0.1)	-	ND (0.2)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-
Benzene	ND (0.2)	ND (0.2)	-	ND (0.2)	-	0.94	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	0.39	-
Carbon tetrachloride	ND (0.2)	ND (0.2)	-	ND (0.2)	-	ND (0.4)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-
Chlorobenzene	ND (0.1)	ND (0.1)	-	ND (0.1)	-	ND (0.2)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-
Ethylbenzene	ND (0.1)	ND (0.1)	-	ND (0.1)	-	ND (0.2)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-	ND (0.1)	-
Methyl tert butyl ether (MTBE)	ND (0.2)	ND (0.2)	-	ND (0.2)	-	ND (0.4)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-
Methylene chloride	ND (0.3)	ND (0.3)	-	ND (0.3)	-	ND (0.6)	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	-	ND (0.3)	-
Tetrachloroethene	ND (0.2)	ND (0.2)	-	ND (0.2)	-	ND (0.4)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-
Toluene	ND (0.2)	ND (0.2)	-	ND (0.2)	-	ND (0.4)	-	ND (0.2)	-	0.41	-	ND (0.2)	-	ND (0.2)	-	1.2	-
Trichloroethene	ND (0.2)	ND (0.2)	-	ND (0.2)	-	ND (0.4)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-
Vinyl chloride	ND (0.17)	ND (0.17)	-	ND (0.17)	-	ND (0.34)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-	ND (0.17)	-
Xylenes (total)	ND (0.2)	ND (0.2)	-	ND (0.2)	-	ND (0.4)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	ND (0.2)	-	0.22	-

Notes:

ODWS	Indicates value exceeds Ontario Drinking Water Standards. Objectives and Guidelines, Ontario Ministry of the Environment, as revised June 2006 (ODWS).
RUC	
ND	Not detected at the associated reporting limit.
J	Estimated concentration.
4.90	Detected result exceeds associated RUC standard.
ND (0.3)	Reporting limit exceeds associated RUC standard.
OG	Operational Guideline
AO	Aesthetic Objective
MAC	Maximum Acceptable Concentration
IMAC	Interim Maximum Acceptable Concentration
-	Not applicable or not analysed.
*	Background concentration exceeds ODWS, RUC Standard Defaulted to ODWS

Appendices

Appendix A
Quality Assurance/Quality Control Data Validation Memoranda

Memorandum

January 28, 2019

Revised: February 6, 2019

To:	Brian Packer; Jeff Leader; Ben Kempel	Ref. No.:	044985-40
From:	LE Laura Ermeta/ev/52		

Subject: **Analytical Data Verification**
Groundwater Sampling Events
Clean Harbors Canada Inc.
Sarnia, Ontario
June and November 2018

1. Introduction

The following document details an analytical data verification of results for groundwater samples collected at the Clean Harbors Canada Inc. site in Sarnia, Ontario during June and November 2018. Samples were submitted to AGAT Laboratories (AGAT) located in Mississauga, Ontario. A sample collection and analysis summary is presented in Table 1. A summary of the analytical methodology is presented in Table 2.

Standard GHD Limited (GHD) report deliverables were submitted by the laboratory. The final results and supporting quality assurance/quality control (QA/QC) data were assessed. Evaluation of the data was based on information obtained from the chain of custody forms, finished report forms, method blank data, duplicate data, recovery data from surrogate spikes, laboratory control samples (LCS), matrix spikes (MS), and field QC samples.

The QA/QC criteria by which these data have been assessed are outlined in the analytical methods referenced in Table 2 and applicable guidance from the documents entitled:

i) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", United States Environmental Protection Agency (USEPA) 540/R-99-008, October 1999

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", USEPA 540/R-94-013, February 1994

Items i) and ii) will subsequently be referred to as the "Guidelines" in this Memorandum.

2. Sample Holding Time and Preservation

The sample holding time criteria for the analyses are summarized in Table 2. Sample chain of custody documents and analytical reports were used to determine sample holding times. All samples were prepared and analyzed within the required holding times.

All samples were properly preserved, delivered on ice, and stored by the laboratory at the required temperature of <10 degrees Celsius (°C).

3. Laboratory Method Blank Analyses

Method blanks are prepared from a purified matrix and analyzed with investigative samples to determine the existence and magnitude of sample contamination introduced during the analytical procedures.

For this study, laboratory method blanks were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

All method blank results were non-detect, indicating that laboratory contamination was not a factor for this investigation.

4. Surrogate Spike Recoveries

In accordance with the methods employed, all samples, blanks, and QC samples analyzed for organics are spiked with surrogate compounds prior to sample extraction and/or analysis. Surrogate recoveries provide a means to evaluate the effects of laboratory performance on individual sample matrices.

All samples submitted for volatile organic compound (VOC) determinations were spiked with the appropriate number of surrogate compounds prior to sample analysis.

Surrogate recoveries were assessed against laboratory control limits. All surrogate recoveries met the above criteria.

5. Laboratory Control Sample Analyses

LCS are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects.

For this study, LCS were analyzed at a minimum frequency of 1 per 20 investigative samples and/or 1 per analytical batch.

Organic Analyses

The LCS contained all compounds of interest. All LCS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

Inorganic Analyses

The LCS contained all analytes of interest. LCS recoveries were assessed per the "Guidelines". All LCS recoveries were within the control limits, demonstrating acceptable analytical accuracy.

6. Matrix Spike Analyses

To evaluate the effects of sample matrices on the extraction or digestion process, measurement procedures, and accuracy of a particular analysis, samples are spiked with a known concentration of the analyte of concern and analyzed as MS samples. If the original sample concentration is significantly greater than the spike concentration, the recovery is not assessed.

Organic Analyses

The MS samples were spiked with all compounds of interest. All MS recoveries were within the laboratory control limits, demonstrating acceptable analytical accuracy.

Inorganic Analyses

The MS samples were spiked with the analytes of interest, and the results were evaluated using the "Guidelines". All percent recoveries were within the control limits, demonstrating acceptable analytical accuracy.

7. Duplicate Sample Analyses

Analytical precision is evaluated based on the analysis of laboratory duplicate samples. For this study, duplicate samples were prepared and analyzed by the laboratory. The laboratory performed additional site-specific duplicate analyses internally. The relative percent differences (RPDs) associated with these duplicate samples must be less than 20 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the reporting limit (RL), the evaluation criteria is a difference of one times the RL value for water samples. All duplicate analyses performed were acceptable, demonstrating acceptable analytical precision.

8. Field QA/QC Samples

The field QA/QC consisted of one trip blank, six field blanks and seven field duplicate sample sets.

Trip Blank Sample Analysis

To evaluate contamination from sample collection, transportation, storage, and analytical activities, one trip blank sample was submitted to the laboratory for VOC analysis as outlined in Table 1. All results were non-detect for the compounds of interest.

Field Blank Sample Analysis

To evaluate contamination sample collection, transportation, storage, and analytical activities, six field blank samples were collected and submitted to the laboratory for analyses.

Most sample concentrations were non-detect for the compounds of interest. A low level concentration of sodium was detected in field blank GW-44985-112218-DD-FB1. Associated sample concentrations were greater than five times the blank value and were not qualified.

Field Duplicate Sample Analysis

To assess the analytical and sampling protocol precision, seven field duplicate sample sets were collected and submitted "blind" to the laboratory, as specified in Table 1. The RPDs associated with these duplicate samples must be less than 50 percent for water samples. If the reported concentration in either the investigative sample or its duplicate is less than five times the RL, the evaluation criteria is a difference of one times the RL value for water samples.

All field duplicate results were within acceptable agreement, demonstrating acceptable sampling and analytical precision.

9. Conclusion

Based on the assessment detailed in the foregoing, the data are acceptable without qualification.

Table 1

Sample Collection and Analysis Summary
Groundwater Sampling Events
Clean Harbors Canada Inc.
Sarnia, Ontario
June and November 2018

Lab Report #	Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Alkalinity	Ammonia-N	pH	Metals	Cations	Mercury	Cyanide, free	Conductivity	Total Dissolved Solids	Anions (Cl, Br, F, NO2-N, NO3-N, SO4)	VOCs	Comments
					Analysis/Parameters											
18T347938	GW-44985-060418-DD-52B	TW52-02B	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-51B	TW51-02B	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-50B	TW50-02B	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-50A	TW50-02A	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-51A	TW51-02A	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-52A	TW52-02A	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-41S	TW41-99S	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-41D	TW41-99D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-30D	TW30-99D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-511B	TW51-02B	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	FD (GW-44985-060418-DD-51B)
18T347938	GW-44985-060418-DD-411D	TW41-99D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	FD (GW-44985-060418-DD-41D)
18T347938	GW-44985-060418-DD-32D	OW32-90D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-32S	OW32-90S	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-30	TW30-94	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-53D	TW53-03D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-53S	TW53-03S	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-35D	OW35-05D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-35S	OW35-90S	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-46D	TW46-99D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-46I	TW46-99I	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-46S	TW46-99S	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-32II	TW32-94-II	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-32IV	TW32-94-IV	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-40D	TW40-99D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060418-DD-40S	TW40-99S	Groundwater	06/04/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-47D	TW47-00D	Groundwater	06/04/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-61I	TW61-13I	Groundwater	06/05/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060518-DD-61S	TW61-13S	Groundwater	06/05/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060518-DD-61D	TW61-13D	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-22	TW22-94	Groundwater	06/05/2018	X	X	X	X	X	X	X	X	X	X	-	

Table 1

Sample Collection and Analysis Summary
Groundwater Sampling Events
Clean Harbors Canada Inc.
Sarnia, Ontario
June and November 2018

Lab Report #	Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Analysis/Parameters: Alkalinity	Ammonia-N	pH	Metals	Cations	Mercury	Cyanide, free	Conductivity	Total Dissolved Solids	Anions (Cl, Br, F, NO2-N, NO3-N, SO4)	VOCs	Comments
18T347938	GW-44985-060518-DD-22D	TW22-99D	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-60D	TW60-13D	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-39D	TW39-99D	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-39I	TW39-99I	Groundwater	06/05/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060518-DD-39S	TW39-99S	Groundwater	06/05/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060518-DD-21II	TW21-94-II	Groundwater	06/05/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060518-DD-54D	TW54-09D	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-PW2	PW2-S(R11)	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-EW2C	EW2c-13	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-EW2B	EW2b-13	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-EW1C	EW1c-13	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-EW11C	EW1c-13	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	FD (GW-44985-060518-DD-EW1C)
18T347938	GW-44985-060518-DD-EW1B	EW1b-13	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060518-DD-PW1	PW1-N	Groundwater	06/05/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060618-DD-48S	TW48-16S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-48D	TW48-00D	Groundwater	06/06/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060618-DD-45S	TW45-99S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-45D	TW45-99D	Groundwater	06/06/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060618-DD-62S	TW62-13S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-63S	TW63-13S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-59D	TW59-13D	Groundwater	06/06/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060618-DD-59S	TW59-13S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-43S	TW43-99S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-43D	TW43-99D	Groundwater	06/06/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060618-DD-49D	TW49-00D	Groundwater	06/06/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060618-DD-42S	TW42-99S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-55S	TW55-09S	Groundwater	06/06/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060618-DD-55D	TW55-09D	Groundwater	06/06/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060718-DD-FB1	-	Water	06/07/2018	X	X	X	X	X	X	X	X	X	X	-	Field Blank
18T347938	GW-44985-060718-DD-FB2	-	Water	06/07/2018	X	-	X	X	X	X	X	X	X	X	X	Field Blank

Table 1

Sample Collection and Analysis Summary
Groundwater Sampling Events
Clean Harbors Canada Inc.
Sarnia, Ontario
June and November 2018

Lab Report #	Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Analysis/Parameters: Alkalinity	Ammonia-N	pH	Metals	Cations	Mercury	Cyanide, free	Conductivity	Total Dissolved Solids	Anions (Cl, Br, F, NO2-N, NO3-N, SO4)	VOCs	Comments
18T347938	GW-44985-060718-DD-FB3	-	Water	06/07/2018	X	-	X	X	X	X	X	X	X	X	X	Field Blank
18T347938	GW-44985-060718-DD-57D	TW57-11D	Groundwater	06/07/2018	X	-	X	X	X	X	X	X	X	X	X	
18T347938	GW-44985-060718-DD-57S	TW57-11S	Groundwater	06/07/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060718-DD-56S	TW56-11S	Groundwater	06/07/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060718-DD-58S	TW58-11S	Groundwater	06/07/2018	X	X	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060718-DD-56D	TW56-11D	Groundwater	06/07/2018	X	-	X	X	X	X	X	X	X	X	-	
18T347938	GW-44985-060418-DD-Trip Blank	-	Water	06/04/2018	-	-	-	-	-	-	-	-	-	-	X	Trip Blank
18T413071	GW-44985-111918-DD-43S	TW43-99S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-43D	TW43-99D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-49D	TW49-00D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-42S	TW42-99S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-55S	TW55-09S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-55D	TW55-09D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-57S	TW57-11S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-57D	TW57-11D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-58S	TW58-11S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-56S	TW56-11S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-56D	TW56-11D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-59S	TW59-13S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-59D	TW59-13D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-32IV	TW32-94-IV	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-46D	TW46-99D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-46S	TW46-99S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-46I	TW46-99I	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-40S	TW40-99S	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-40D	TW40-99D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-47D	TW47-00D	Groundwater	11/19/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-21II	TW21-94-II	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-111918-DD-DUP1	TW21-94-II	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	FD (GW-44985-111918-DD-21II)

Table 1

Sample Collection and Analysis Summary
Groundwater Sampling Events
Clean Harbors Canada Inc.
Sarnia, Ontario
June and November 2018

Lab Report #	Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Analysis/Parameters: Alkalinity	Ammonia-N	pH	Metals	Cations	Mercury	Cyanide, free	Conductivity	Total Dissolved Solids	Anions (Cl, Br, F, NO2-N, NO3-N, SO4)	VOCs	Comments
18T413071	GW-44985-111918-DD-22	TW22-94	Groundwater	11/19/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-61S	TW61-13S	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-61I	TW61-13I	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-61D	TW61-13D	Groundwater	11/20/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-DUP2	TW61-13I	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	FD (GW-44985-112018-DD-61I)
18T413071	GW-44985-112018-DD-22D	TW22-99D	Groundwater	11/20/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-60D	TW60-13D	Groundwater	11/20/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-39D	TW39-99D	Groundwater	11/20/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-39I	TW39-99I	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-39S	TW39-99S	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-63S	TW63-13S	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-54D	TW54-09D	Groundwater	11/20/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-45D	TW45-99D	Groundwater	11/20/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-45S	TW45-99S	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-62S	TW62-13S	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-48D	TW48-00D	Groundwater	11/20/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-48S	TW48-16S	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-52B	TW52-02B	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-52A	TW52-02A	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-51B	TW51-02B	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-51A	TW51-02A	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-50B	TW50-02B	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112018-DD-50A	TW50-02A	Groundwater	11/20/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-35S	OW35-90S	Groundwater	11/21/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-35D	OW35-90D	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-DUP3	OW35-90D	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	FD (GW-44985-112118-DD-35D)
18T413071	GW-44985-112118-DD-53S	TW53-03S	Groundwater	11/21/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-53D	TW53-03D	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-32S	OW32-90S	Groundwater	11/21/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-32D	OW32-90D	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	

Table 1

Sample Collection and Analysis Summary
Groundwater Sampling Events
Clean Harbors Canada Inc.
Sarnia, Ontario
June and November 2018

Lab Report #	Sample Identification	Location	Matrix	Collection Date (mm/dd/yyyy)	Analysis/Parameters: Alkalinity	Ammonia-N	pH	Metals	Cations	Mercury	Cyanide, free	Conductivity	Total Dissolved Solids	Anions (Cl, Br, F, NO2-N, NO3-N, SO4)	VOCs	Comments
18T413071	GW-44985-112118-DD-30D	TW30-99D	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-30	TW30-94	Groundwater	11/21/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-41D	TW41-99D	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-41S	TW41-99S	Groundwater	11/21/2018	X	X	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-PW2	PW2-S(R11)	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112118-DD-DUP4	PW2-S(R11)	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	FD (GW-44985-112118-DD-PW2)
18T413071	GW-44985-112118-DD-EW2C	EW2c-13	Groundwater	11/21/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112218-DD-EW2B	EW2b-13	Groundwater	11/22/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112218-DD-EW1C	EW1c-13	Groundwater	11/22/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112218-DD-EW1B	EW1b-13	Groundwater	11/22/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112218-DD-PW1	PW1-N	Groundwater	11/22/2018	X	-	X	-	X	-	X	X	X	X	-	
18T413071	GW-44985-112218-DD-FB1	-	Water	11/22/2018	X	X	X	-	X	-	X	X	X	X	-	Field Blank
18T413071	GW-44985-112218-DD-FB2	-	Water	11/22/2018	X	X	X	-	X	-	X	X	X	X	-	Field Blank
18T413071	GW-44985-112218-DD-FB3	-	Water	11/22/2018	X	-	X	-	X	-	X	X	X	X	-	Field Blank

Notes:

"-"	- Not applicable
FD	- Field Duplicate Sample of sample in parenthesis
N	- Nitrogen
Cl	- Chloride
Br	- Bromide
F	- Fluoride
NO2-N	- Nitrite-Nitrogen
NO3-N	- Nitrate-Nitrogen
SO4	- Sulphate
VOCs	- Volatile Organic Compounds

Table 2

Analytical Method and Holding Time Criteria
Groundwater Sampling Events
Clean Harbors Canada Inc.
Sarnia, Ontario
June and November 2018

Parameters	Methodology (1)	Holding Time Criteria Water
Alkalinity	SM 2320	14 days
Ammonia-N	SM 4500 NH3-F	28 days
pH	SM 4500H	28 days
Metals	SW846 6020/EPA 200.8	60 days
Cations	SW846 6010/EPA 200.7	60 days
Mercury	SW846 7470/EPA 245.1	28 days
Cyanide, free	SM 4500 CN-I	14 days
Conductivity	SM 2510	28 days
Total Dissolved Solids	SM 2540C	7 days
Anions (Chloride)	SM 4110	28 days
Anions (Nitrite-N, Nitrate-N)	SM 4110	7 days
Anions (Bromide, Fluoride, Sulphate)	SM 4110	30 days
Volatile Organic Compounds	SW846 5030/8260	14 days

Notes:

(1) Methods referenced from the following:
SM - "Standard Methods for the Examination of Water and Wastewater", 21st Ed., APHA, September 2005
SW846 - "Test Method for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, Third Edition, 1986, with subsequent revisions

N - Nitrogen

Appendix B
Transducer Hydrographs

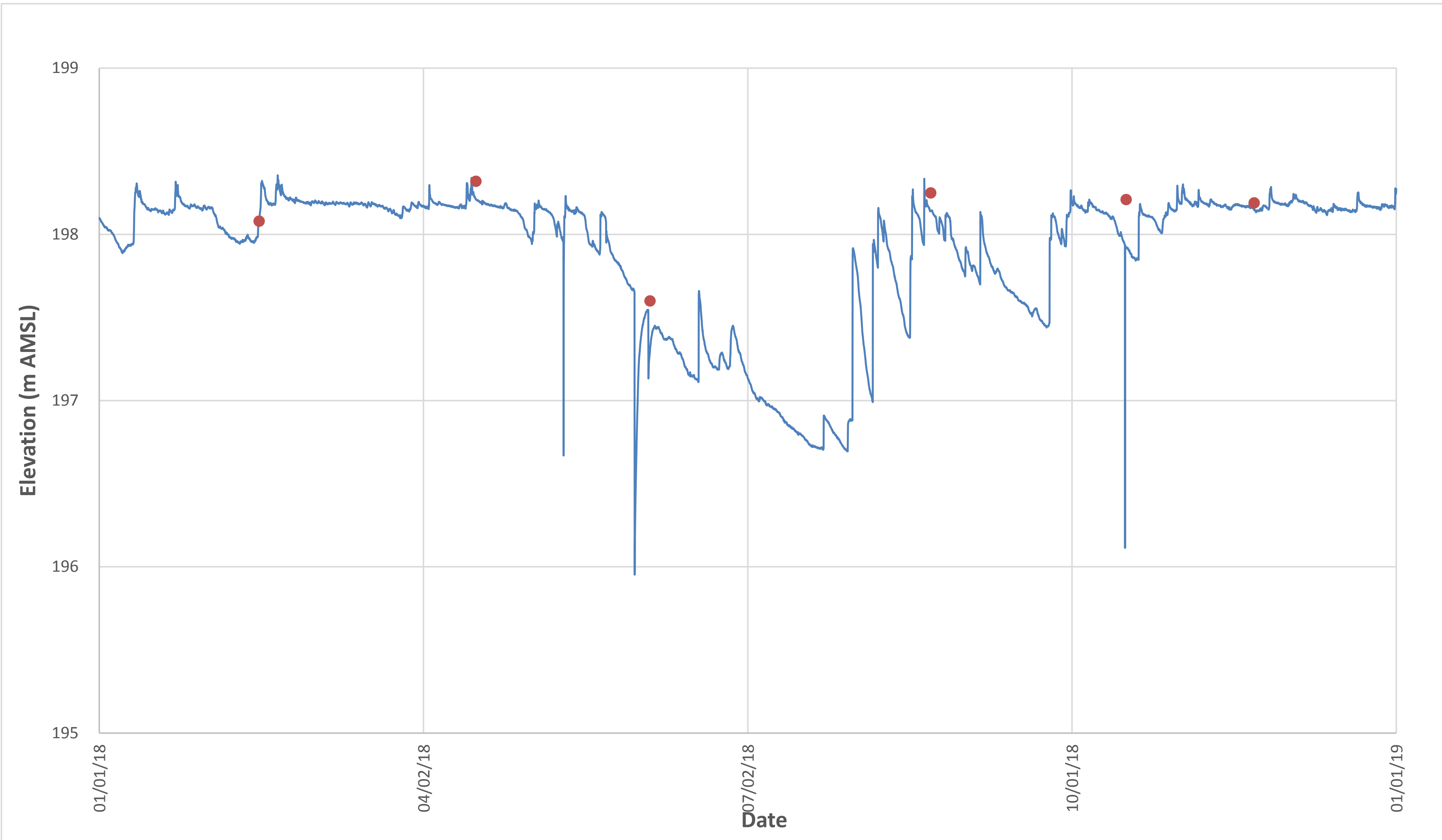


Figure B-1
ACTIVE AQUITARD HYDROGRAPH - OW35-90S
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

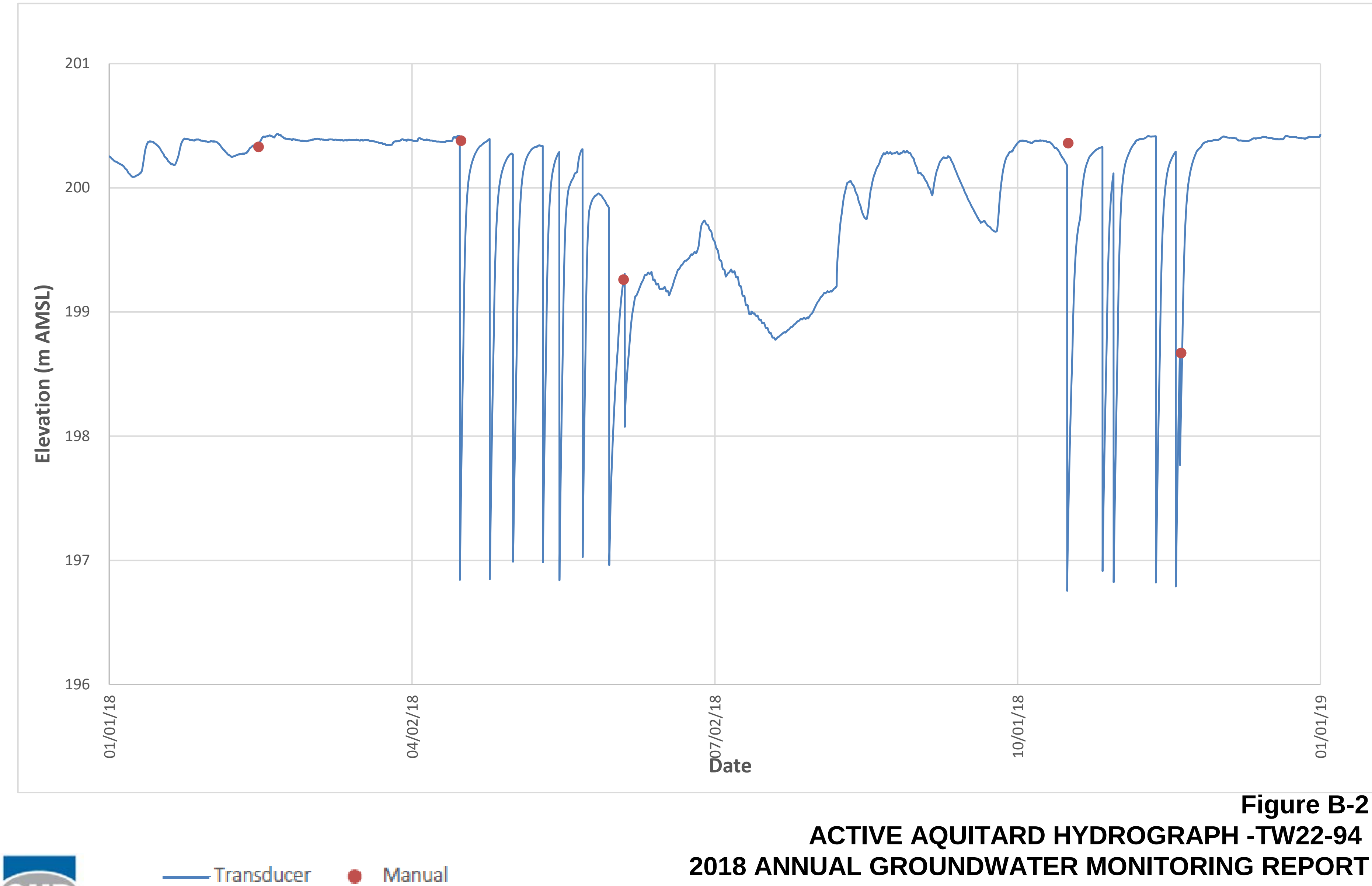


Figure B-2
ACTIVE AQUITARD HYDROGRAPH -TW22-94
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

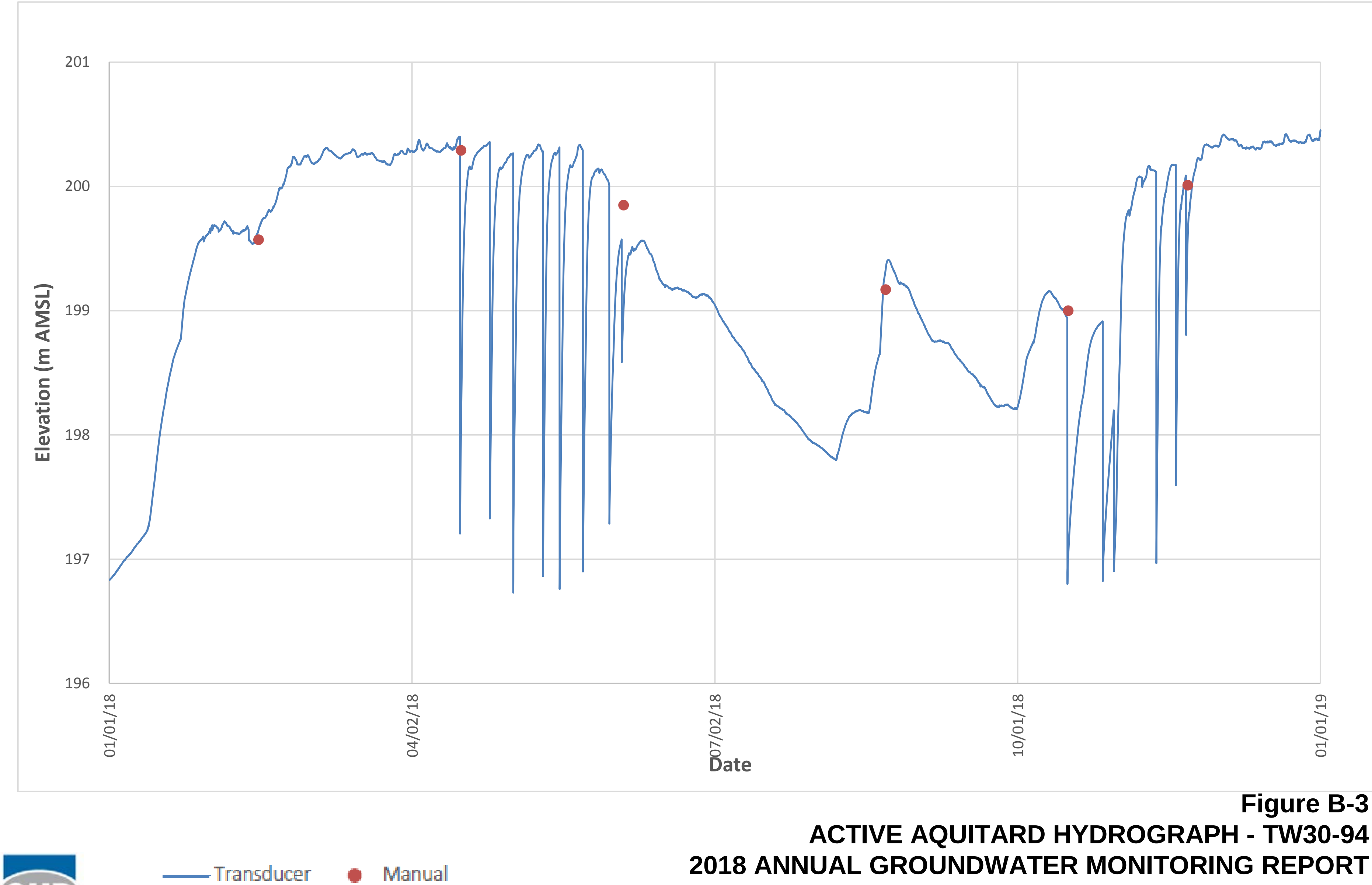
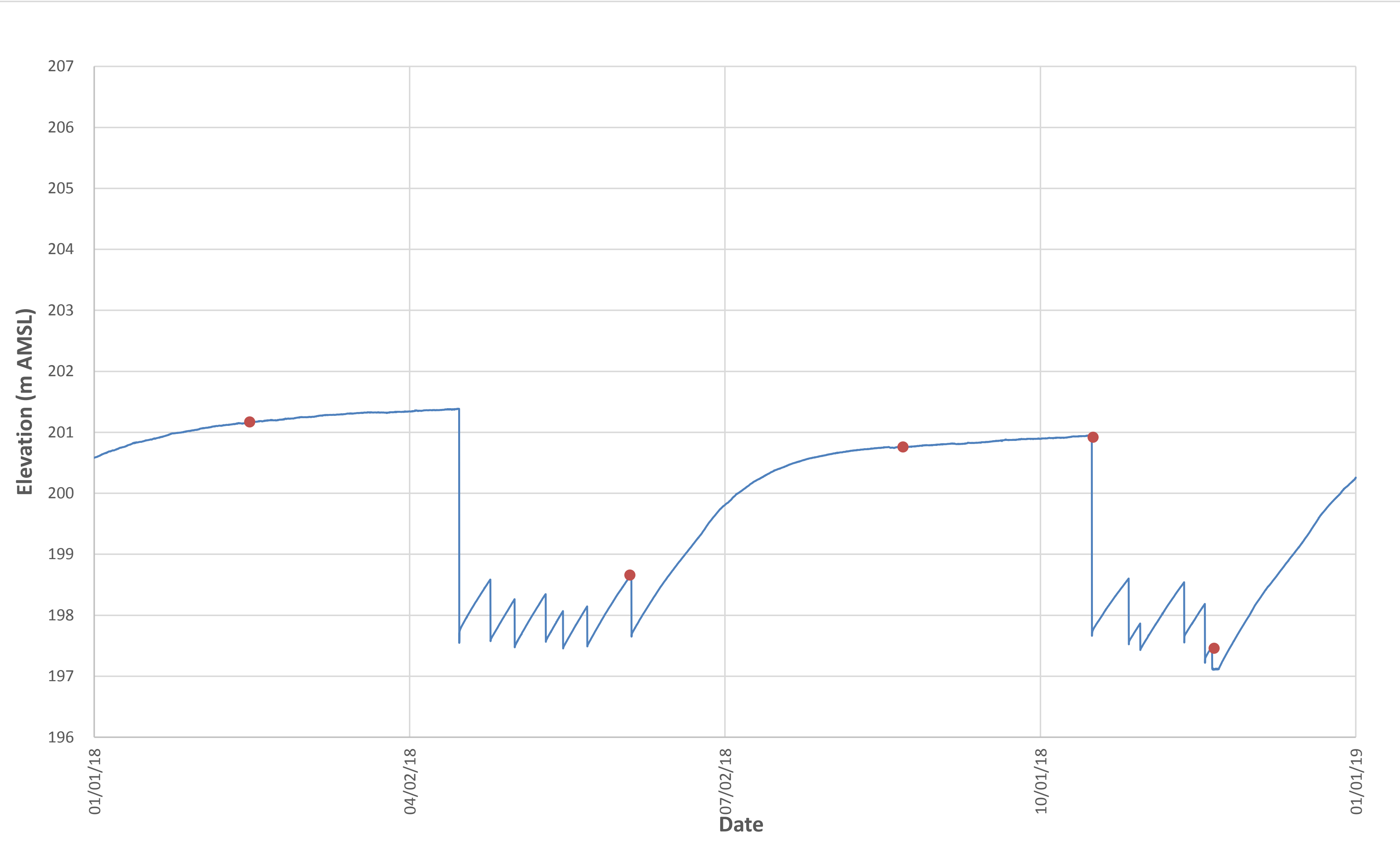


Figure B-3
ACTIVE AQUITARD HYDROGRAPH - TW30-94
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility



Transducer Manual

Figure B-4

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW39-99I

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

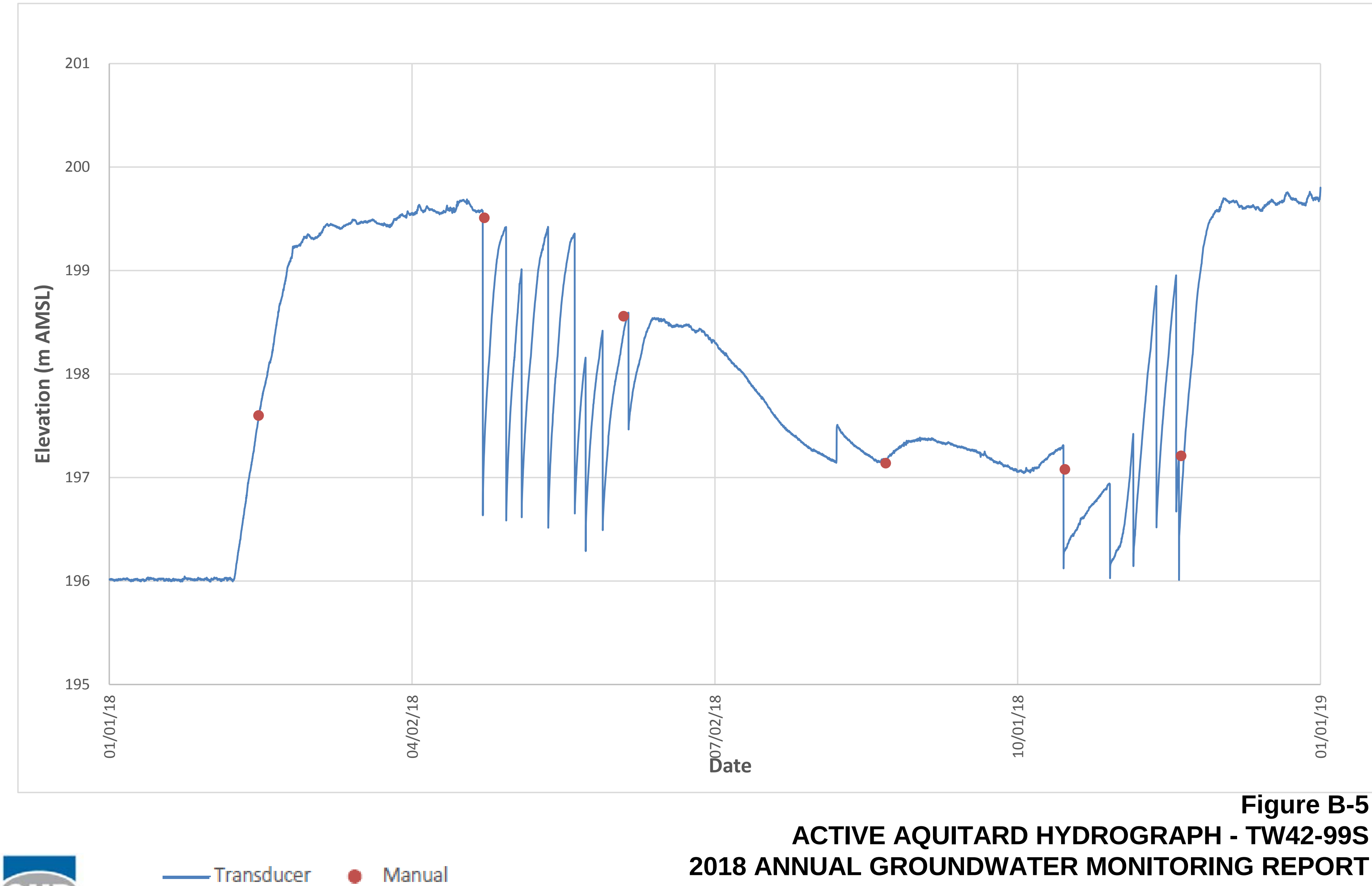


Figure B-5
ACTIVE AQUITARD HYDROGRAPH - TW42-99S
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

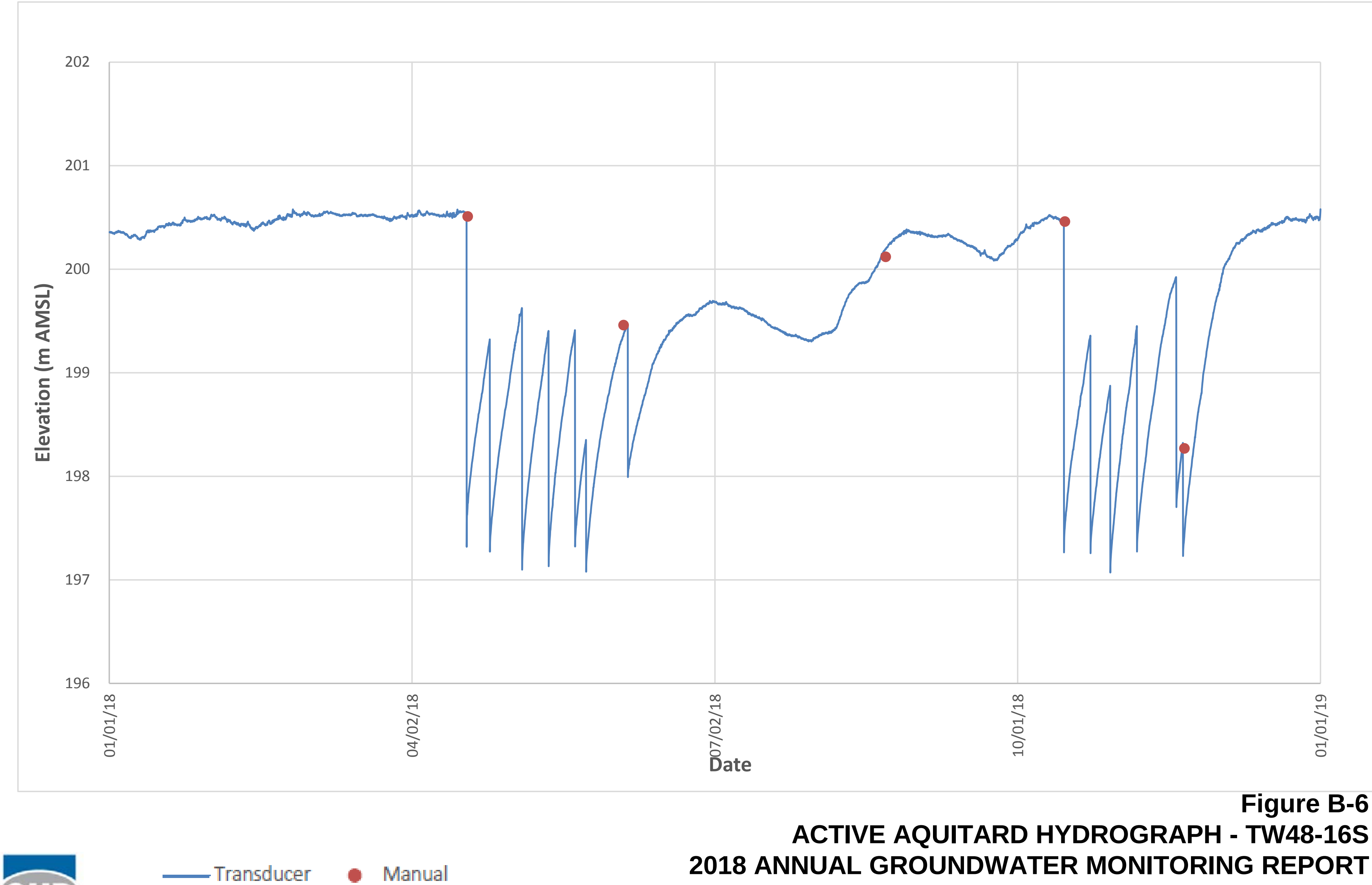


Figure B-6
ACTIVE AQUITARD HYDROGRAPH - TW48-16S
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

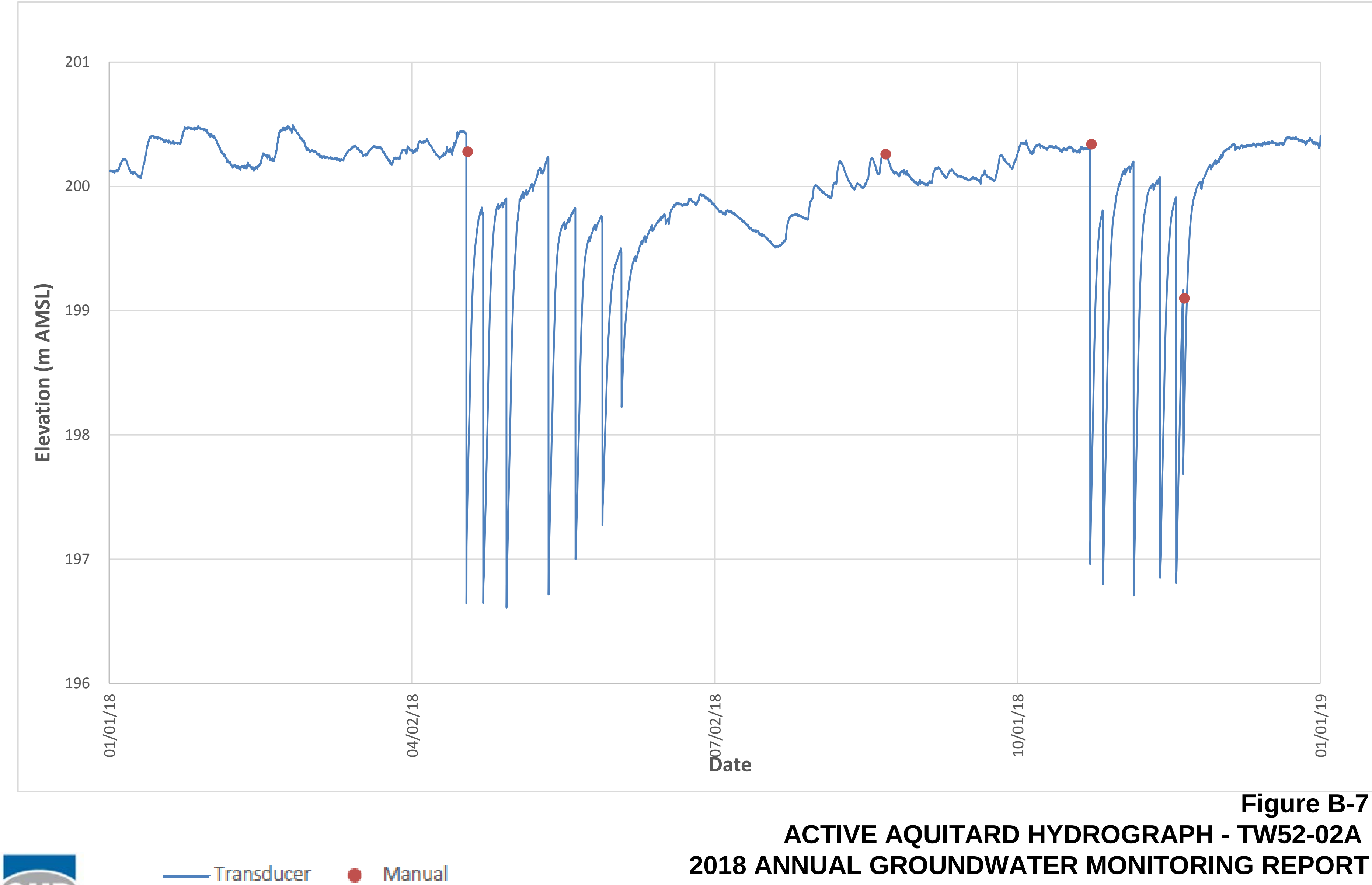


Figure B-7
ACTIVE AQUITARD HYDROGRAPH - TW52-02A
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

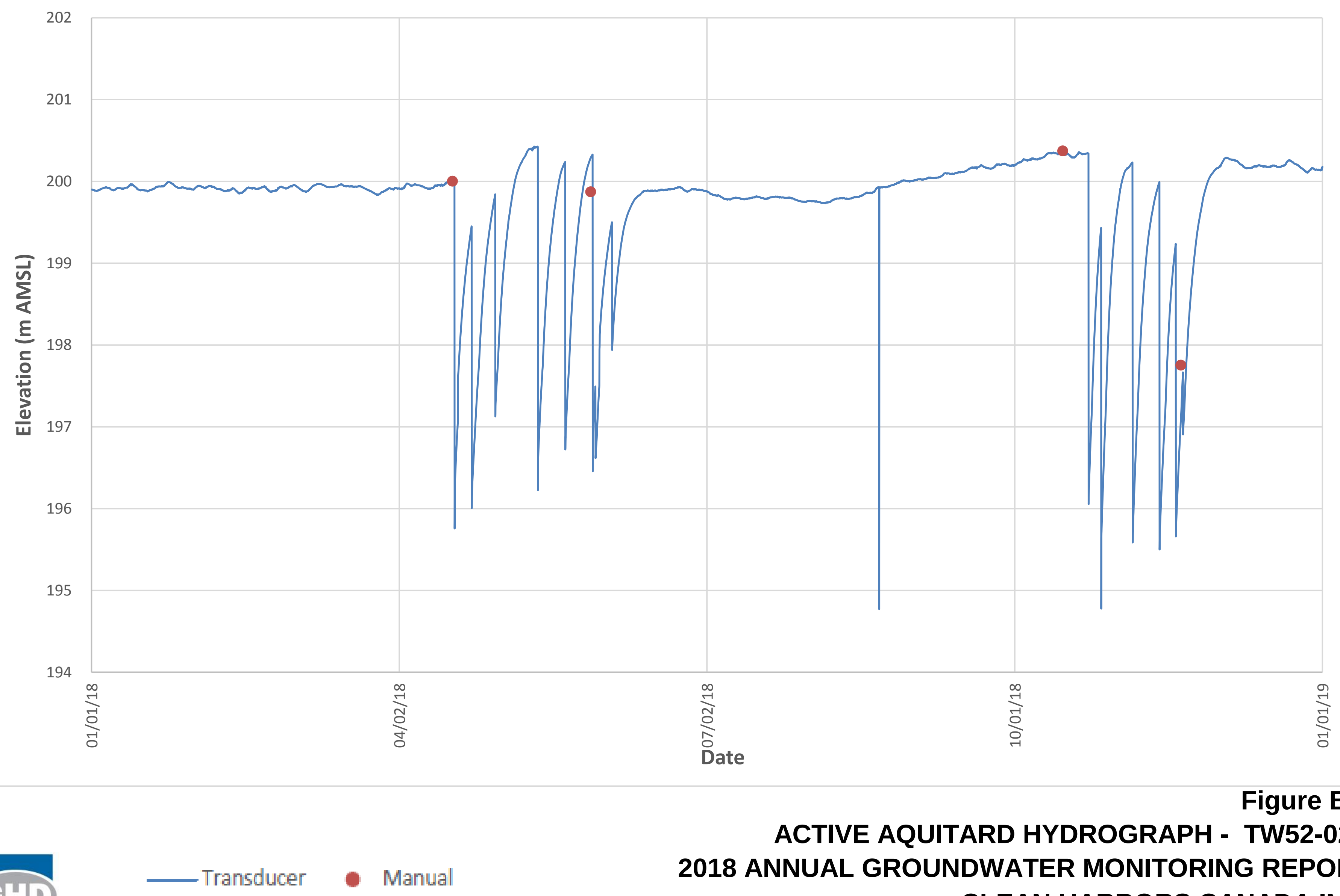


Figure B-8

ACTIVE AQUITARD HYDROGRAPH - TW52-02B

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

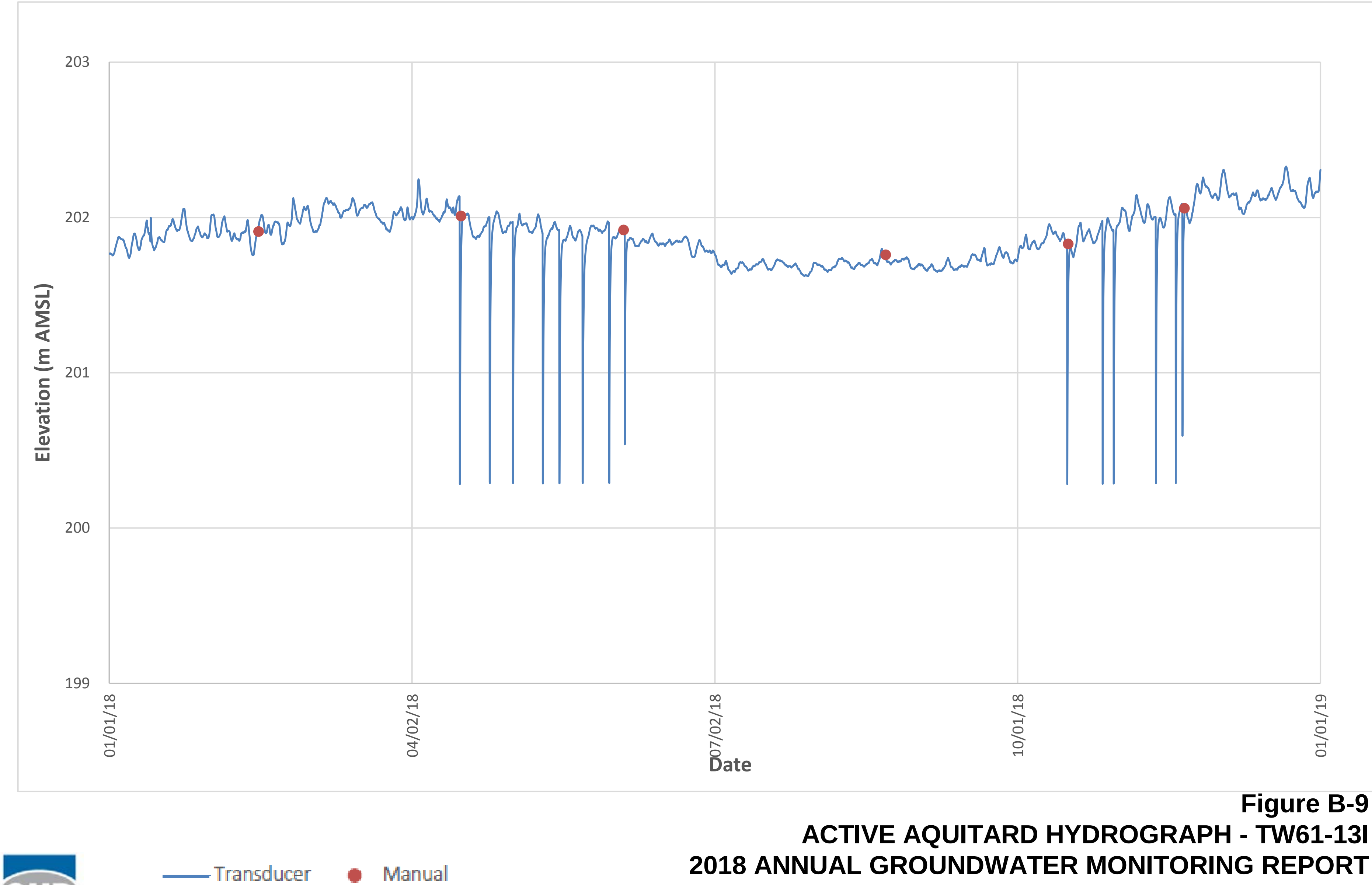


Figure B-9
ACTIVE AQUITARD HYDROGRAPH - TW61-13I
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

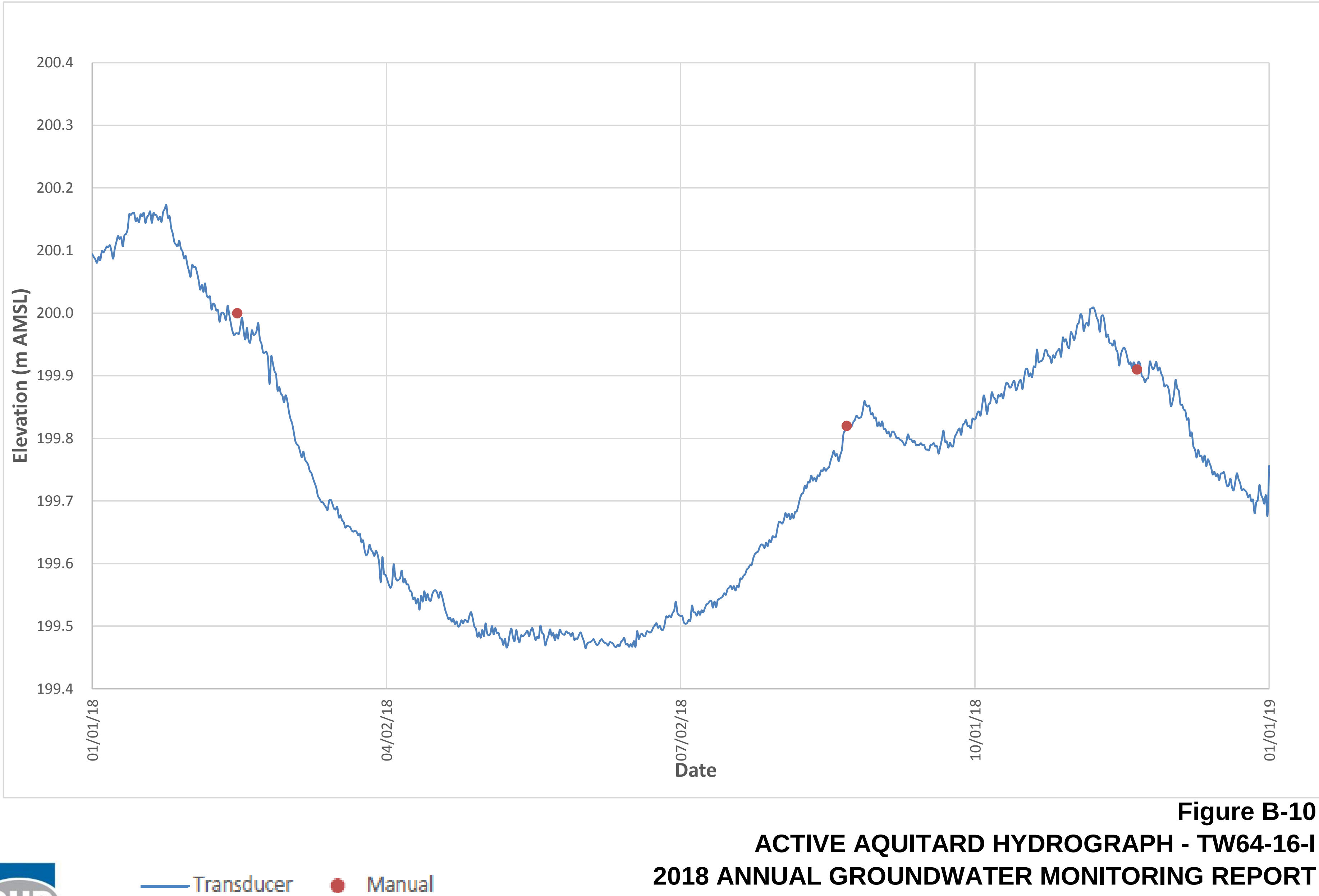


Figure B-10

ACTIVE AQUITARD HYDROGRAPH - TW64-16-I

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

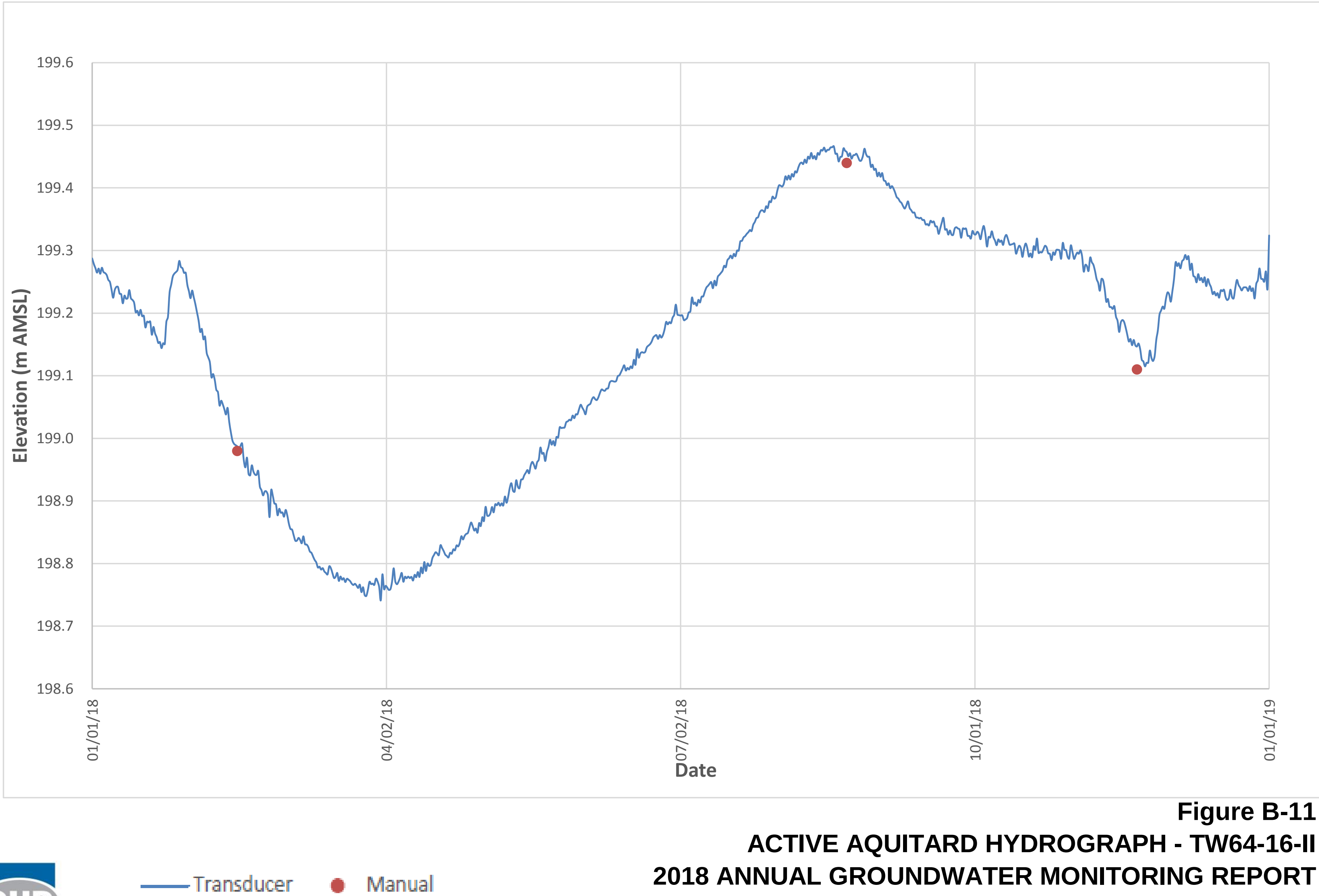


Figure B-11
ACTIVE AQUITARD HYDROGRAPH - TW64-16-II
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

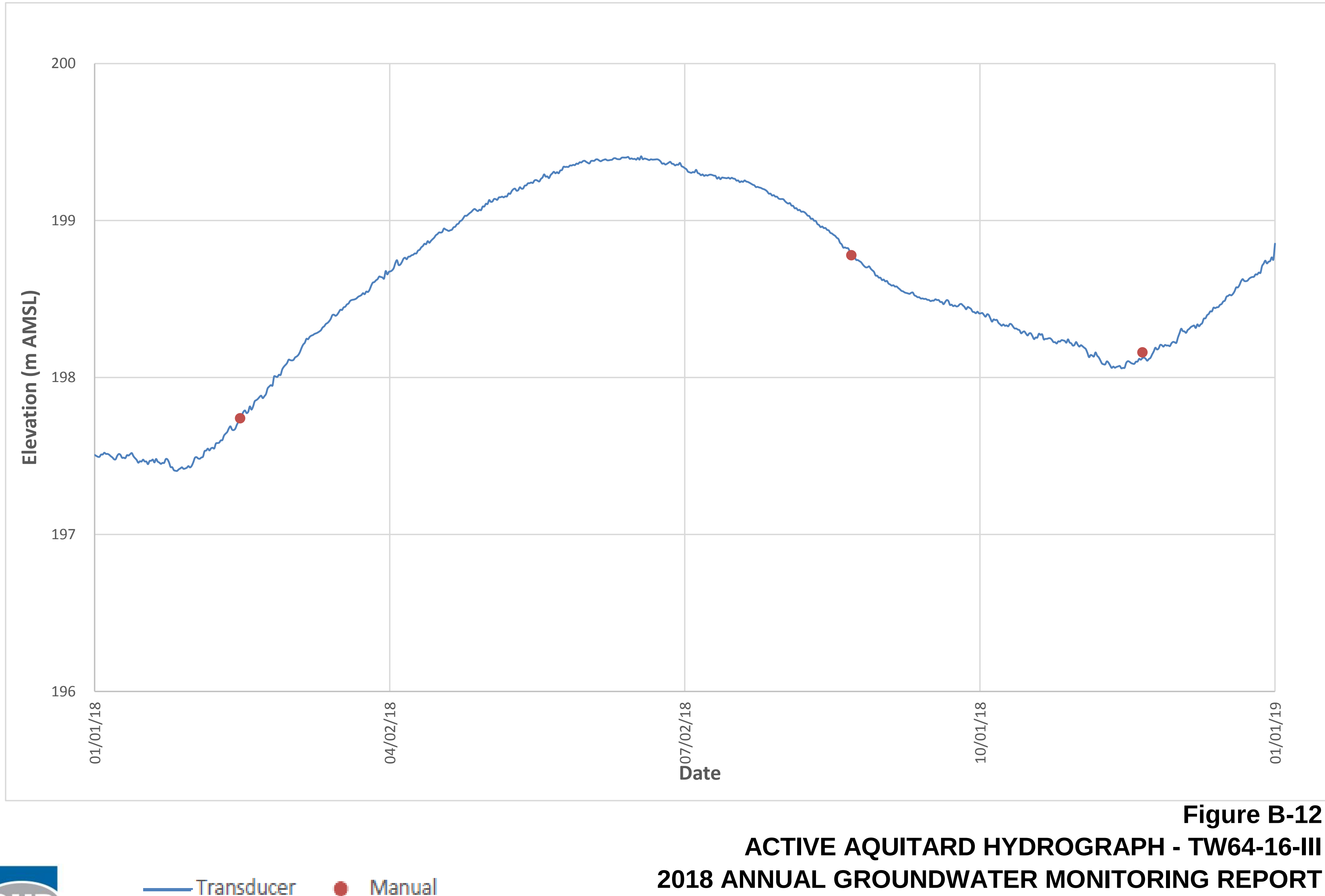


Figure B-12
ACTIVE AQUITARD HYDROGRAPH - TW64-16-III
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

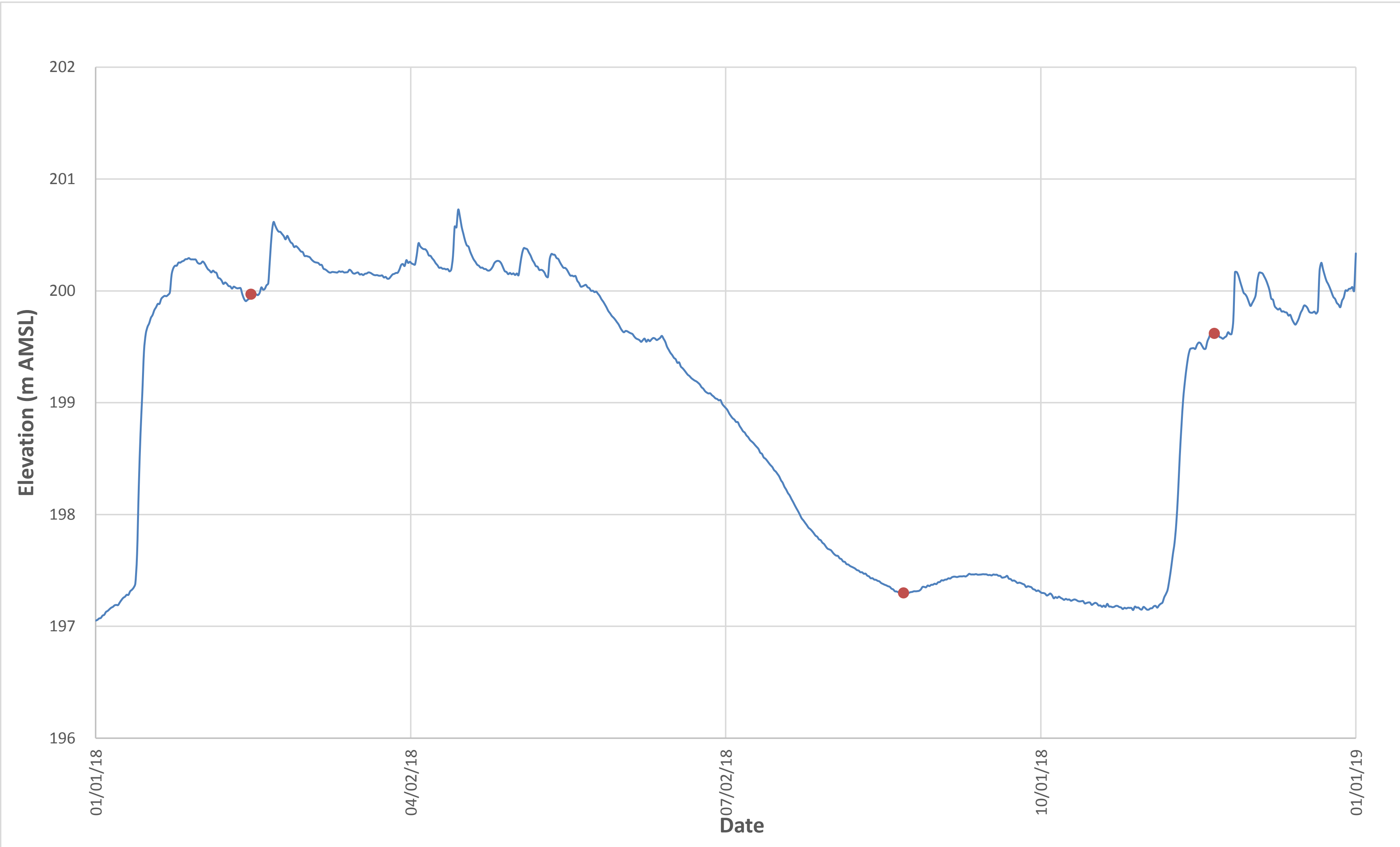


Figure B-13

ACTIVE AQUITARD HYDROGRAPH - TW64-16-IV

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

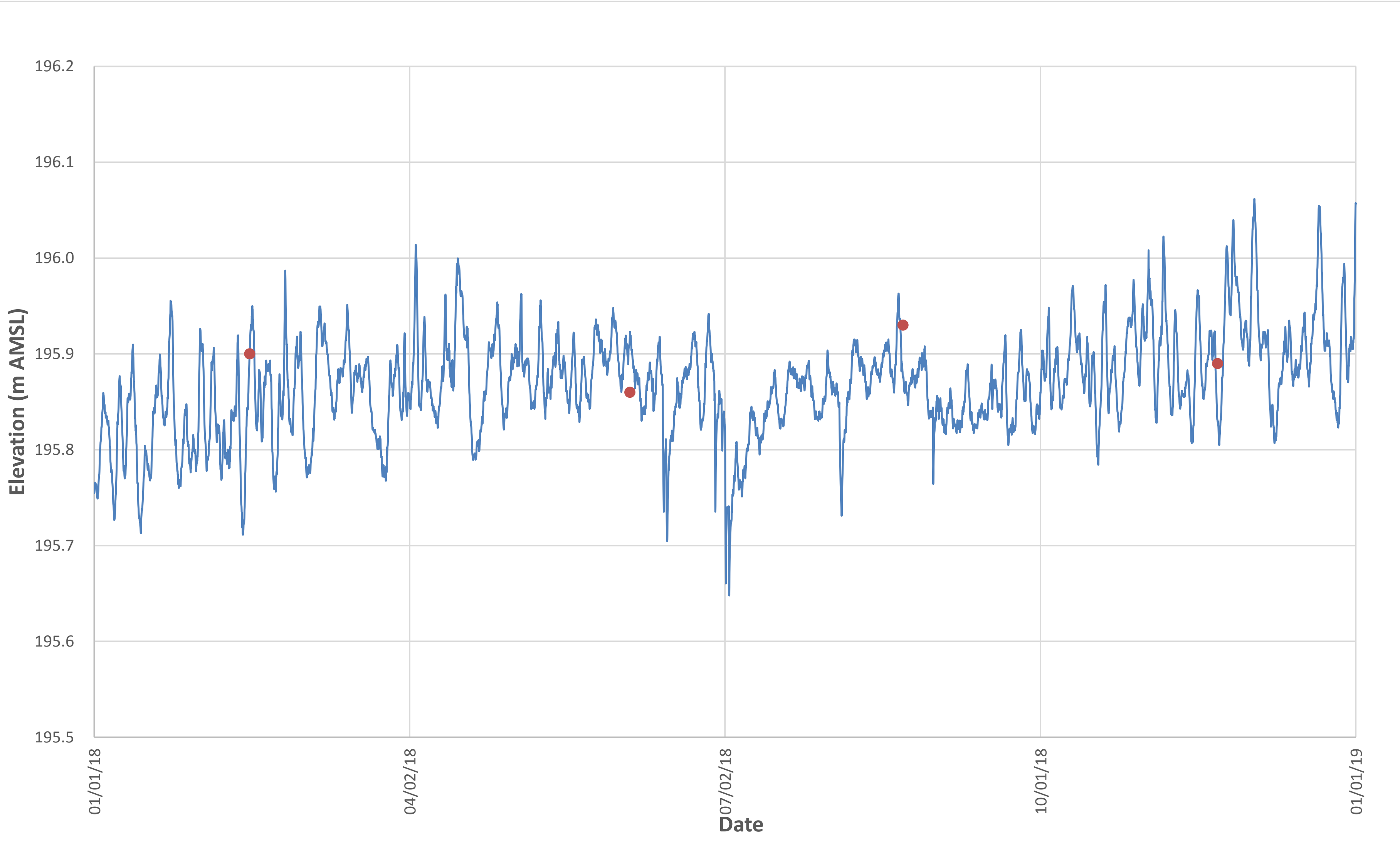


Figure B-14

ACTIVE AQUITARD HYDROGRAPH - OW35-05D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

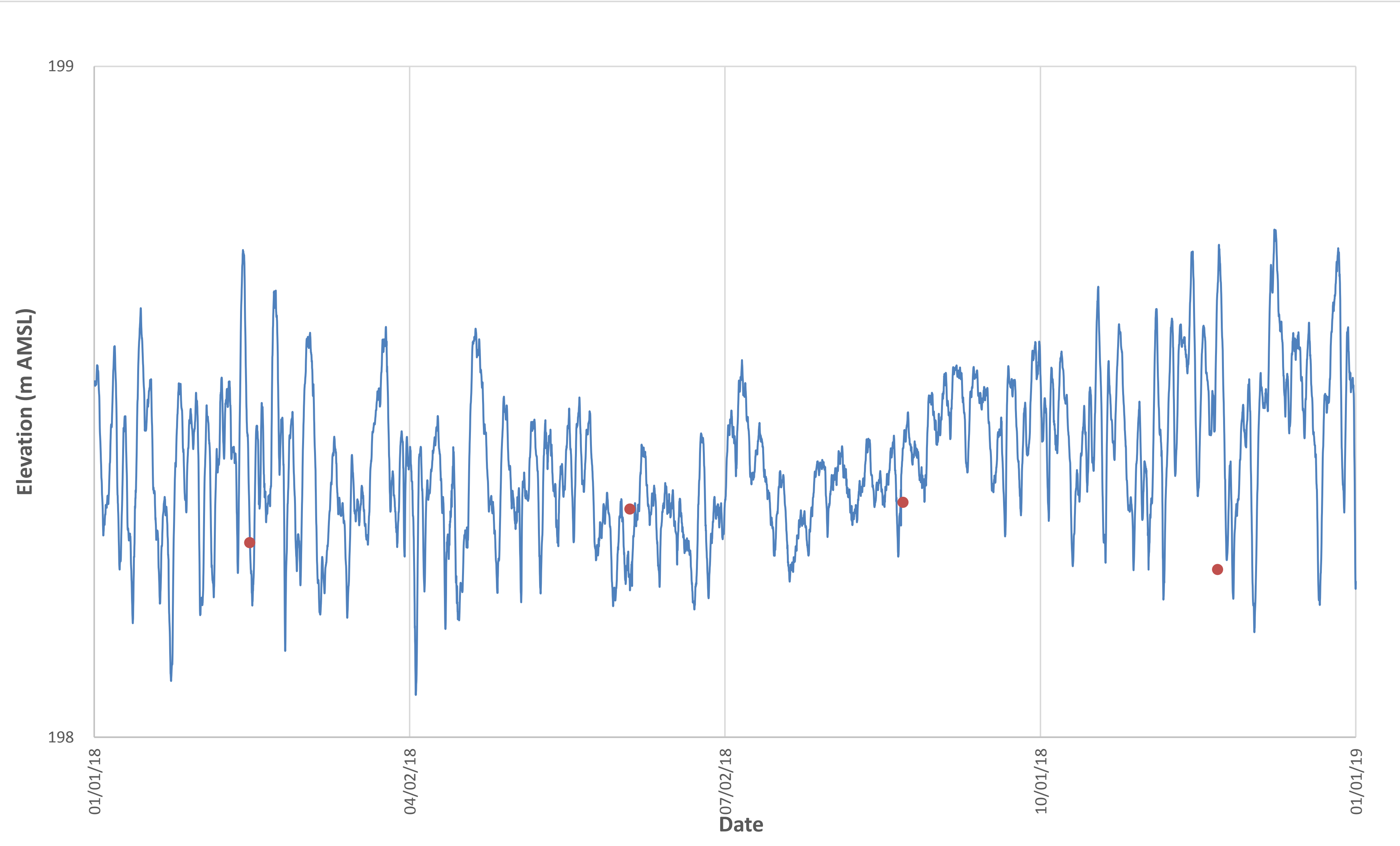


Figure B-15

ACTIVE AQUITARD HYDROGRAPH - PW1-N

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

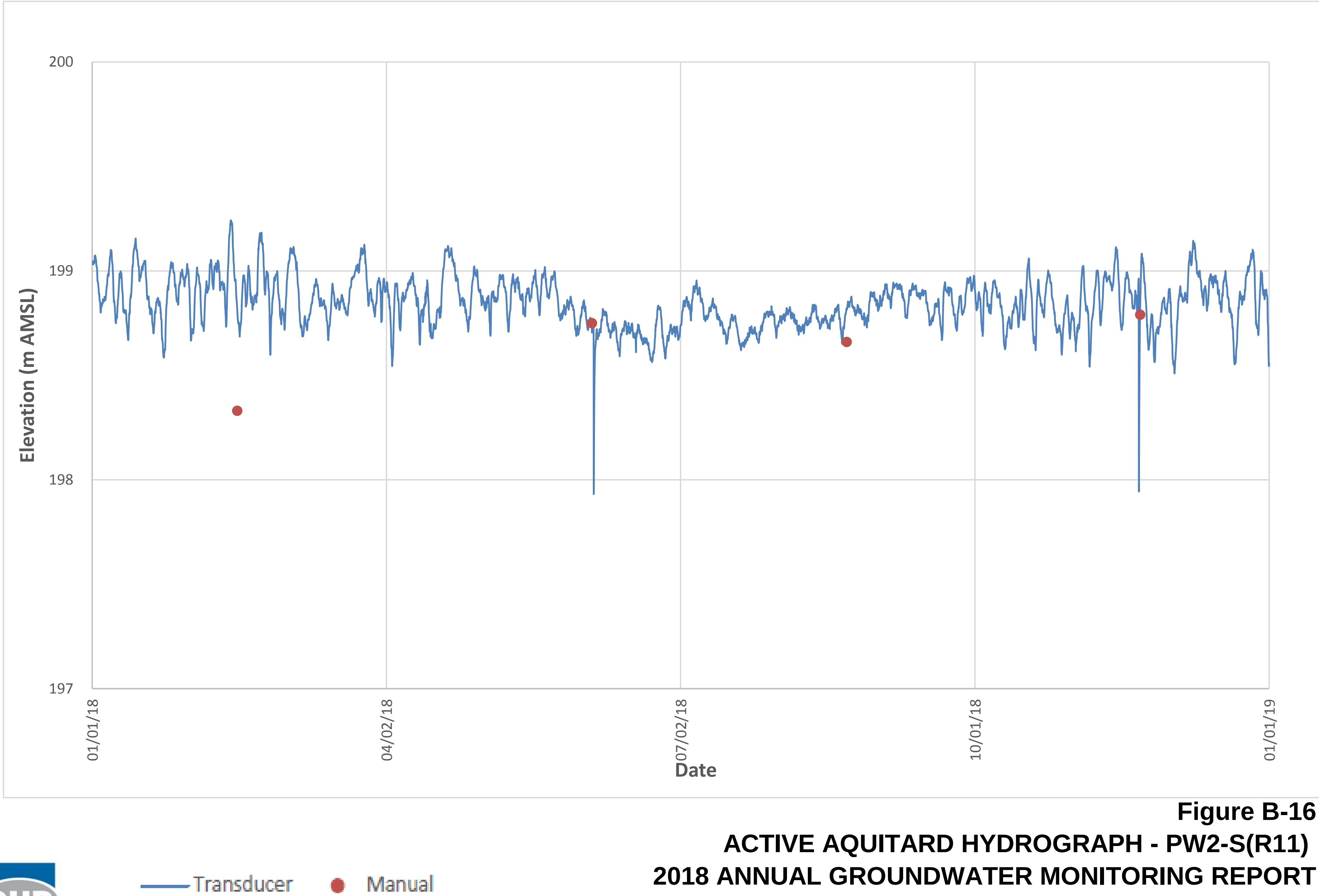


Figure B-16

ACTIVE AQUITARD HYDROGRAPH - PW2-S(R11)

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

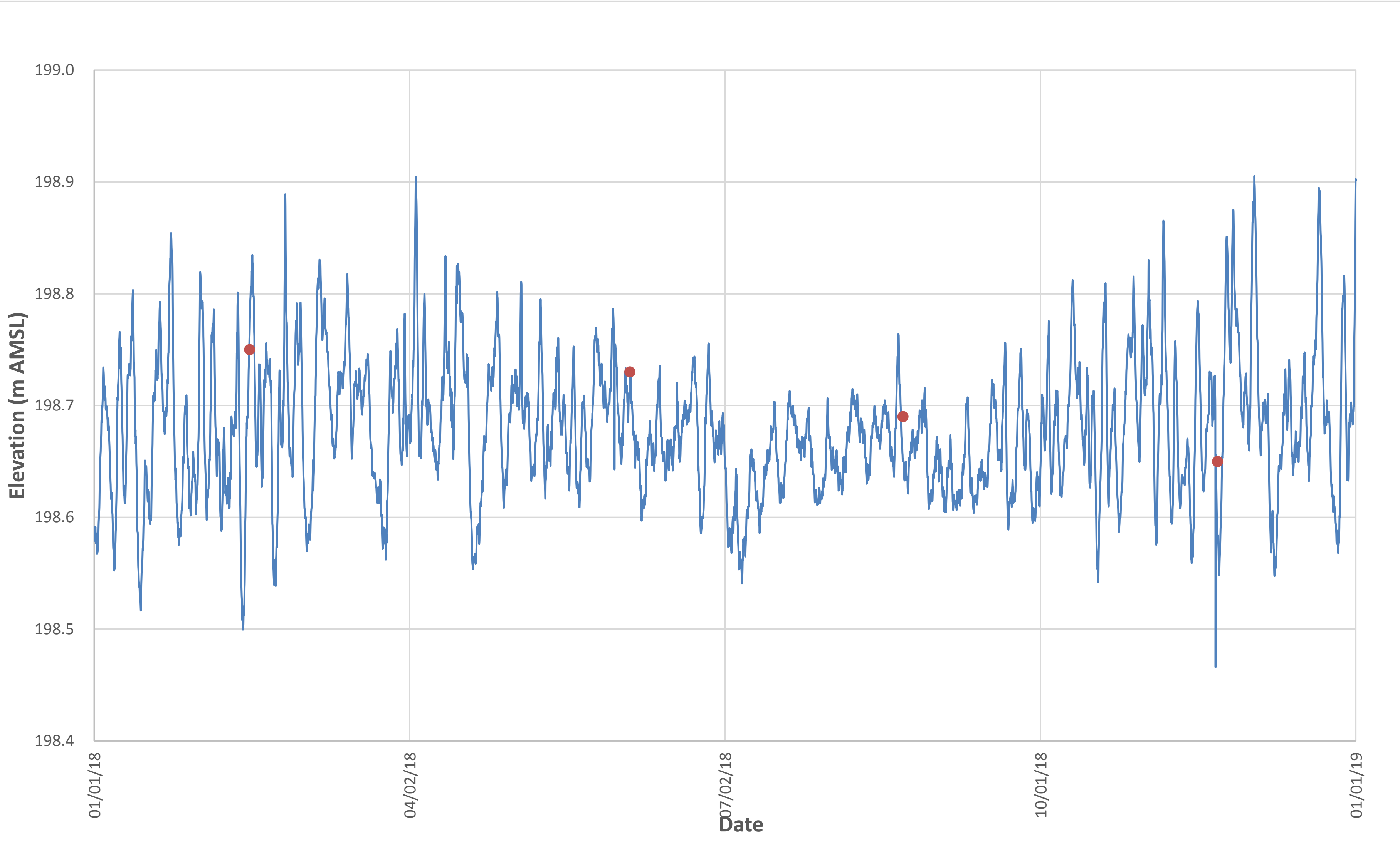


Figure B-17

ACTIVE AQUITARD HYDROGRAPH - TW30-99D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

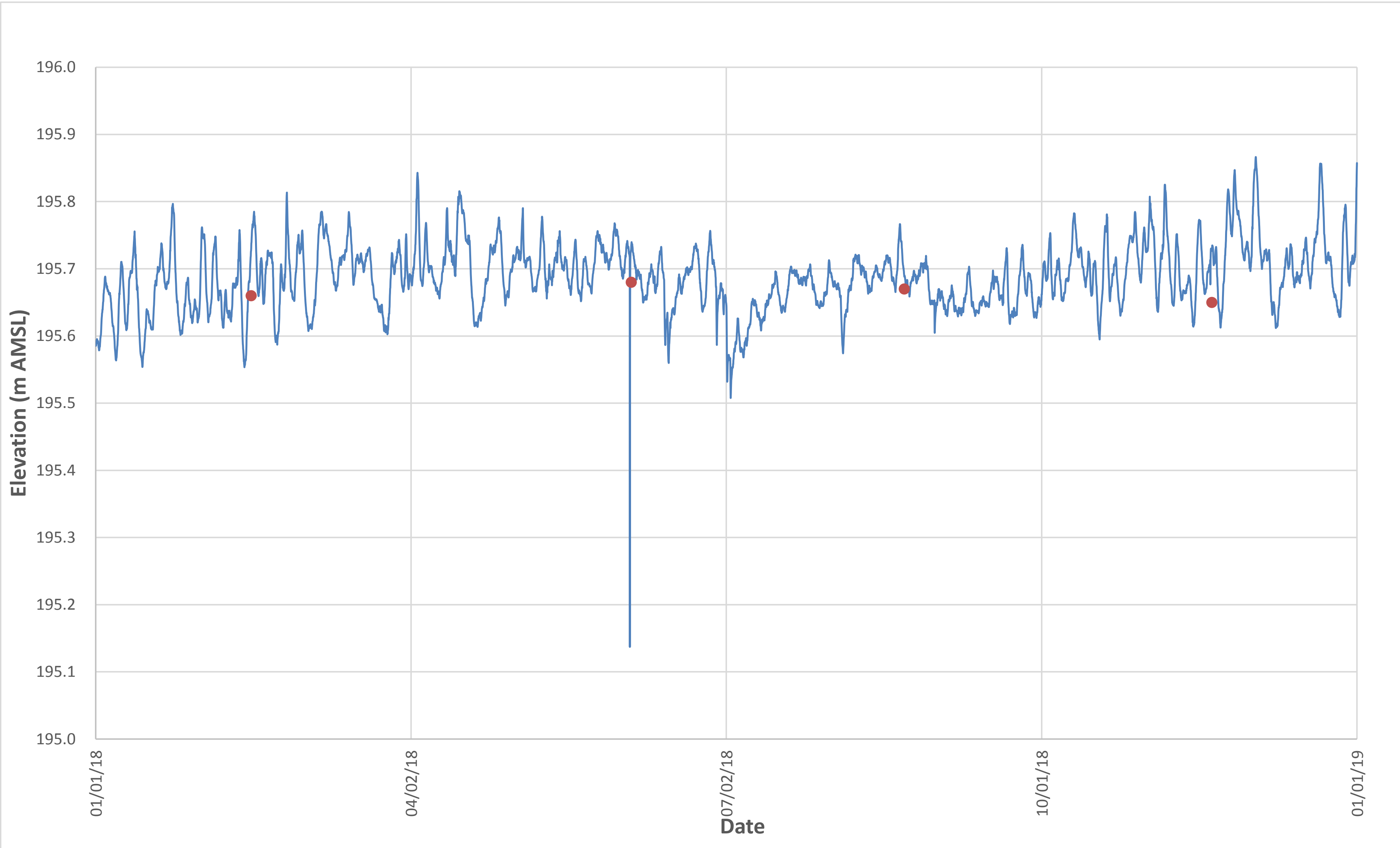


Figure B-18

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW32-94-II

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

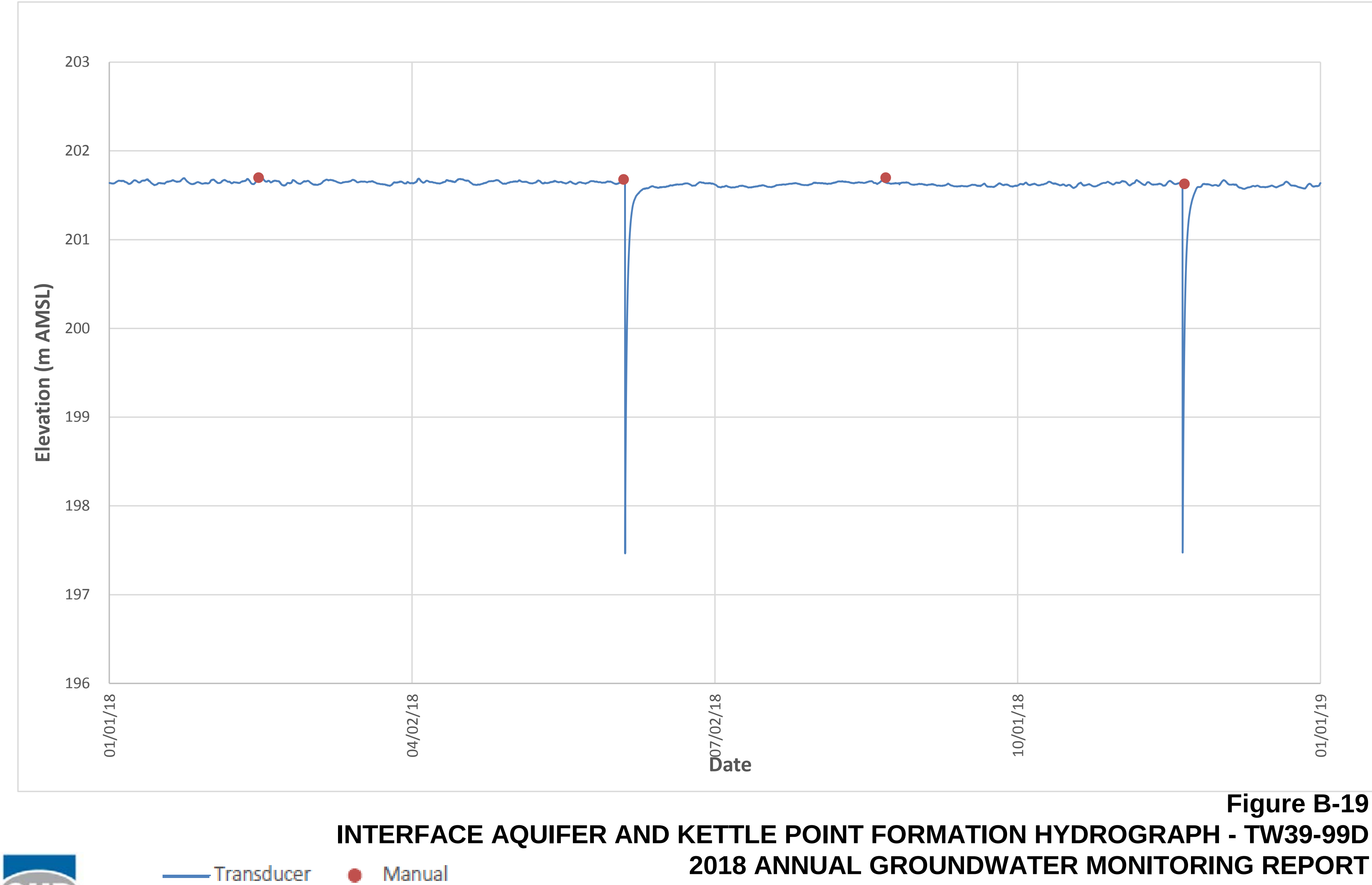


Figure B-19

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW39-99D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

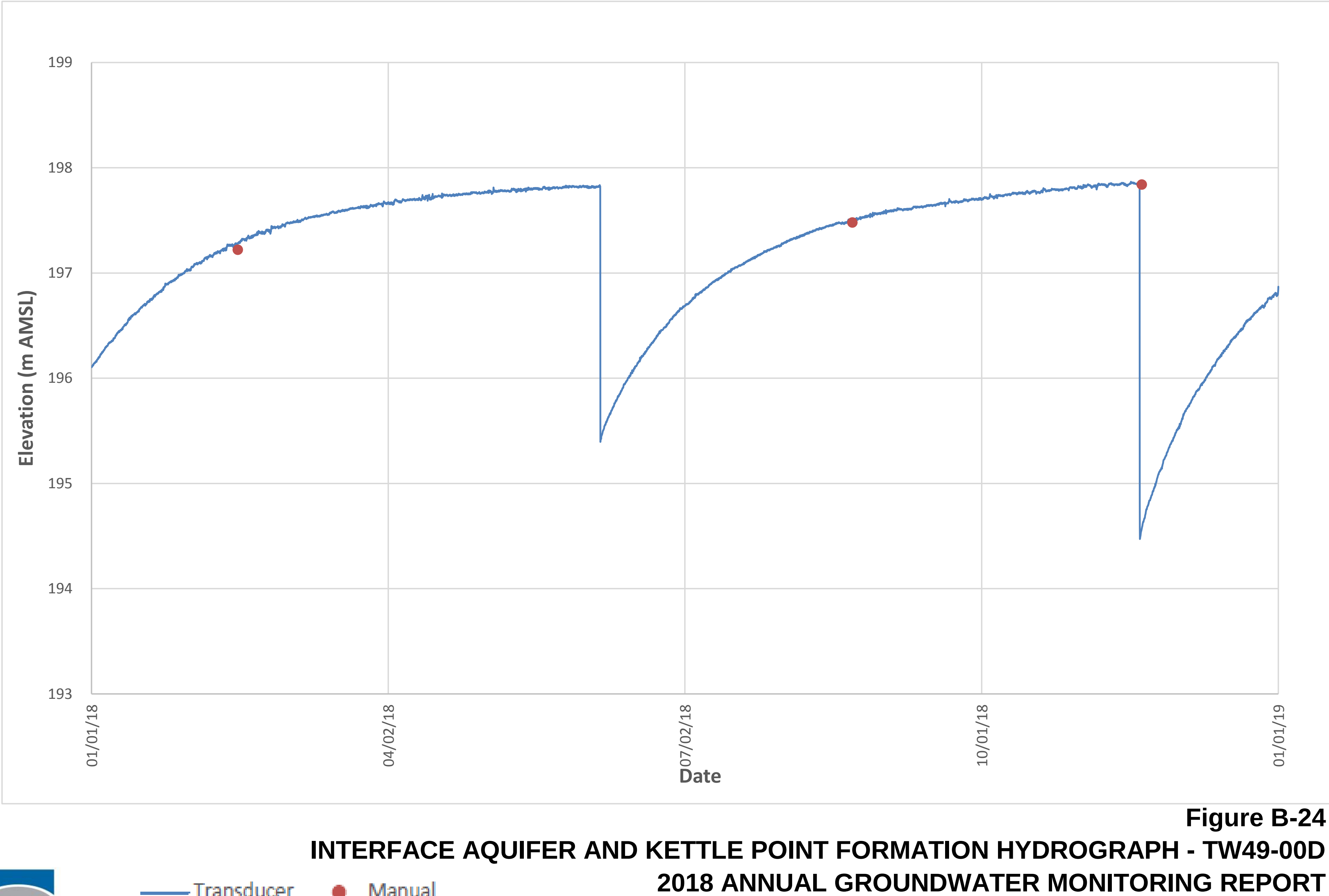


Figure B-24
INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW49-00D
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

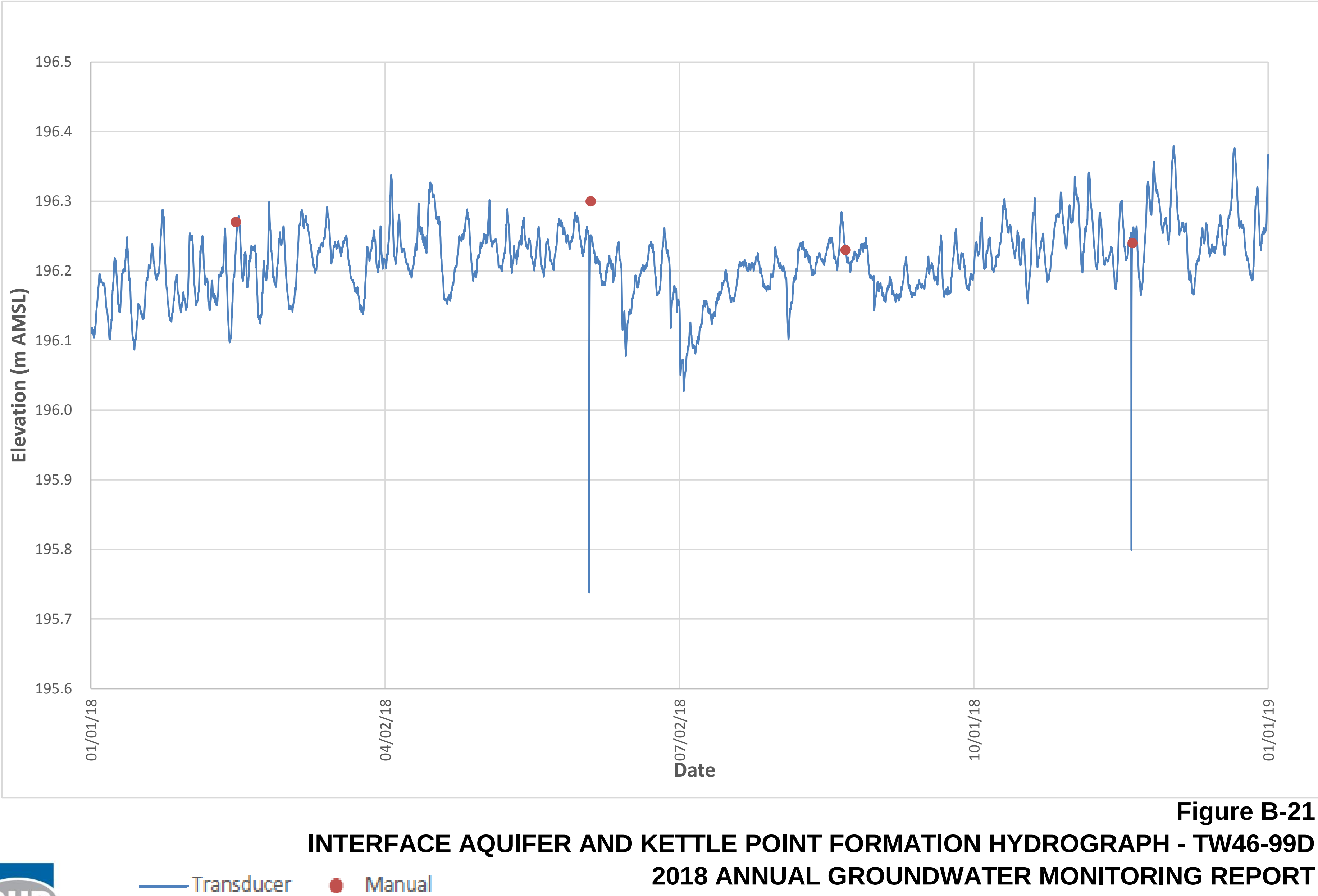


Figure B-21

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW46-99D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

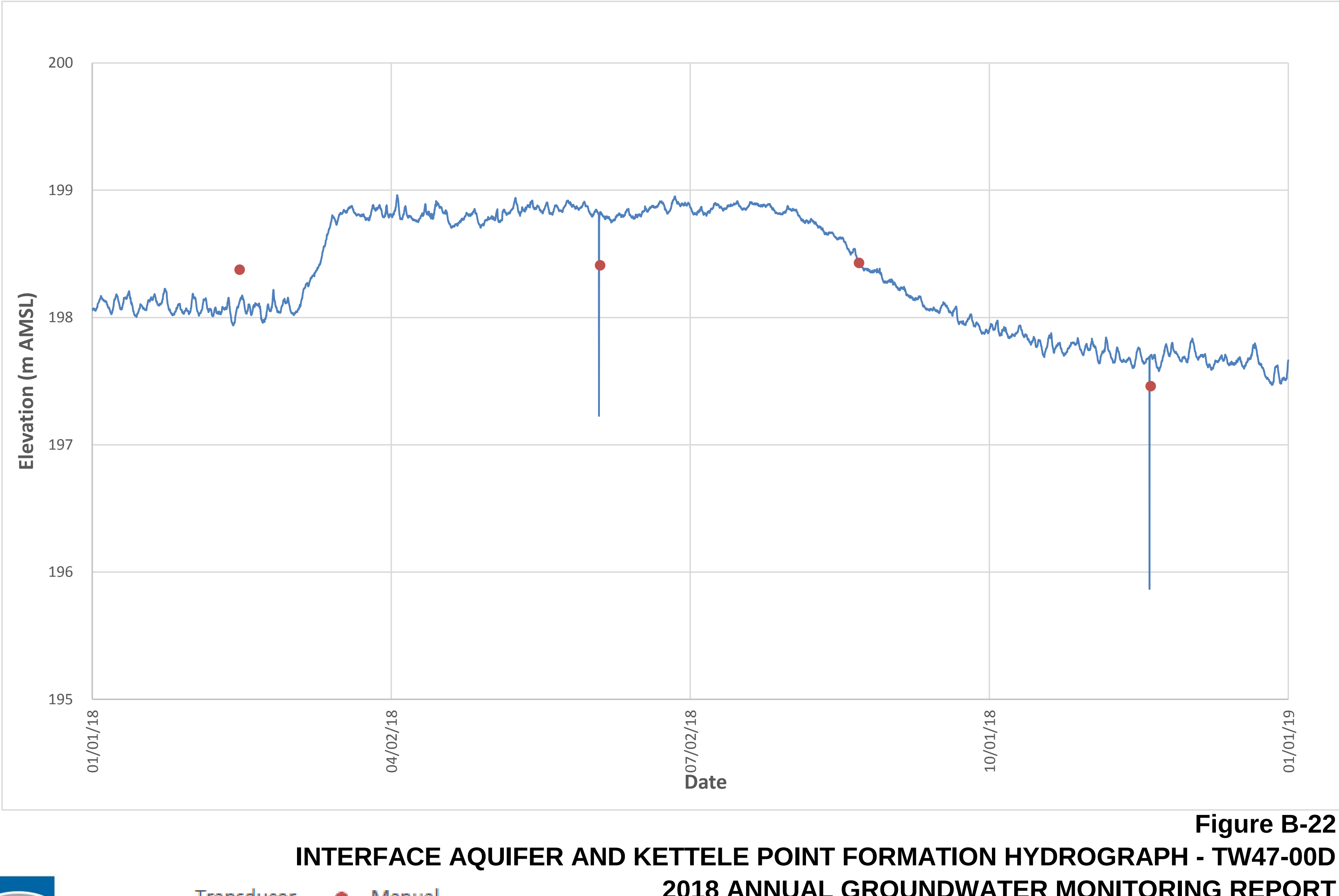


Figure B-22

INTERFACE AQUIFER AND KETTELE POINT FORMATION HYDROGRAPH - TW47-00D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

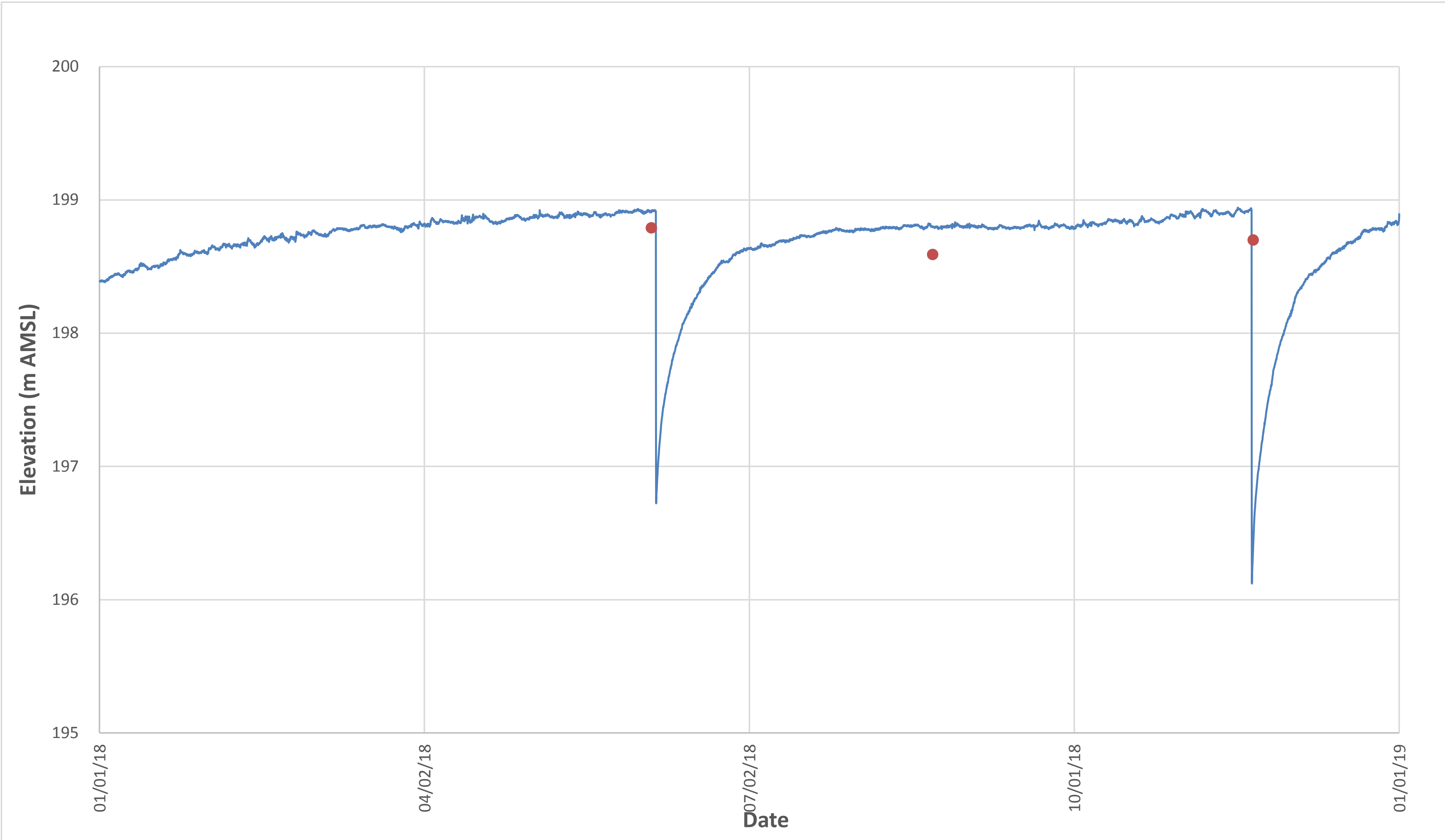


Figure B-23

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW48-00D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

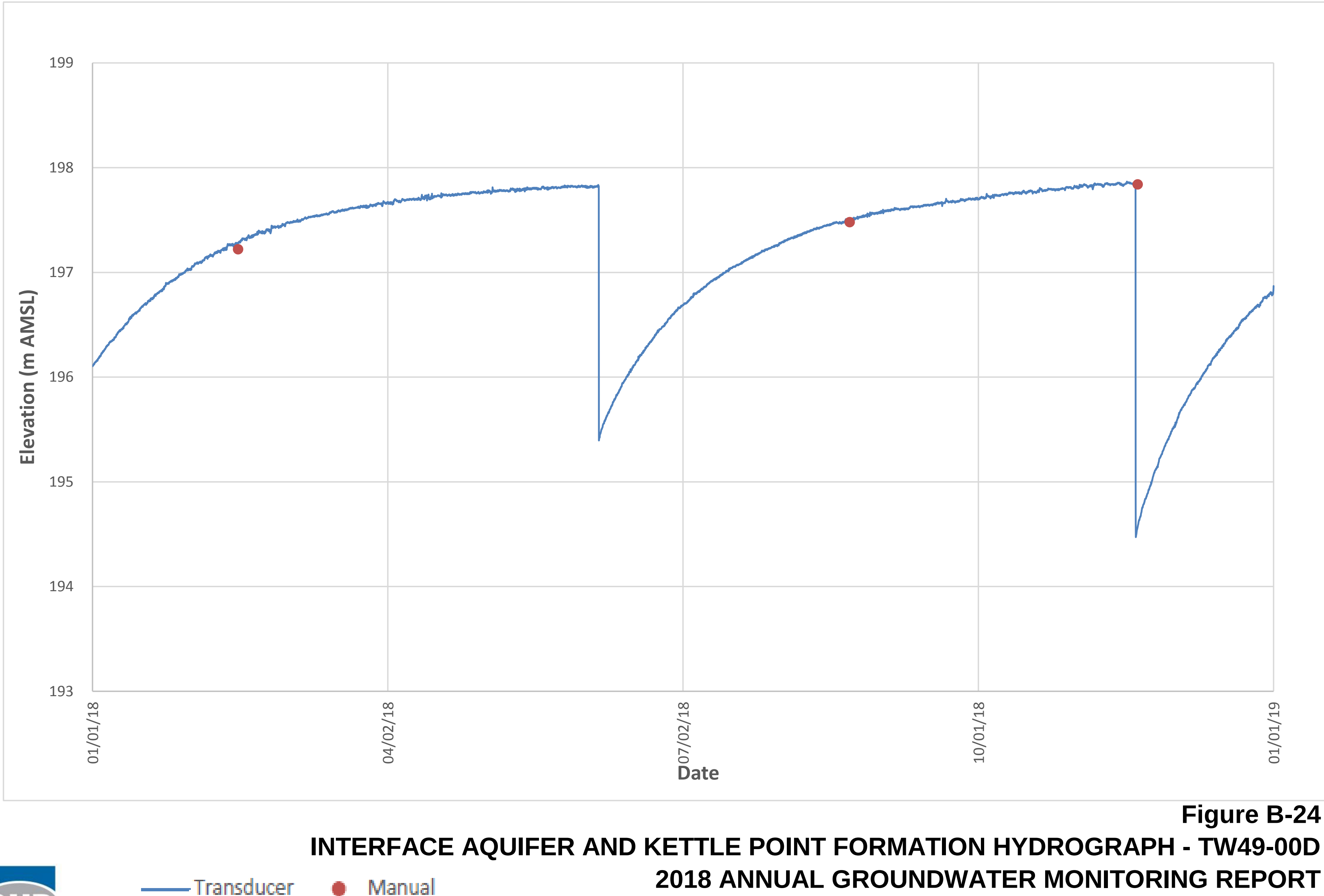


Figure B-24

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW49-00D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

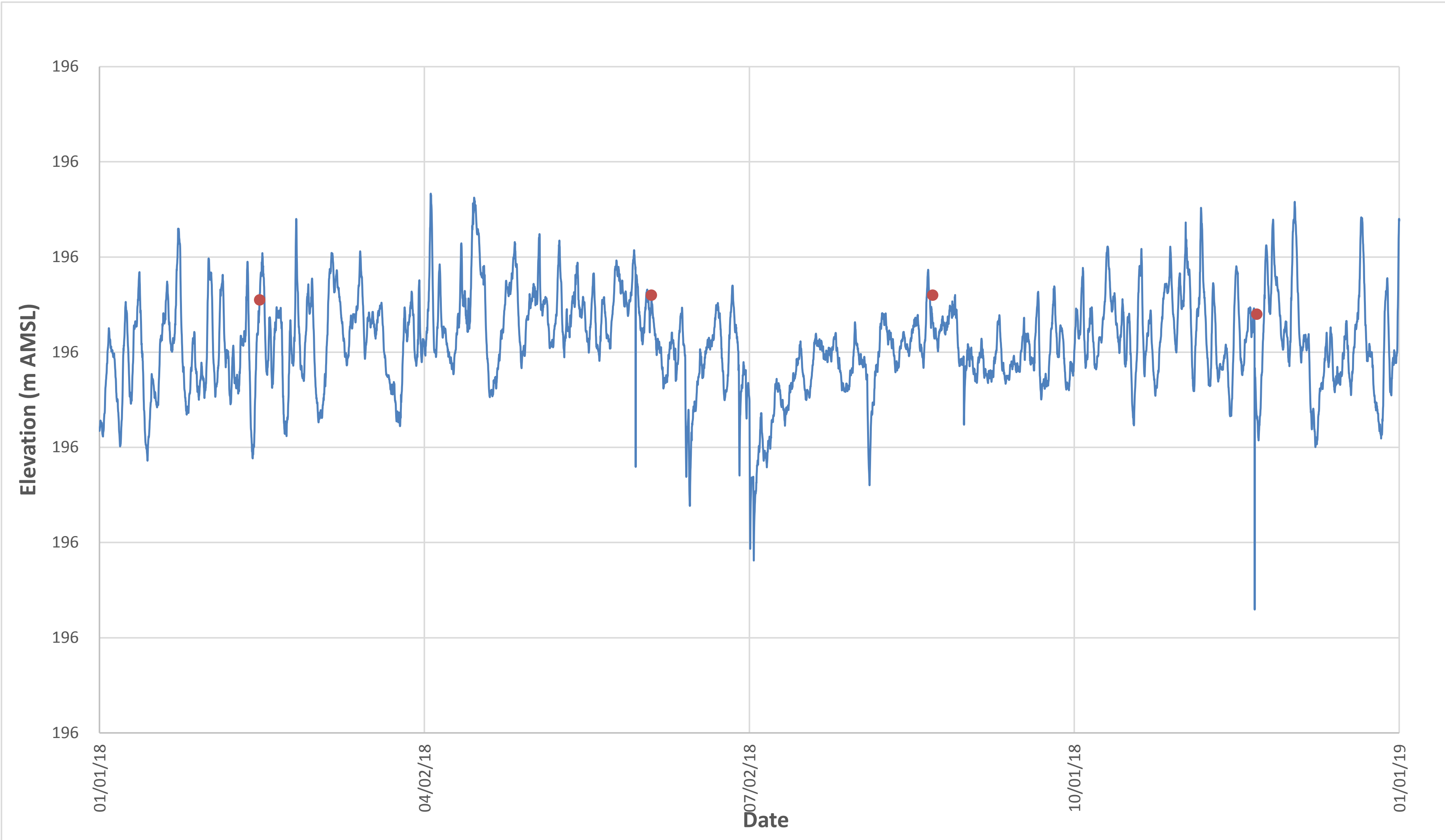


Figure B-25

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW53-03D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

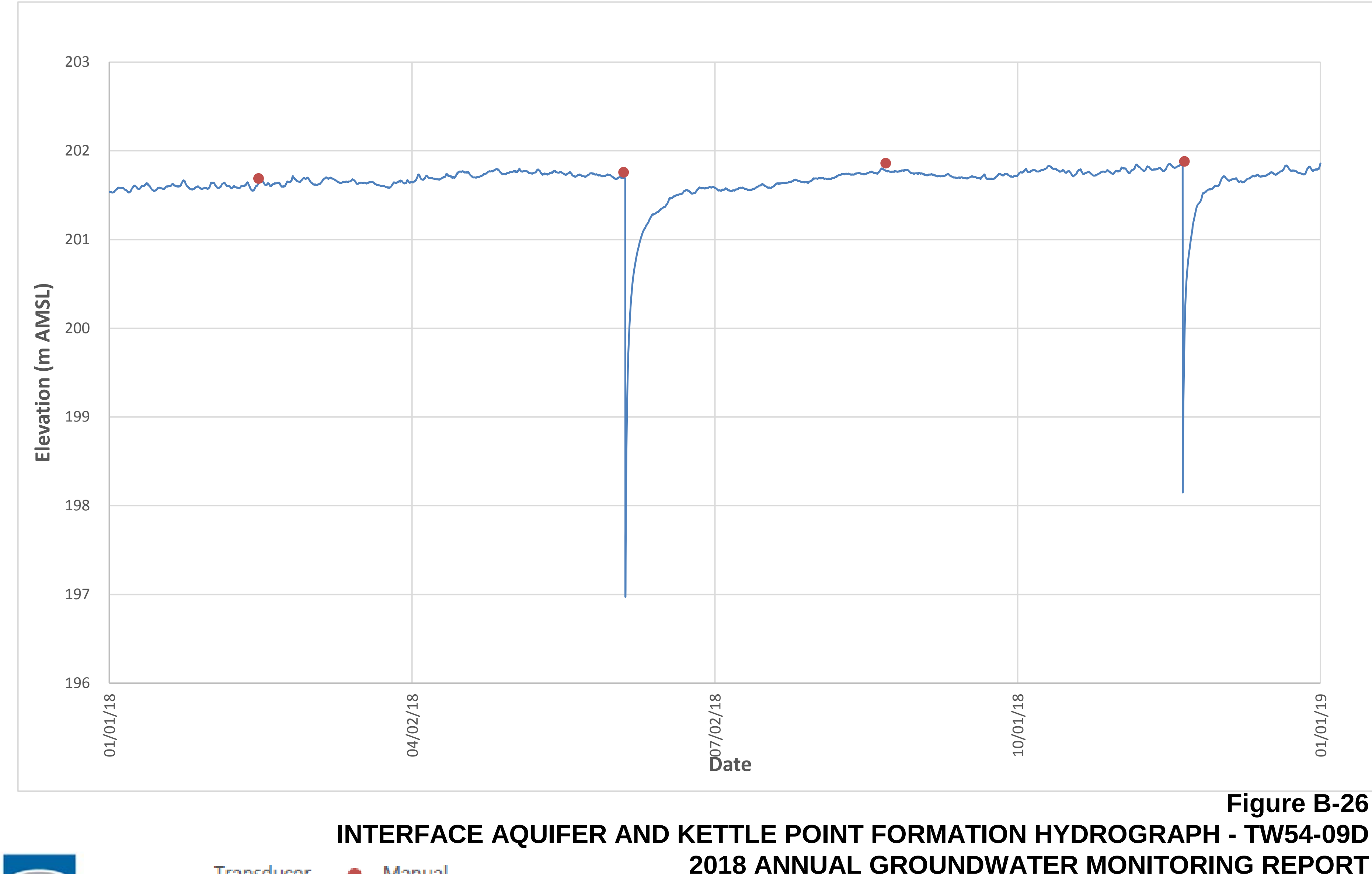


Figure B-26

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW54-09D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

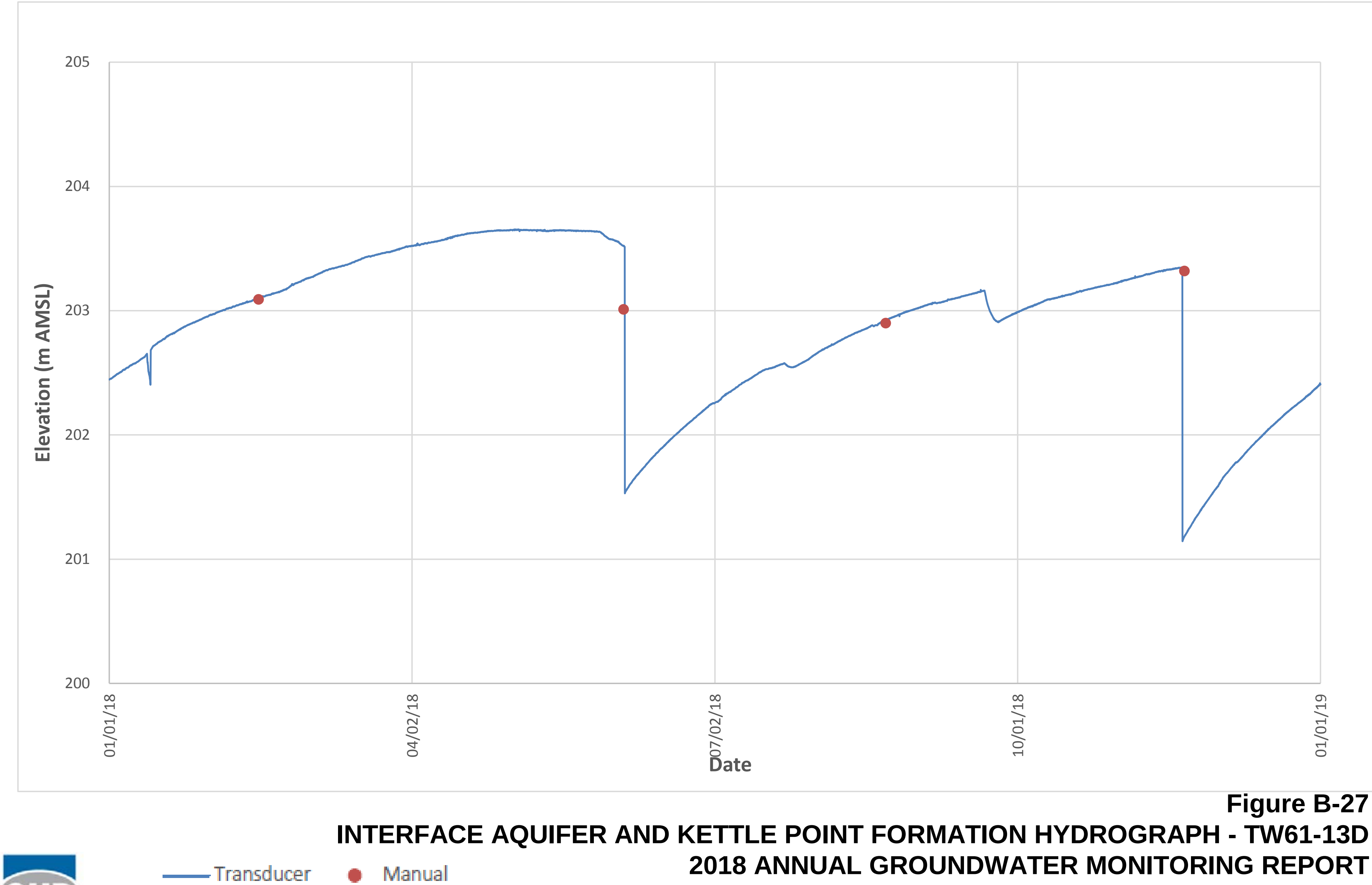


Figure B-27

INTERFACE AQUIFER AND KETTLE POINT FORMATION HYDROGRAPH - TW61-13D

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

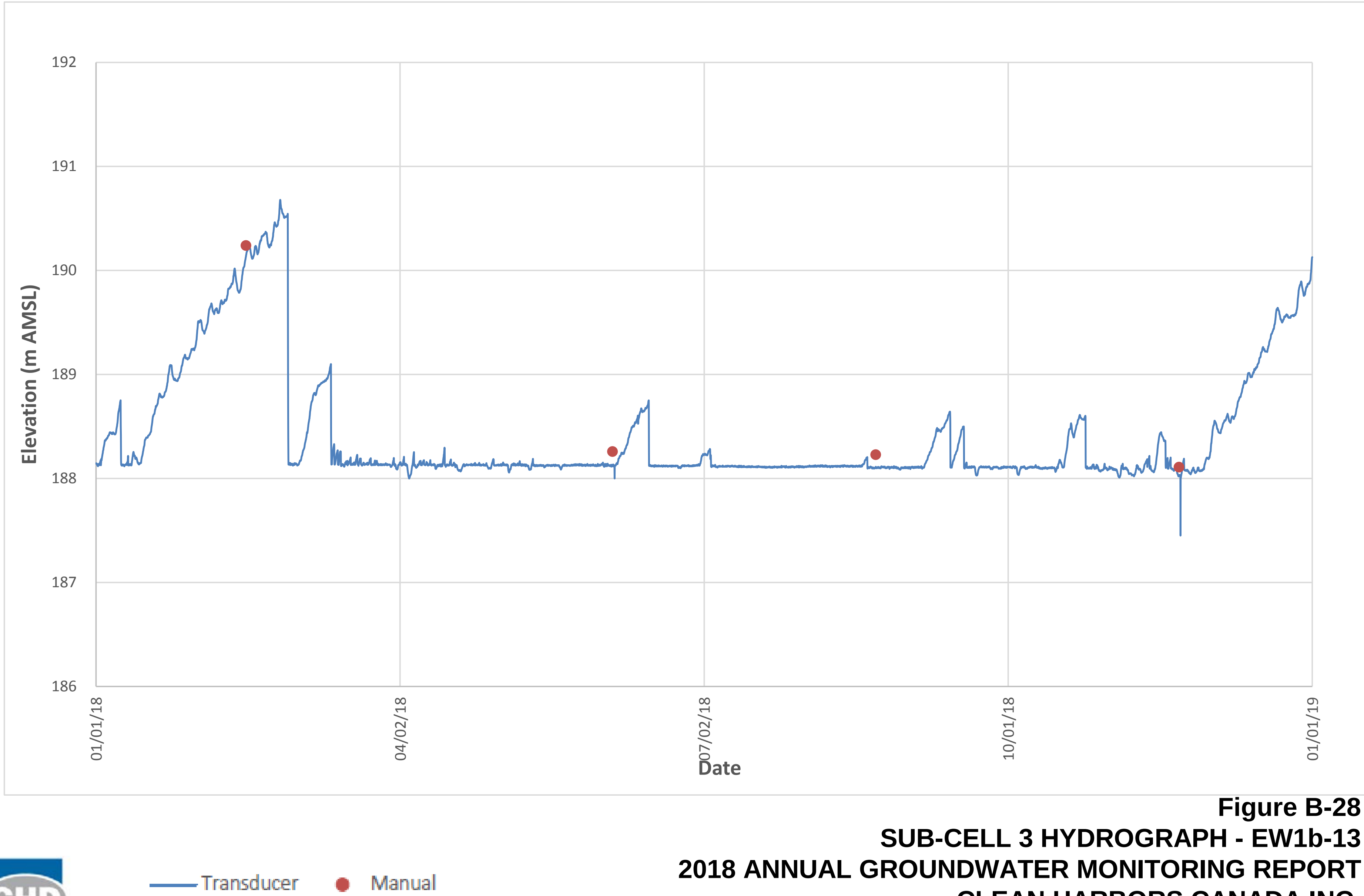


Figure B-28
SUB-CELL 3 HYDROGRAPH - EW1b-13
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

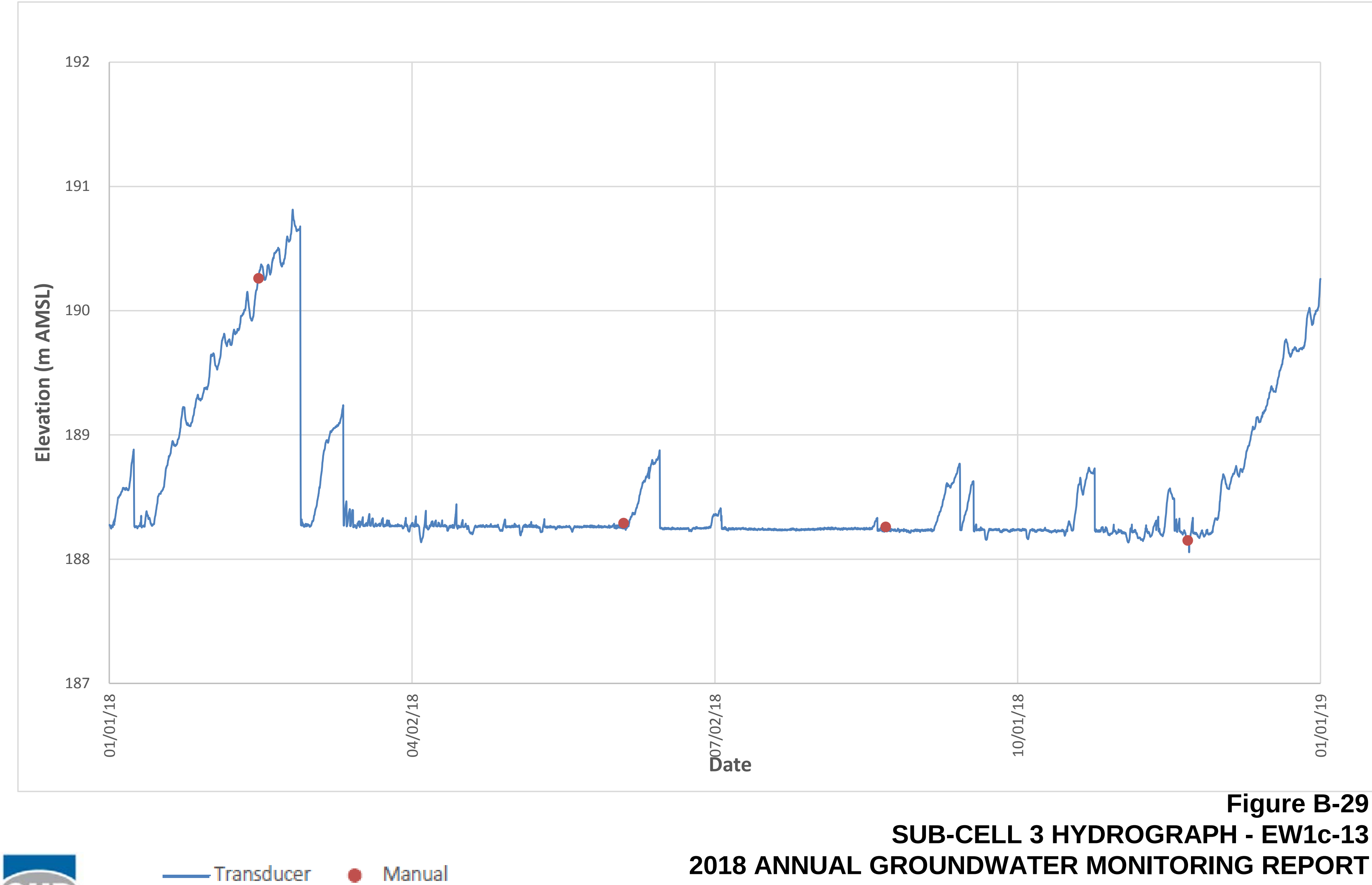


Figure B-29
SUB-CELL 3 HYDROGRAPH - EW1c-13
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

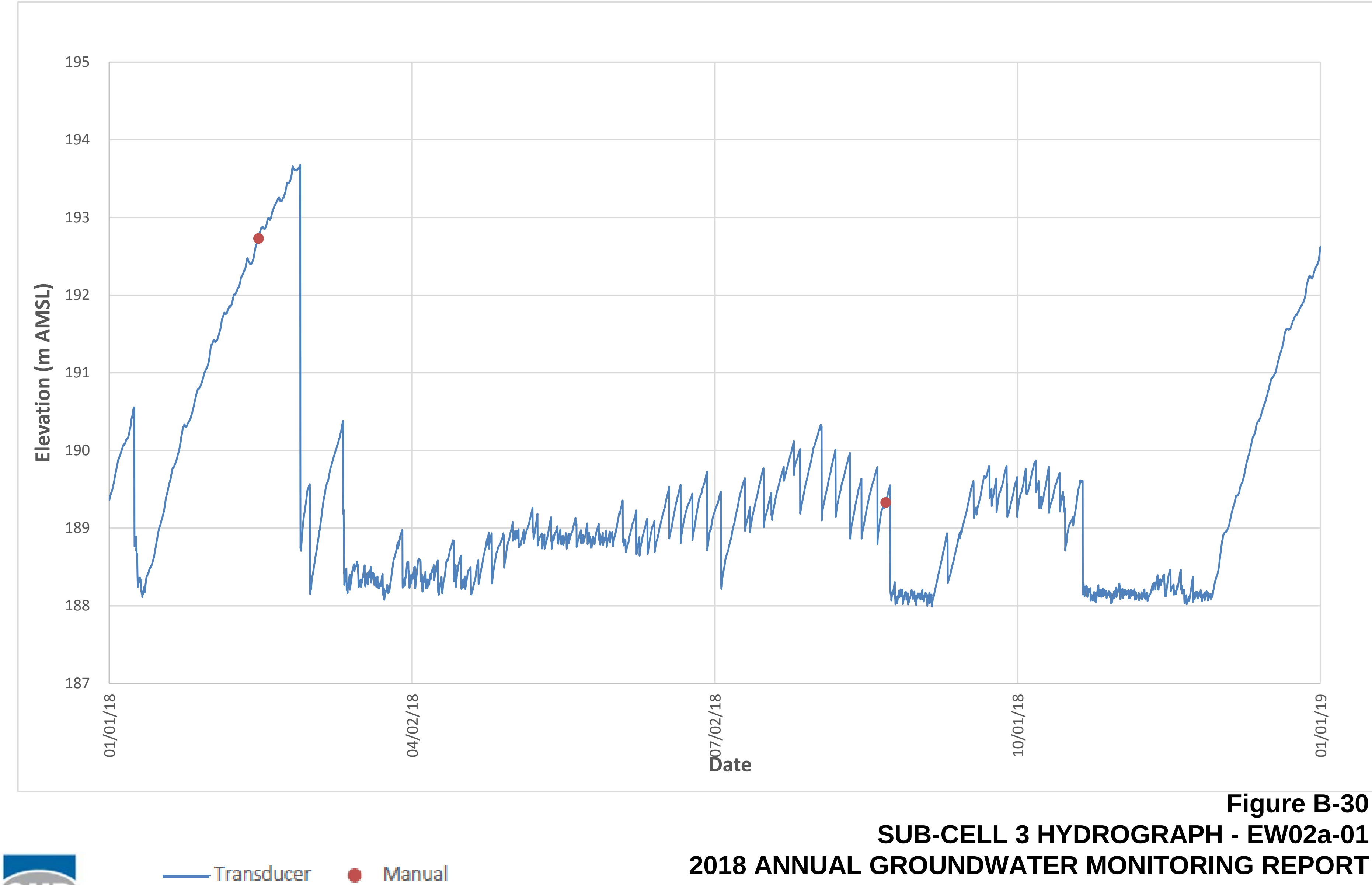


Figure B-30
SUB-CELL 3 HYDROGRAPH - EW02a-01
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

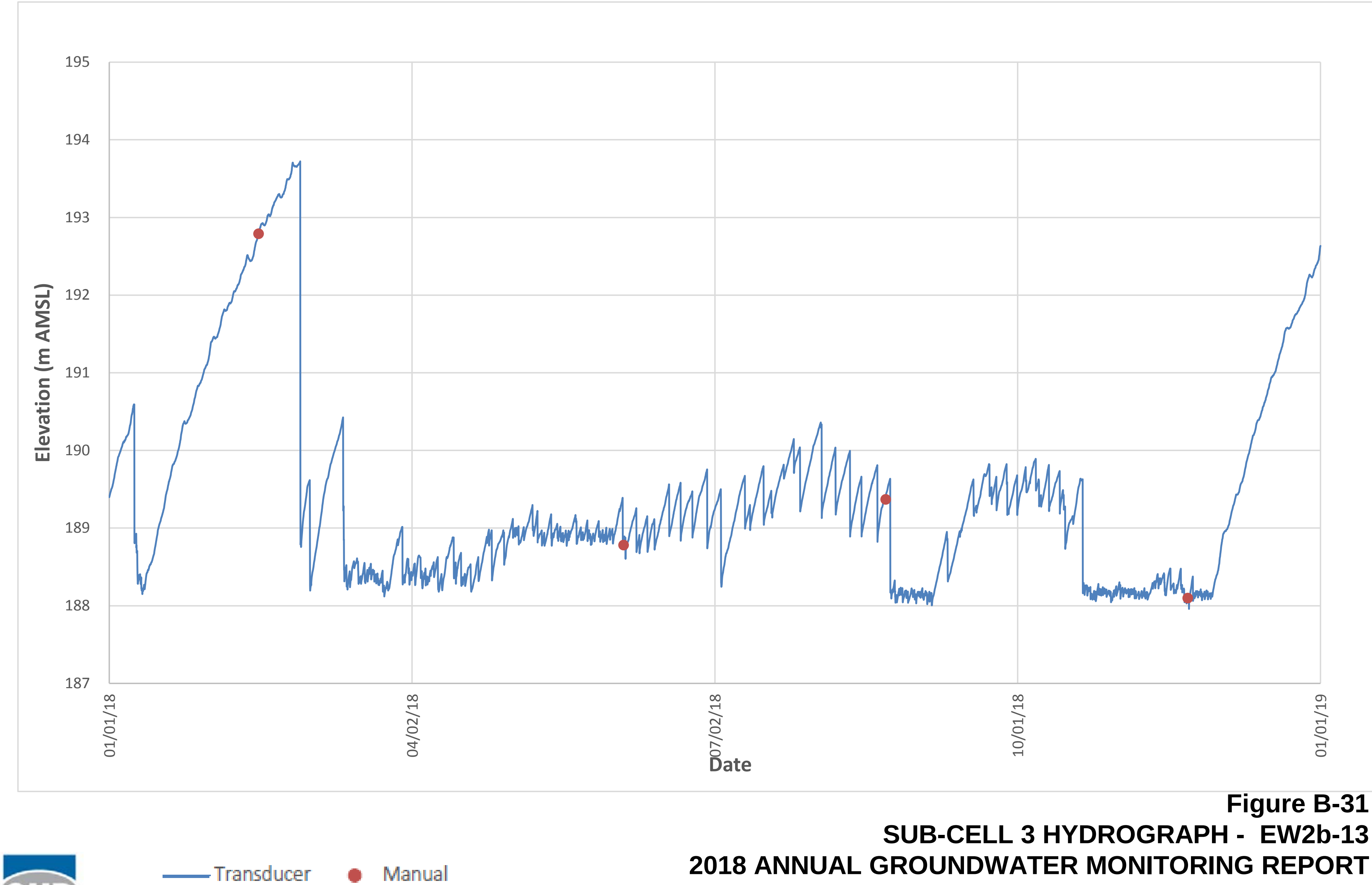


Figure B-31

SUB-CELL 3 HYDROGRAPH - EW2b-13

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

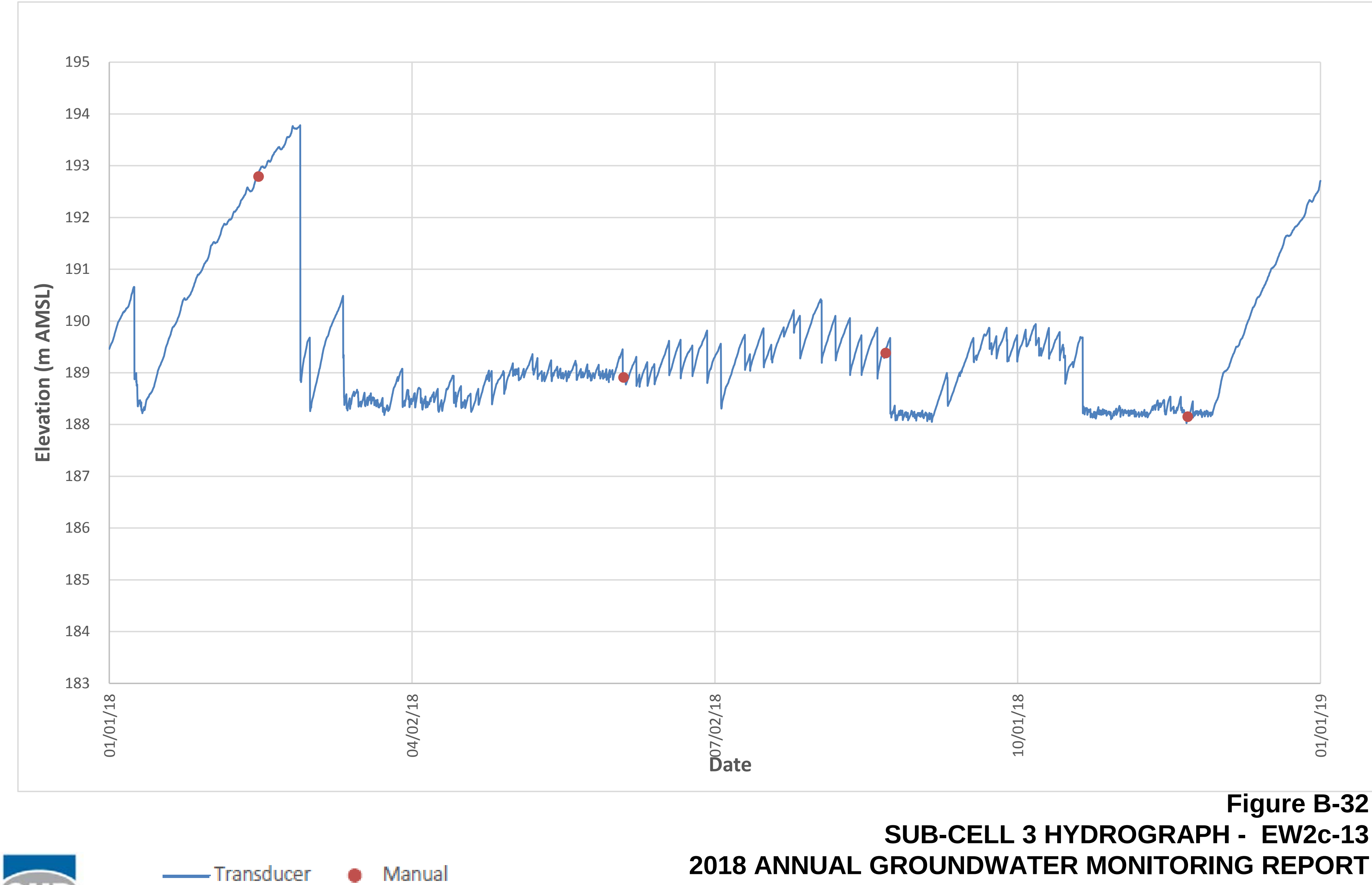


Figure B-32
SUB-CELL 3 HYDROGRAPH - EW2c-13
2018 ANNUAL GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA INC.
Lambton Facility

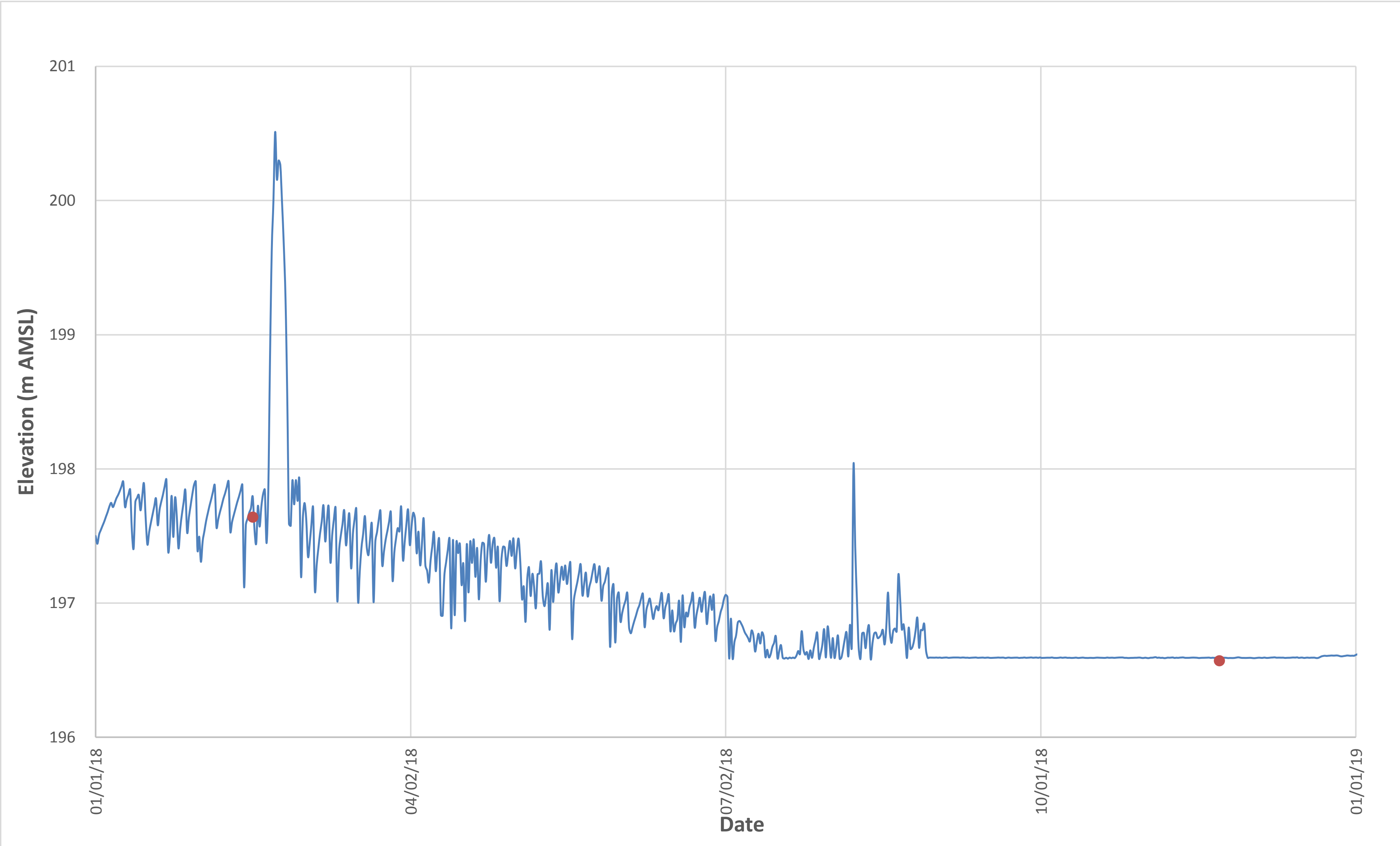


Figure B-33

LEACHATE COLLECTION SYSTEM TRENCH HYDROGRAPH - LCSOW2-15

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

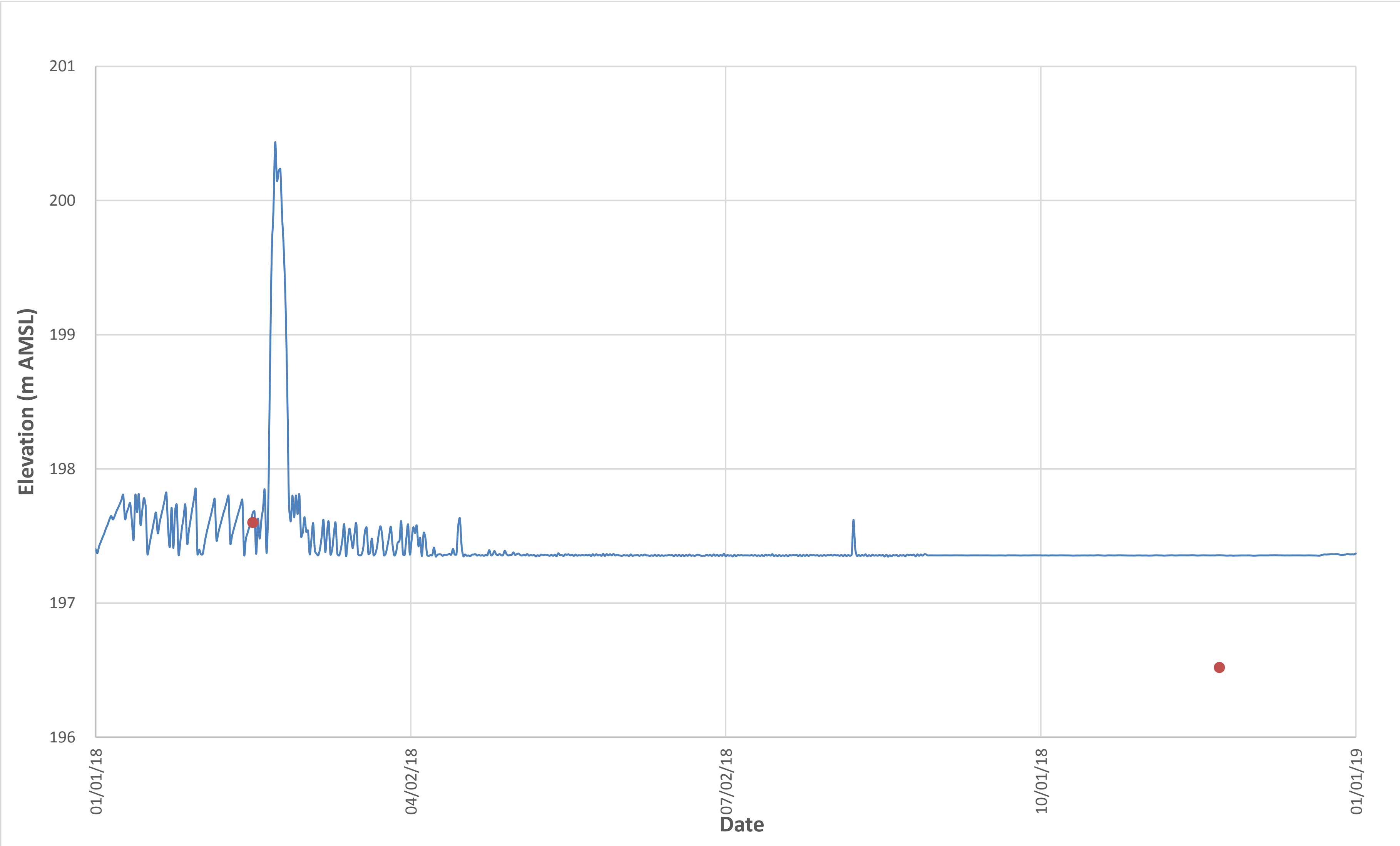


Figure B-34

LEACHATE COLLECTION SYSTEM TRENCH HYDROGRAPH - LCSOW3-15

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

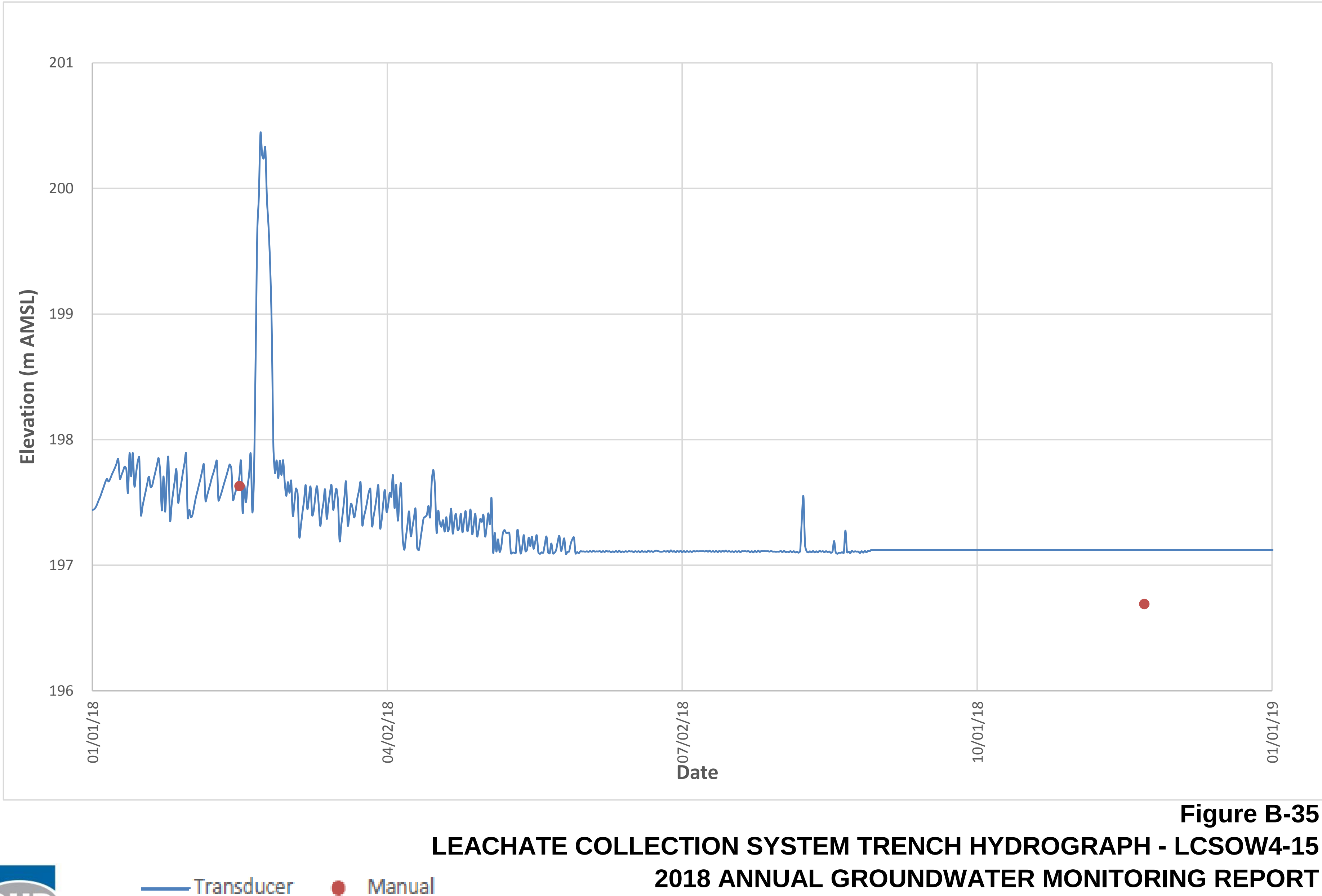


Figure B-35

LEACHATE COLLECTION SYSTEM TRENCH HYDROGRAPH - LCSOW4-15

2018 ANNUAL GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA INC.

Lambton Facility

Appendix C
Historical Manual Hydrographs

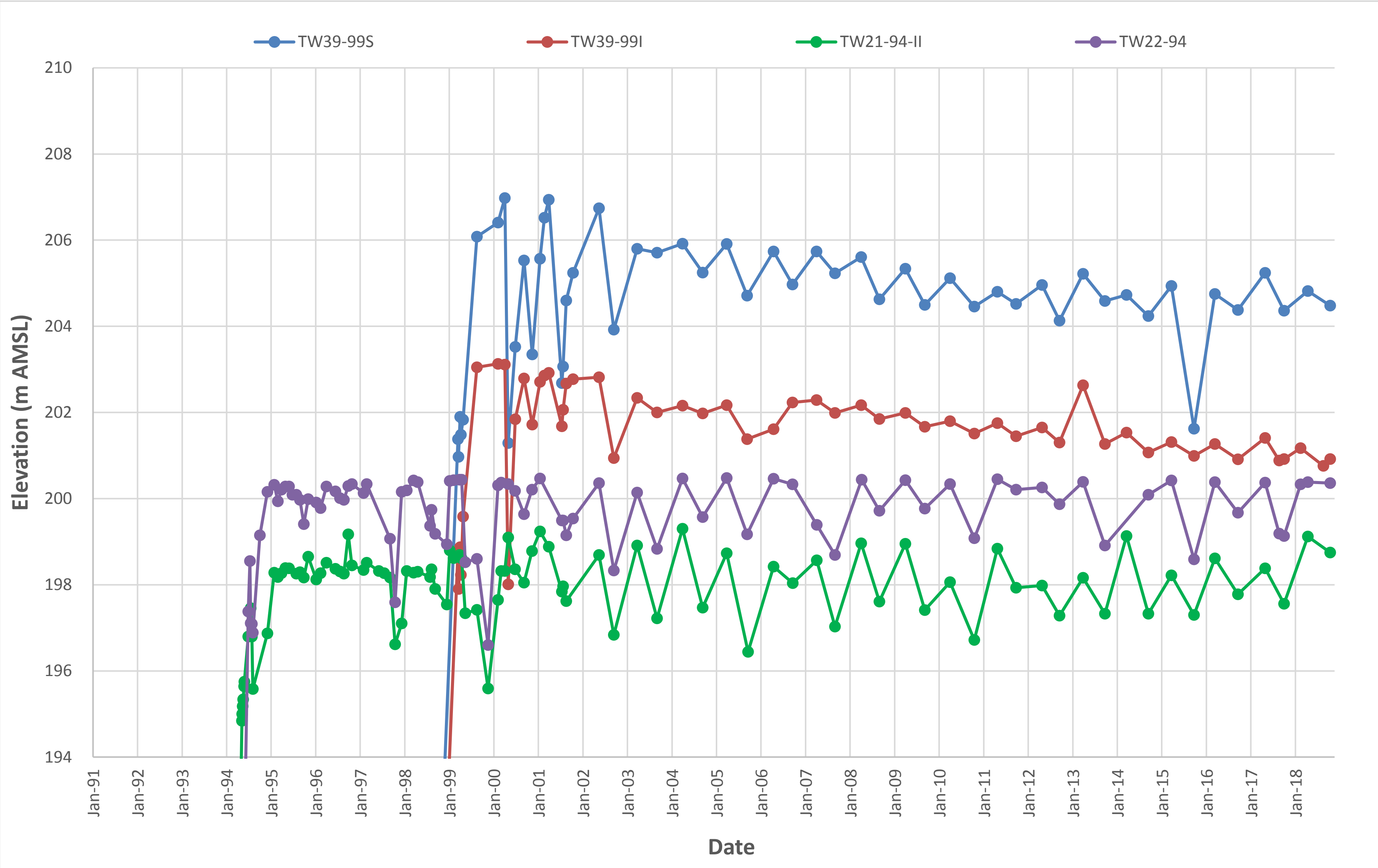


figure C-1

HYDROGRAPHS FOR SHALLOW GROUNDWATER WELLS IN THE VACINITY OF THE FACILITY
NORTH-WEST CORNER BERM AREA
2018 ANNUAL GROUNDWATER MONITORING REPORT
Clean Harbors

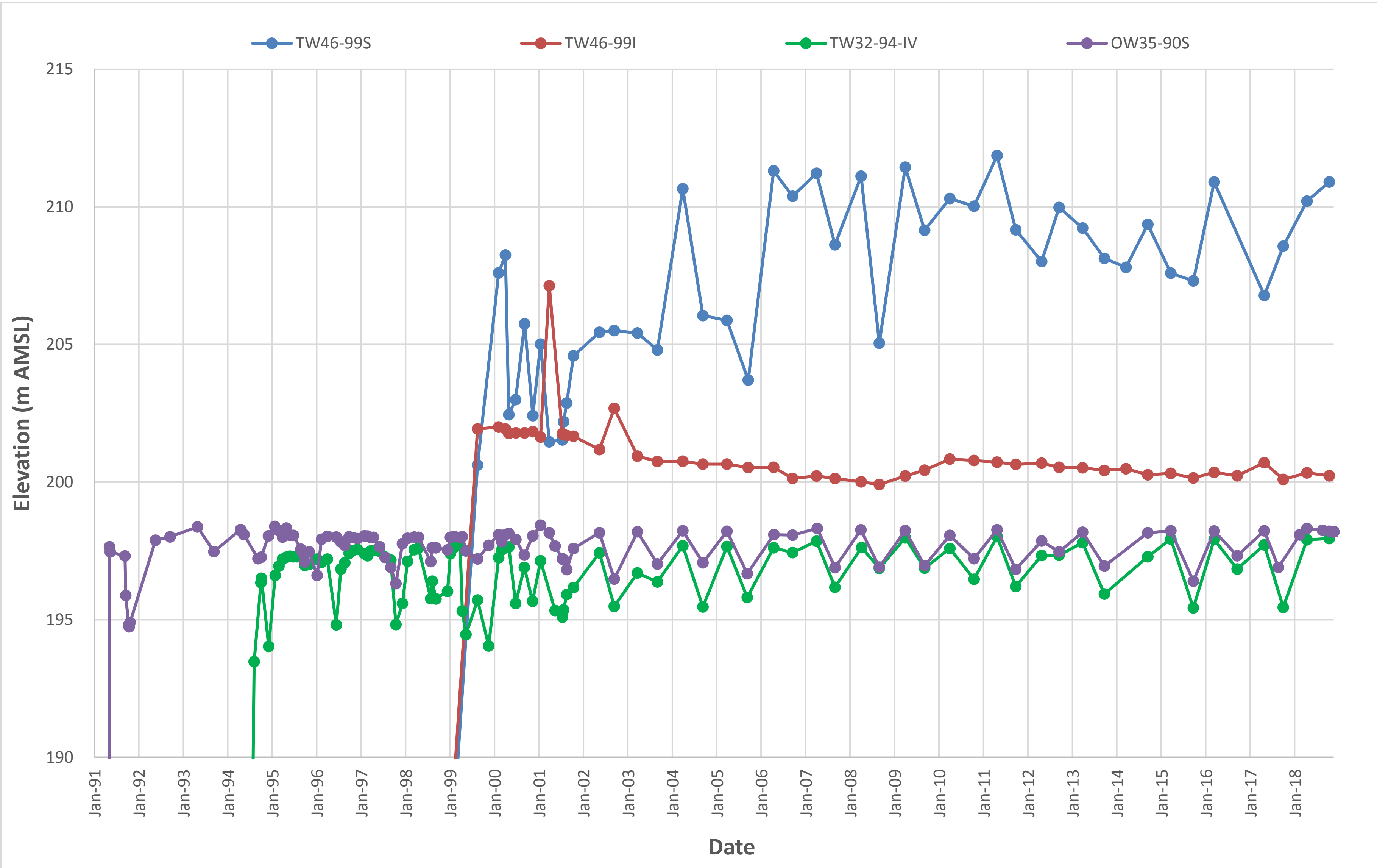


figure C-2

HYDROGRAPHS FOR SHALLOW GROUNDWATER WELLS IN THE VACINITY OF THE FACILITY
NORTH-EAST CORNER BERM AREA
2018 ANNUAL GROUNDWATER MONITORING REPORT
Clean Harbors

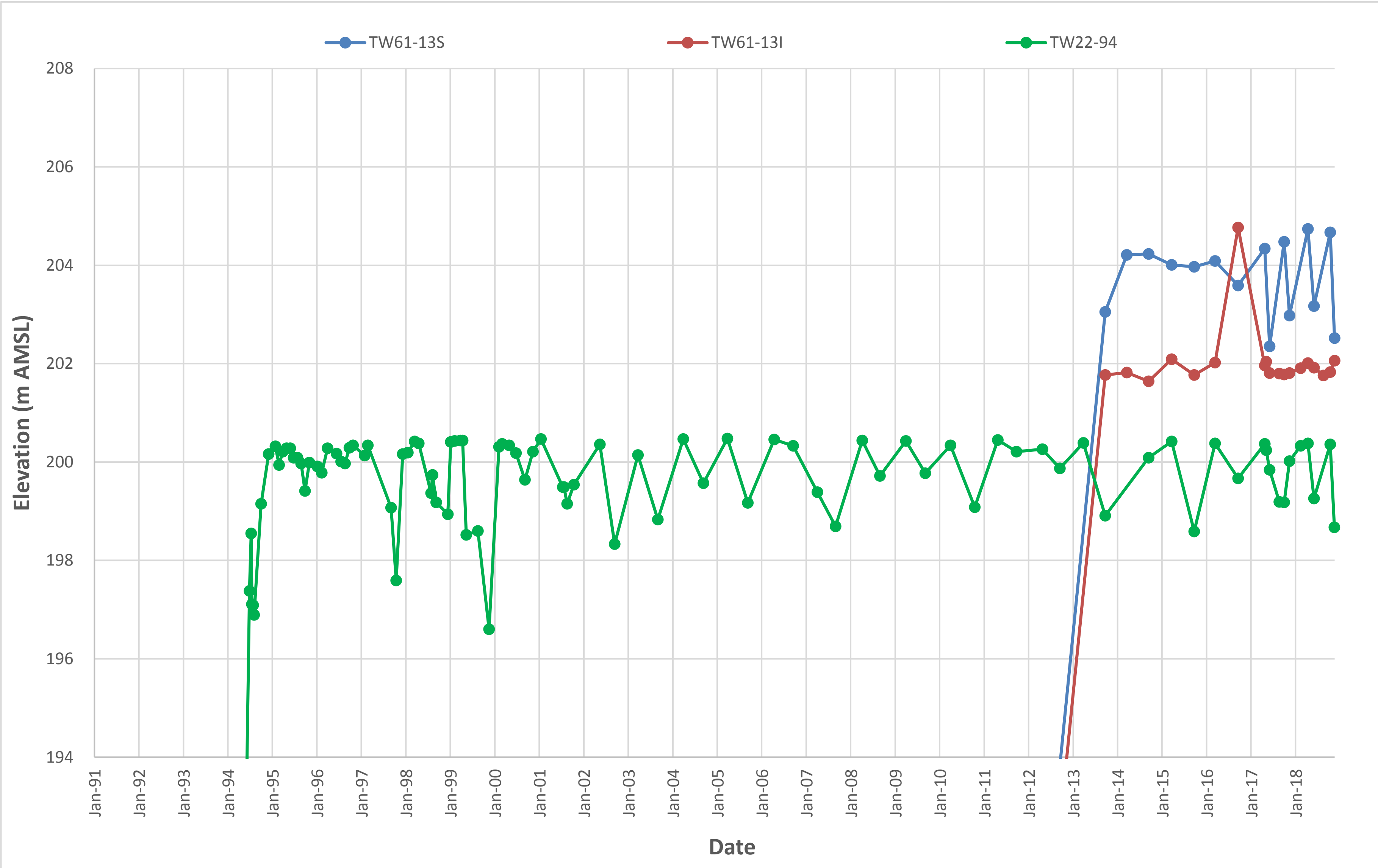


figure C-3

HYDROGRAPHS FOR SHALLOW GROUNDWATER WELLS IN THE VACINITY OF THE FACILITY

NORTH-WEST BERM AREA

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

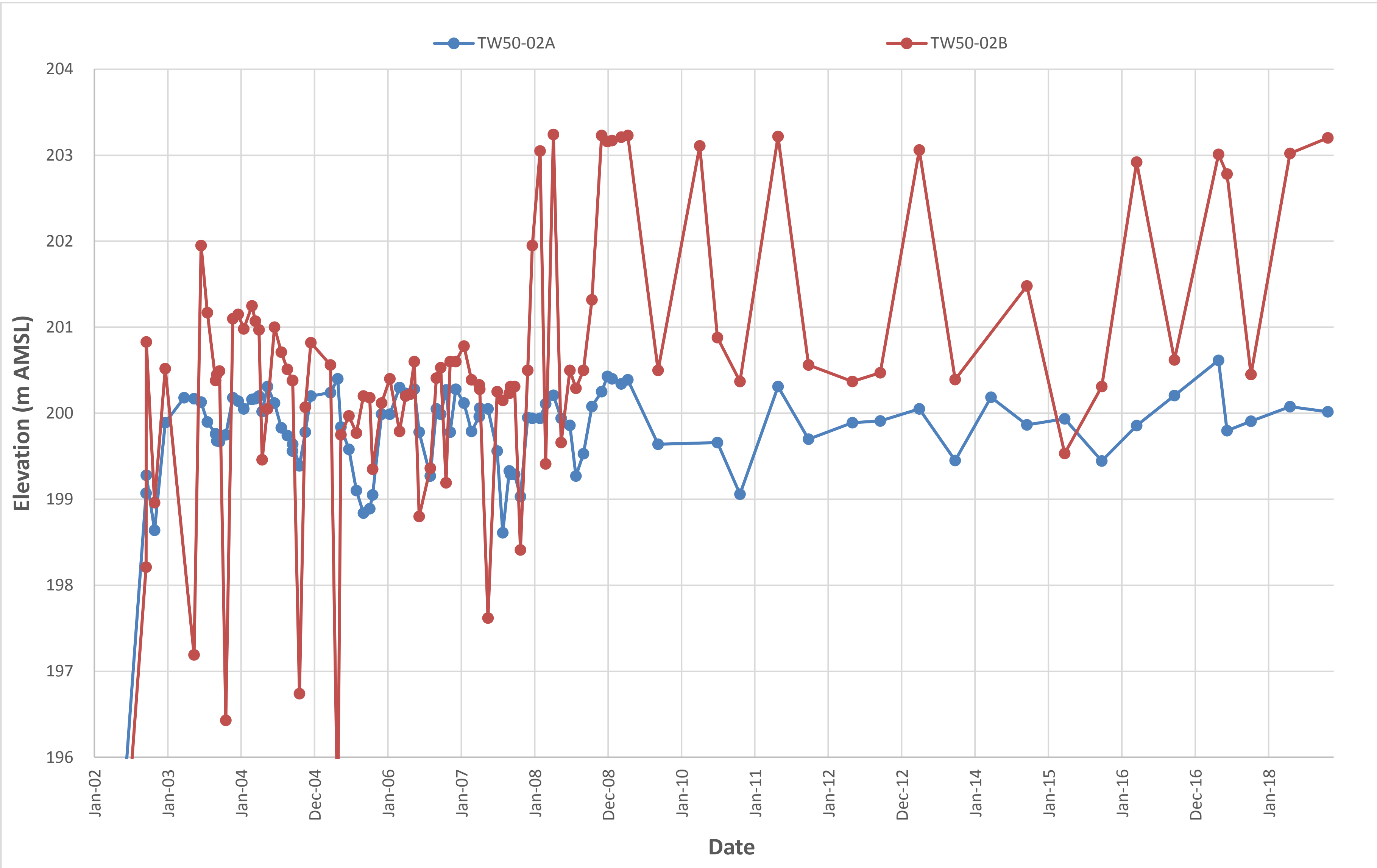


figure C-4

HYDROGRAPHS FOR SHALLOW GROUNDWATER WELLS IN THE VACINITY OF THE FACILITY

SOUTHERN BERM WELL NEST TW50-02

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

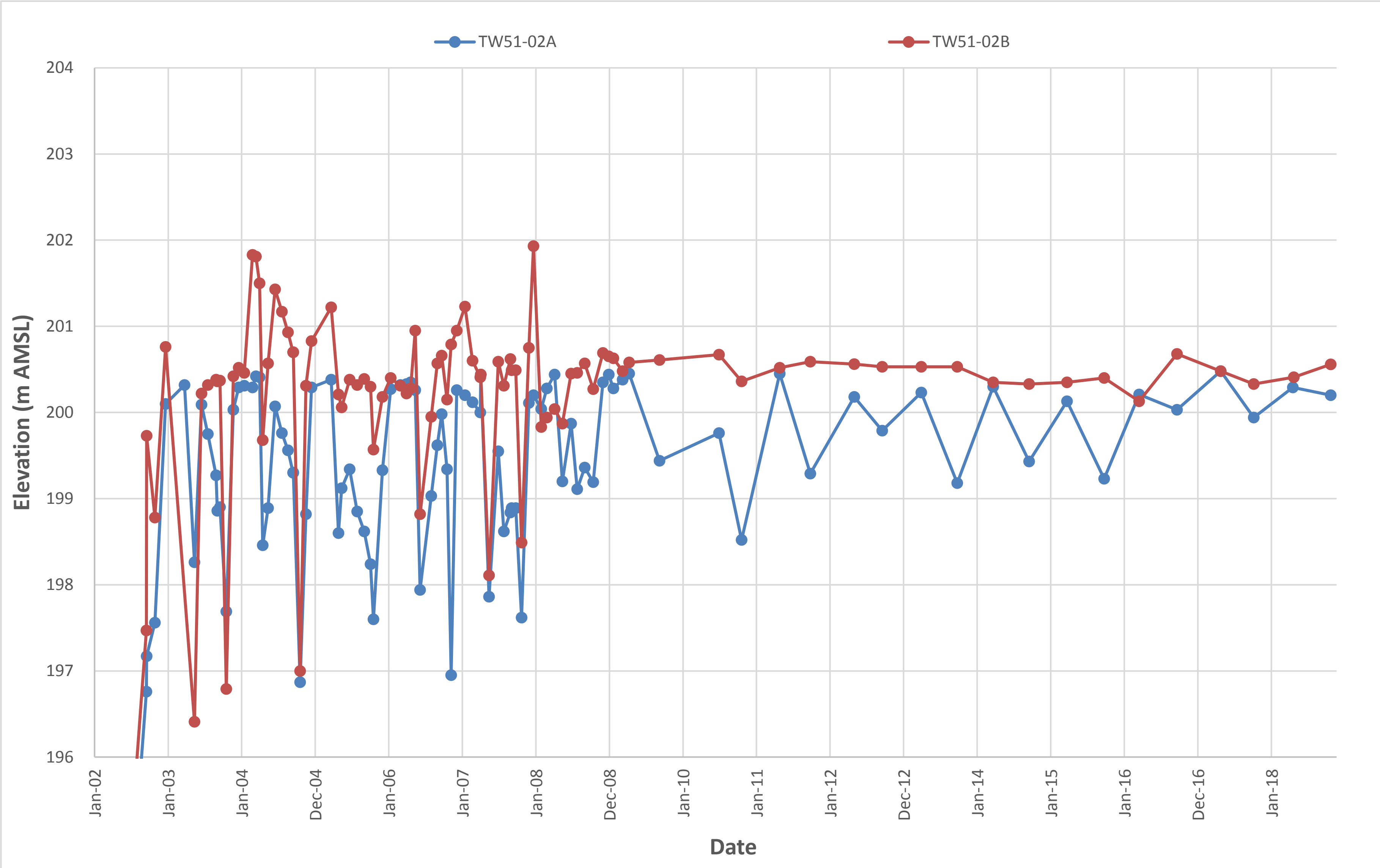


figure C-5

HYDROGRAPHS FOR SHALLOW GROUNDWATER WELLS IN THE VACINITY OF THE FACILITY

SOUTHERN BERM WELL NEST TW51-02

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

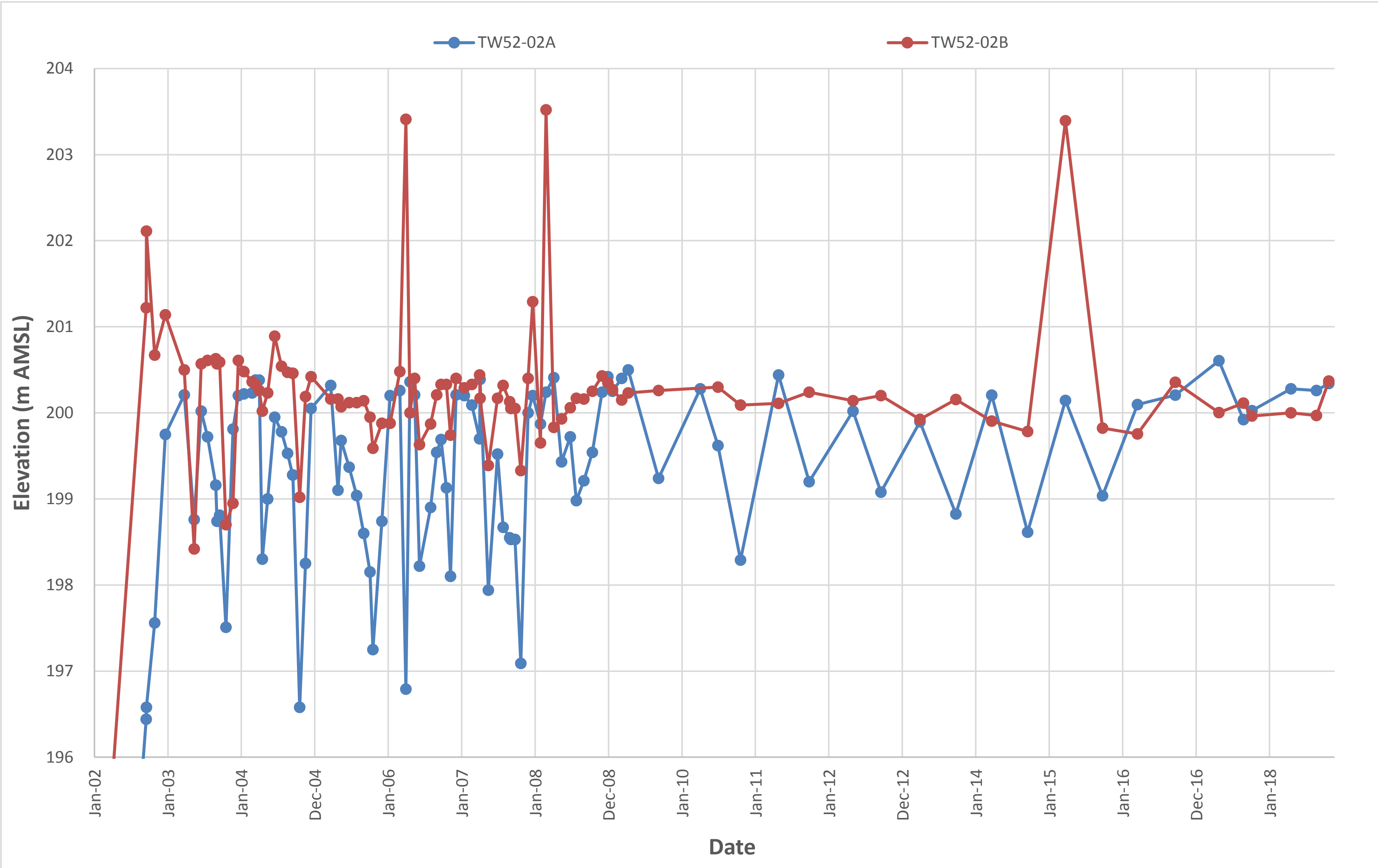


figure C-6

HYDROGRAPHS FOR SHALLOW GROUNDWATER WELLS IN THE VACINITY OF THE FACILITY

SOUTHERN BERM WELL NEST TW52-02

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

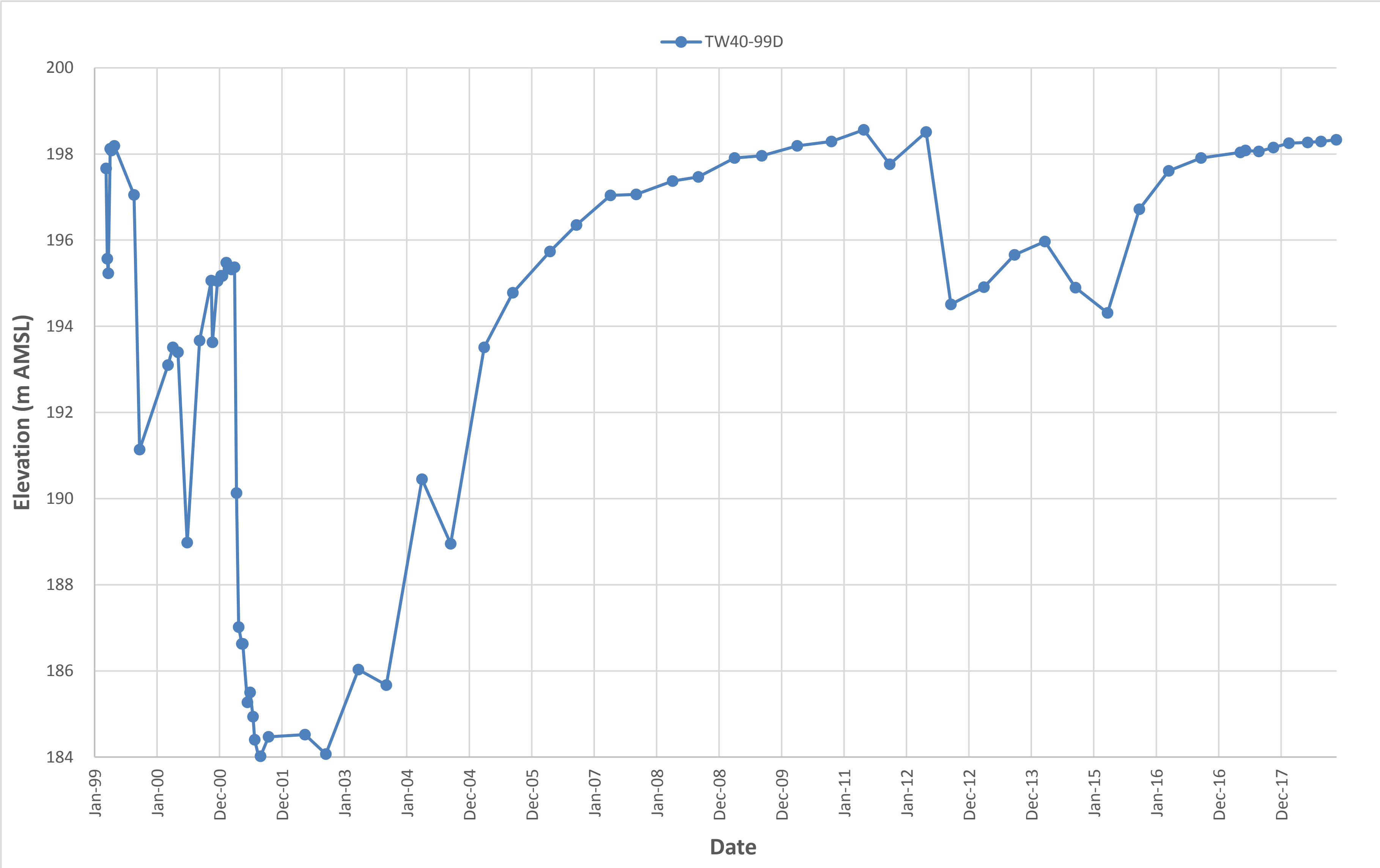


figure C-7

SELECT HYDROGRAPHS - ON-SITE INTERFACE AQUIFER

TW40-99D

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

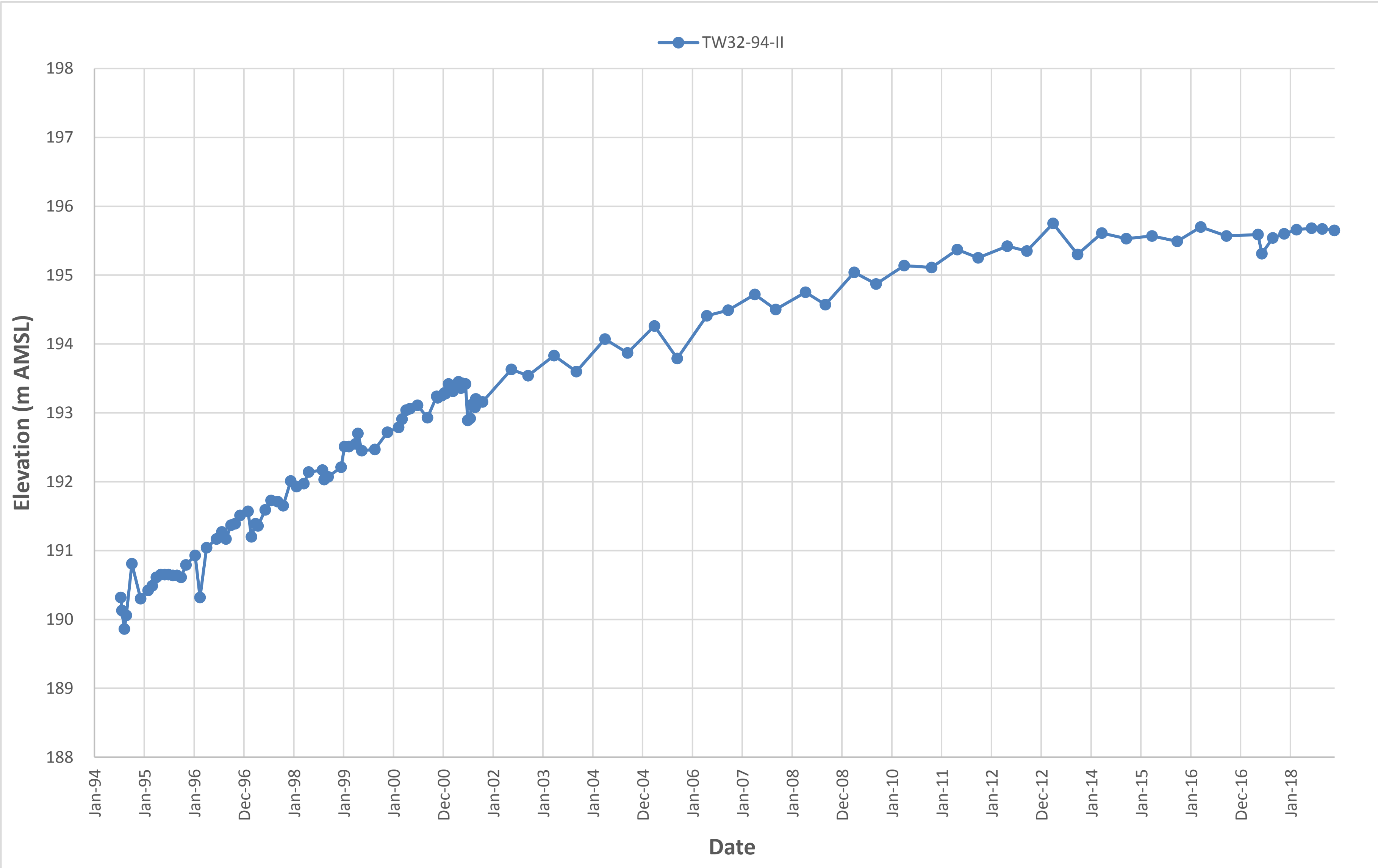


figure C-8
SELECT HYDROGRAPHS - ON-SITE INTERFACE AQUIFER
TW32-94-II
2018 ANNUAL GROUNDWATER MONITORING REPORT
Clean Harbors

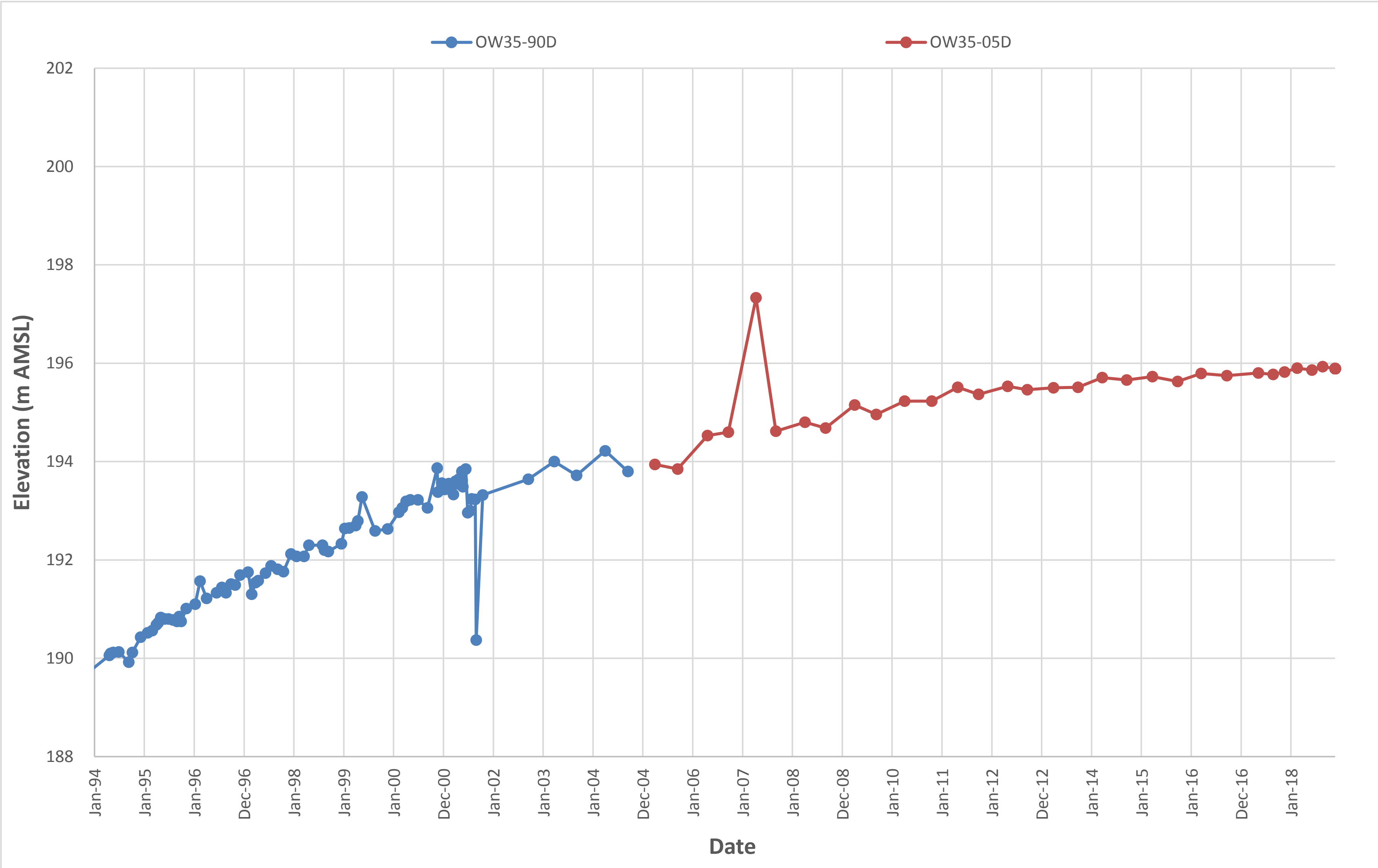


figure C-9

SELECT HYDROGRAPHS - ON-SITE INTERFACE AQUIFER

OW35-90D/OW35-05D

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

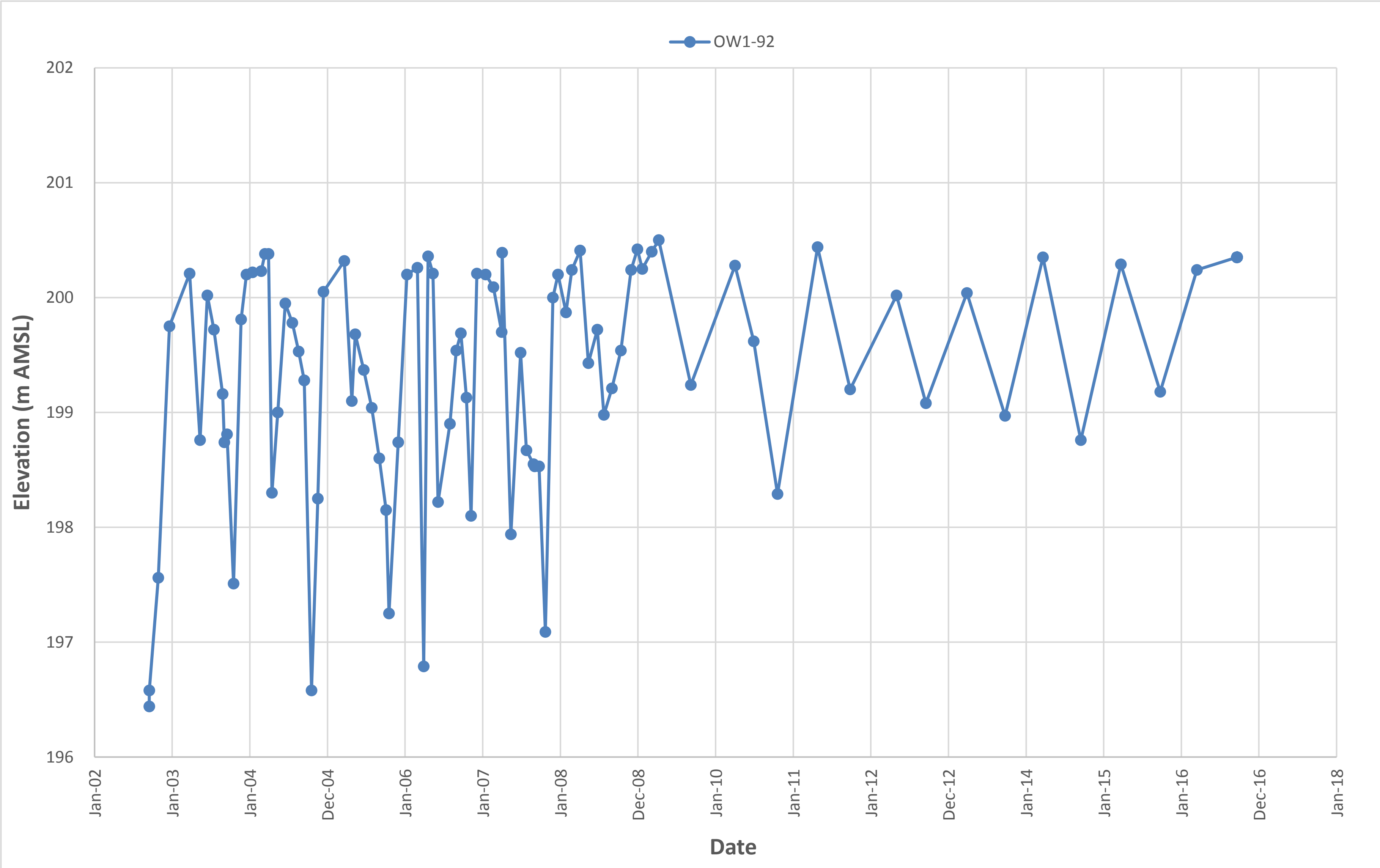


figure C-10

SELECT HYDROGRAPHS - ON-SITE INTERFACE AQUIFER

OW1-92

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

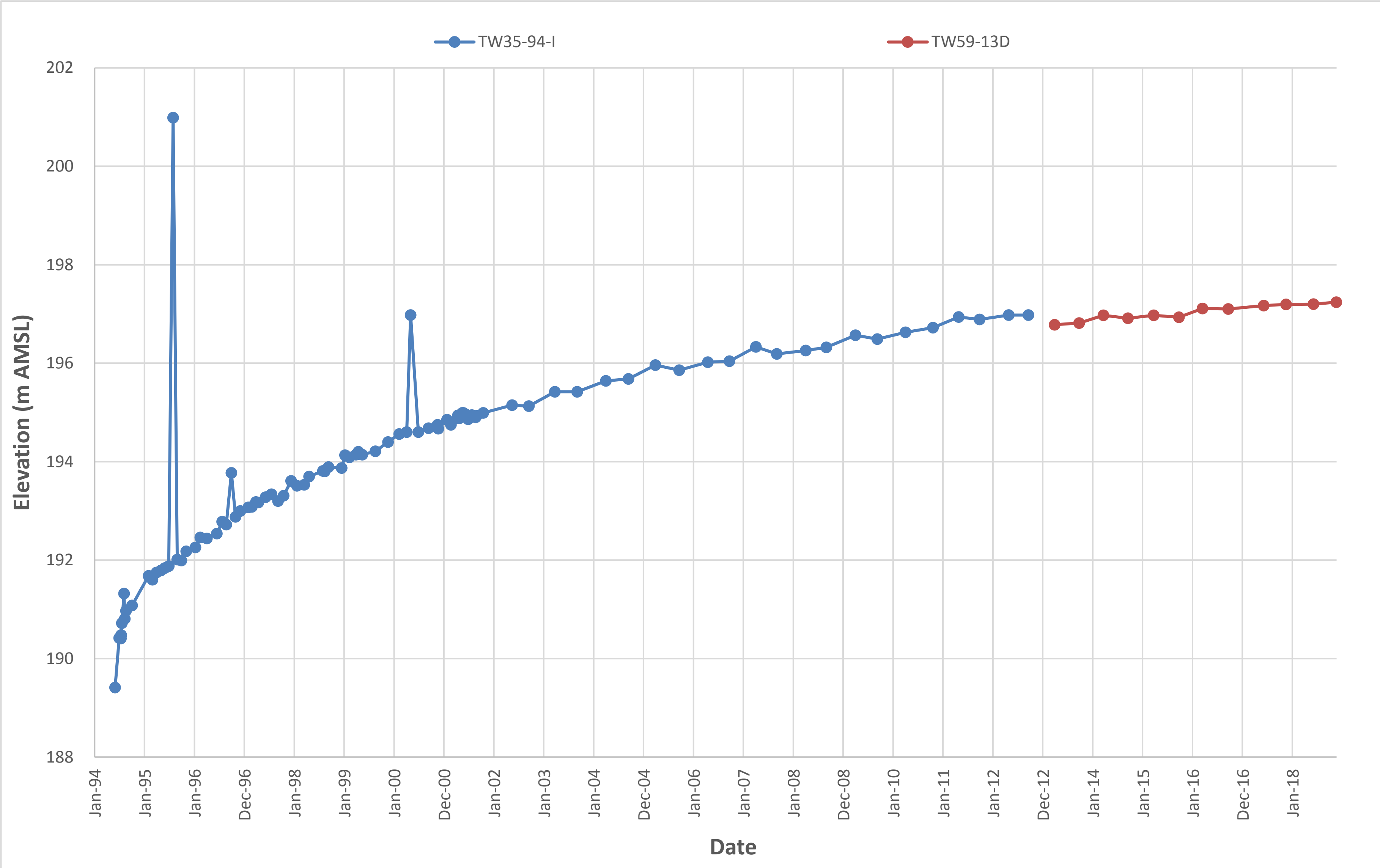


figure C-11

SELECT HYDROGRAPHS - OFF-SITE INTERFACE AQUIFER

TW35-94-I/TW59-13D

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

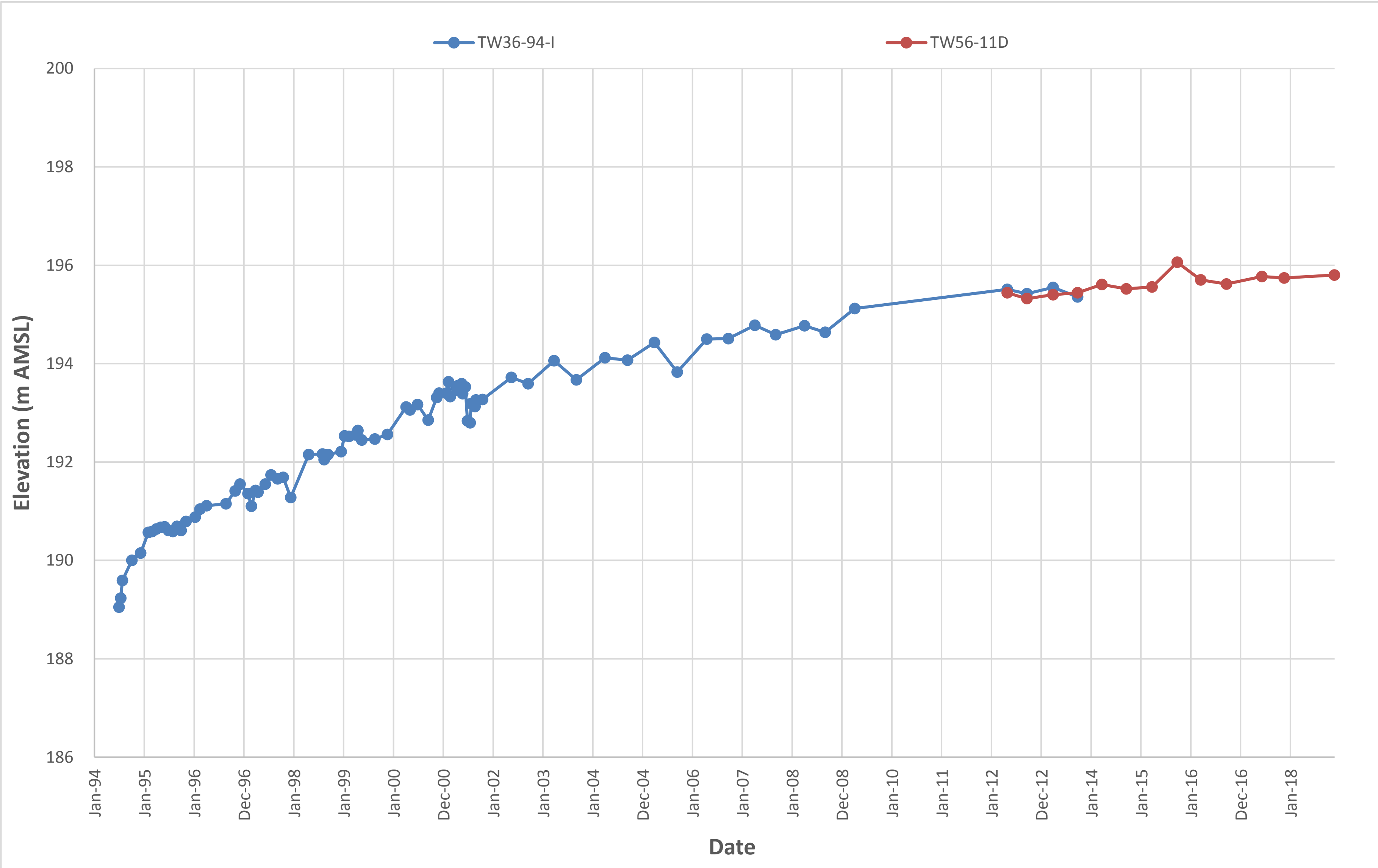


figure C-12

SELECT HYDROGRAPHS - OFF-SITE INTERFACE AQUIFER

TW36-94-I/TW56-11D

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

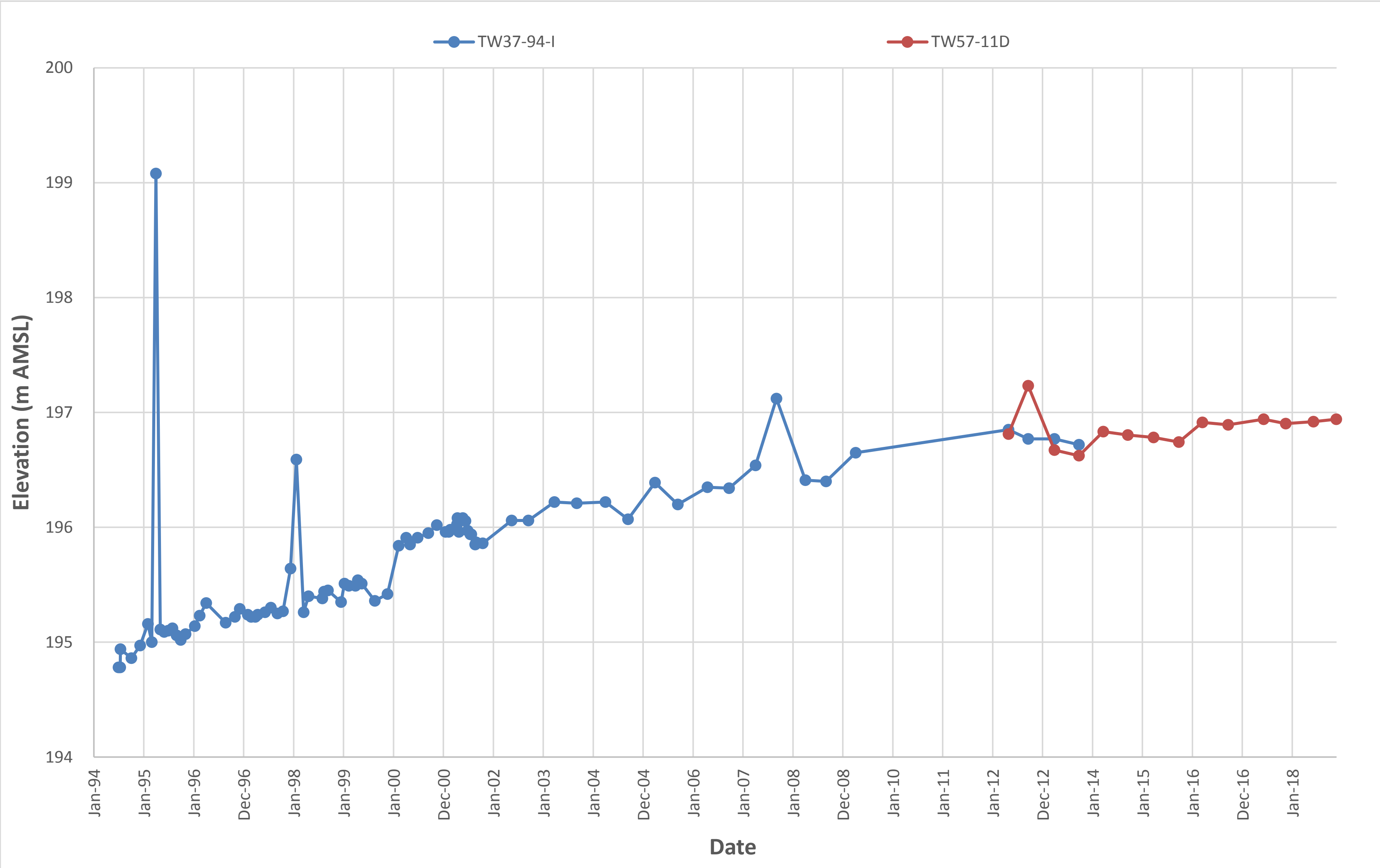


figure C-13

SELECT HYDROGRAPHS - OFF-SITE INTERFACE AQUIFER

TW37-94-I/TW57-11D

2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

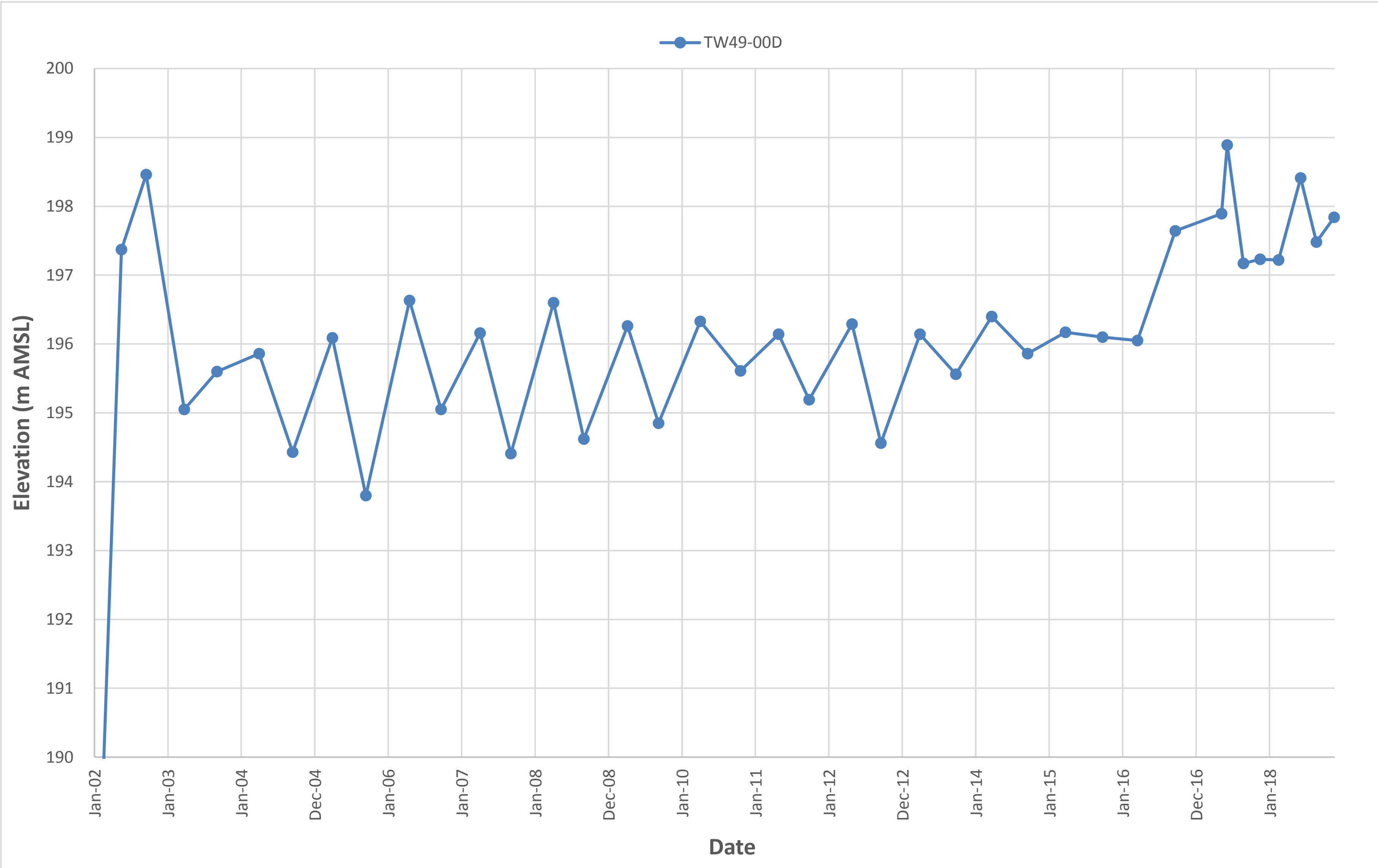


figure C-14

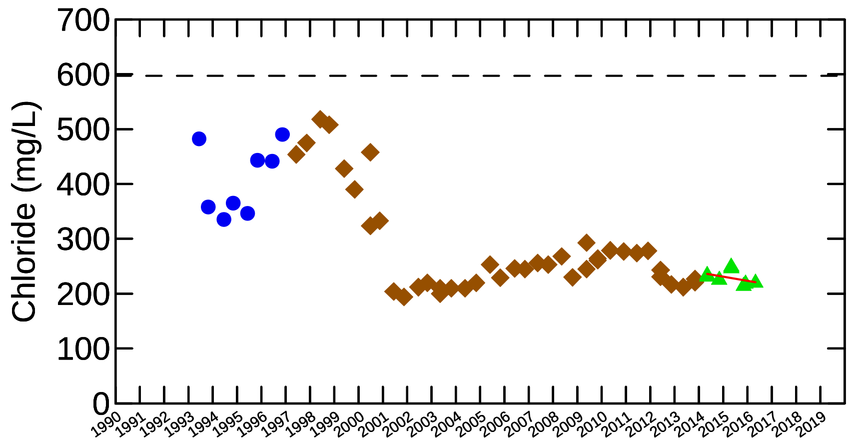
SELECT HYDROGRAPHS - OFF-SITE INTERFACE AQUIFER

TW49-00D

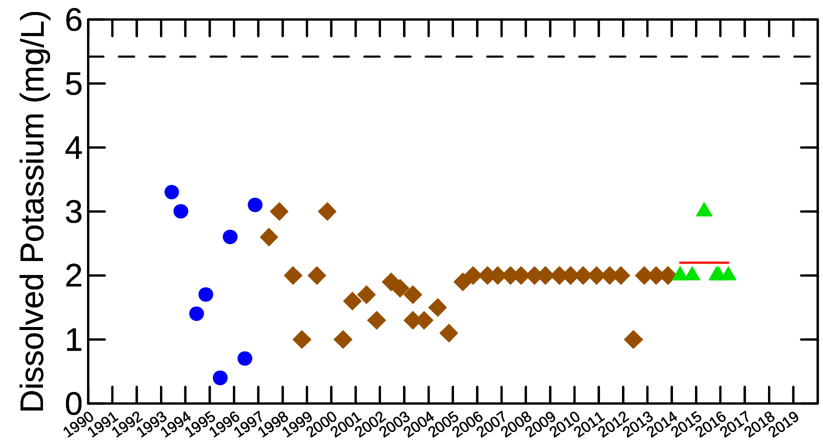
2018 ANNUAL GROUNDWATER MONITORING REPORT

Clean Harbors

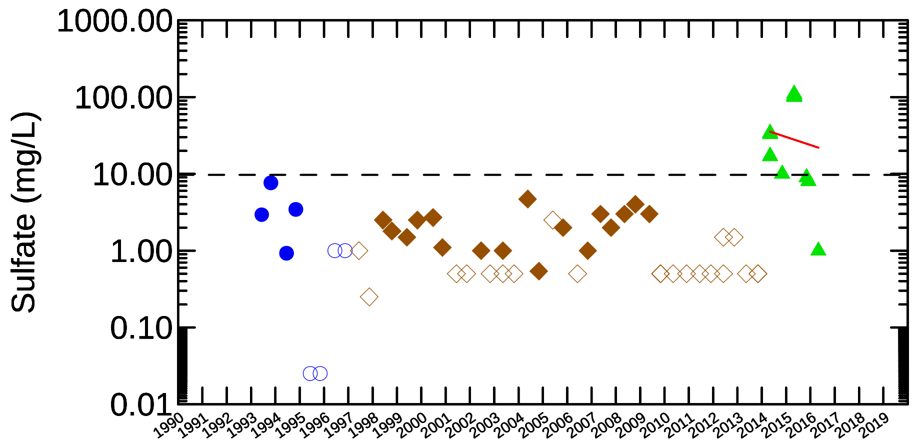
Appendix D
Concentration Versus Time Plots



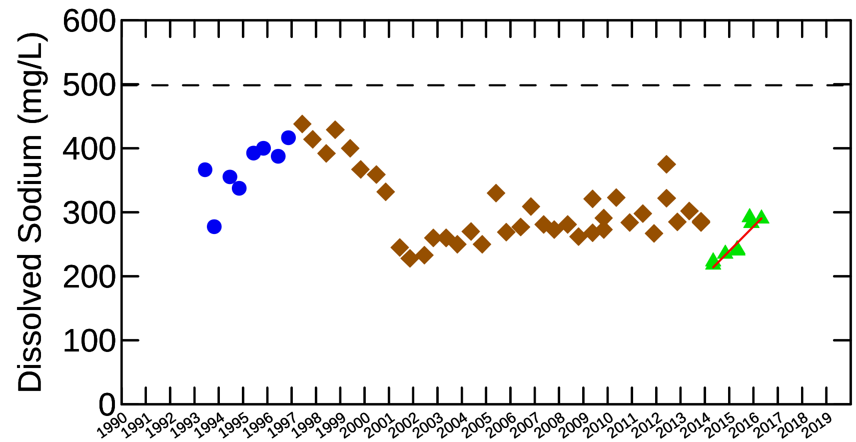
No trend



No trend



No trend



Increasing trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

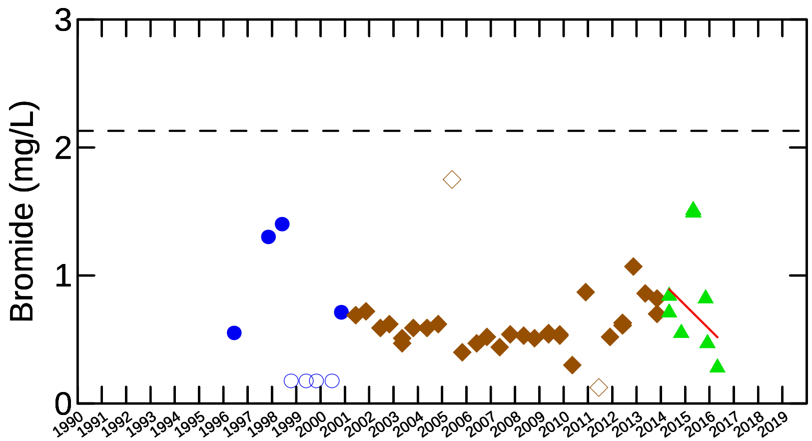
—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at full detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), for wells that are sampled currently, using a 95 percent confidence level.

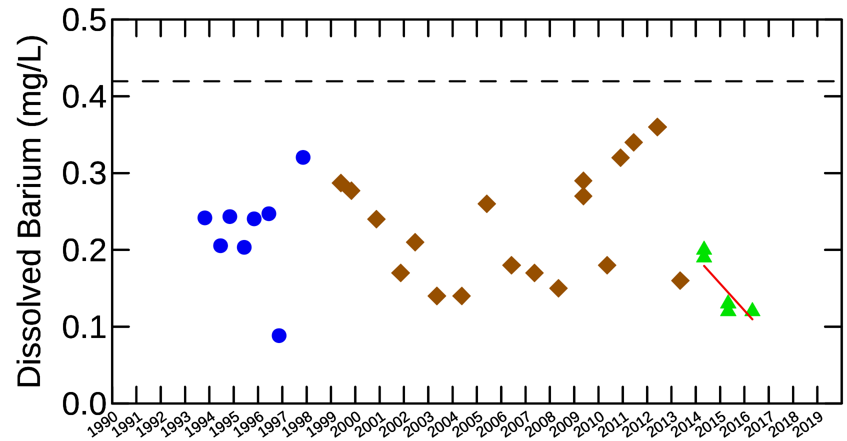
GHD

WELL OW1-92

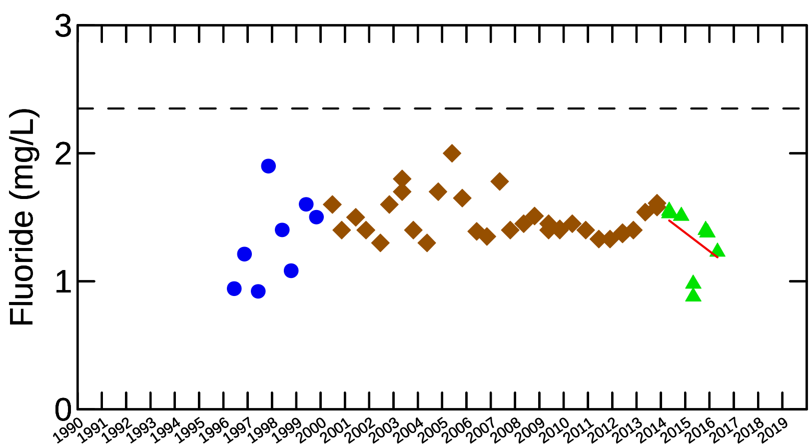
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



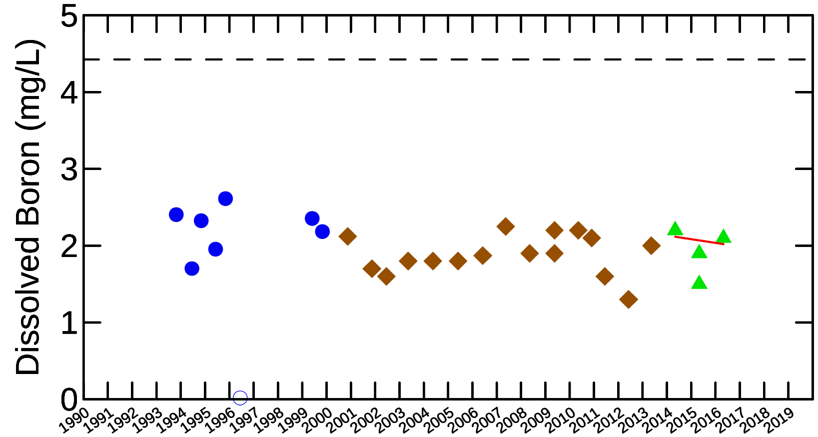
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

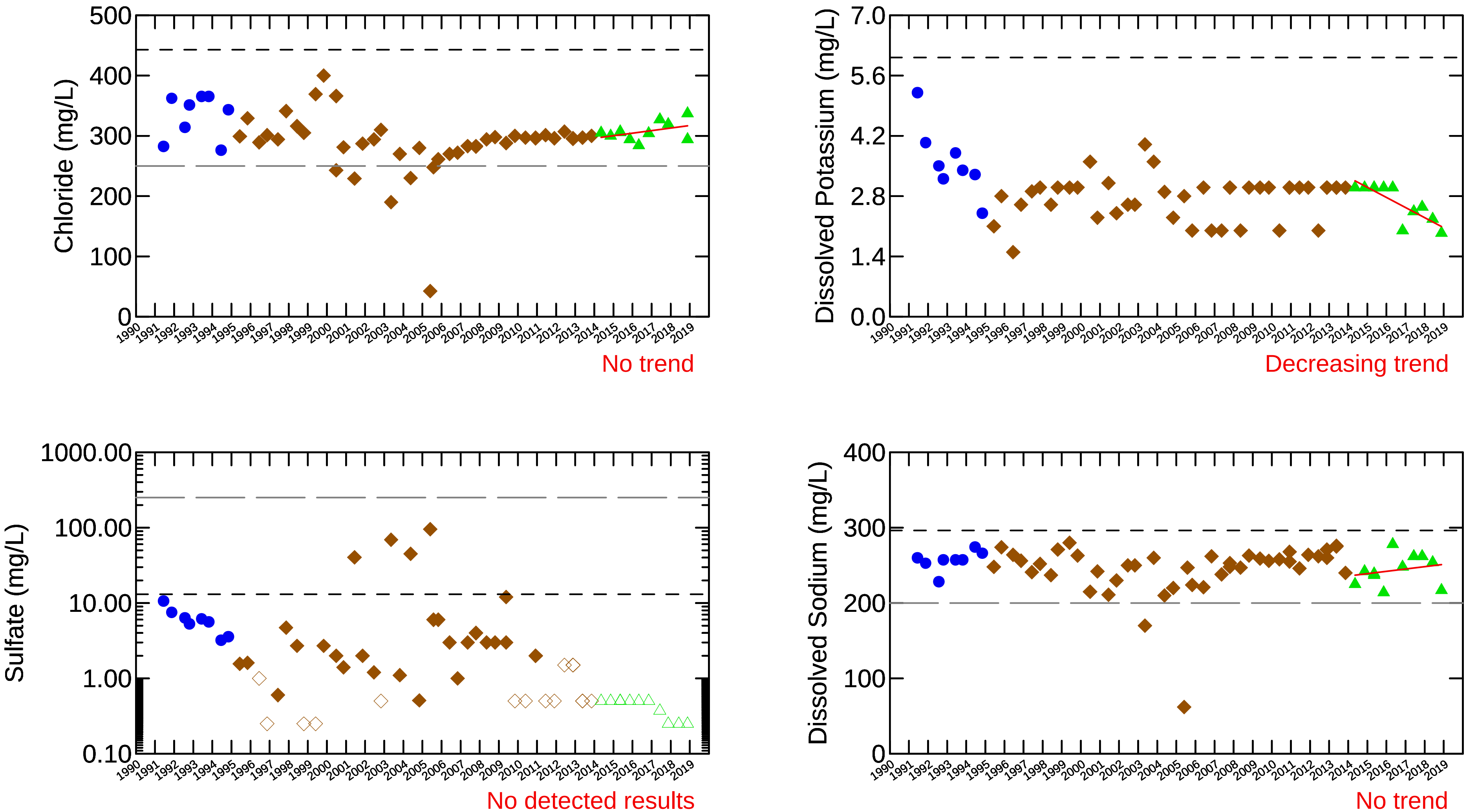
– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at full detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years, using a 95 percent confidence level.

WELL OW1-92

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



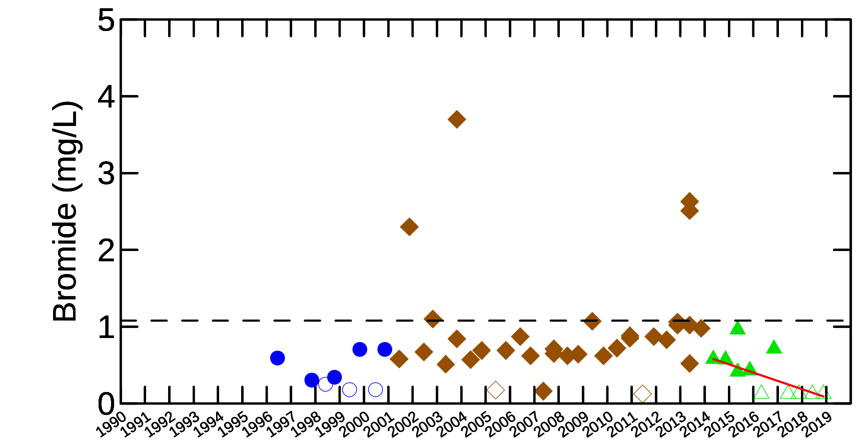
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

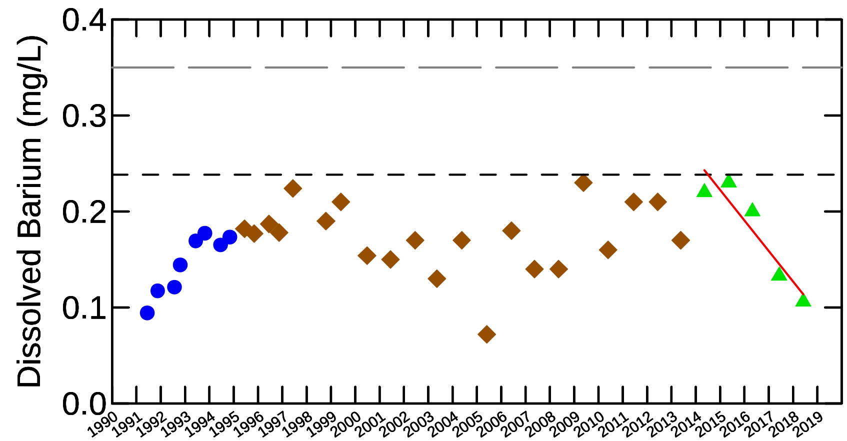
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at full detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years, using a 95 percent confidence level.

WELL OW32-90D

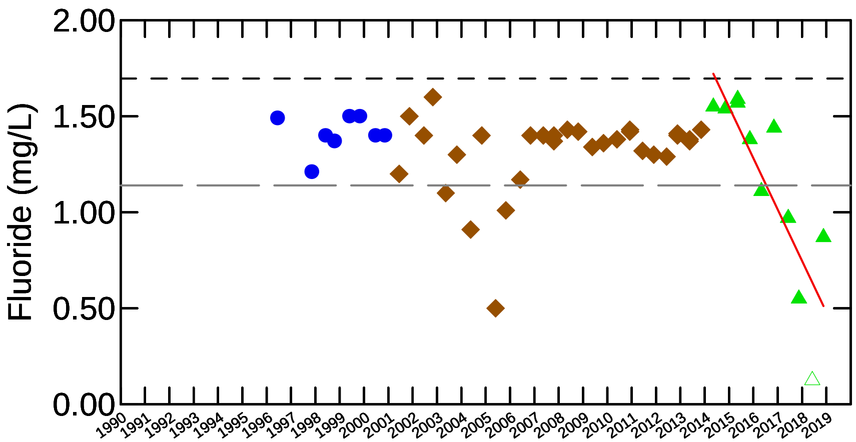
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



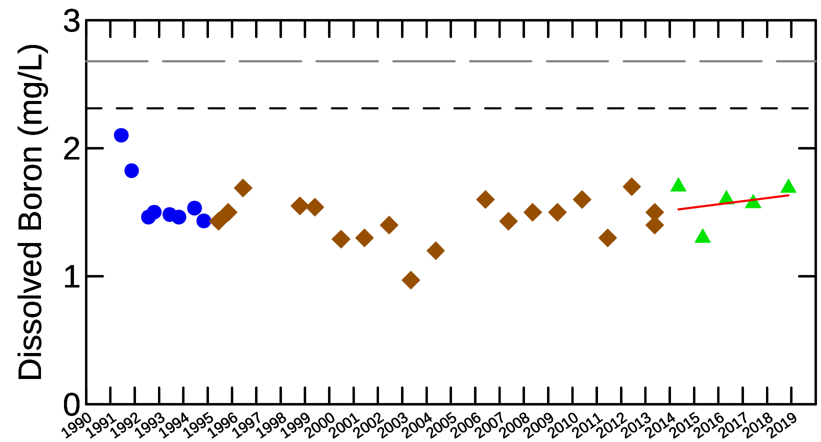
Decreasing trend



Decreasing trend



Decreasing trend



No trend

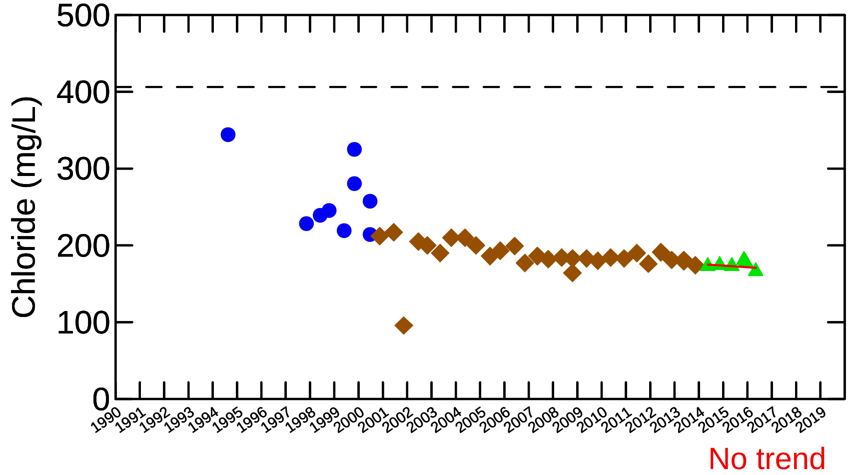
Legend:

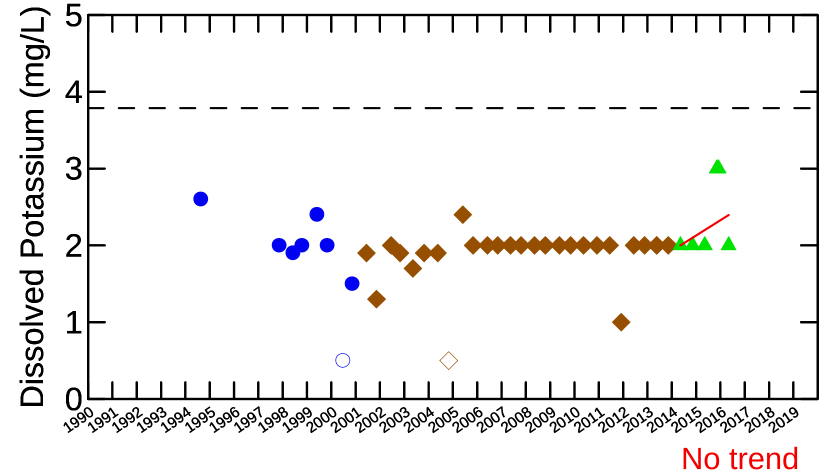
- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

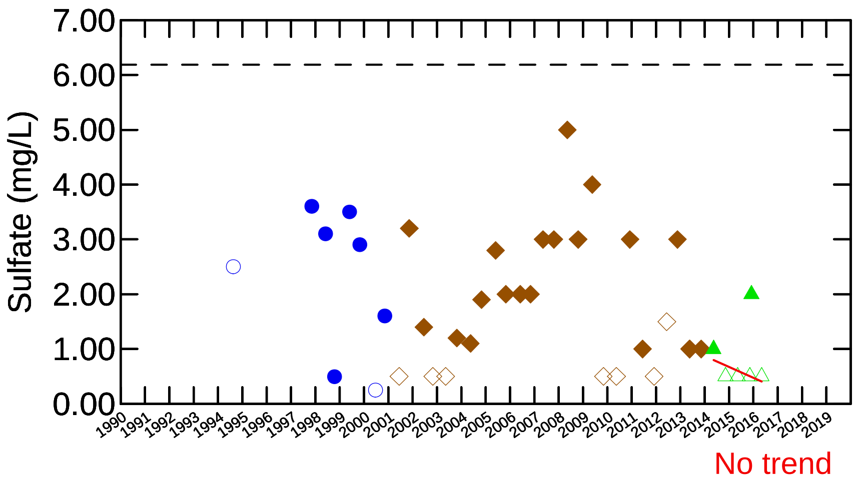
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at full detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

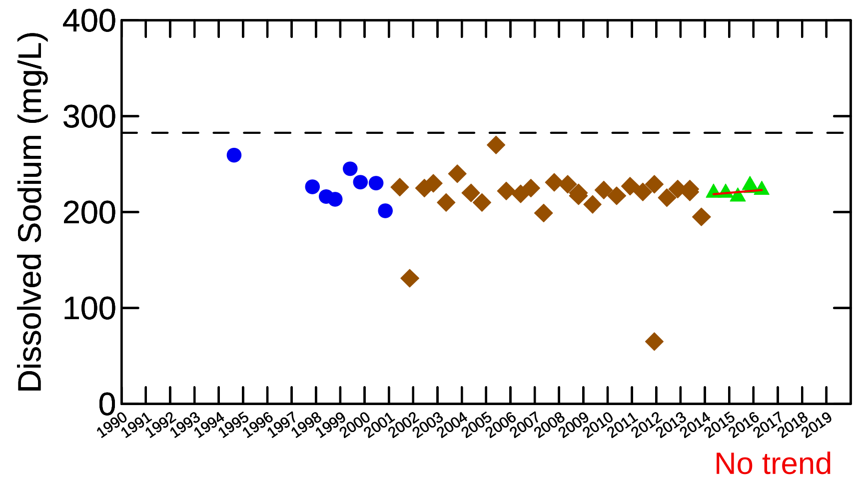
WELL OW32-90D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

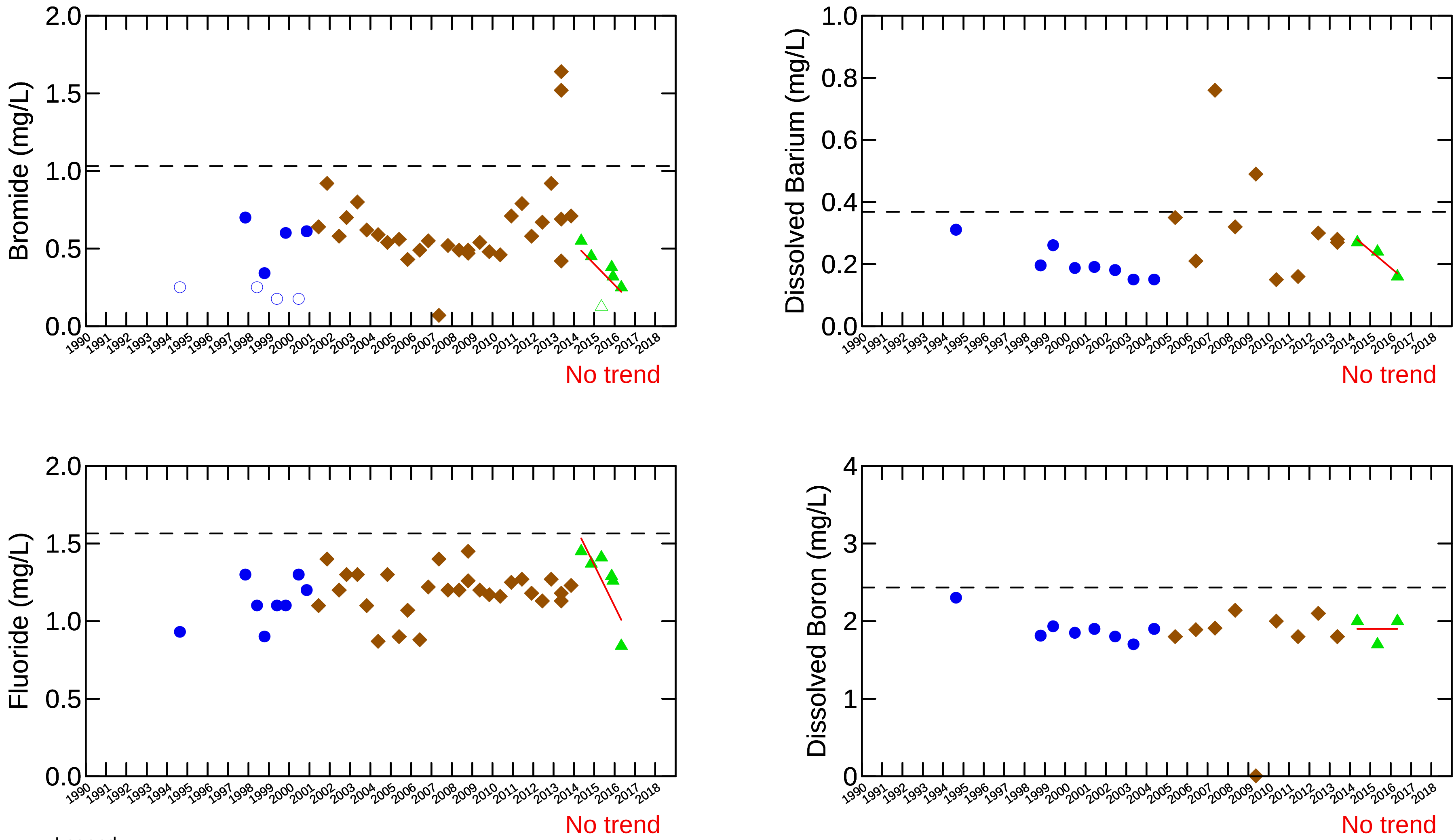
(1) Non-detects (indicated by empty symbols) are plotted at full detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW33-94-I(D)

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



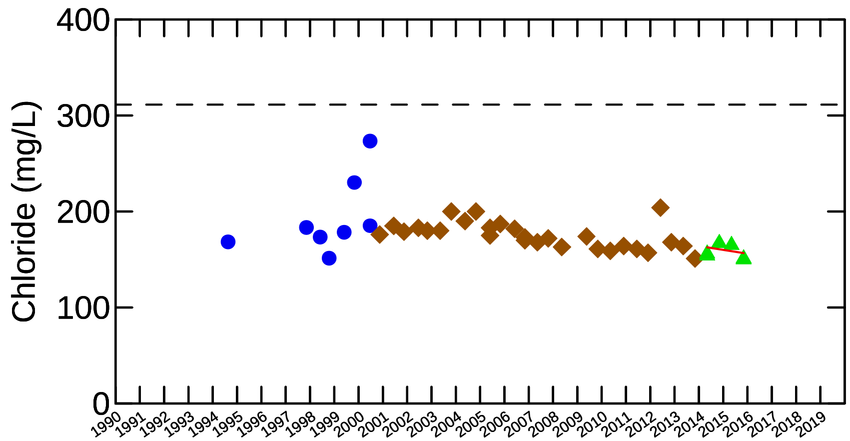
Legend:

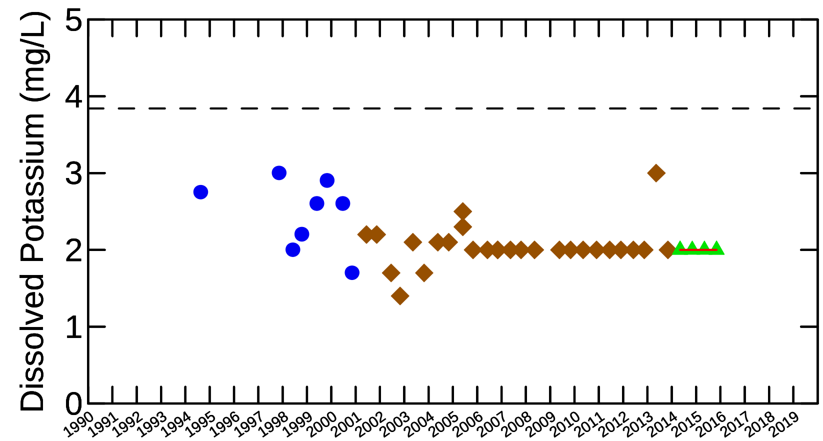
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

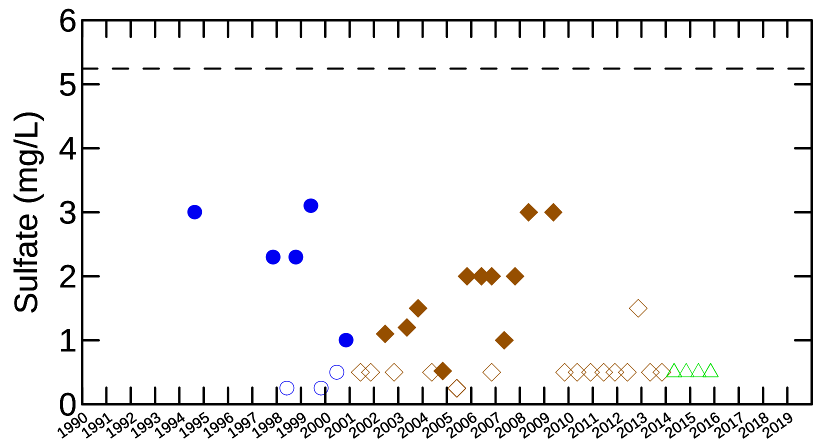
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at full detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

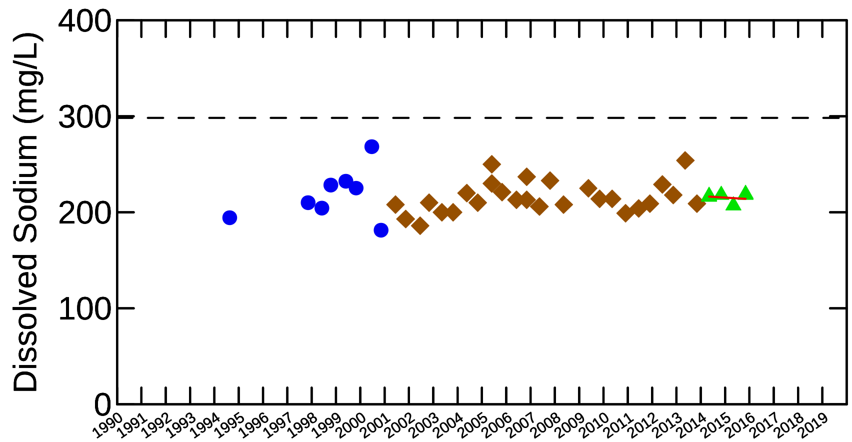
WELL TW33-94-I(D)

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

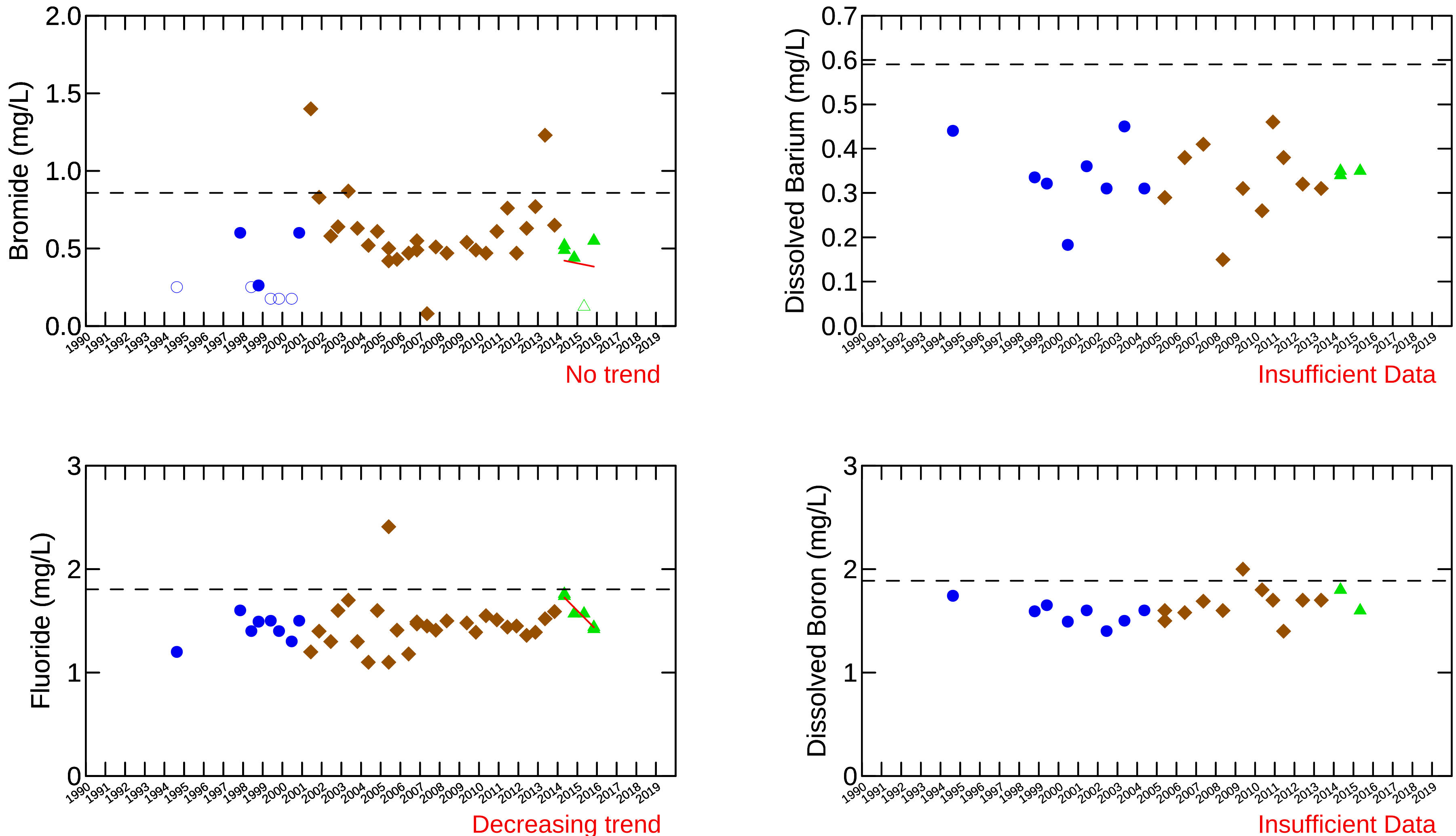
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at full detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW34-94-I(D)

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

Baseline result

Post-Baseline result

Last 5 years (for trend)

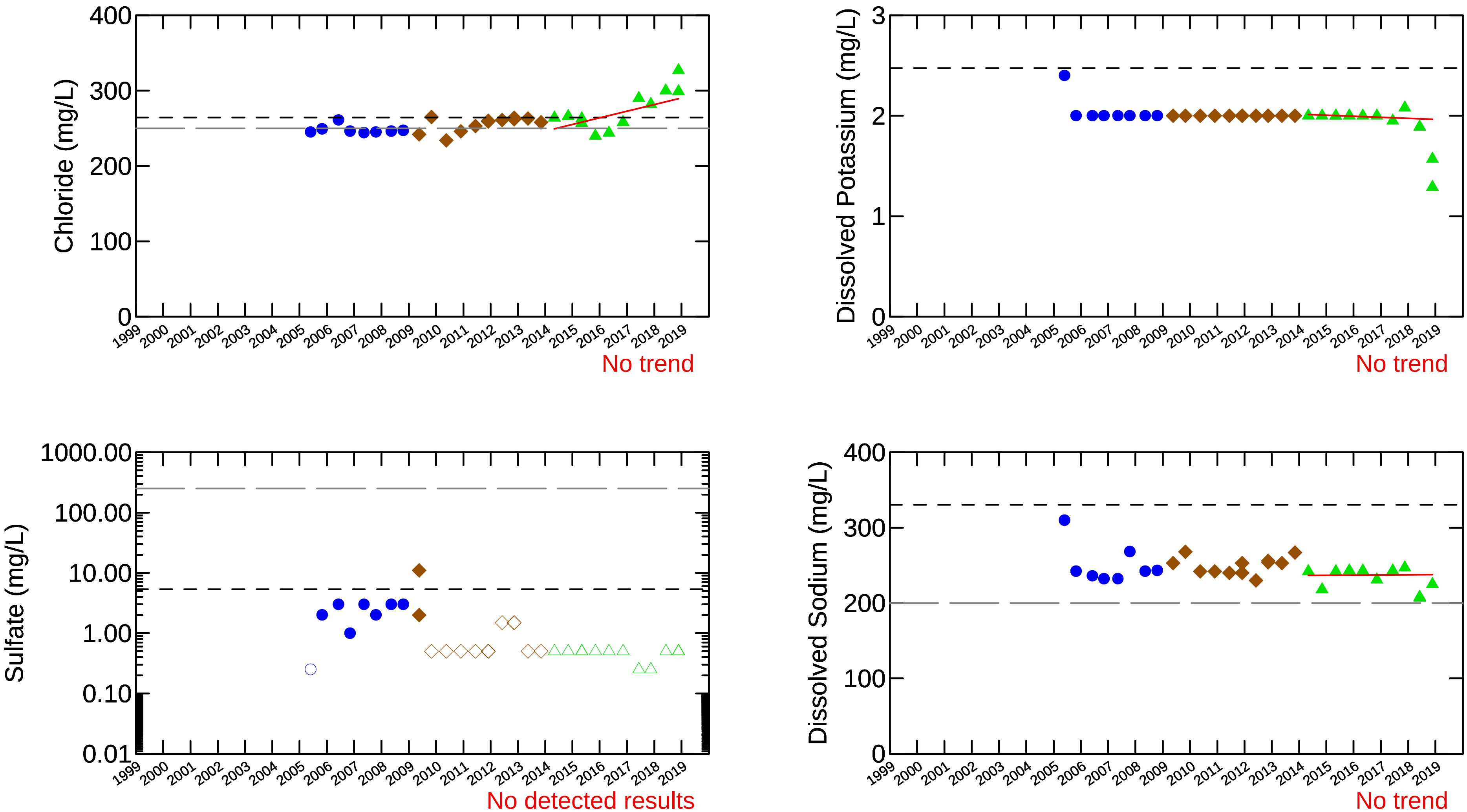
Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW34-94-I(D)

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



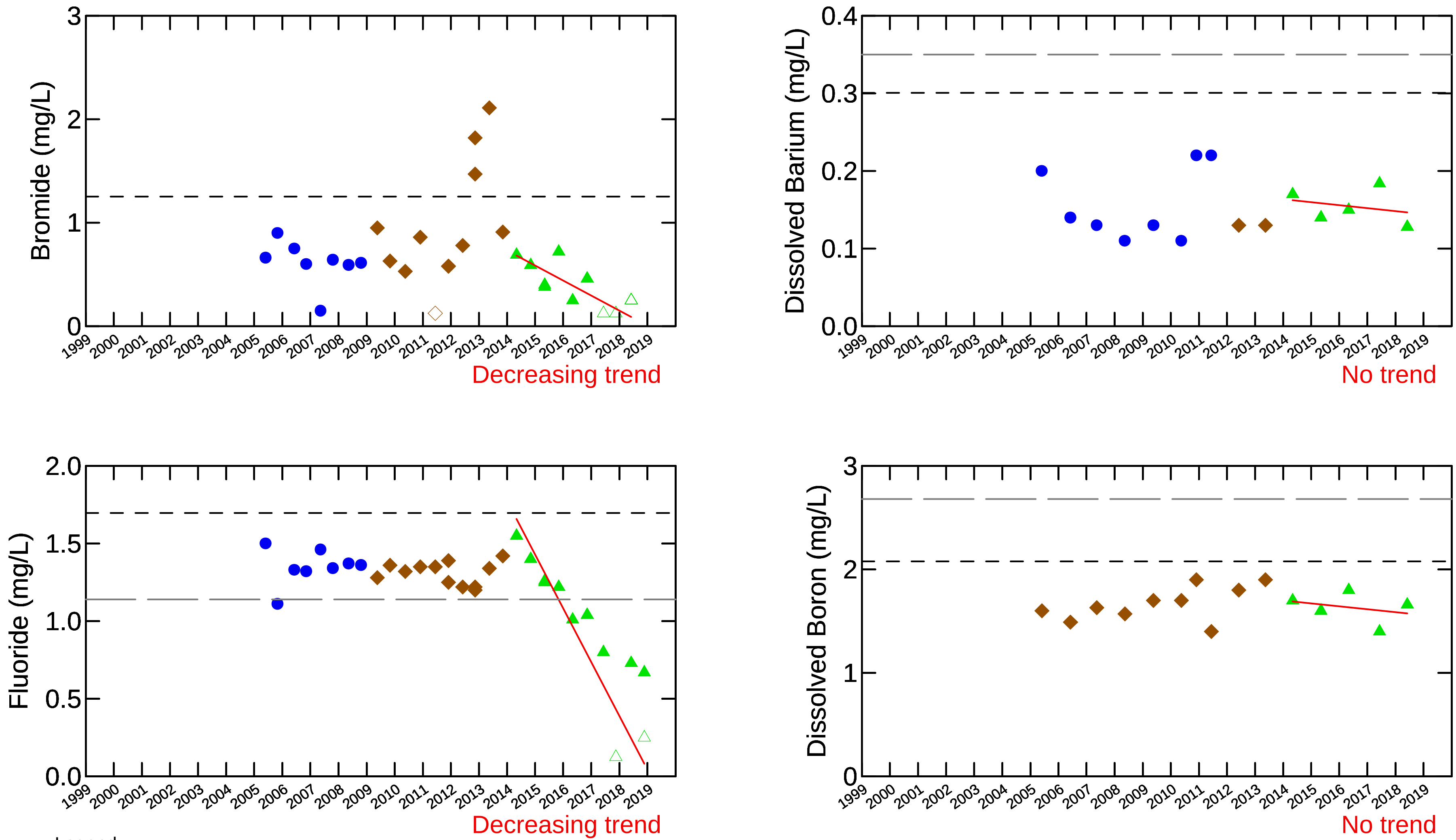
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL OW35-05D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

Baseline result

Post-Baseline result

Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

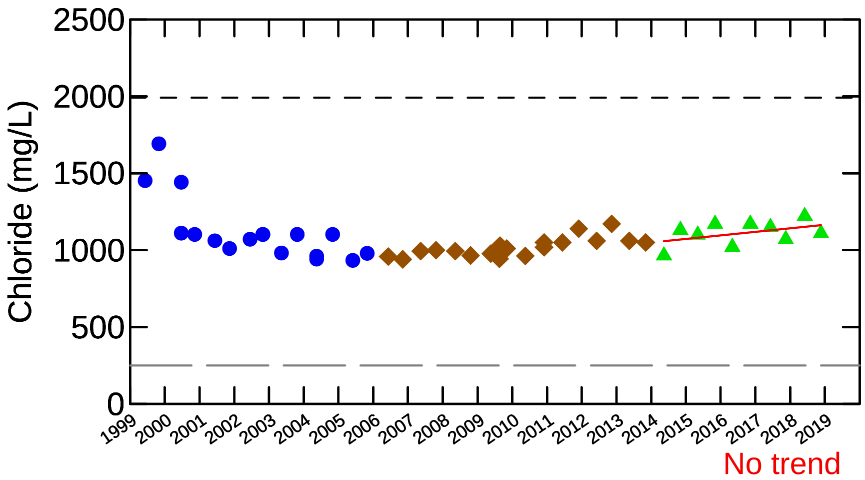
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

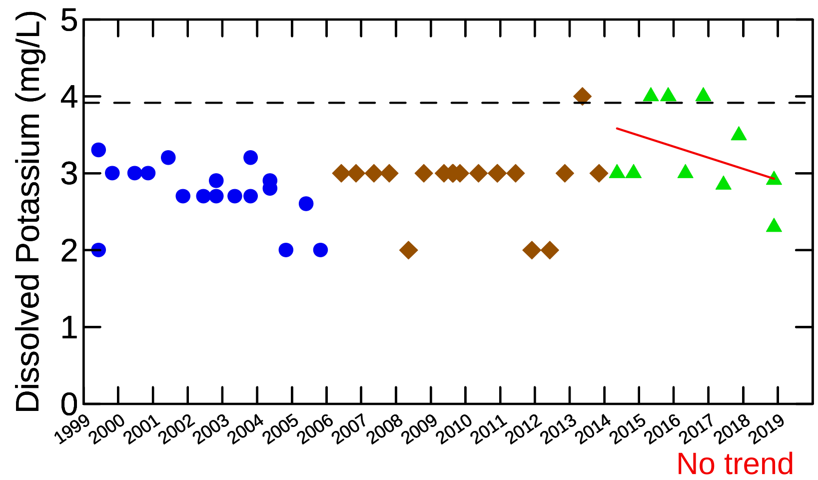
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

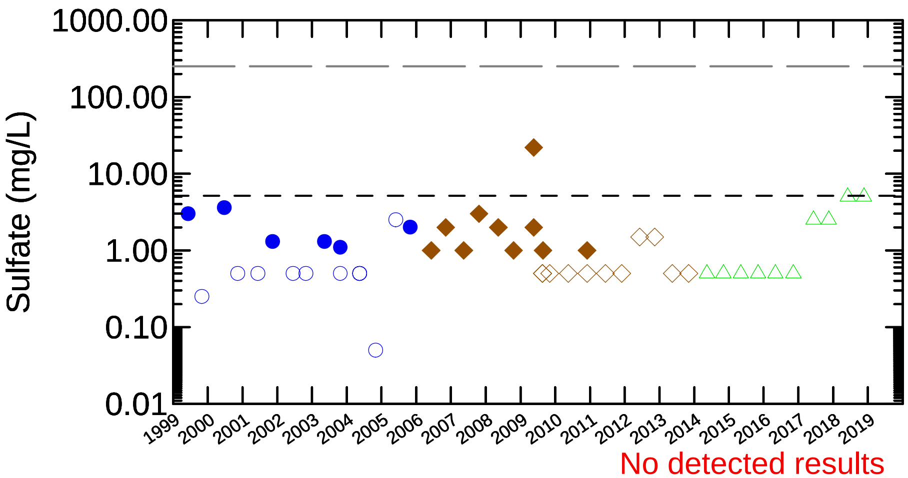
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

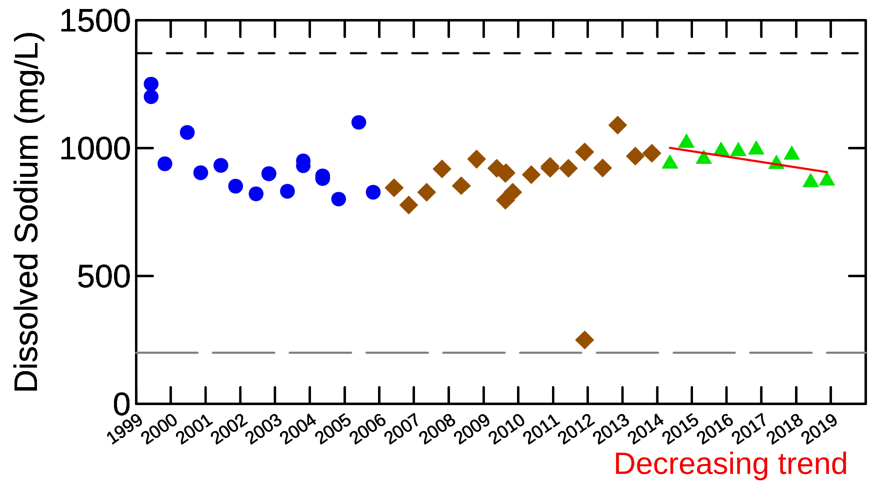
WELL OW35-05D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

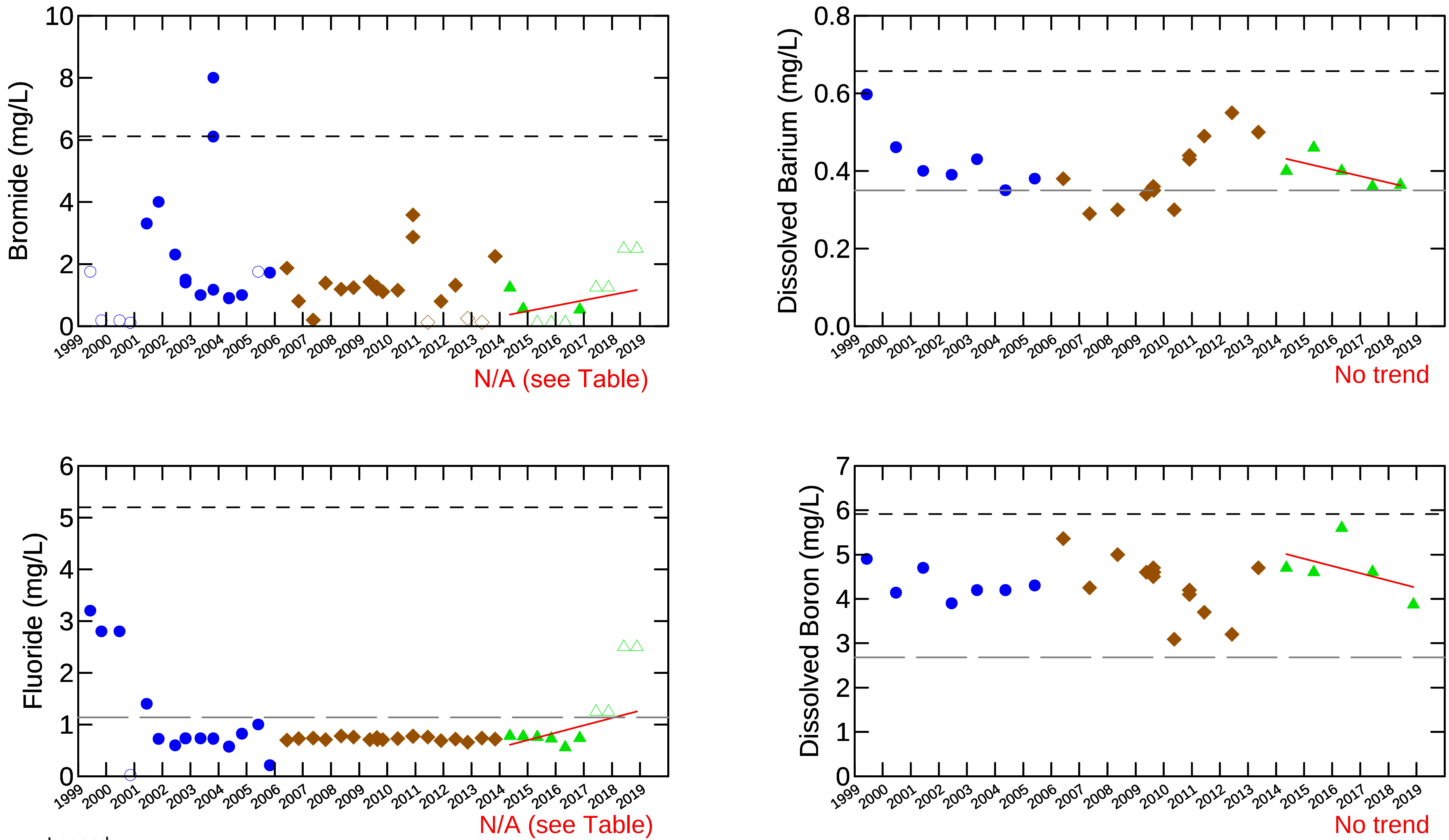
◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)
Baseline Upper Confidence Limit (UCL)
Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW22-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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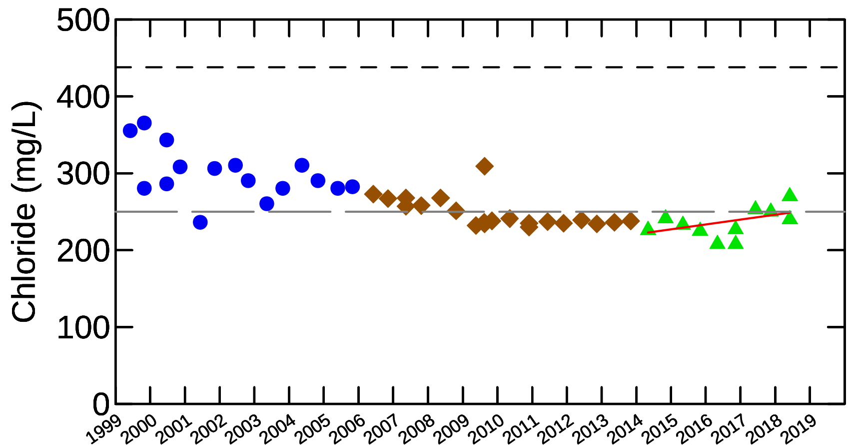
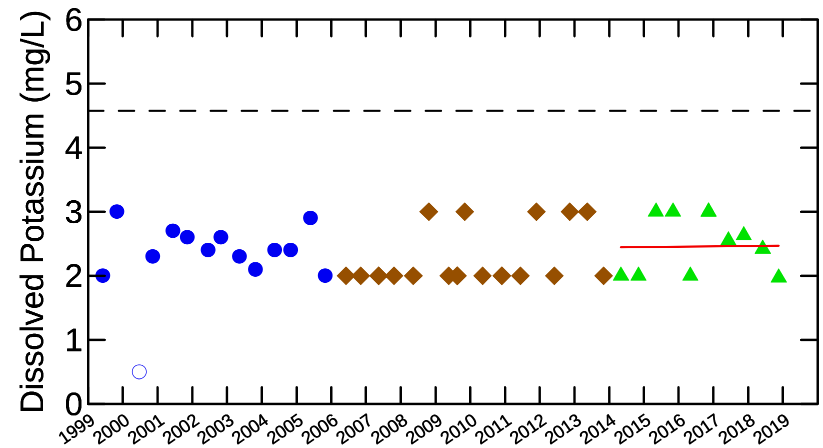
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW22-99D

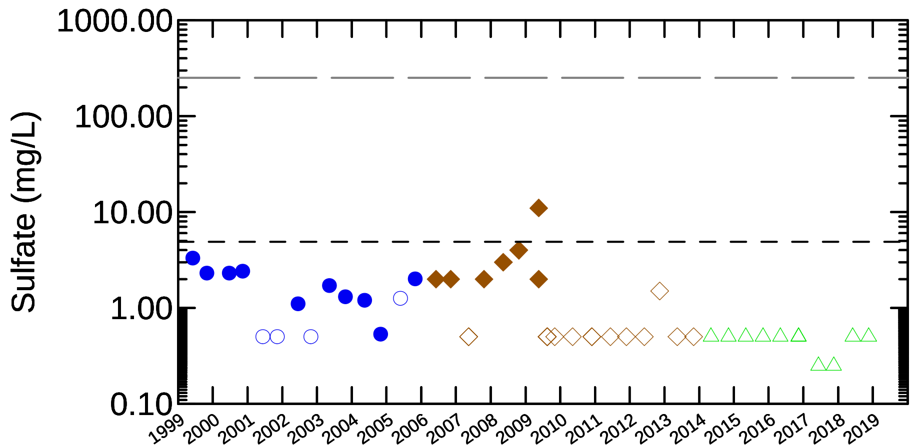
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



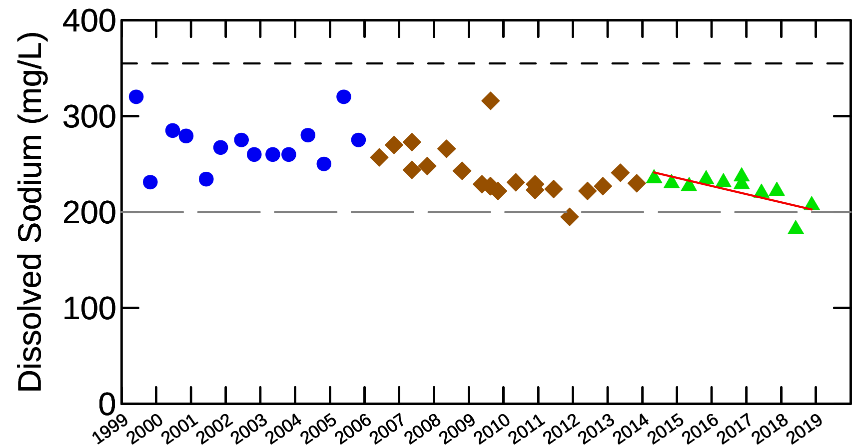
No trend



No trend



No detected results



Decreasing trend

Legend:

- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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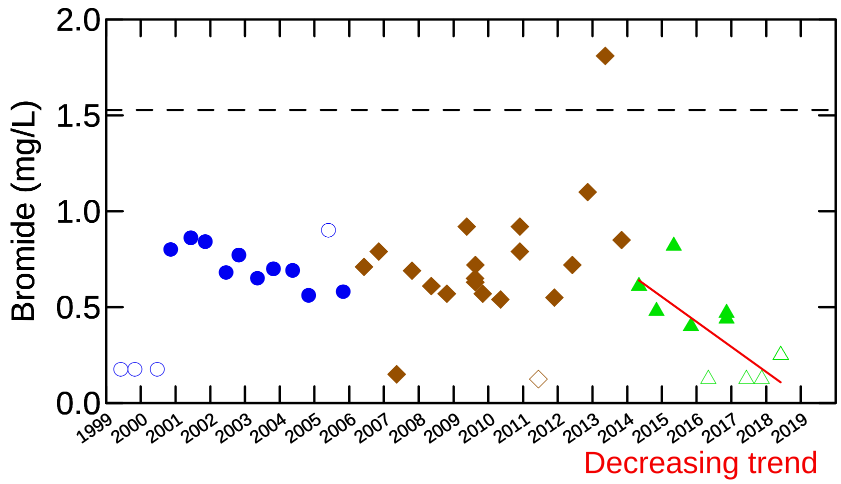
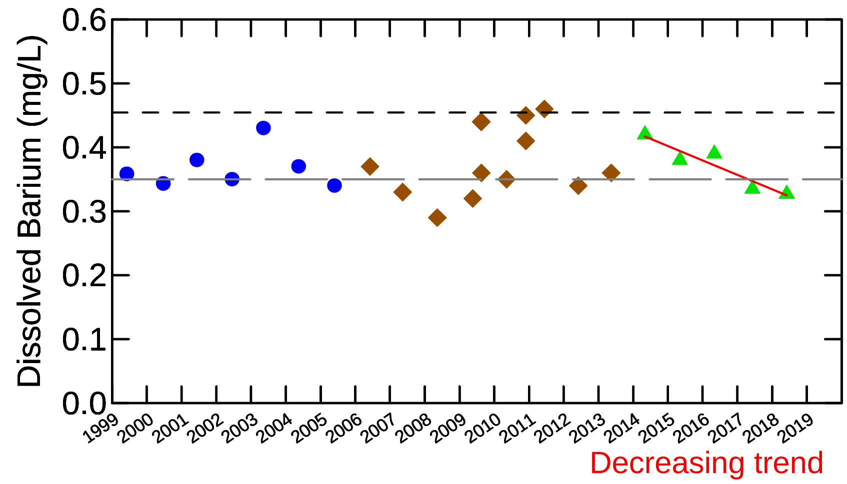
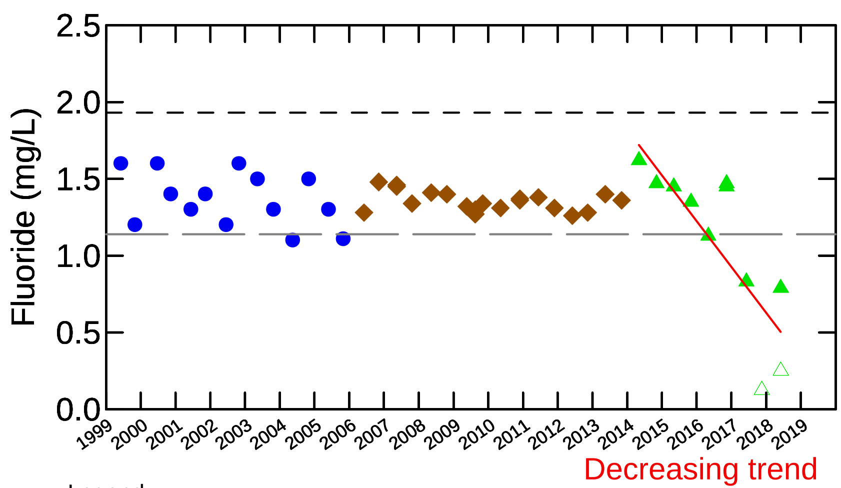
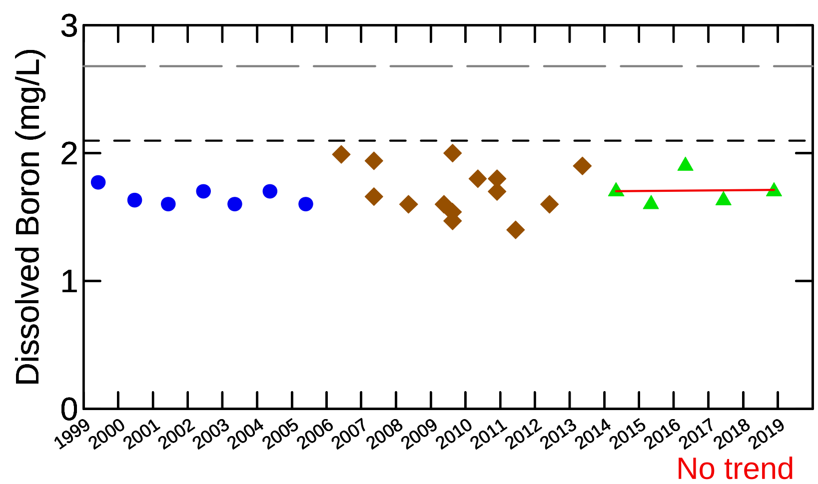
WELL TW30-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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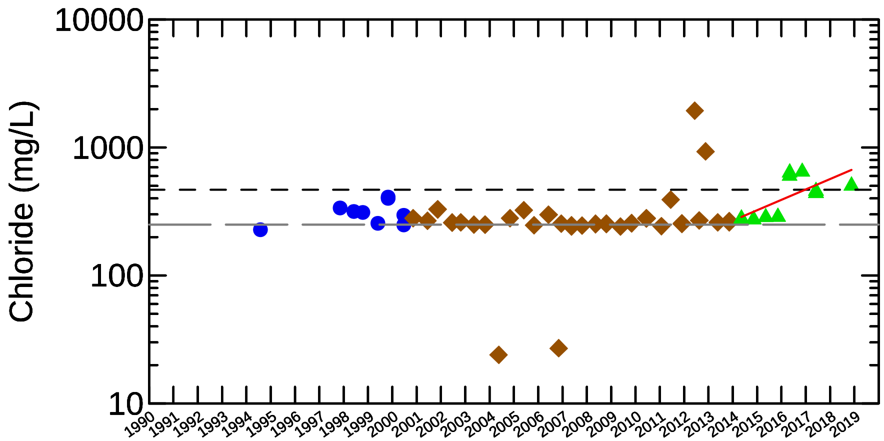
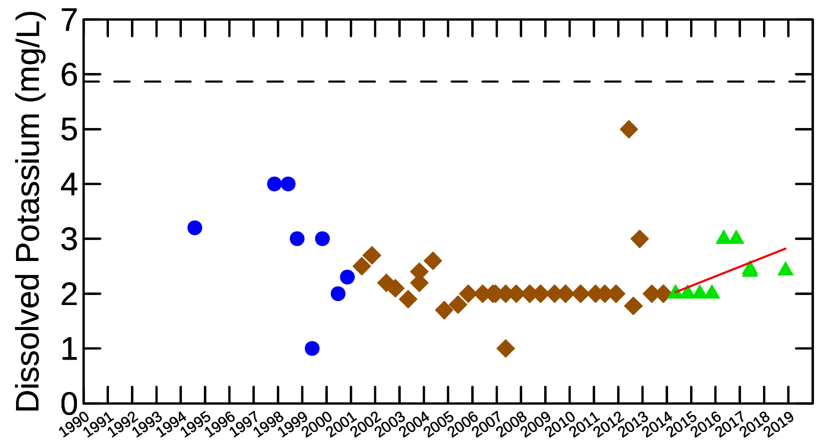
WELL TW30-99D

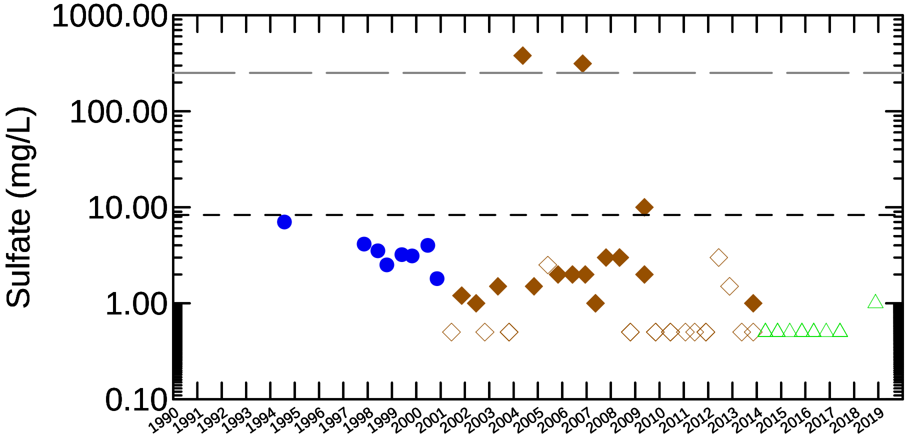
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



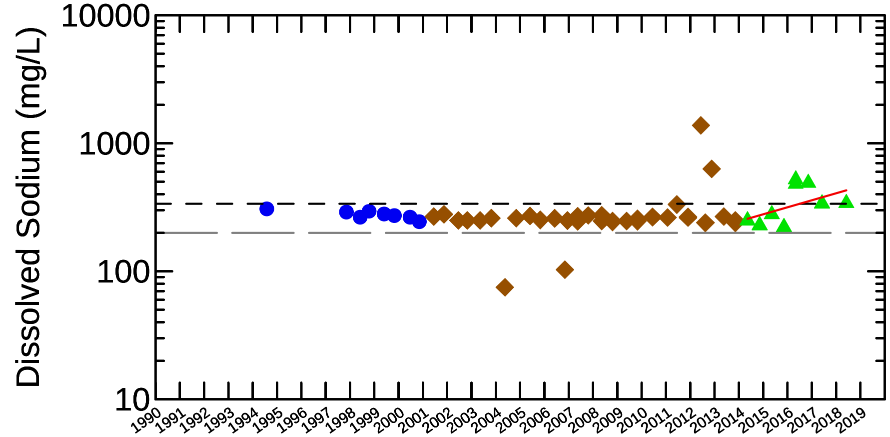
No trend



No trend



No detected results



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

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(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

GHD

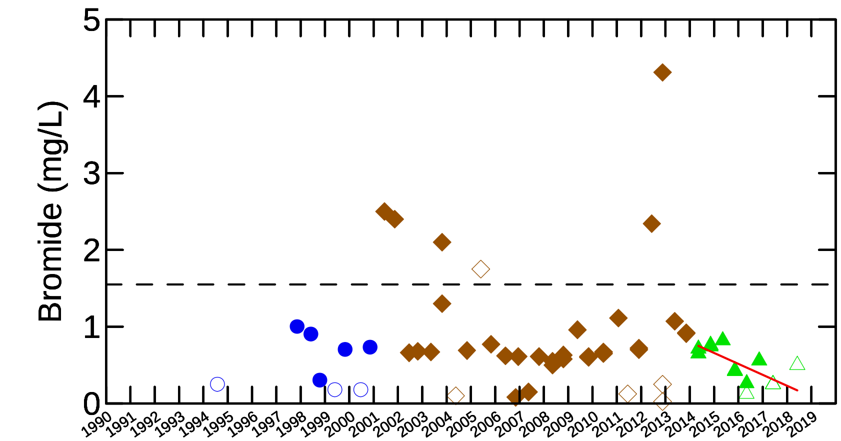
WELL TW32-94-II

DEEP WELL (INTERFACE AQUIFER)

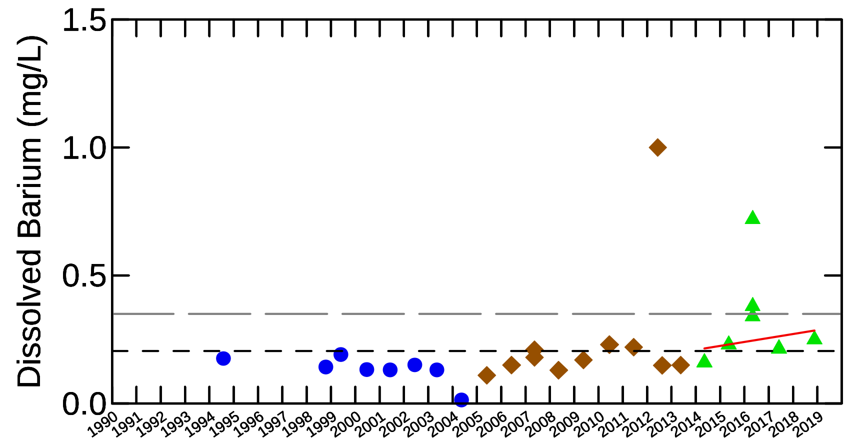
2018 GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA, INC.

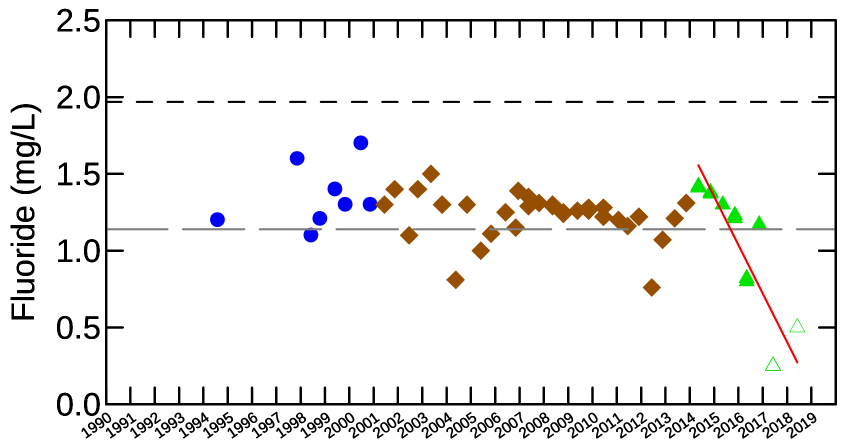
Lambton County, Ontario



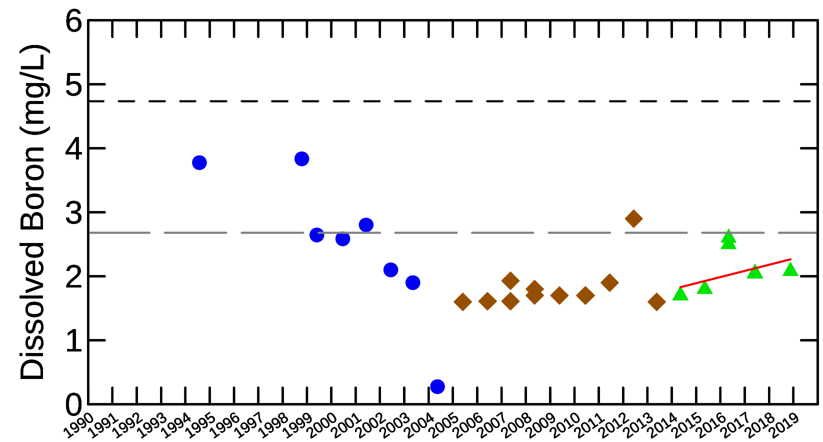
Decreasing trend



No trend



Decreasing trend



No trend

Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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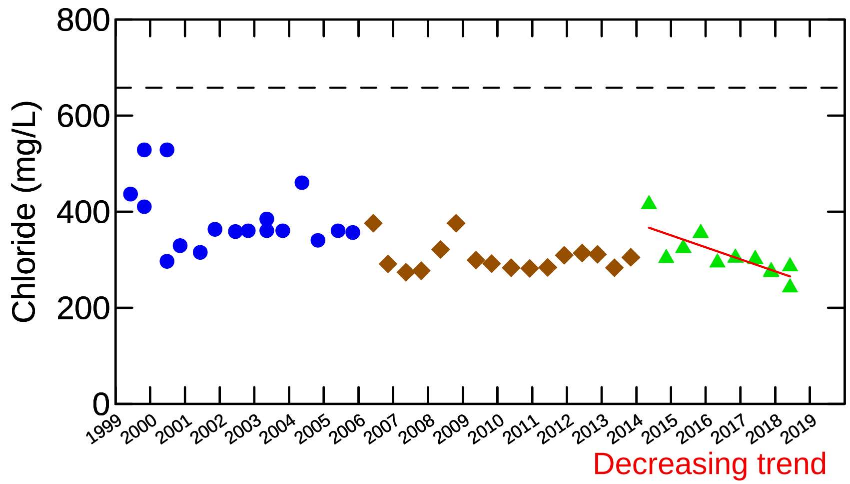
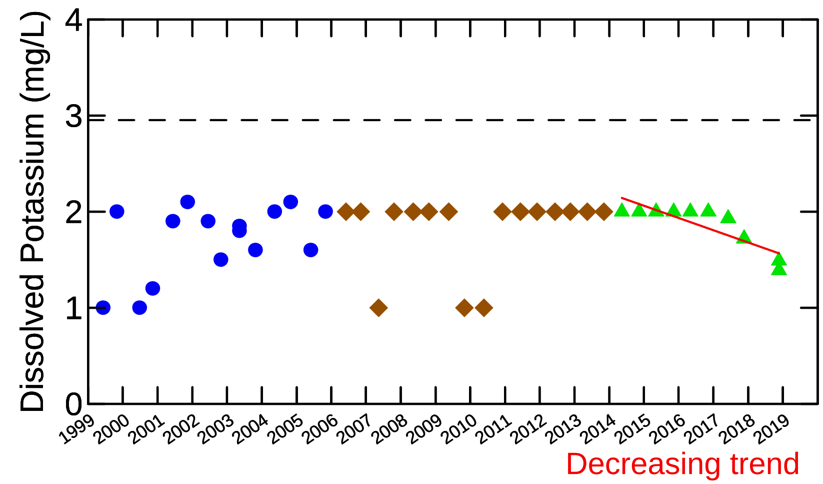
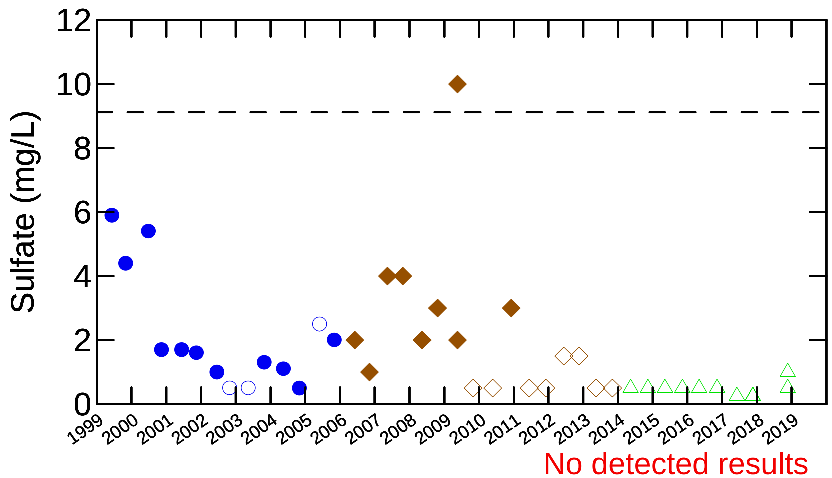
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

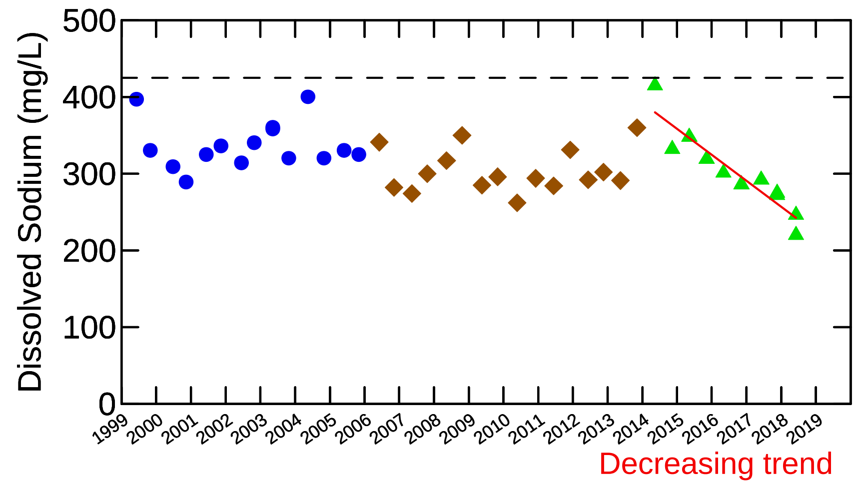
WELL TW32-94-II

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









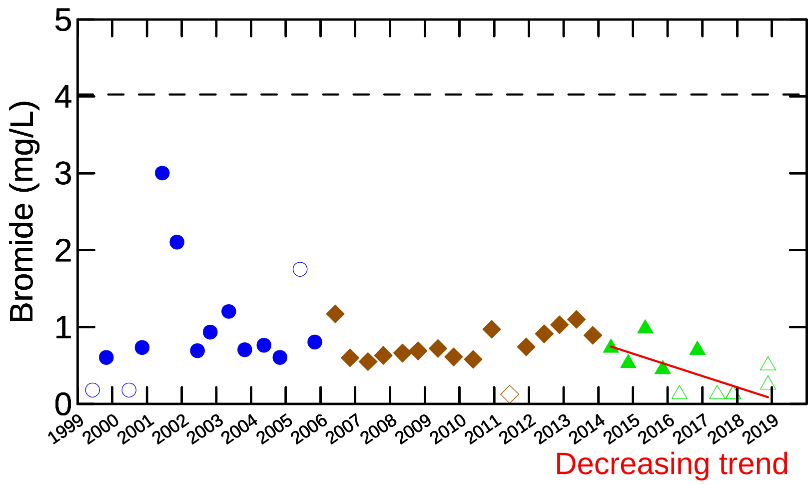
Legend:

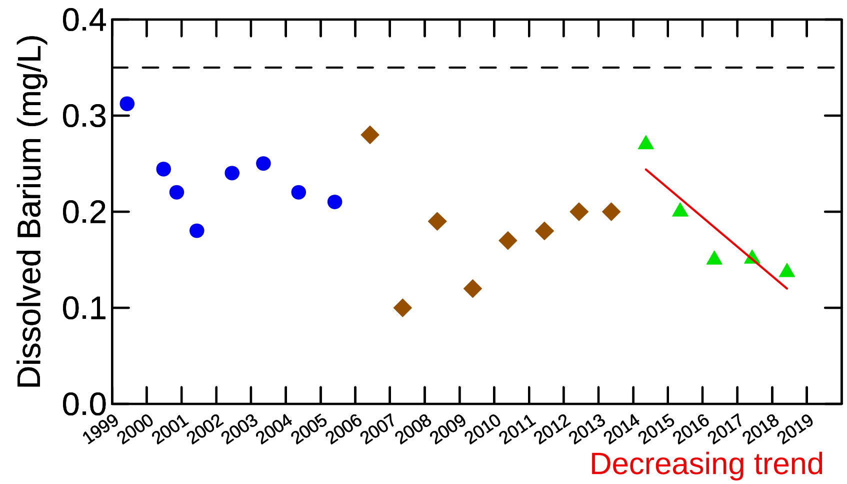
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

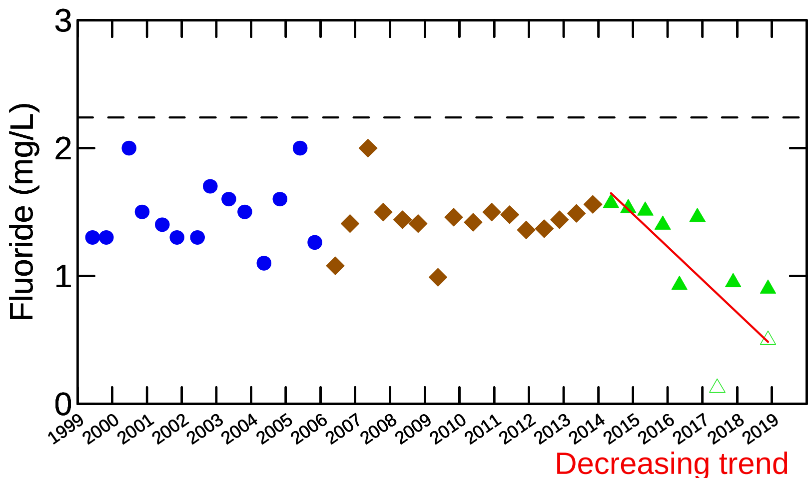
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

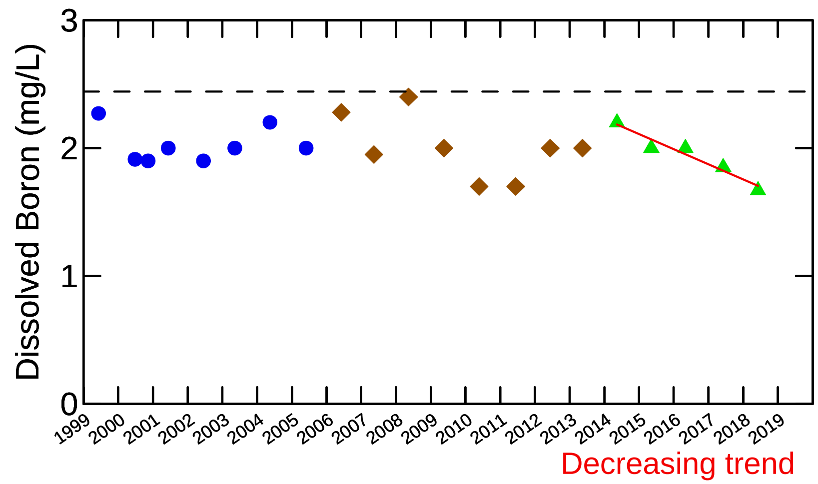
WELL TW39-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

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(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

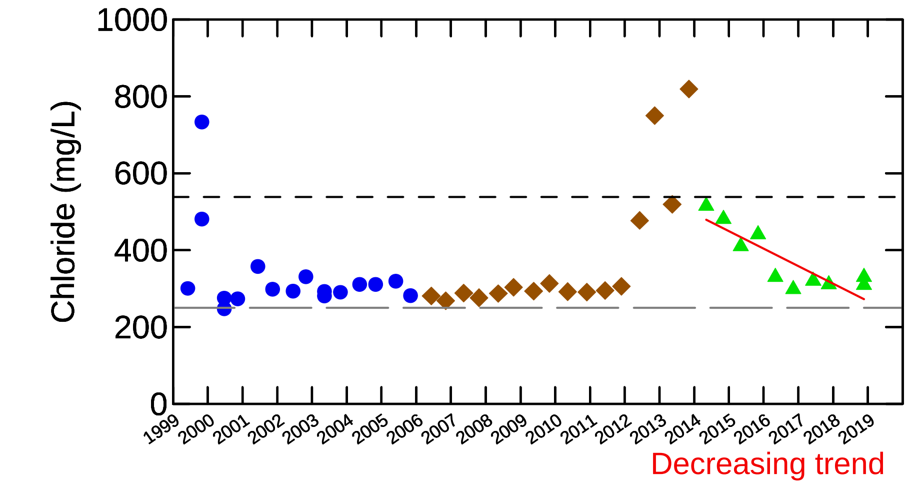
WELL TW39-99D

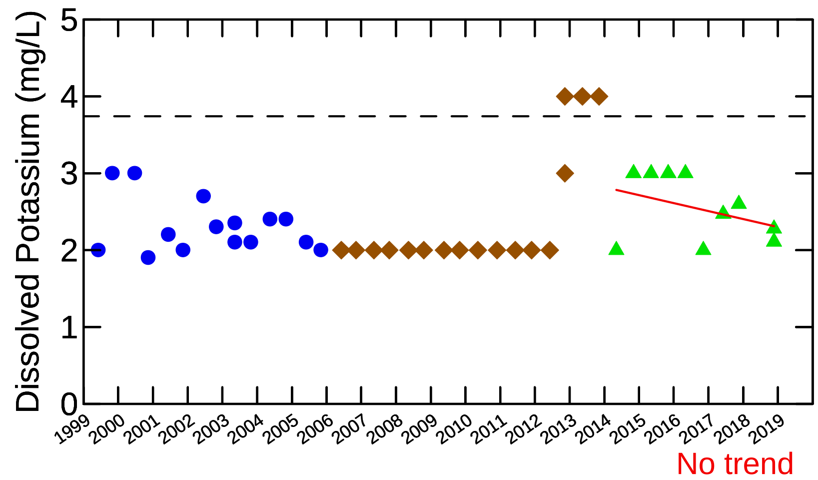
DEEP WELL (INTERFACE AQUIFER)

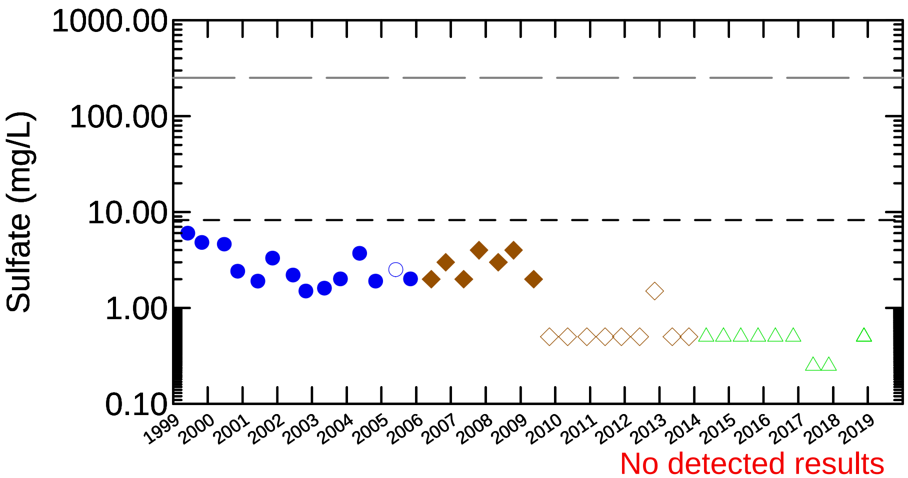
2018 GROUNDWATER MONITORING REPORT

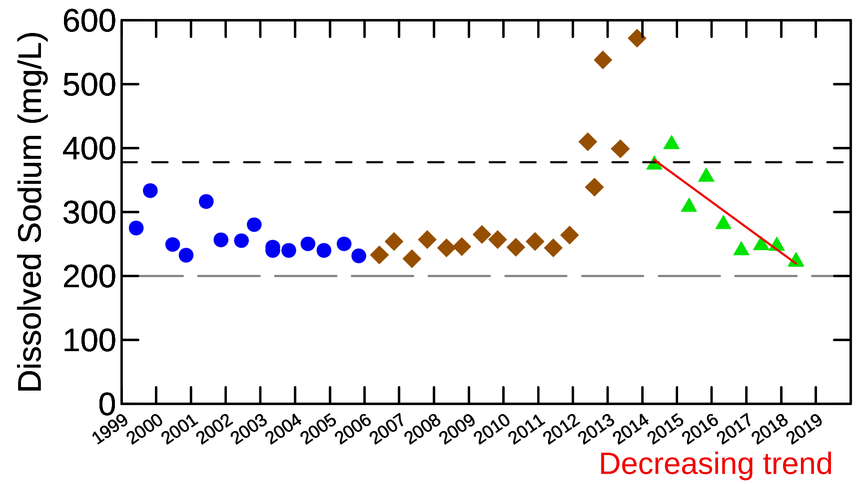
CLEAN HARBORS CANADA, INC.

Lambton County, Ontario









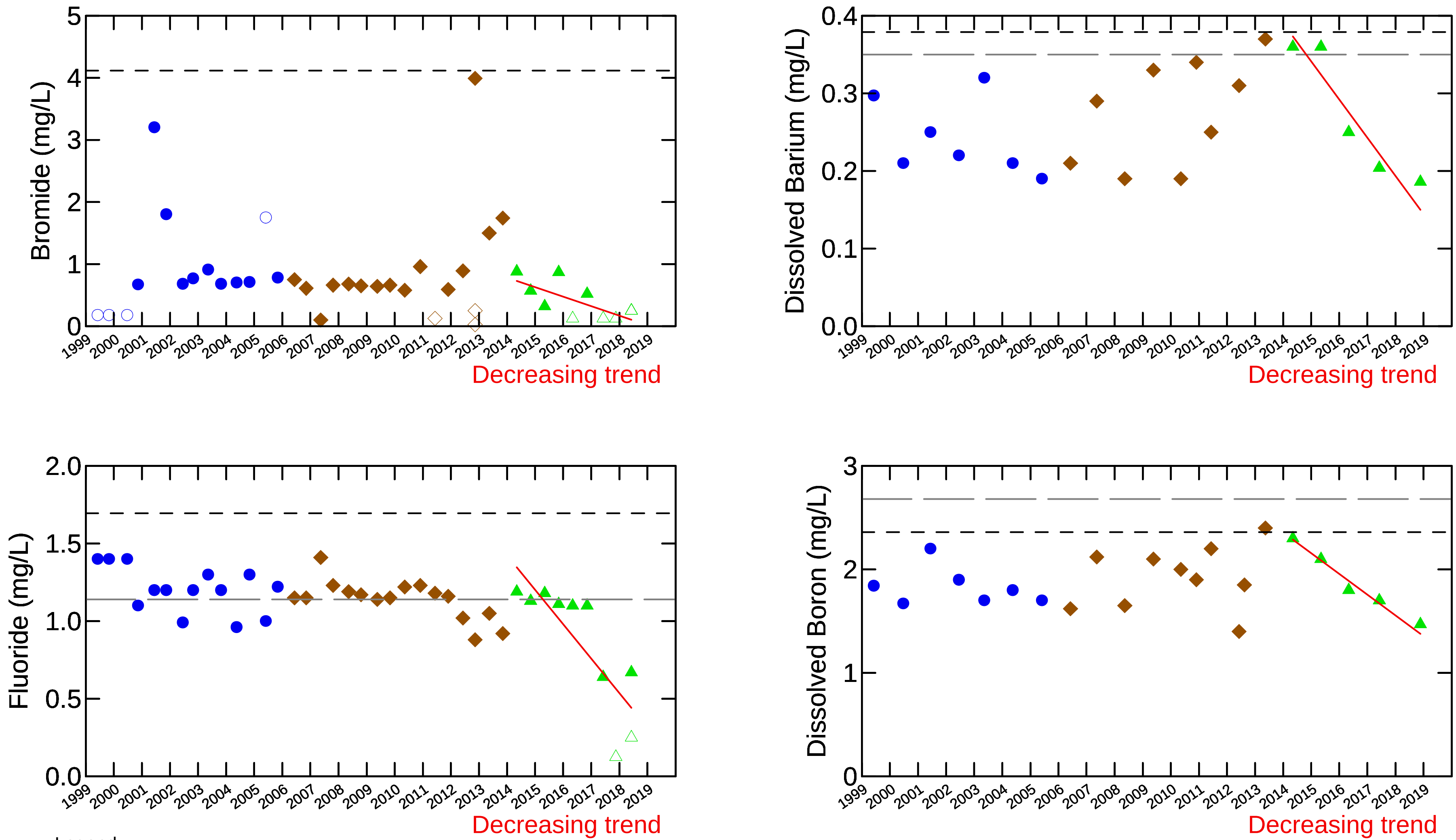
Legend:

- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW40-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

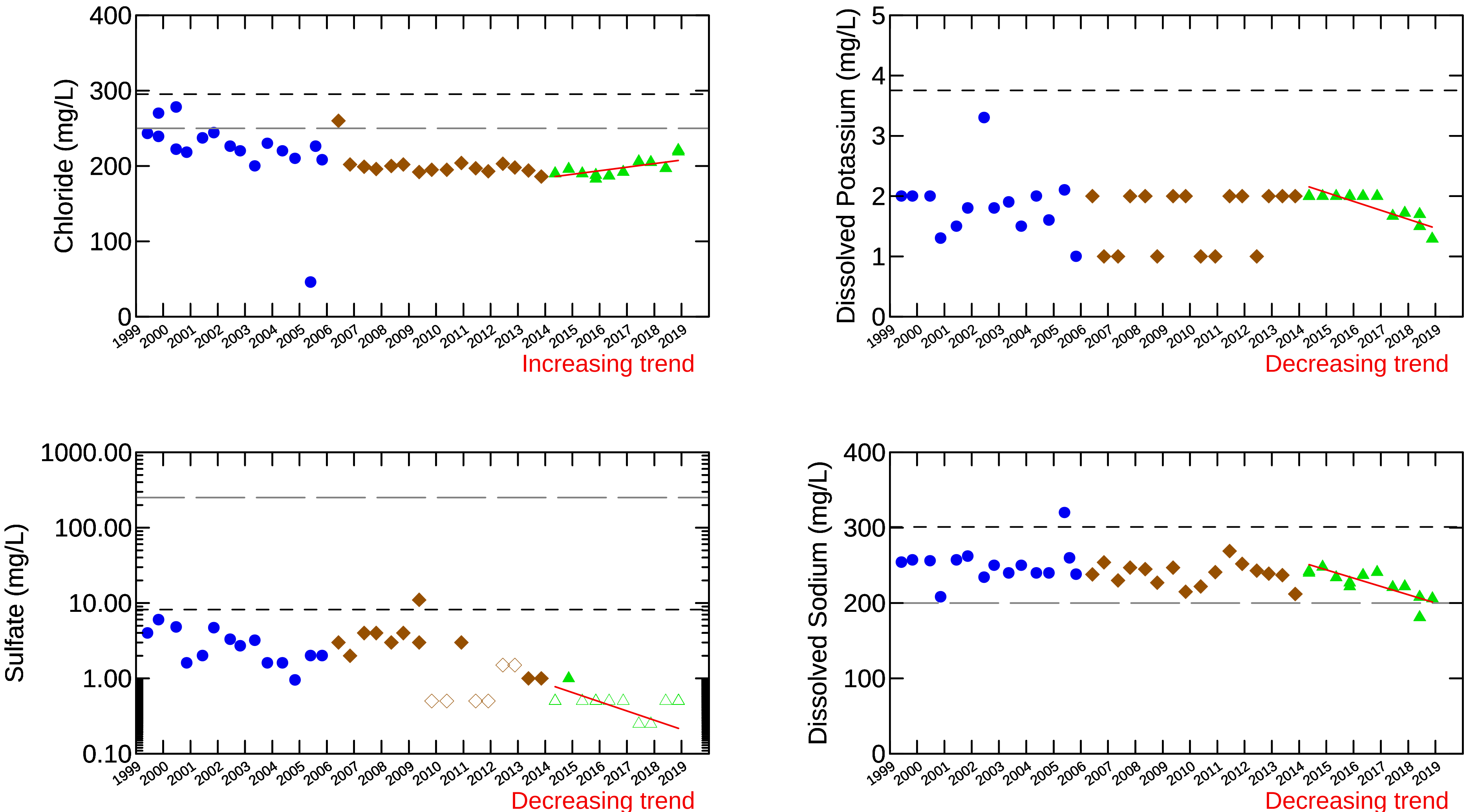
Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW40-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



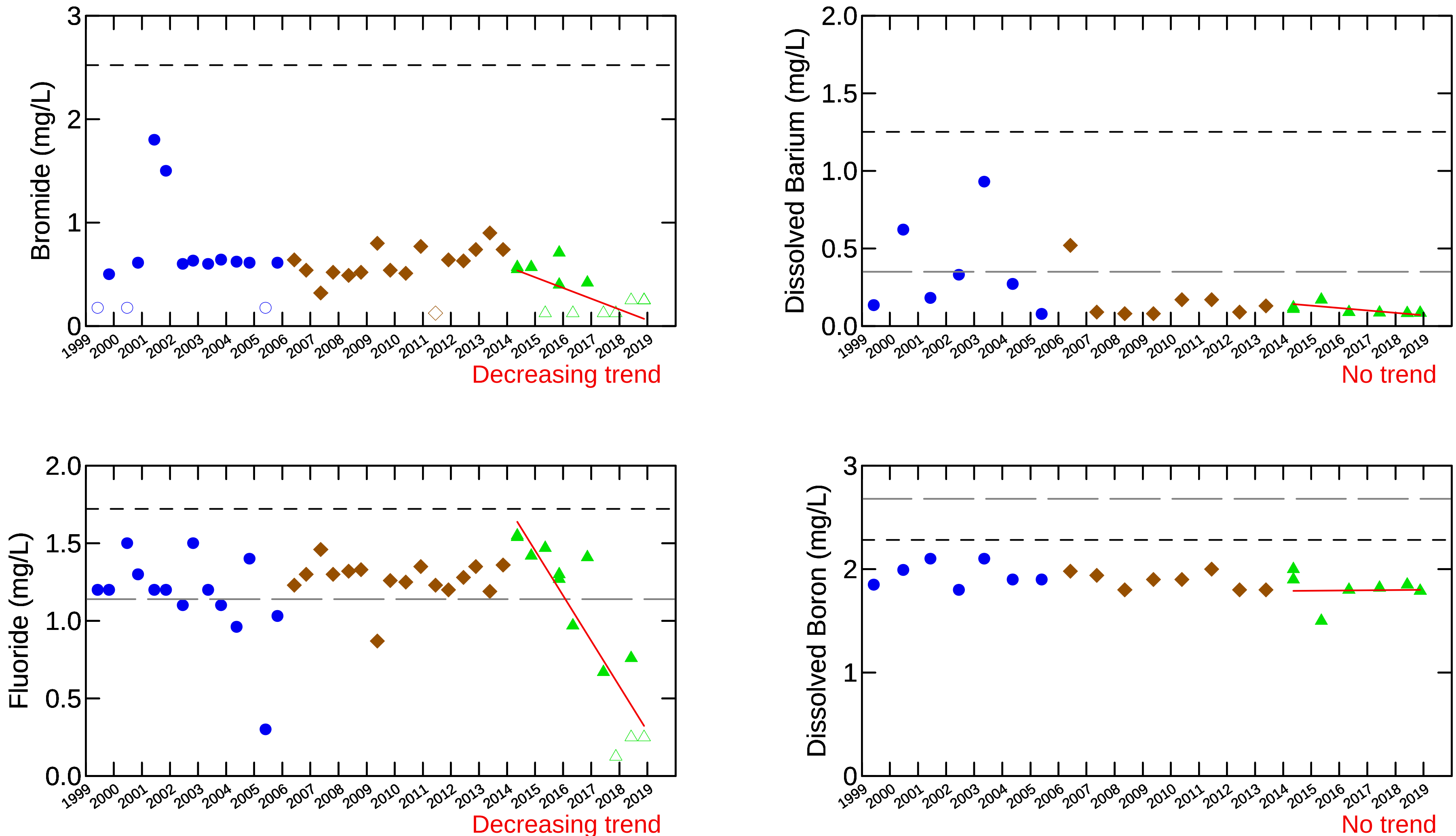
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW41-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

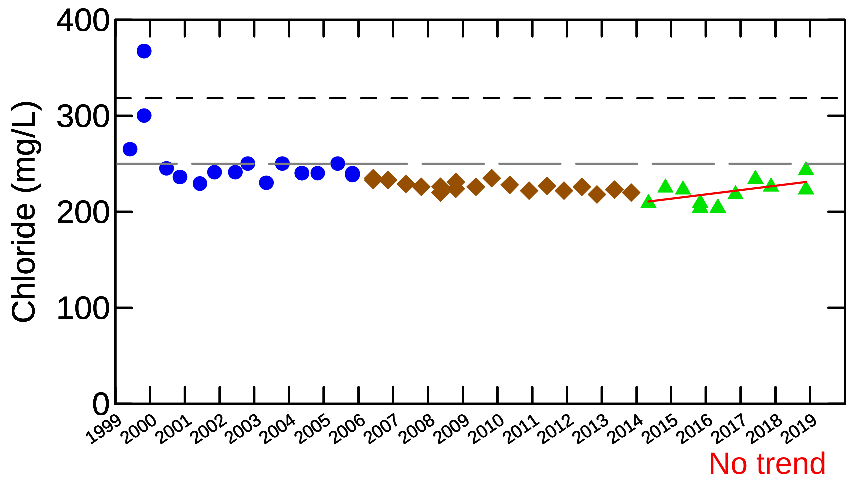
◆ Post-Baseline result ▲ Last 5 years (for trend)

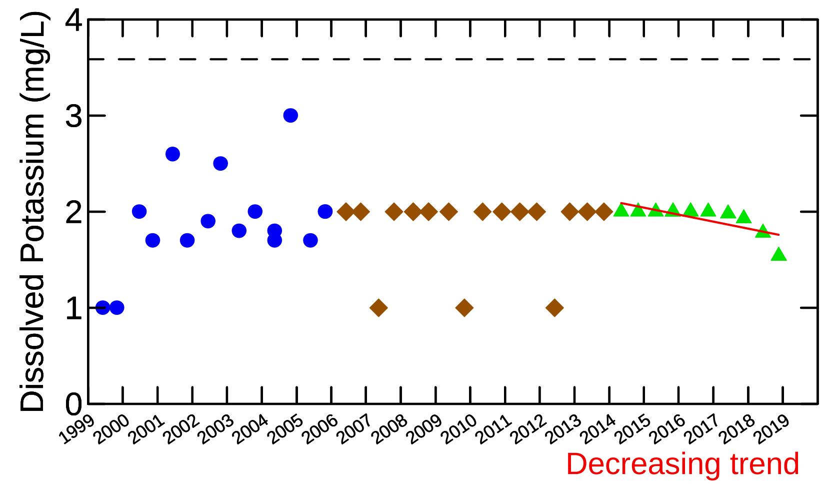
Reasonable Use Criteria (RUC)
Baseline Upper Confidence Limit (UCL)
Linear Regression line

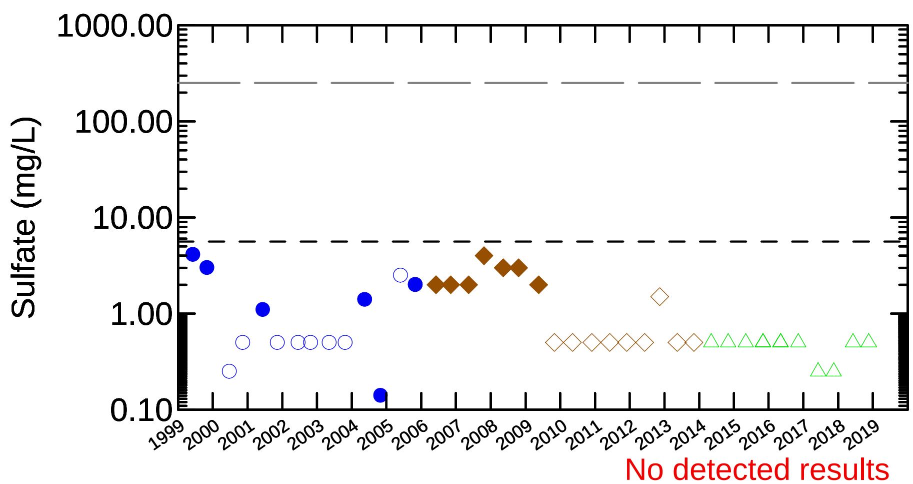
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

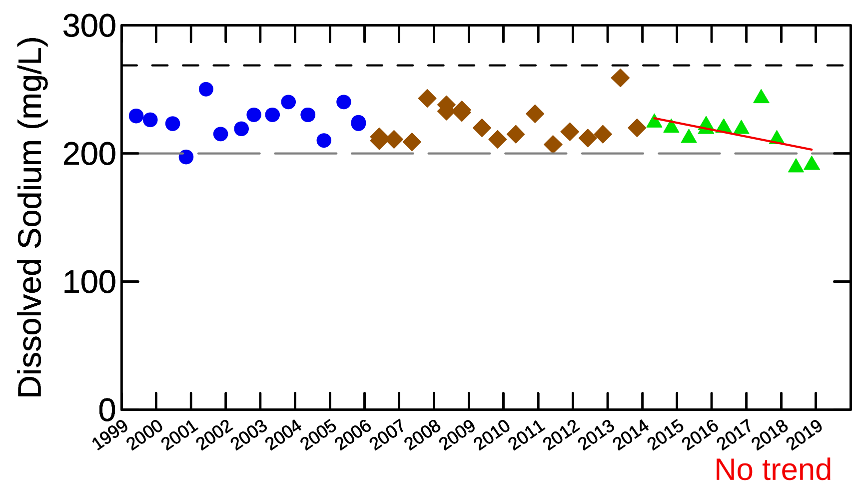
WELL TW41-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









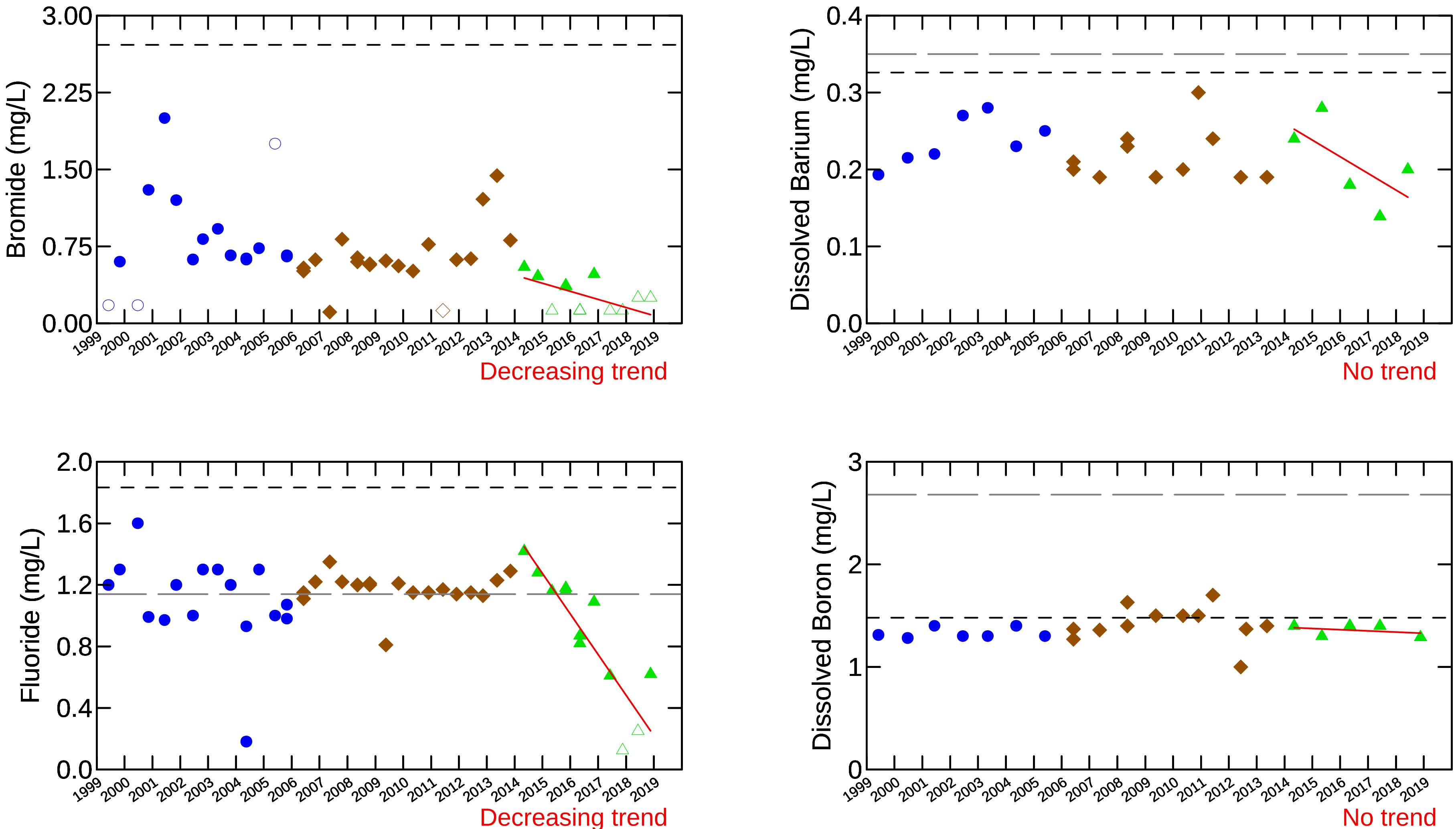
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW43-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

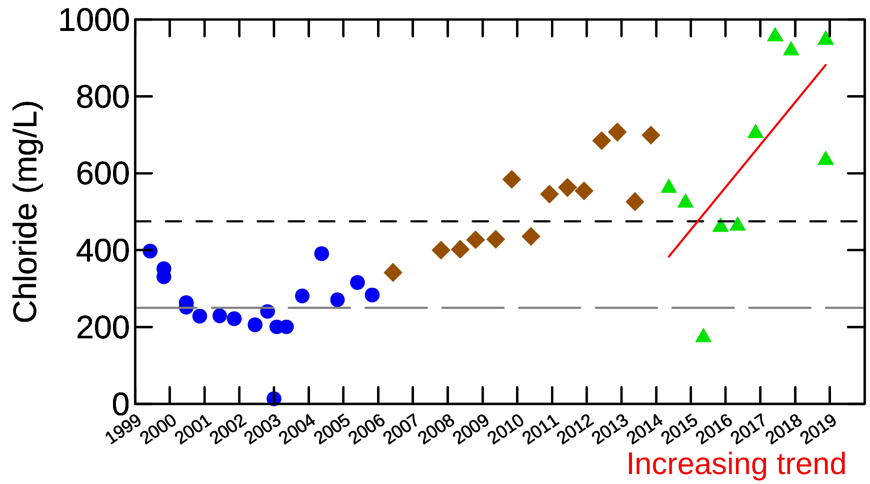
◆ Post-Baseline result ▲ Last 5 years (for trend)

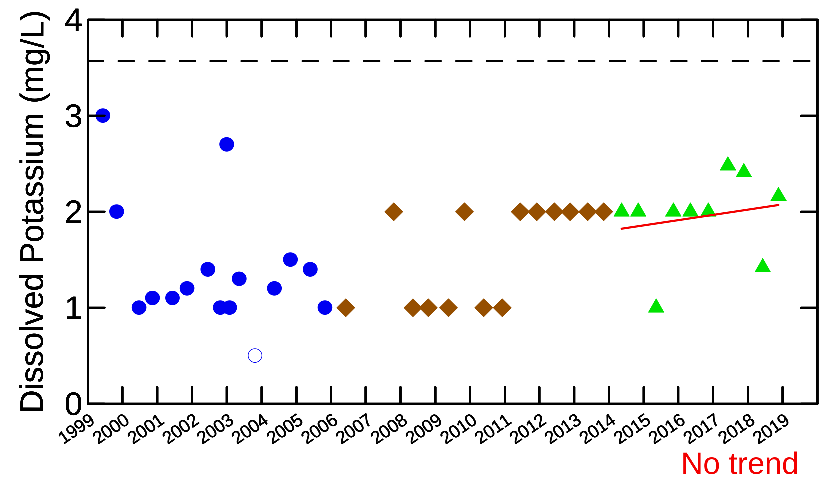
Reasonable Use Criteria (RUC)
Baseline Upper Confidence Limit (UCL)
Linear Regression line

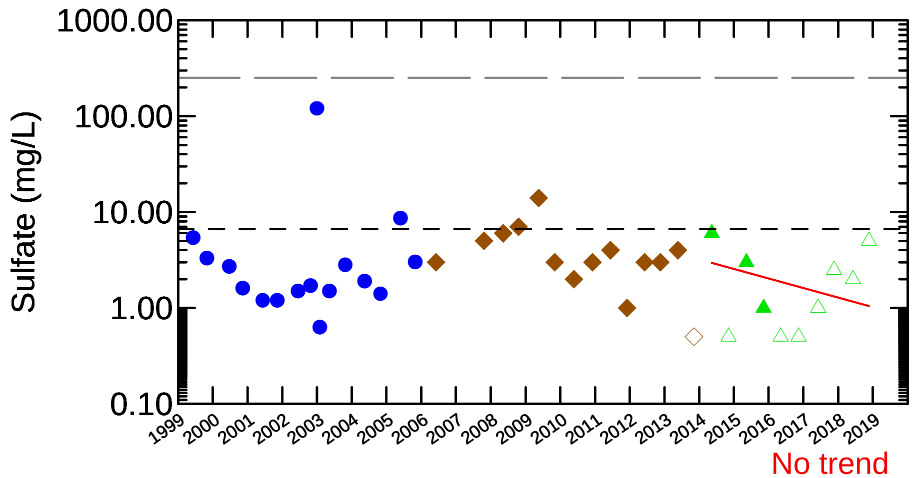
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

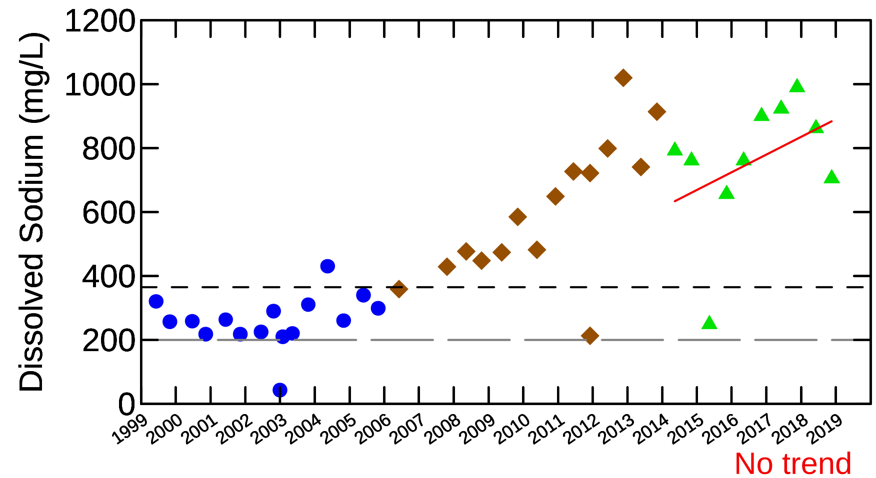
WELL TW43-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









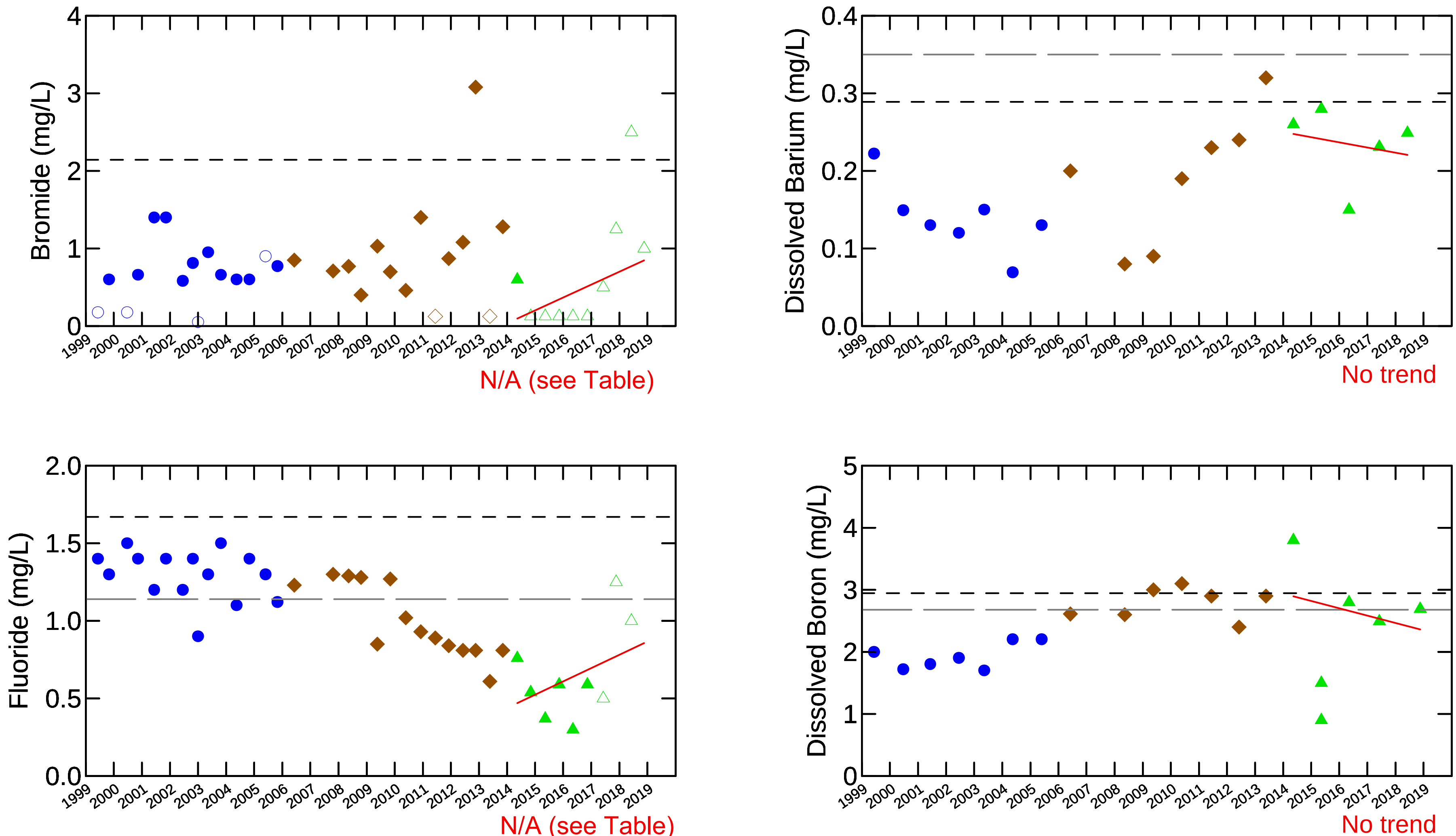
Legend:

- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW45-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

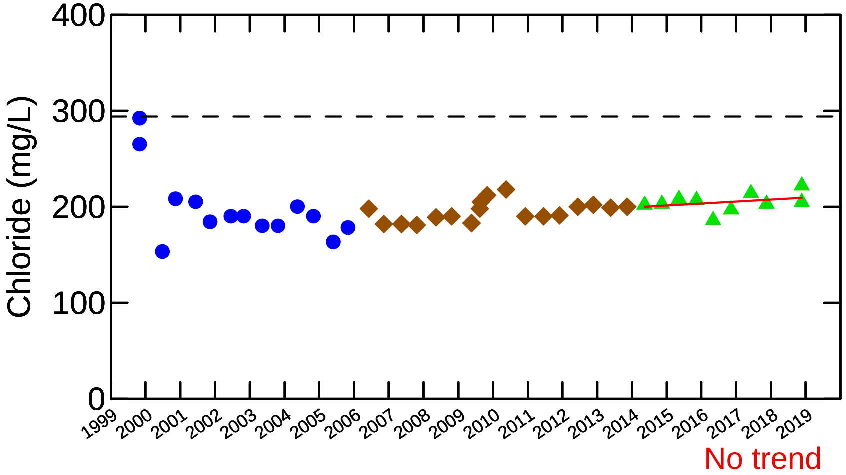
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

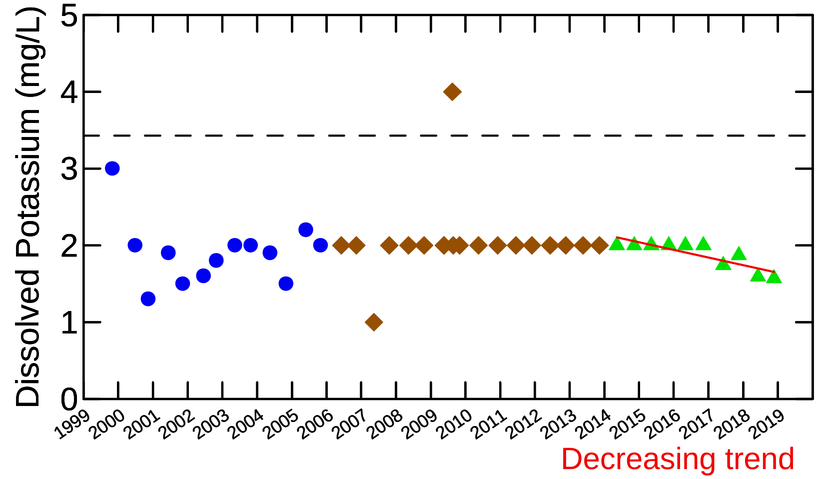
Notes:

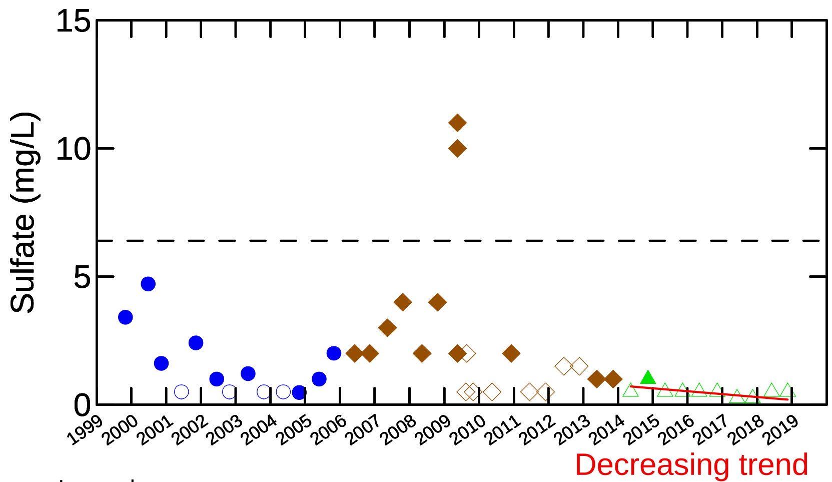
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

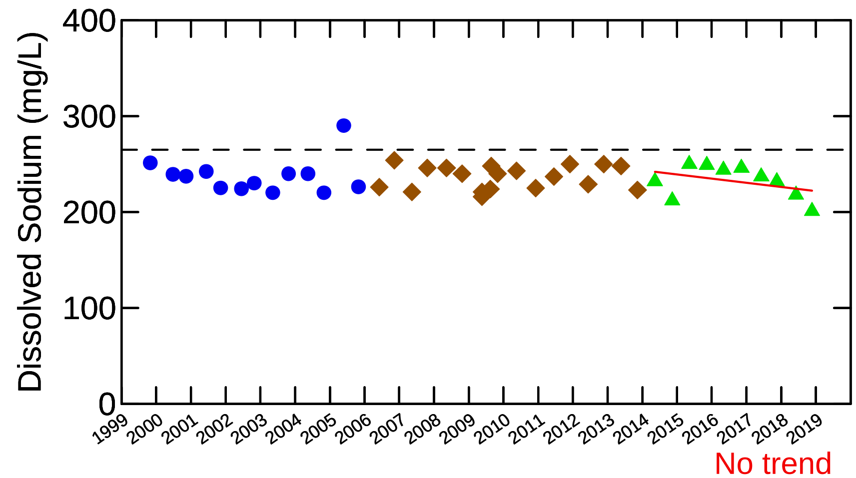
WELL TW45-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

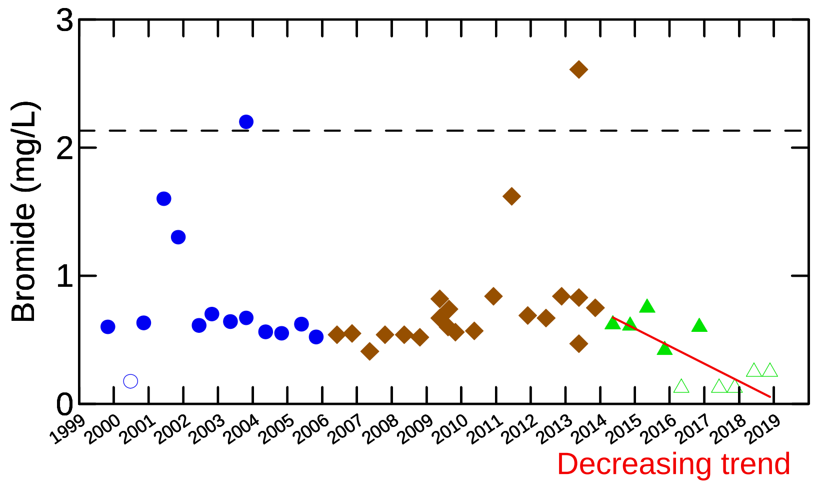
— — Baseline Upper Confidence Limit (UCL)

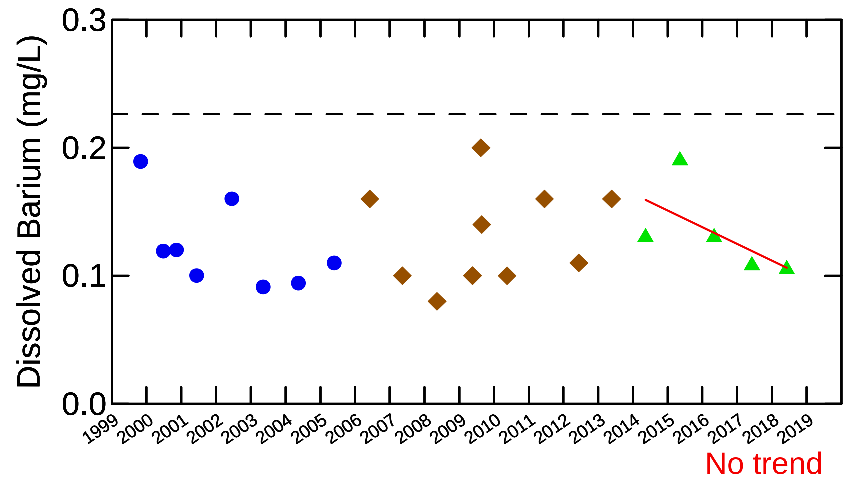
—— Linear Regression line

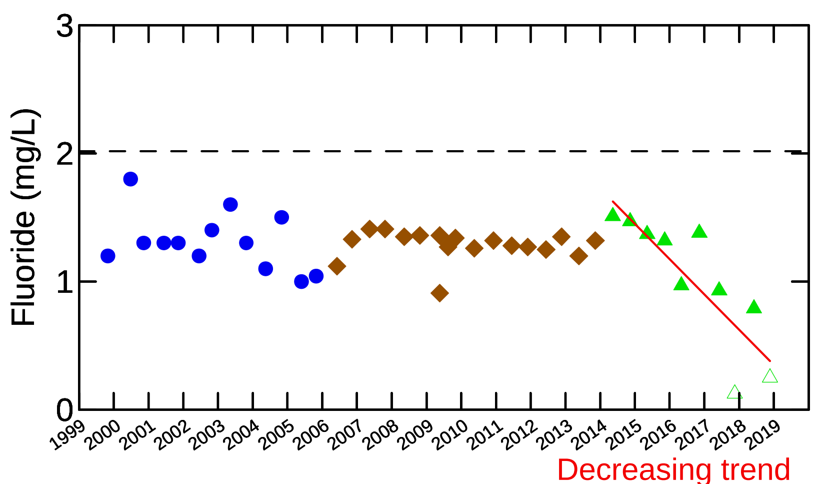
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

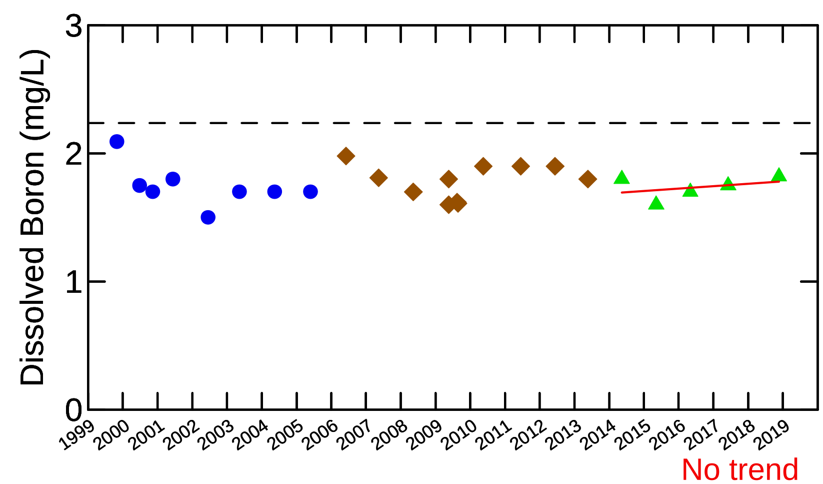
WELL TW46-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

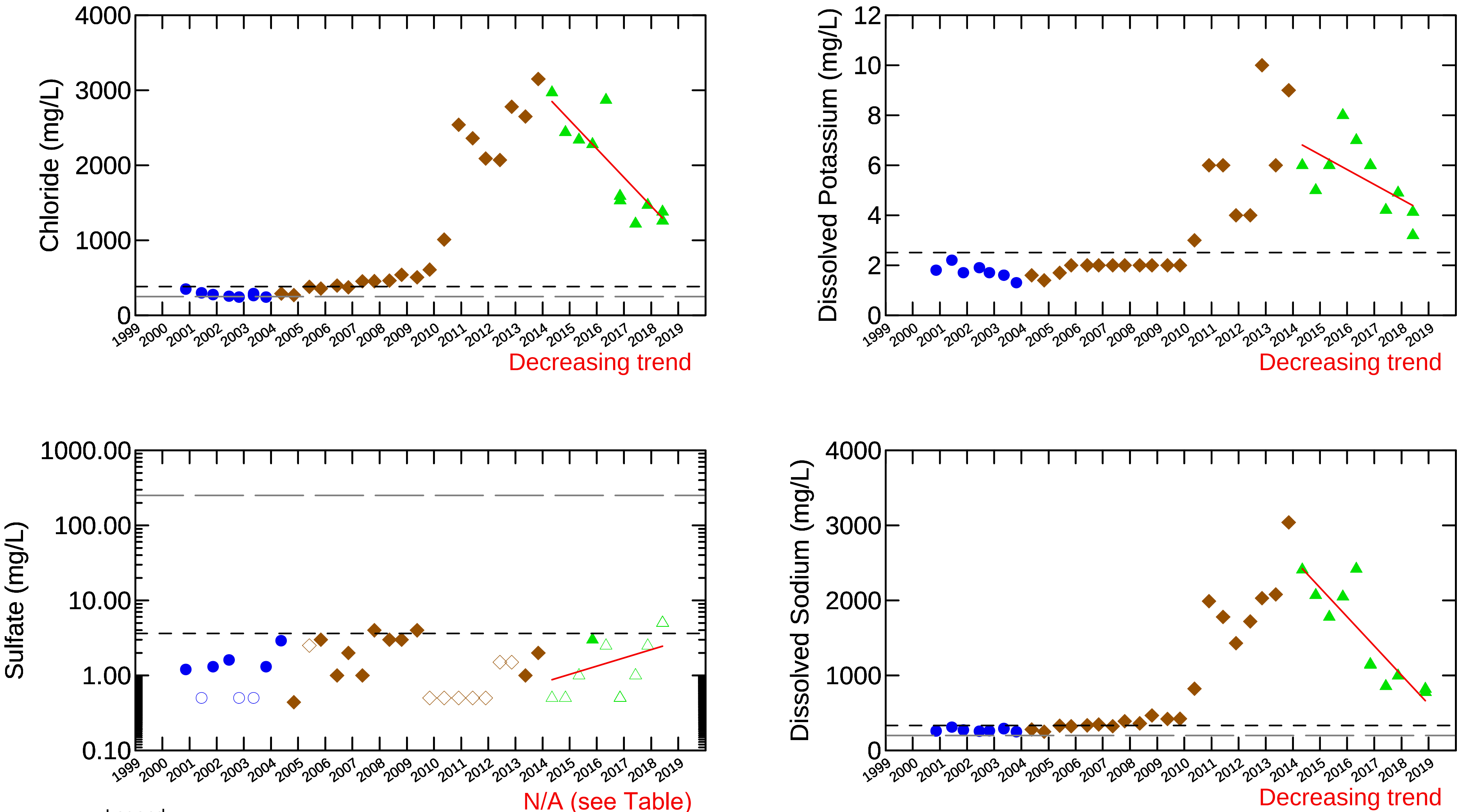
— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW46-99D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

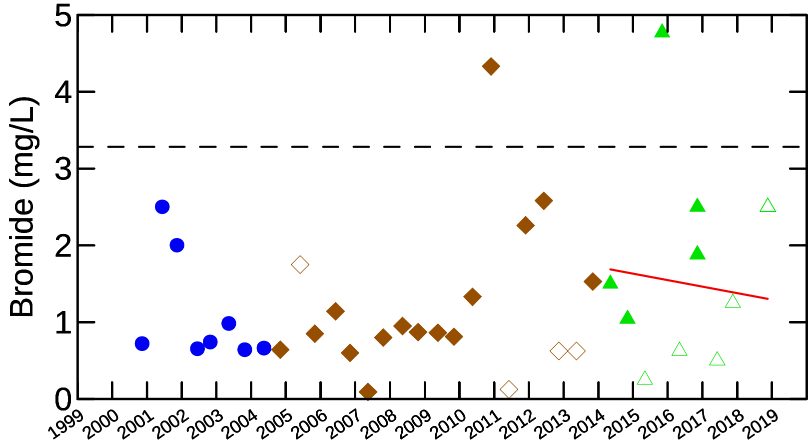
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

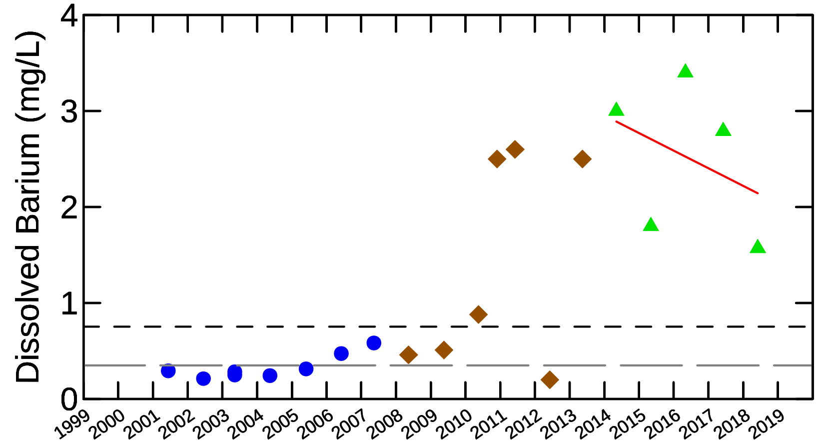
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW47-00D

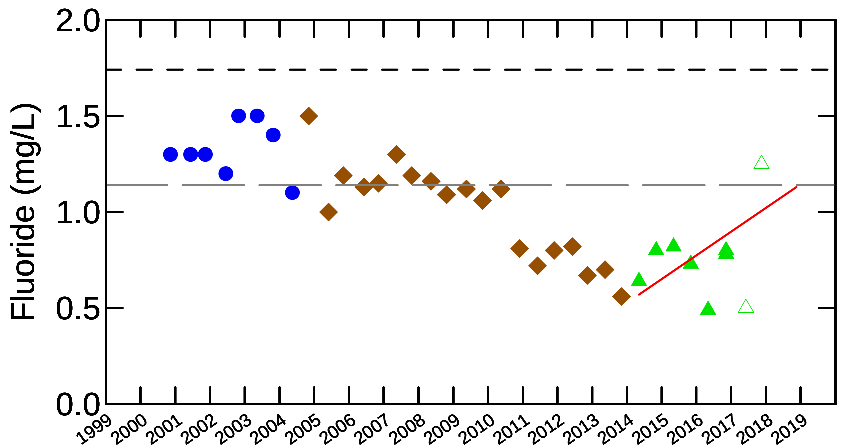
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



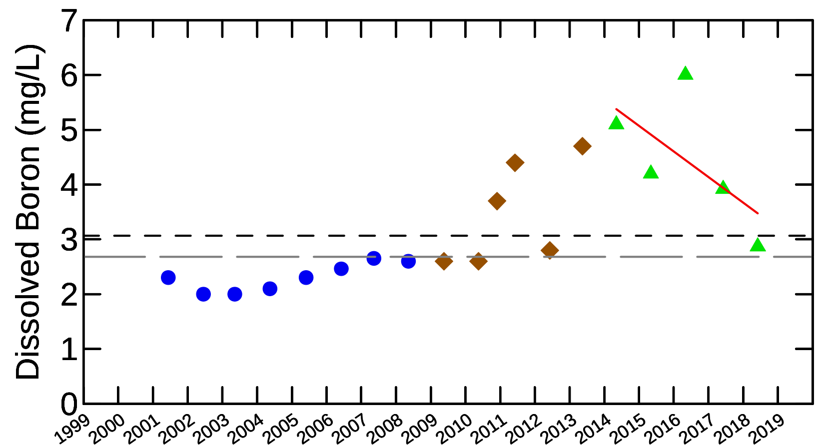
No trend



No trend



N/A (see Table)



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
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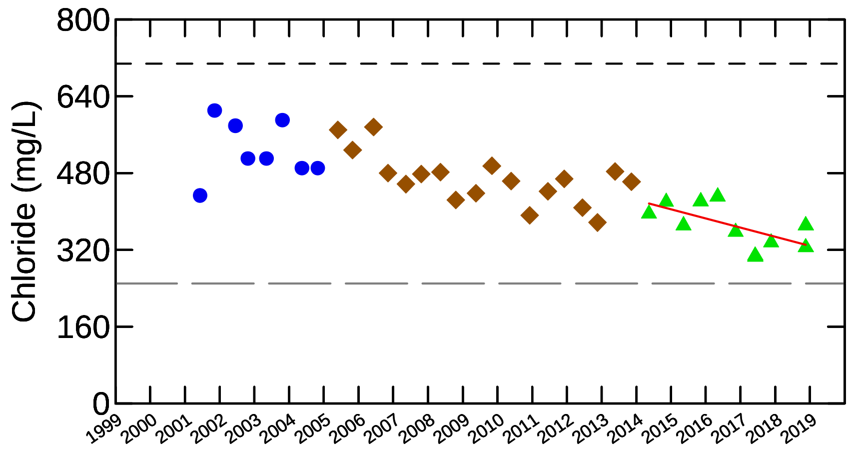
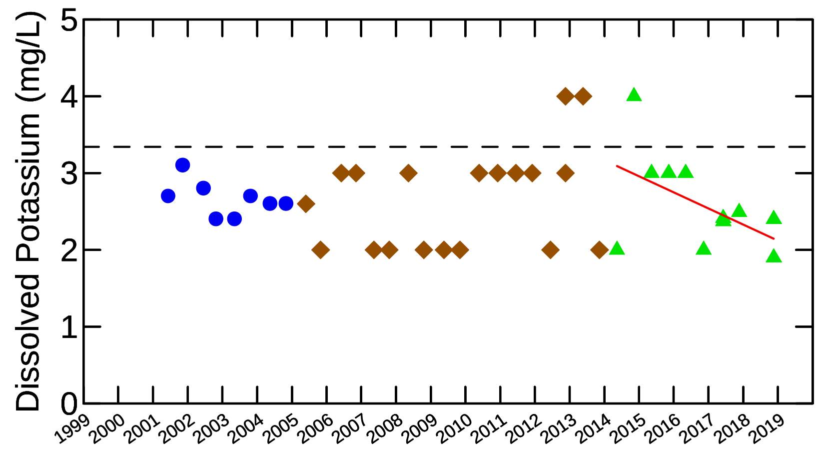
WELL TW47-00D

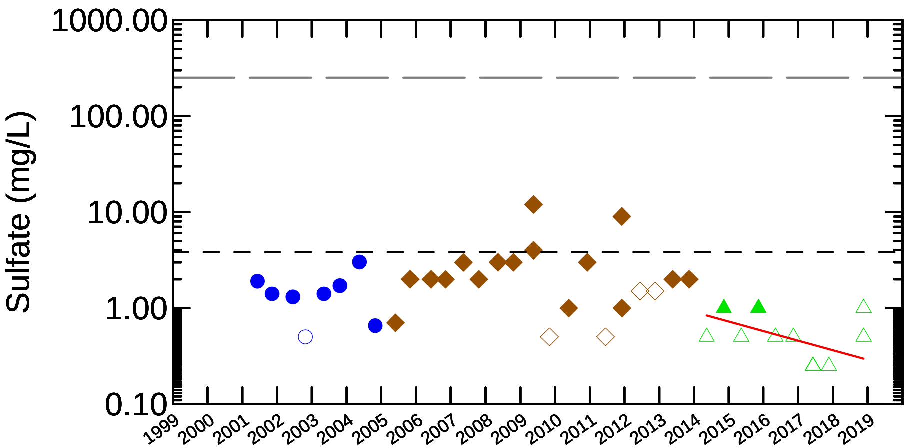
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



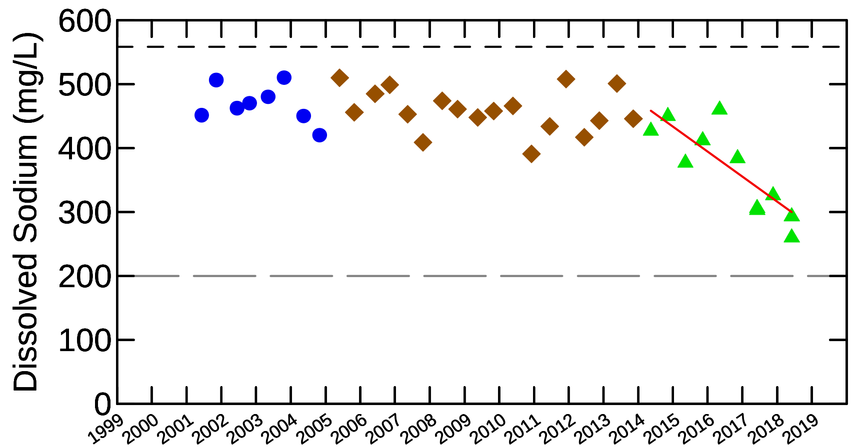
Decreasing trend



No trend



No trend



Decreasing trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

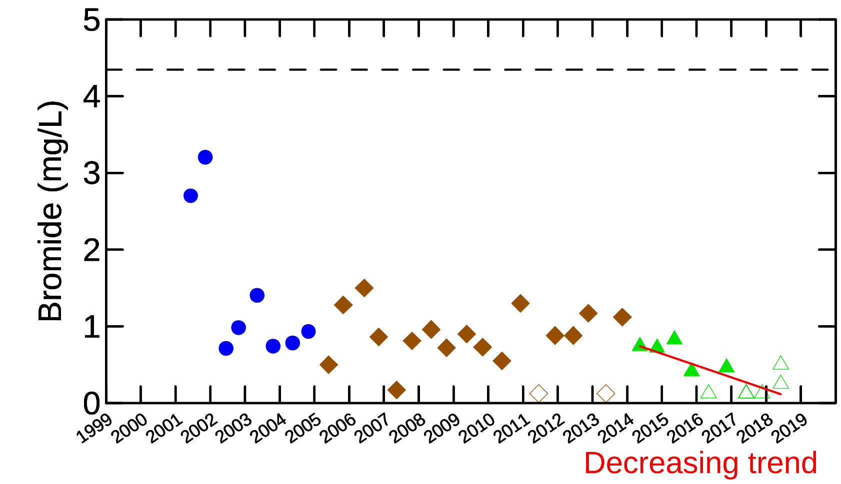
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

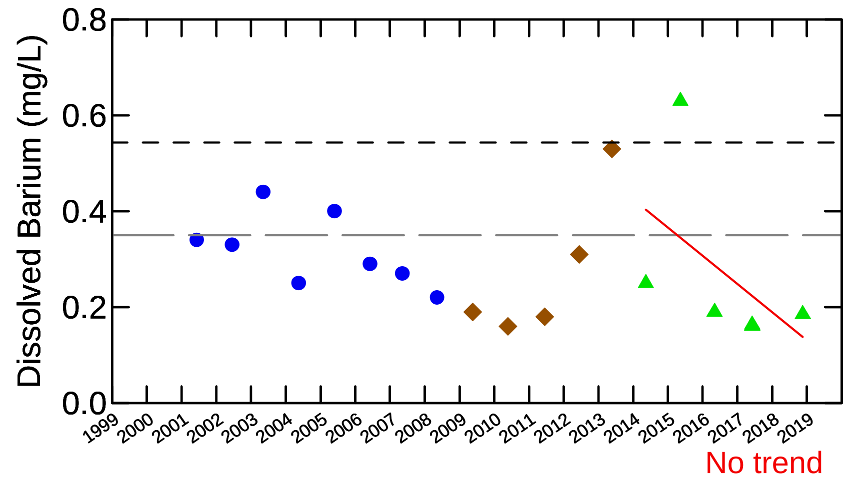
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

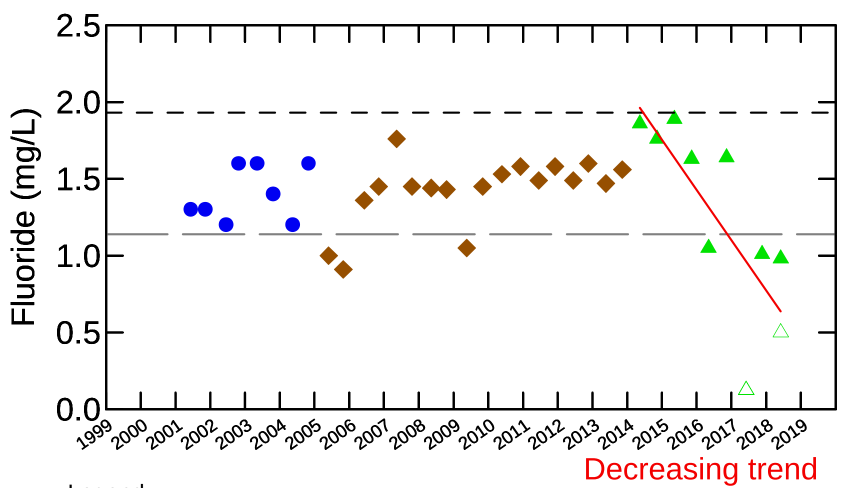
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

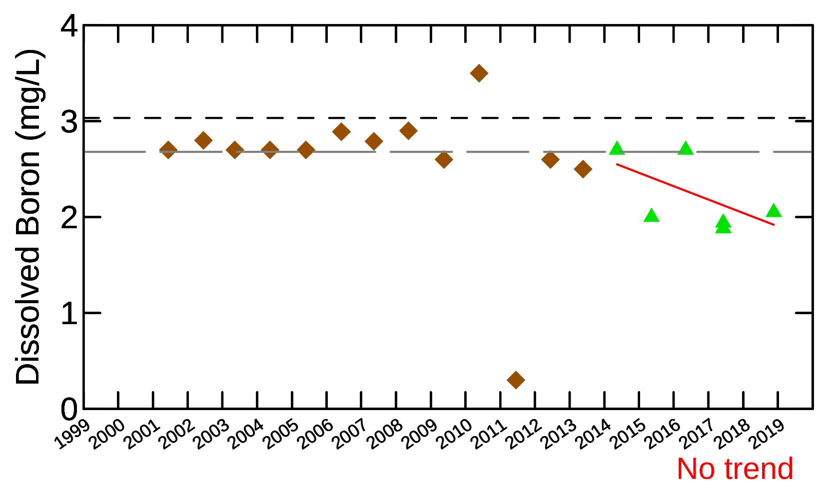
WELL TW48-00D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









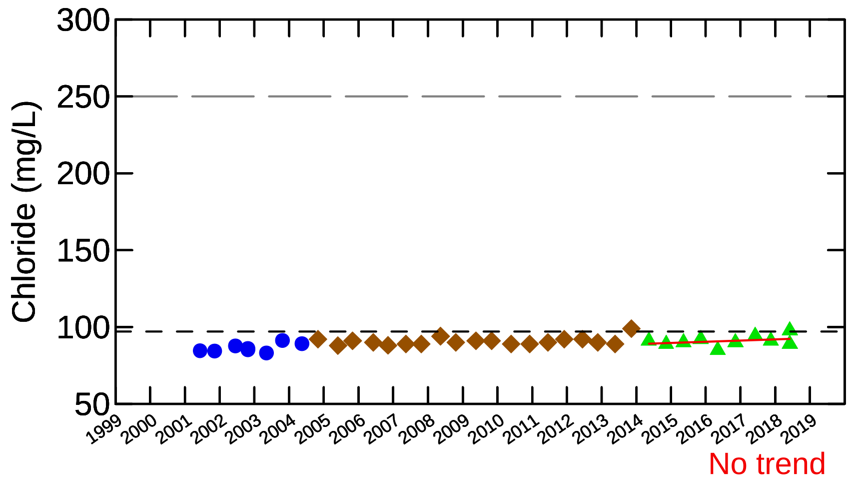
Legend:

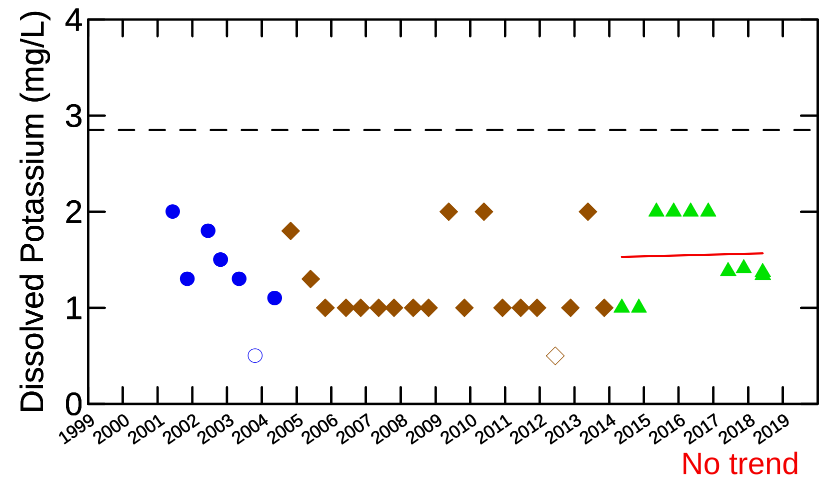
- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

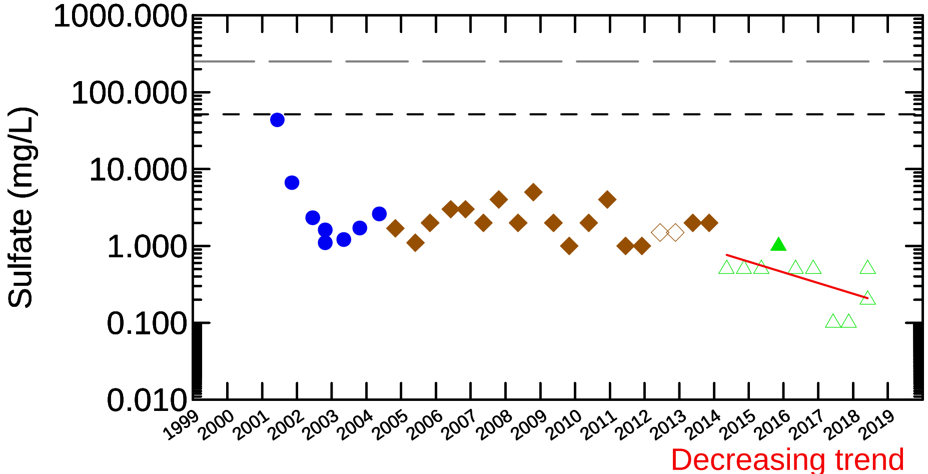
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

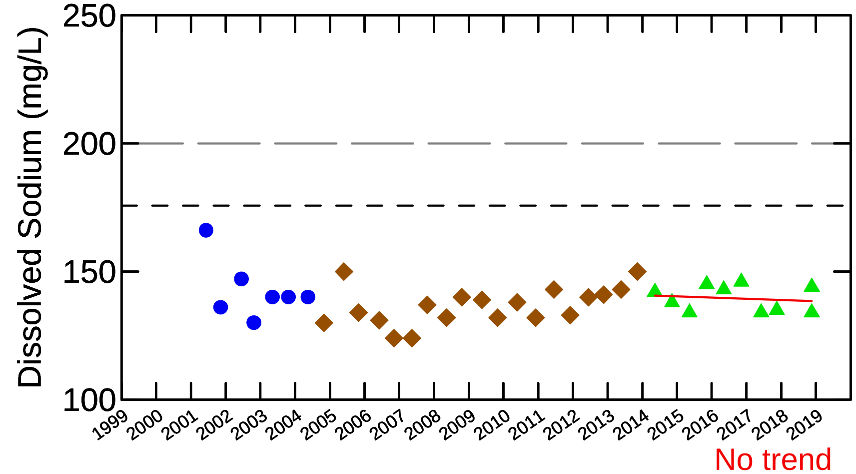
WELL TW48-00D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

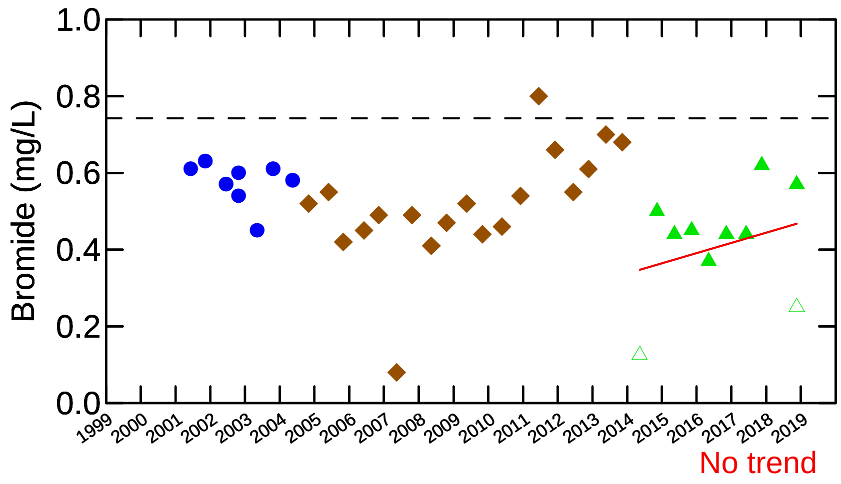
◆ Post-Baseline result ▲ Last 5 years (for trend)

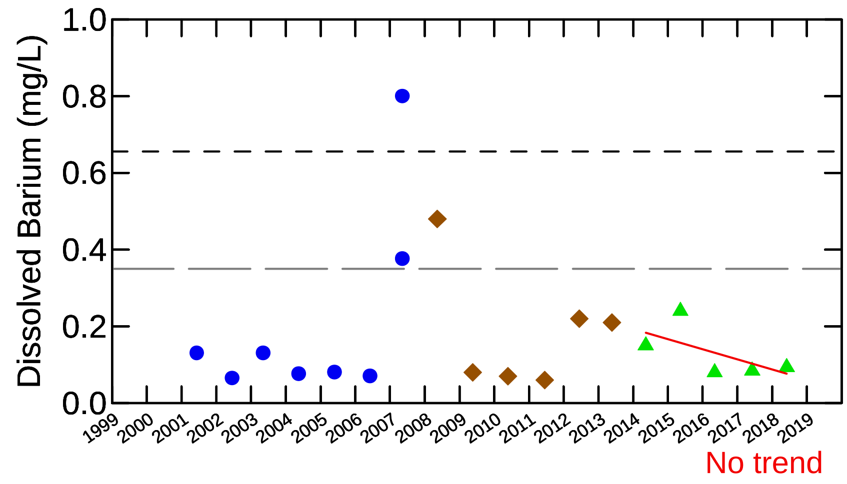
Reasonable Use Criteria (RUC)
Baseline Upper Confidence Limit (UCL)
Linear Regression line

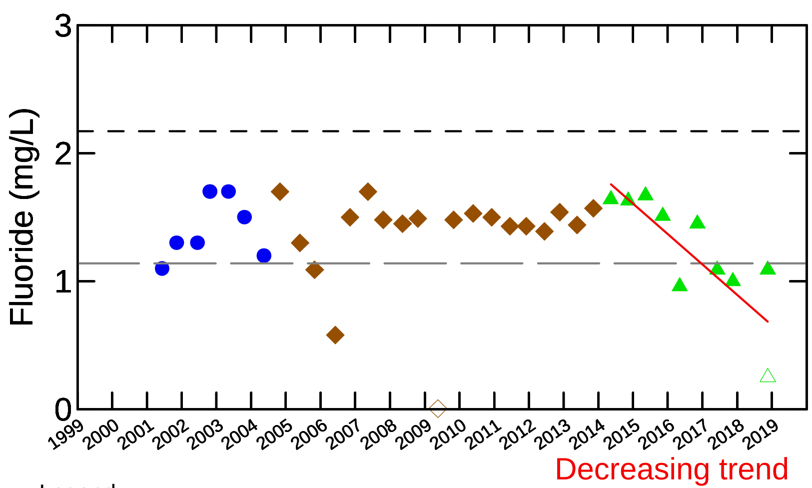
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

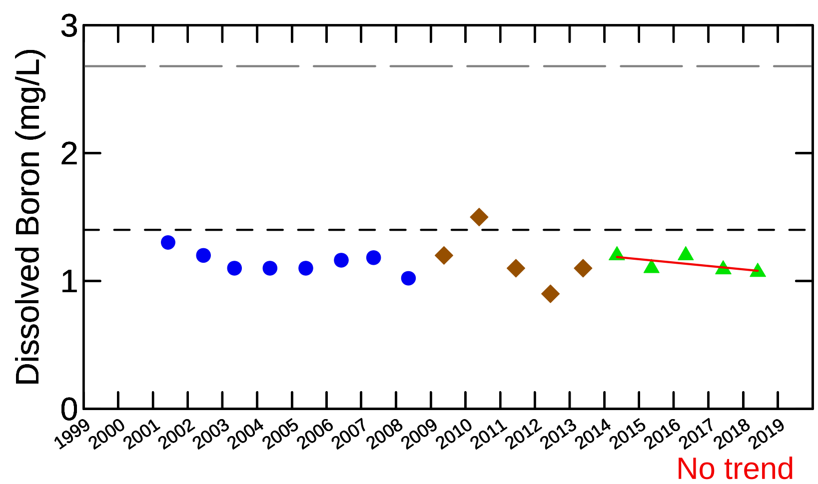
WELL TW49-00D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

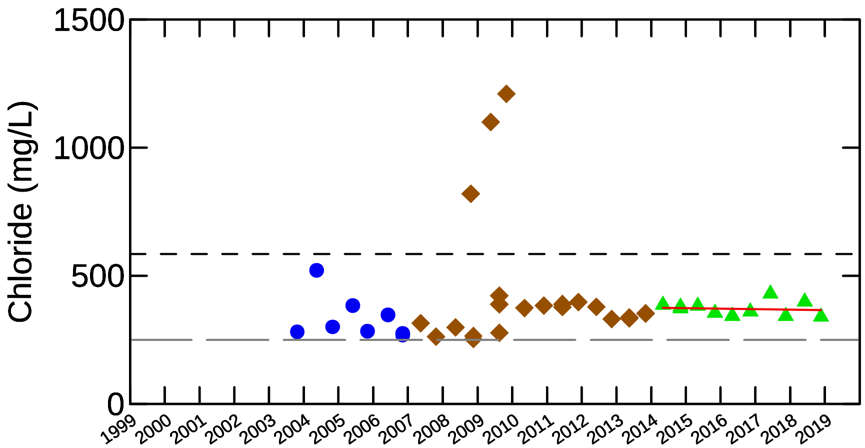
◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)
Baseline Upper Confidence Limit (UCL)
Linear Regression line

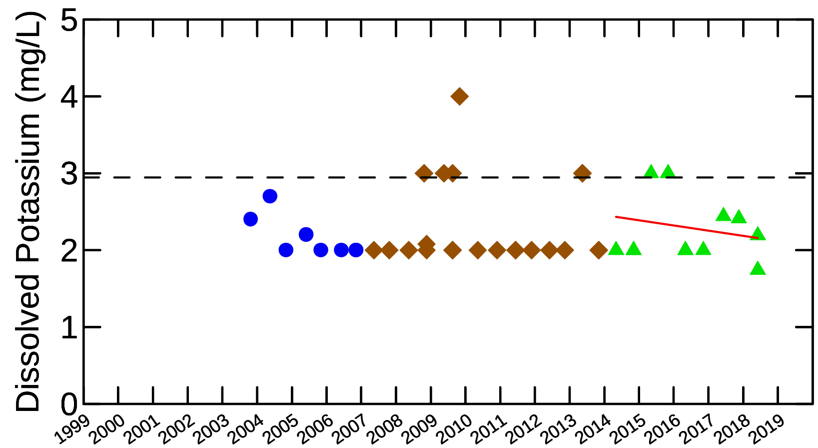
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW49-00D

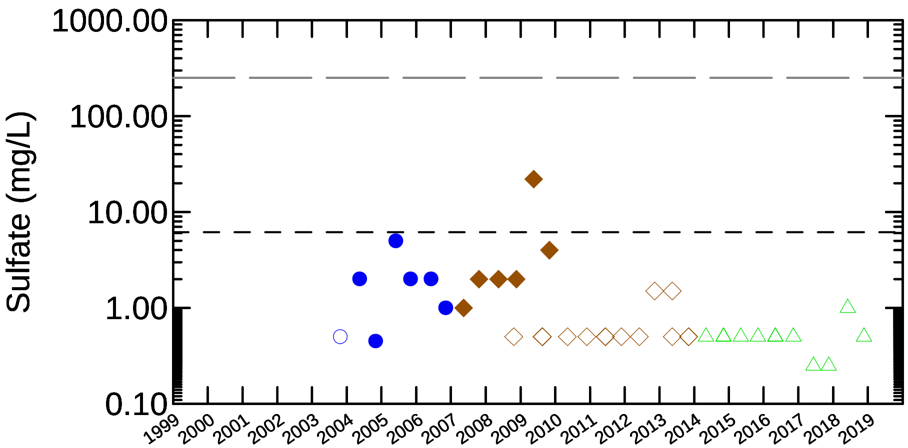
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



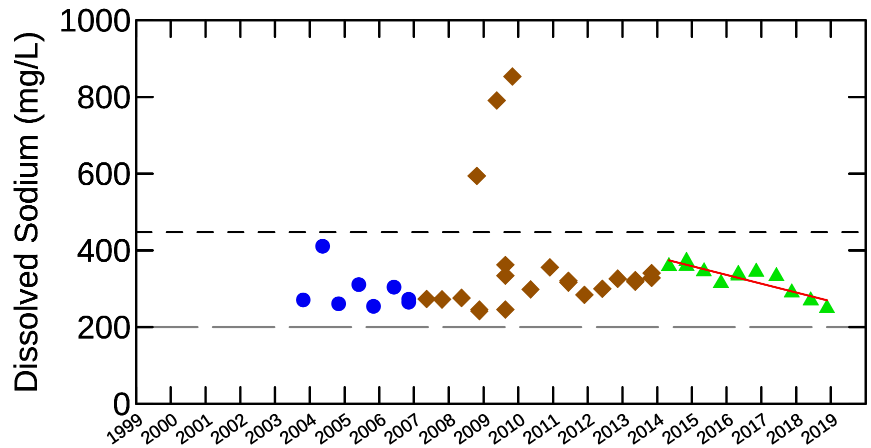
No trend



No trend



No detected results



Decreasing trend

Legend:

- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- —— Reasonable Use Criteria (RUC)
- – – Baseline Upper Confidence Limit (UCL)
- —— Linear Regression line

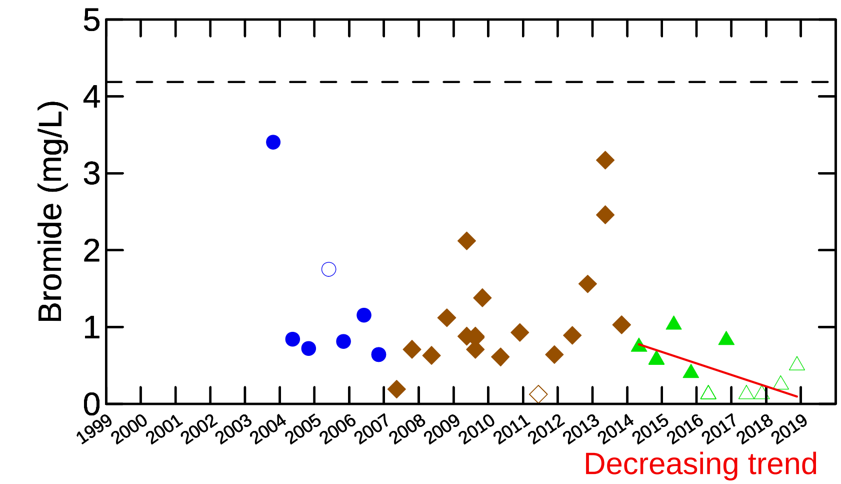
Notes:

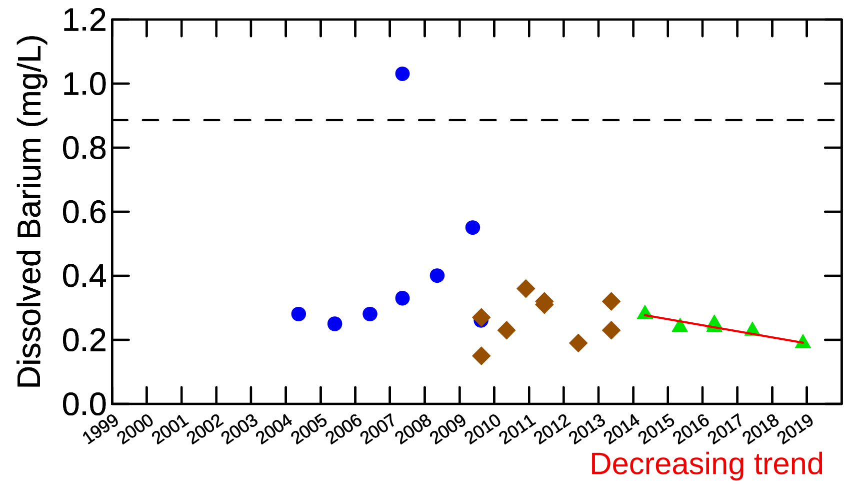
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

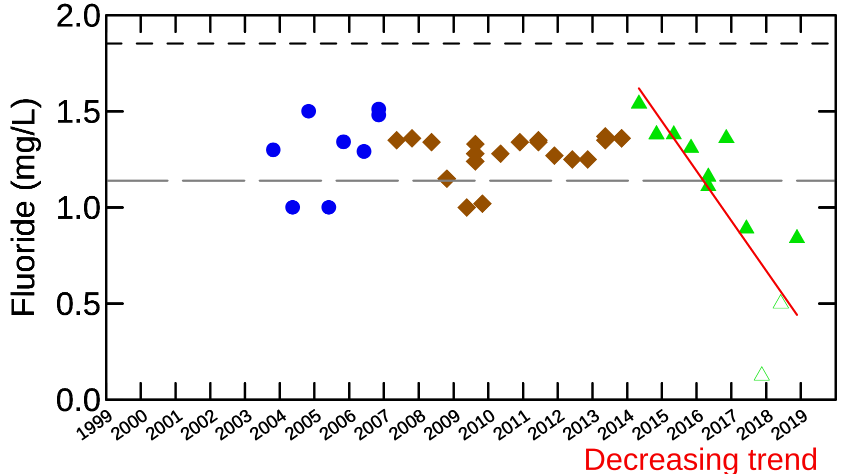
GHD

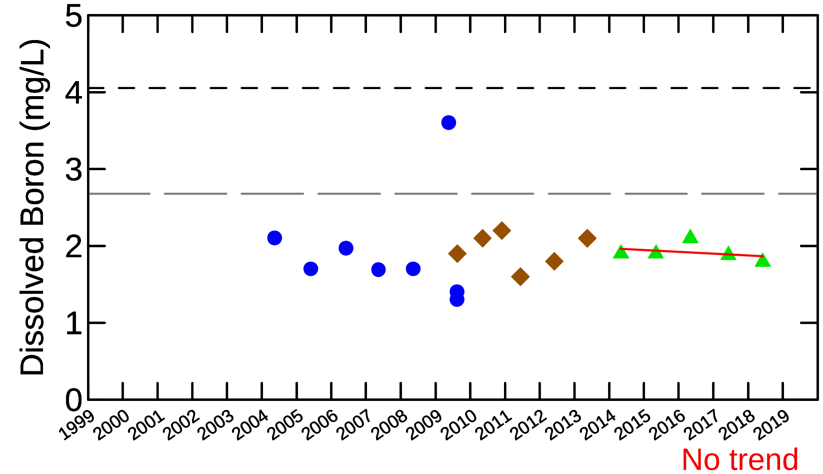
WELL TW53-03D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

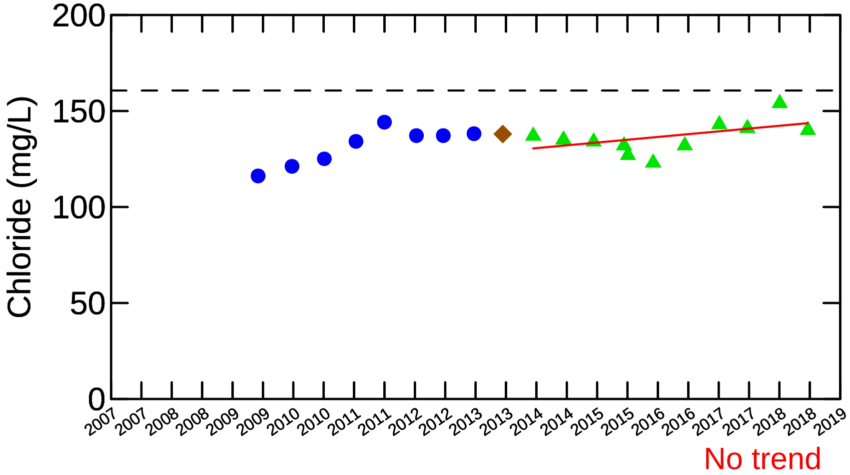
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

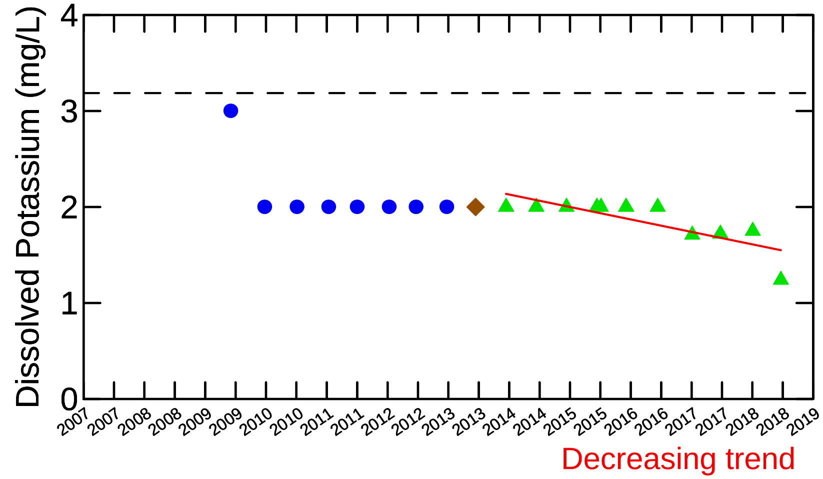
Notes:

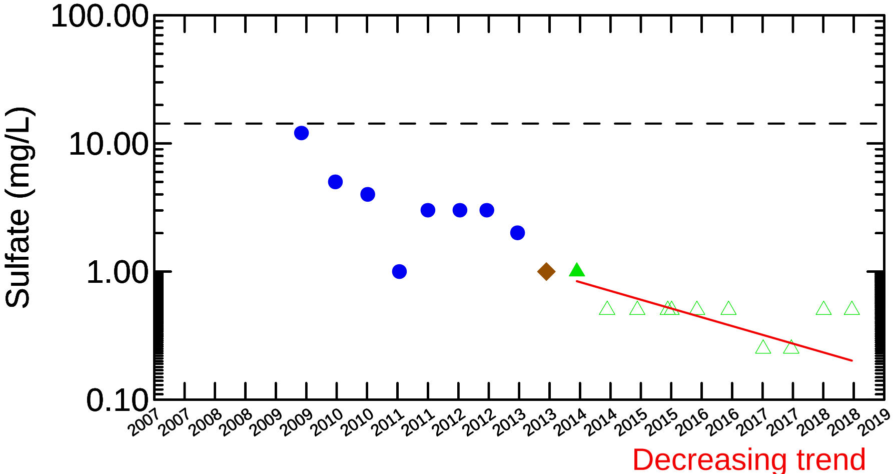
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

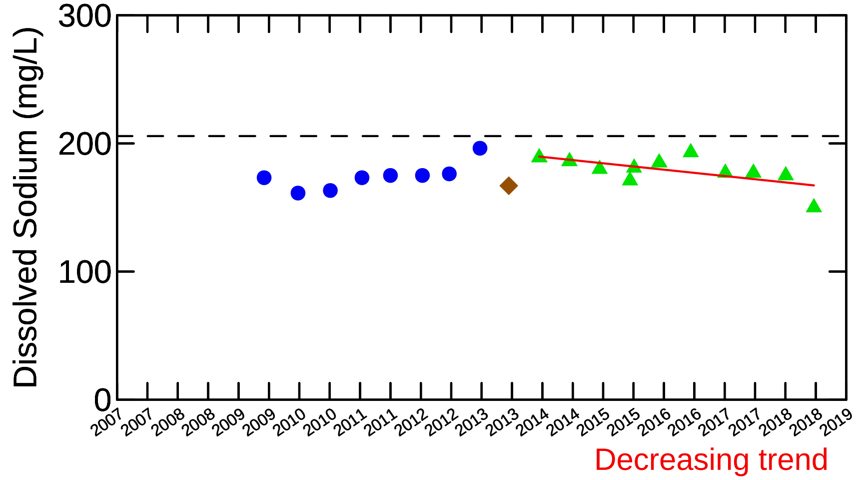
WELL TW53-03D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

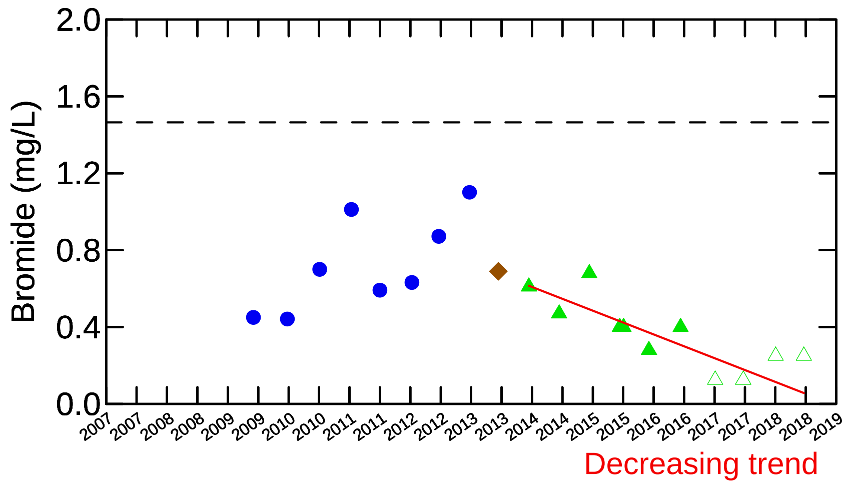
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

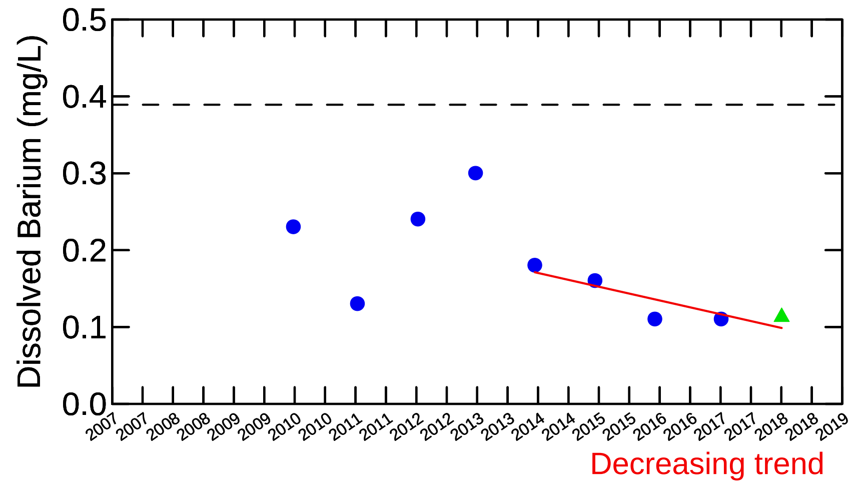
Notes:

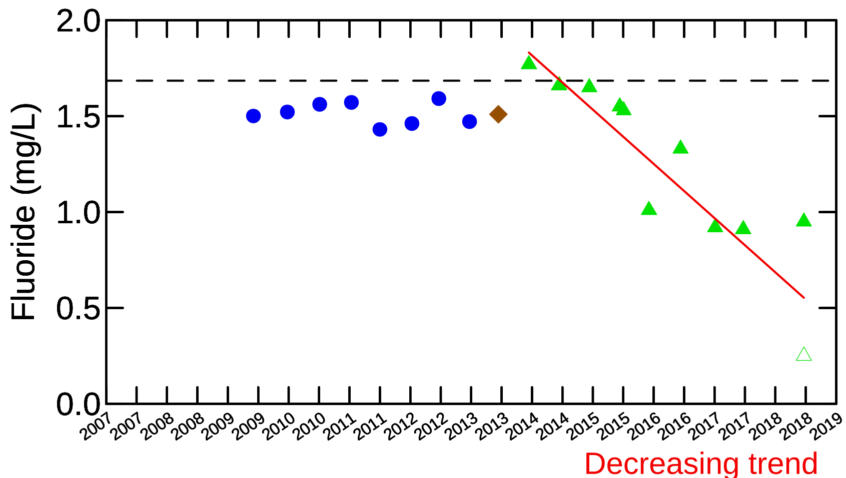
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

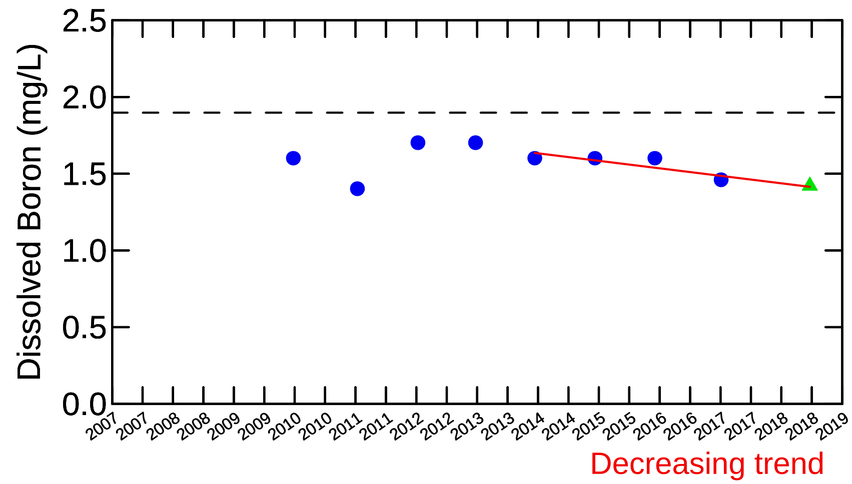
WELL TW54-09D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

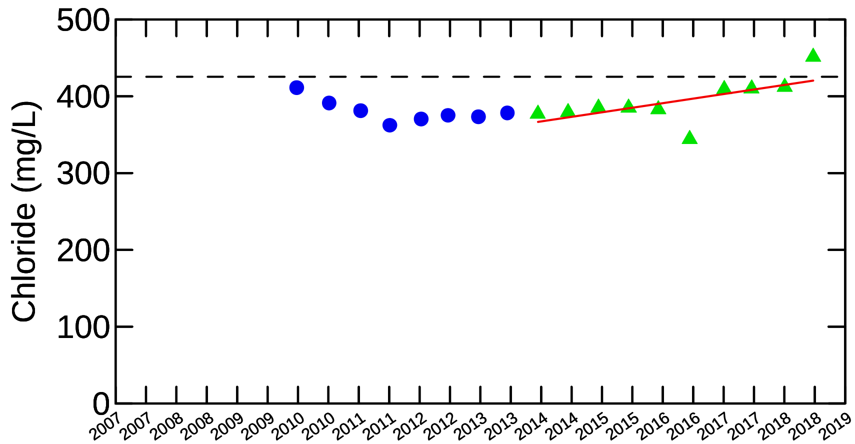
—— Linear Regression line

Notes:

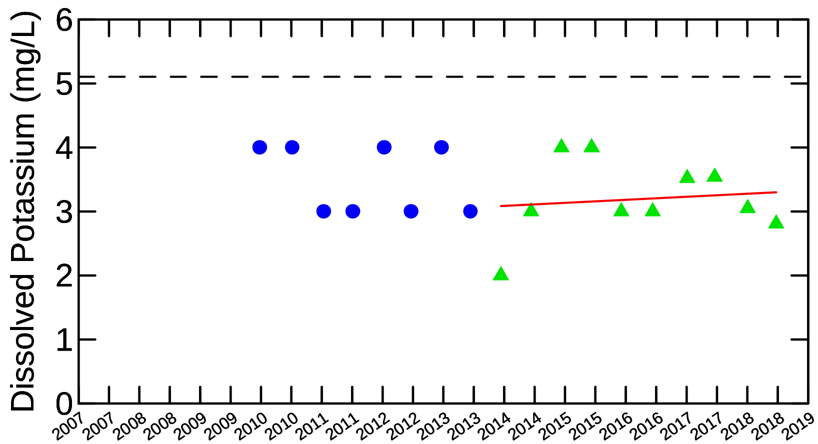
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW54-09D

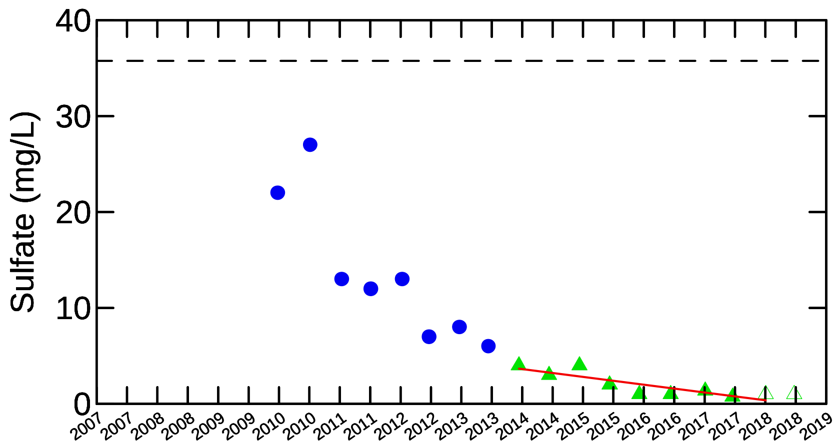
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



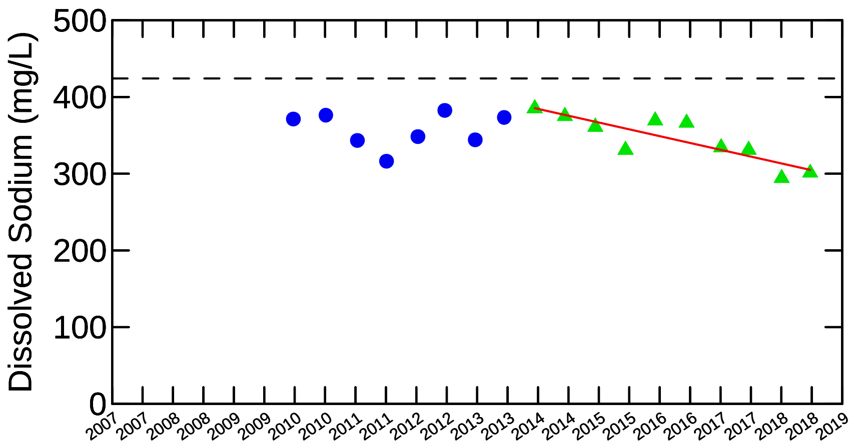
Increasing trend



No trend



Decreasing trend



Decreasing trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

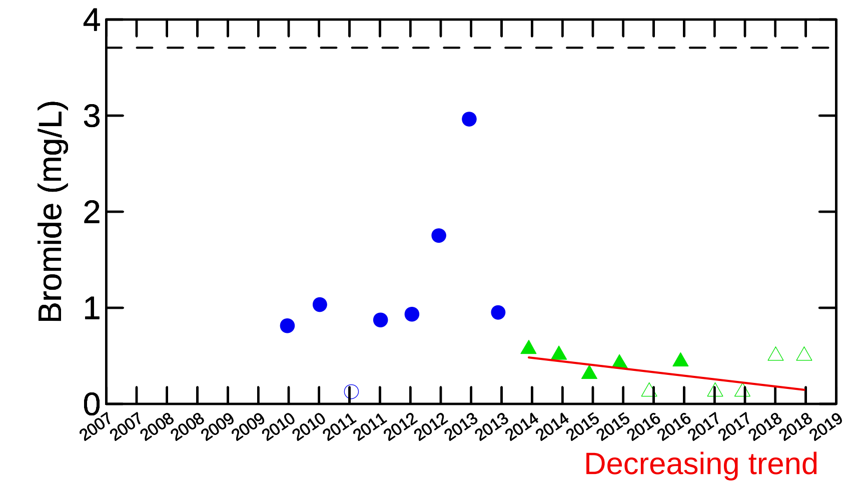
– – Baseline Upper Confidence Limit (UCL)

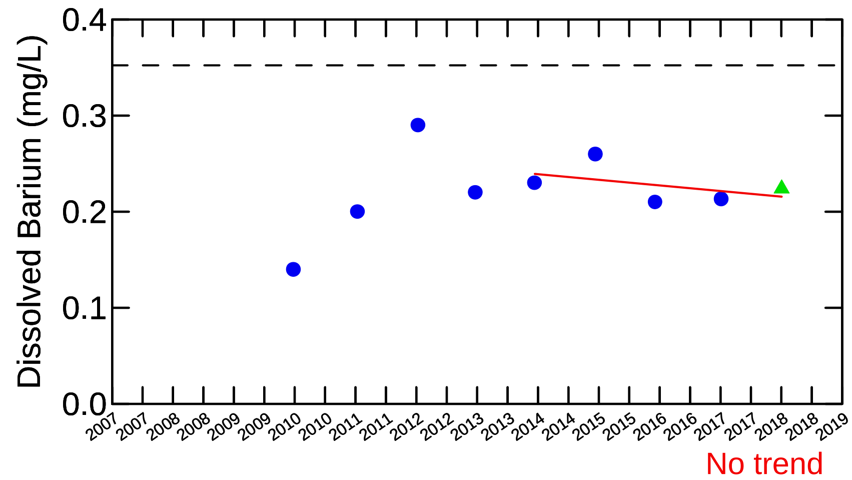
— Linear Regression line

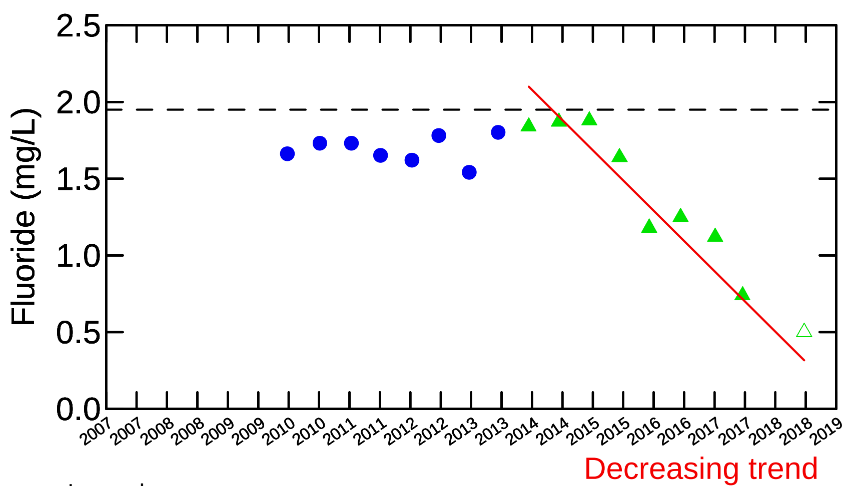
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

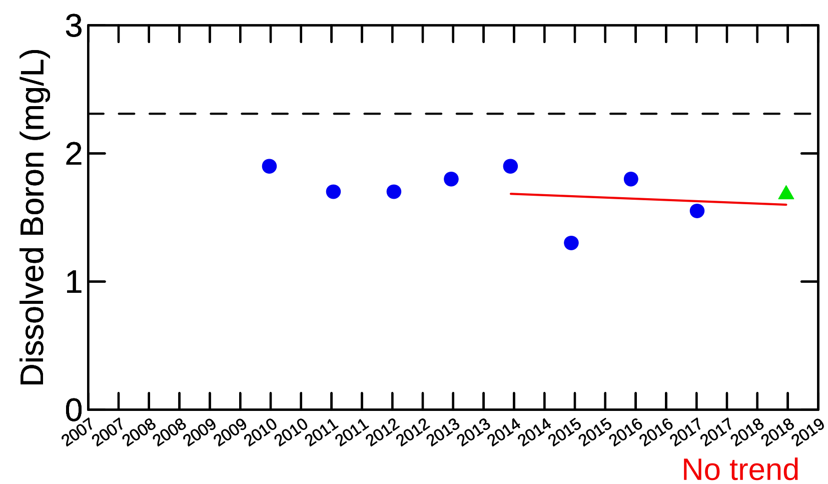
WELL TW55-09D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
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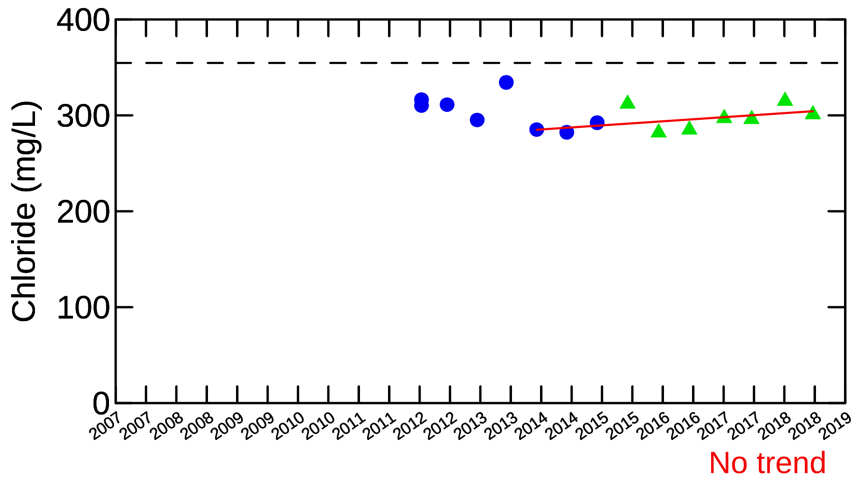
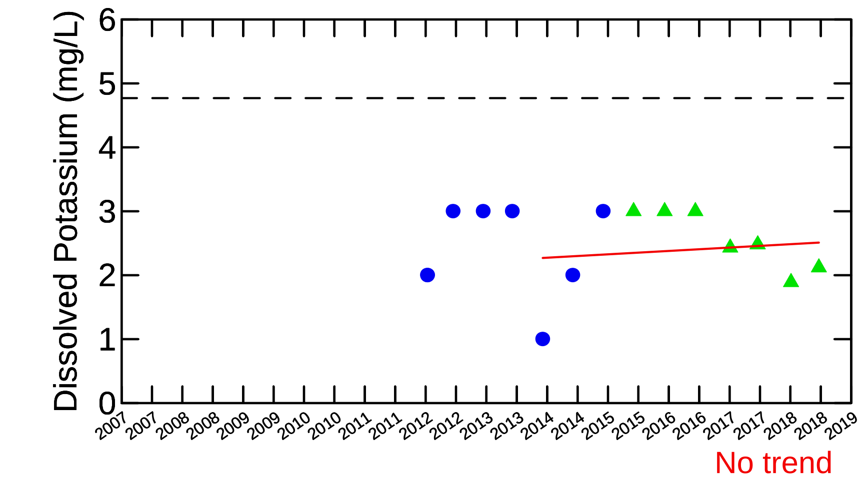
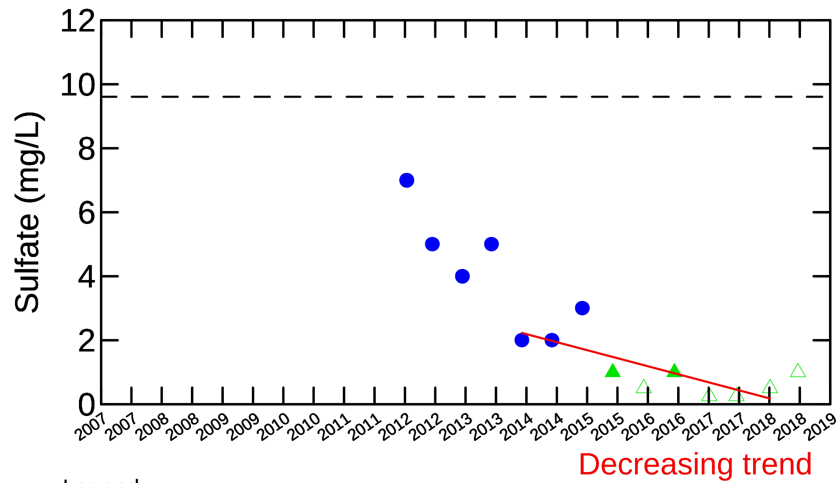
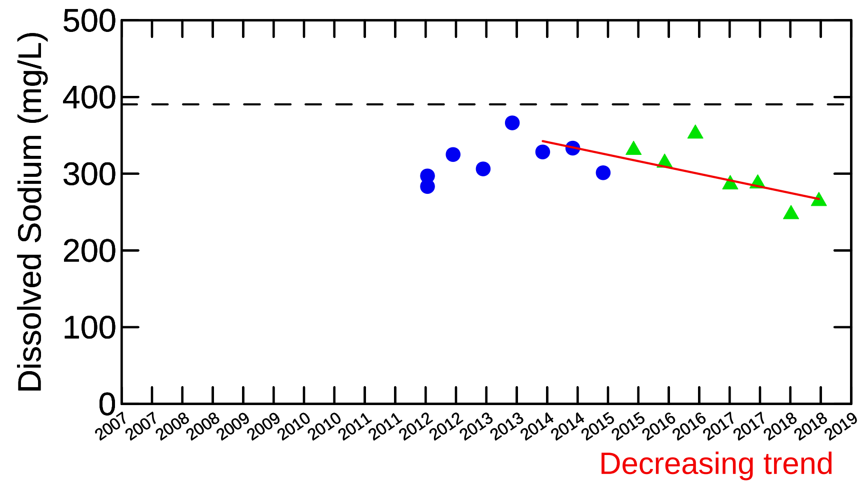
WELL TW55-09D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

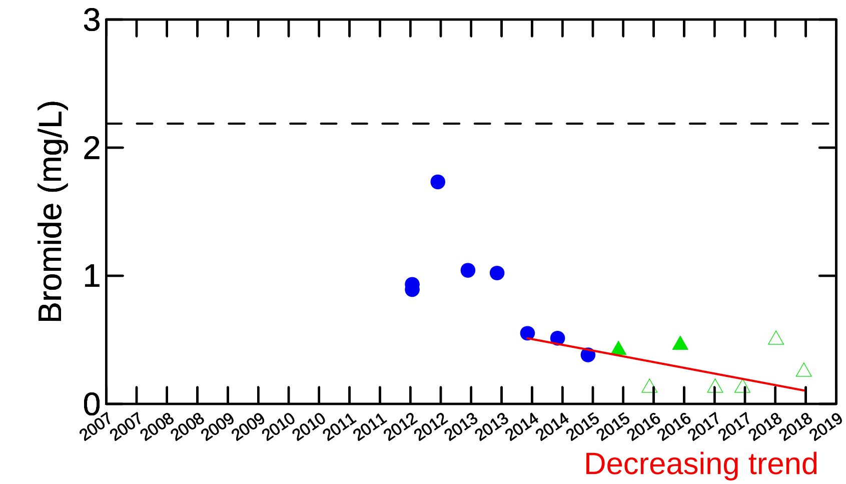
-- -- Baseline Upper Confidence Limit (UCL)

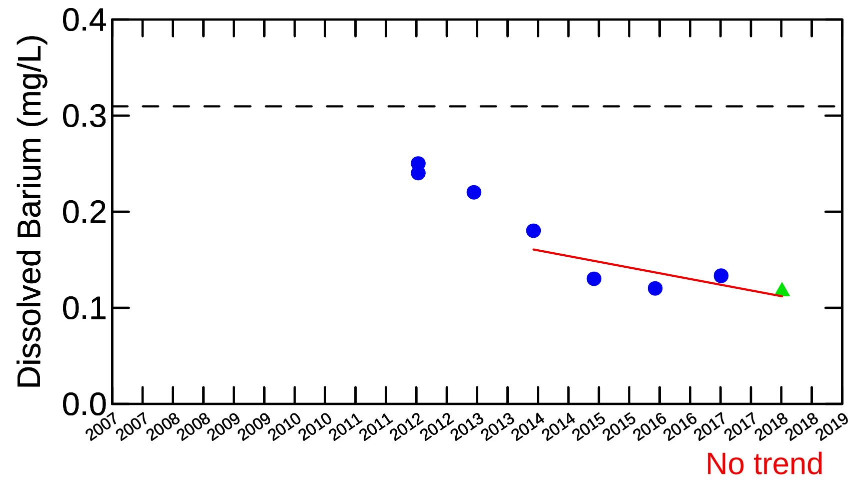
—— Linear Regression line

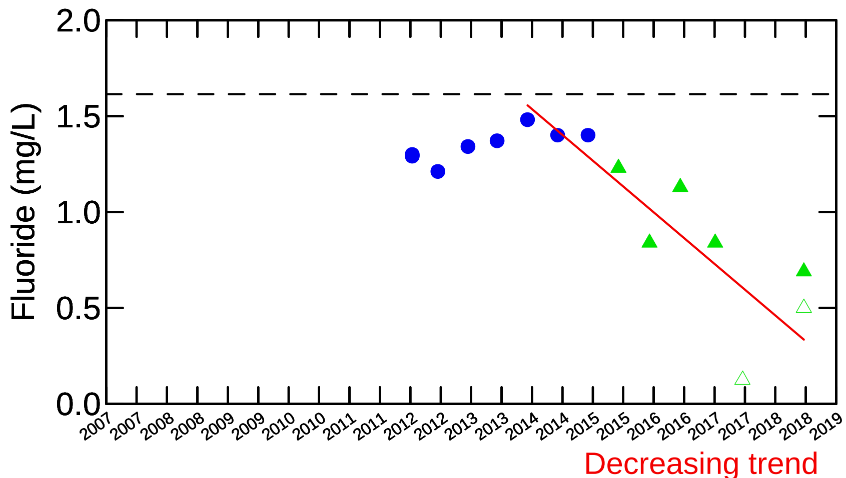
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

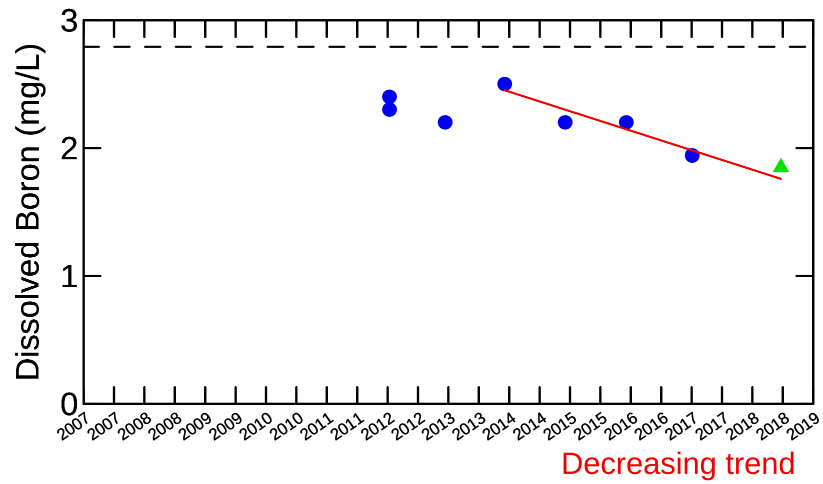
WELL TW56-11D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

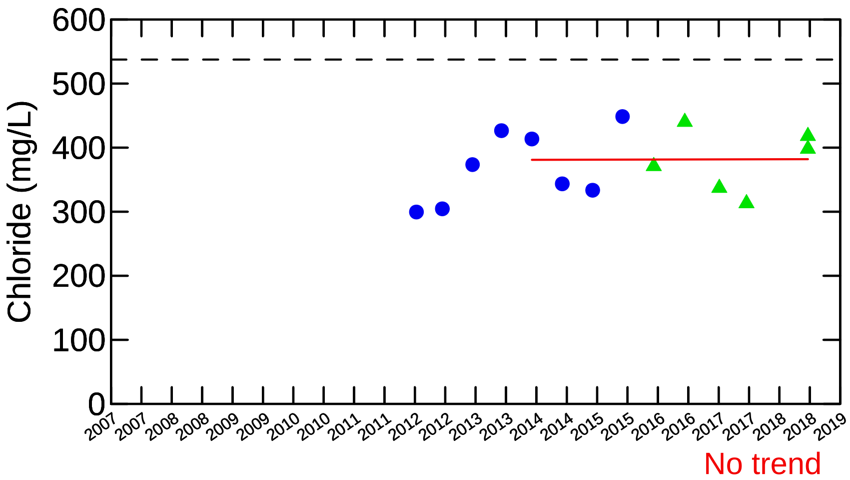
— Linear Regression line

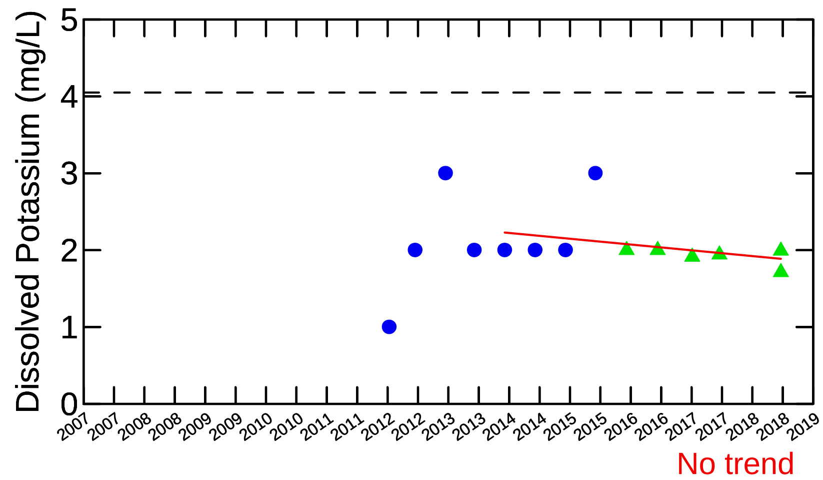
Notes:

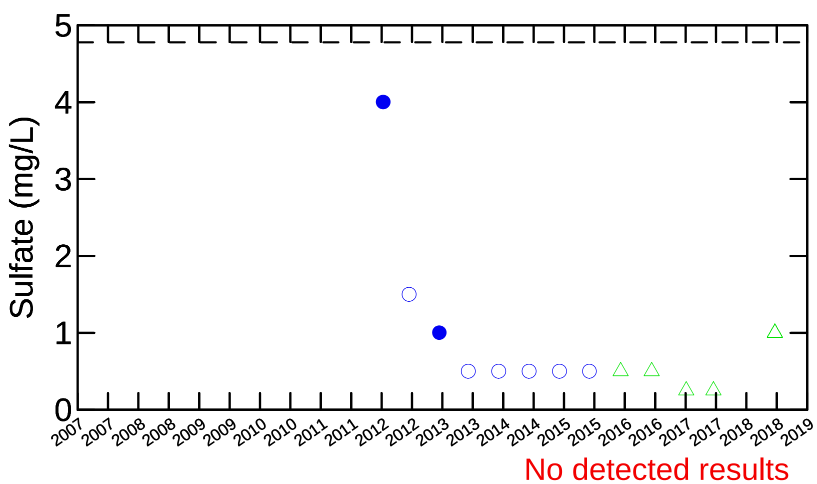
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

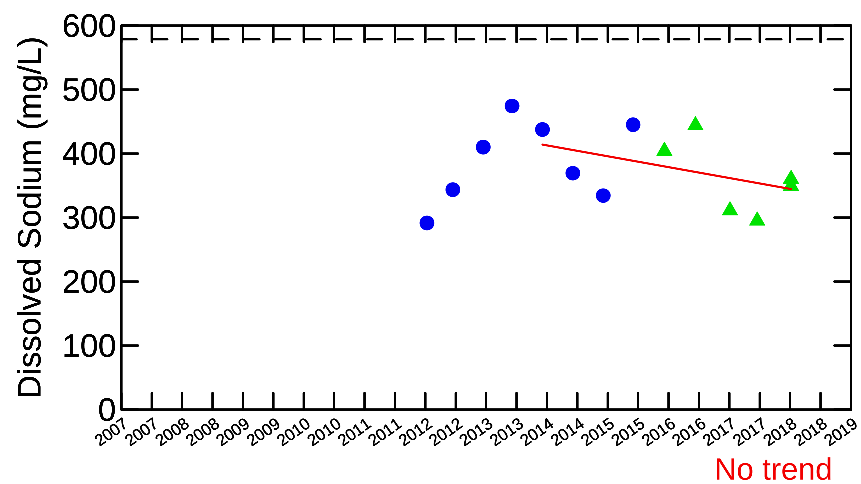
WELL TW56-11D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

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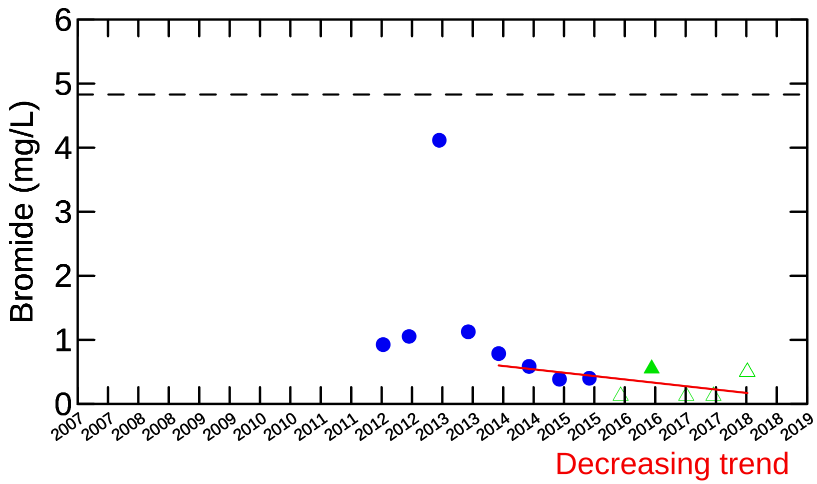
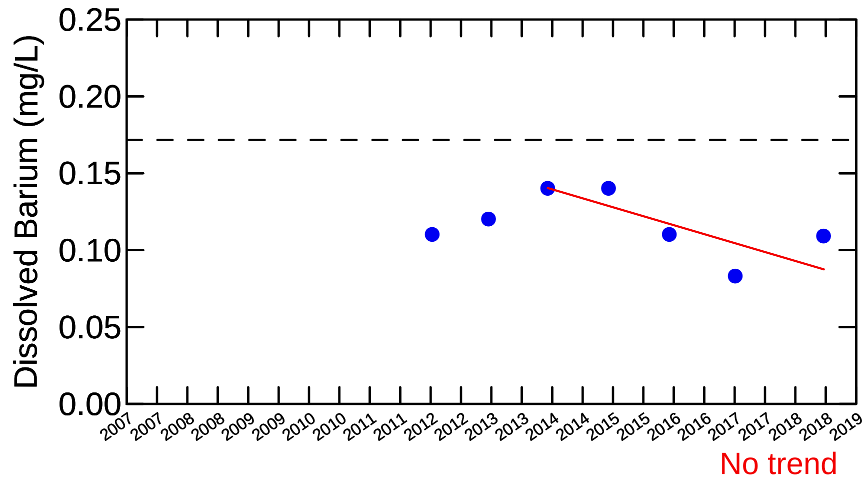
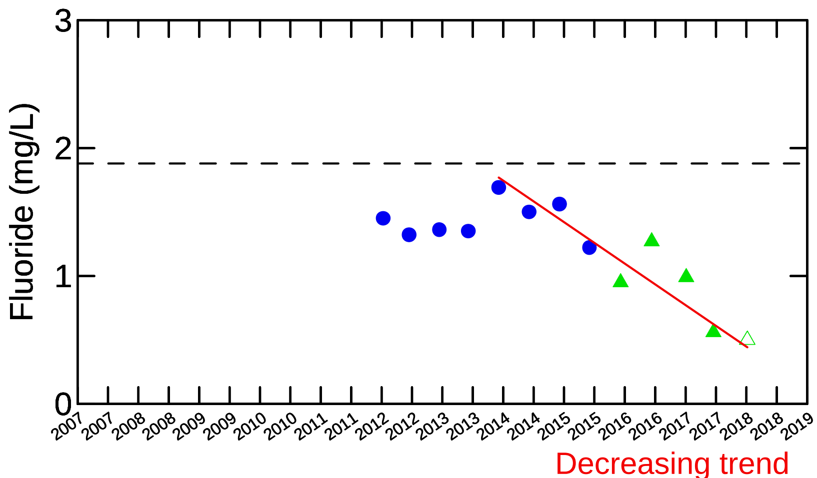
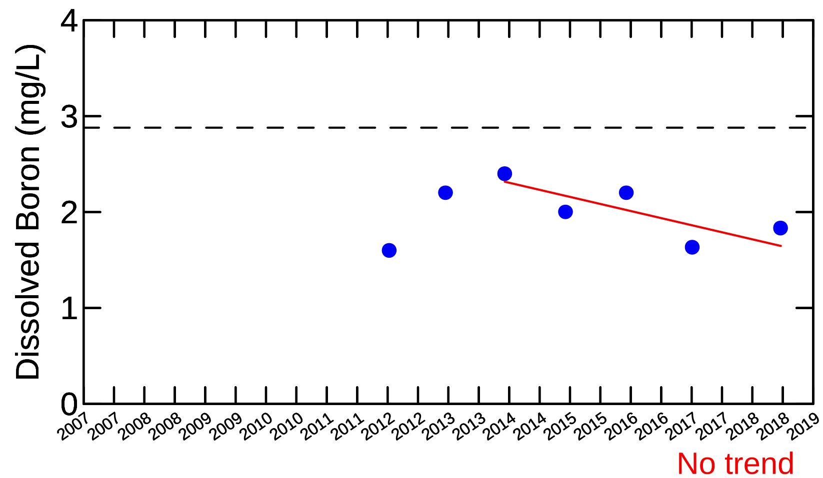
WELL TW57-11D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









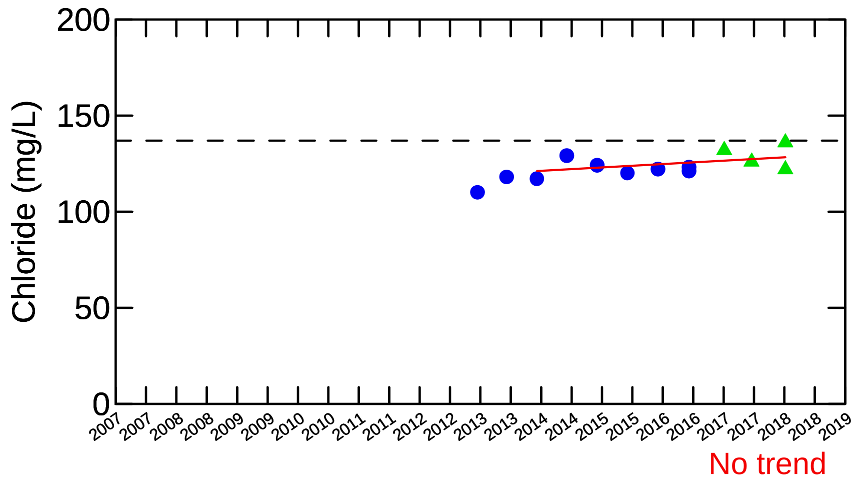
Legend:

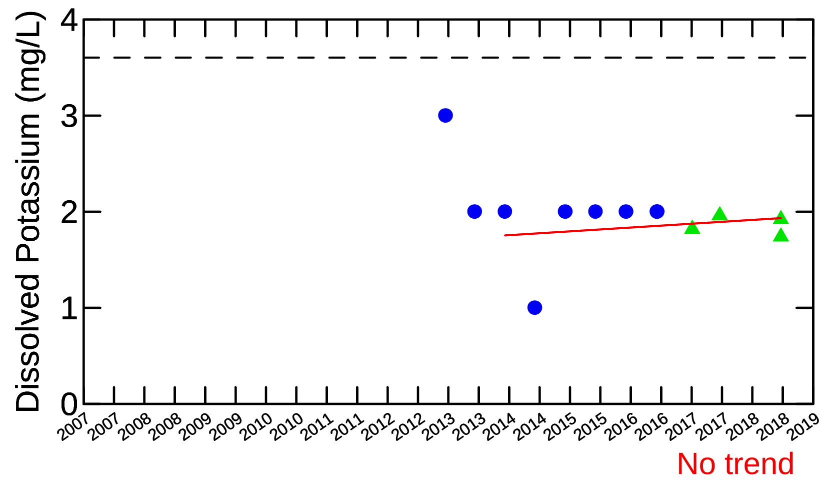
- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- — — Baseline Upper Confidence Limit (UCL)
- —— Linear Regression line

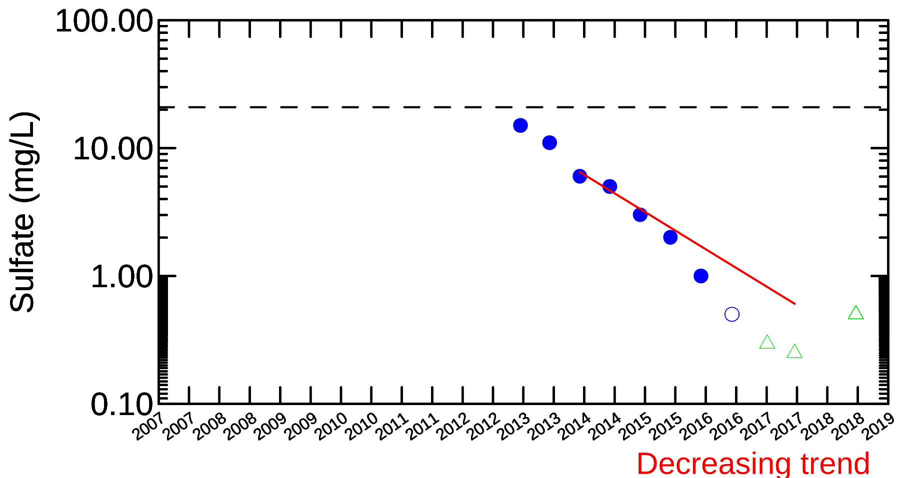
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

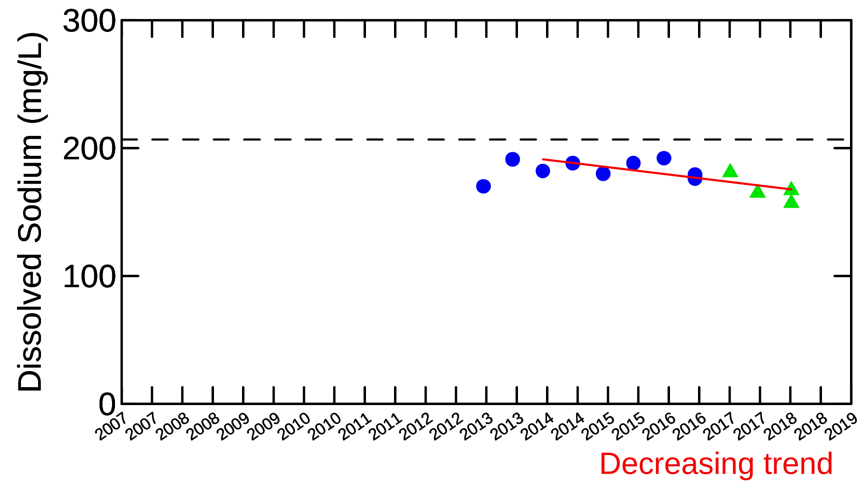
WELL TW57-11D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

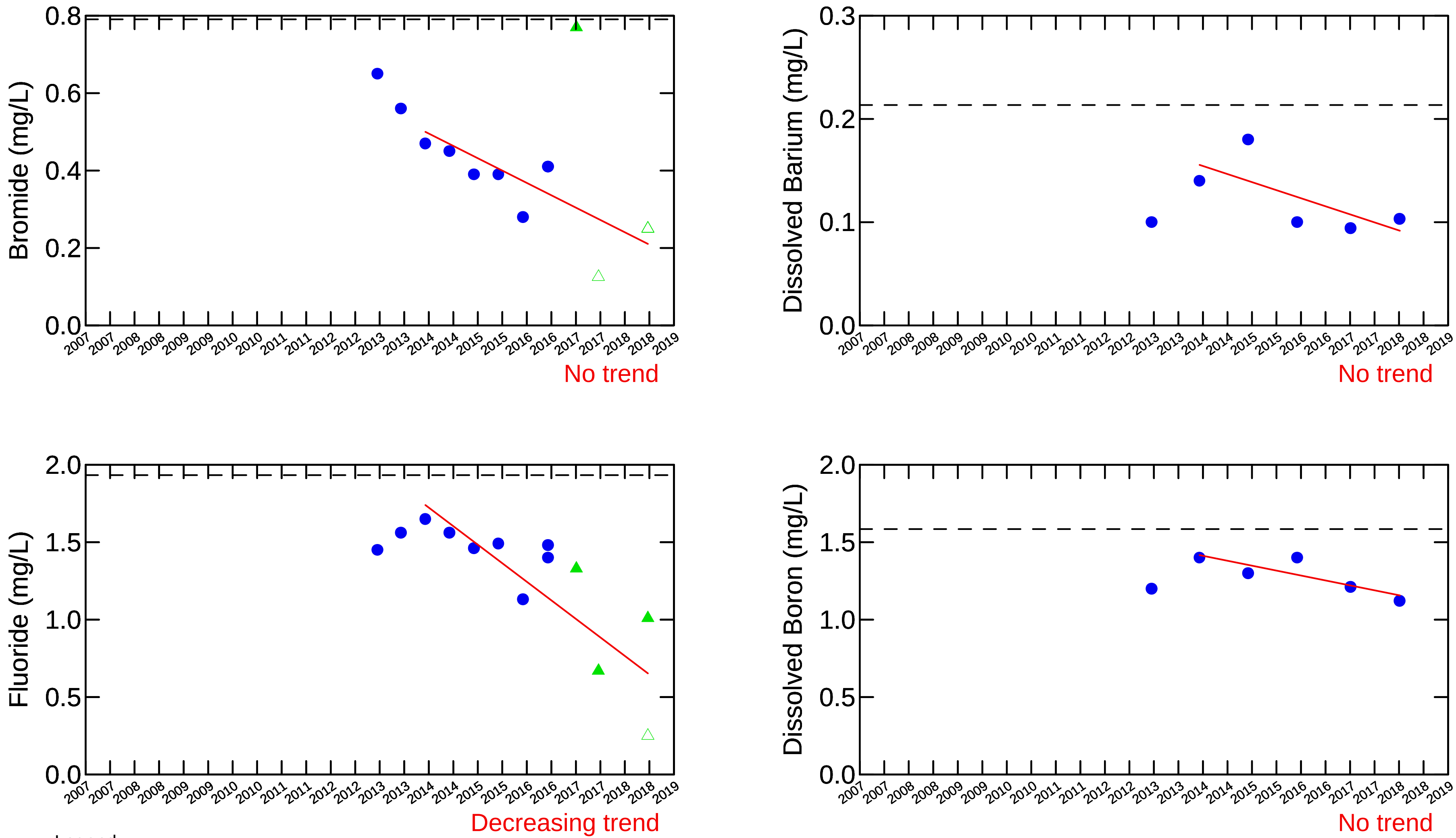
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW59-13D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

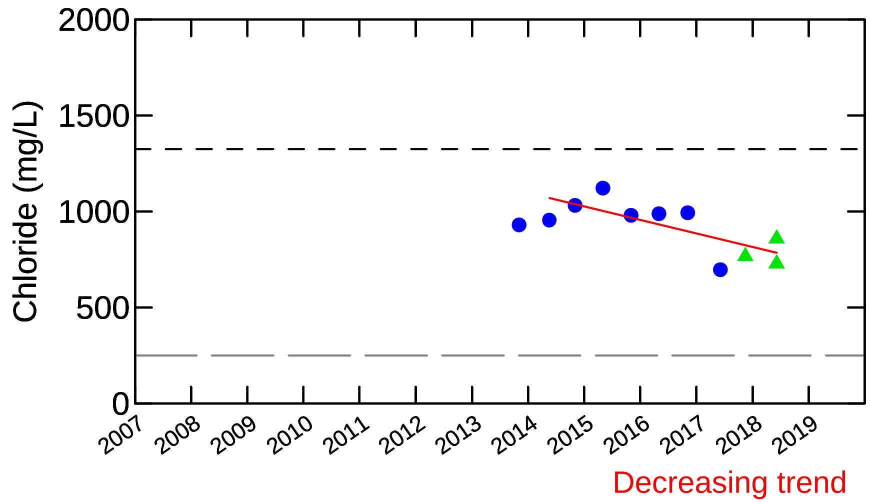
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

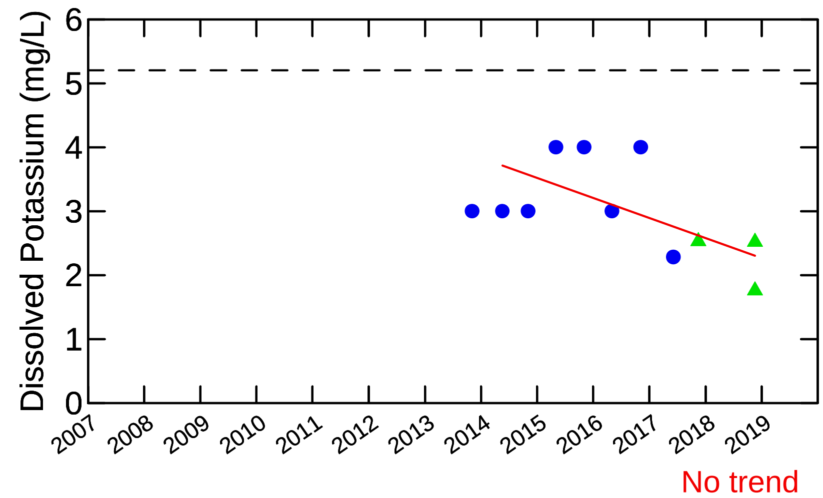
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

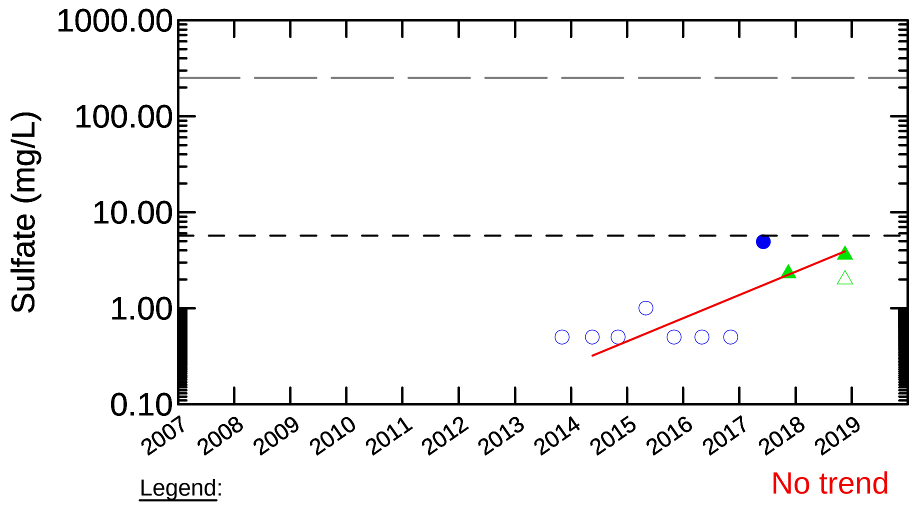
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

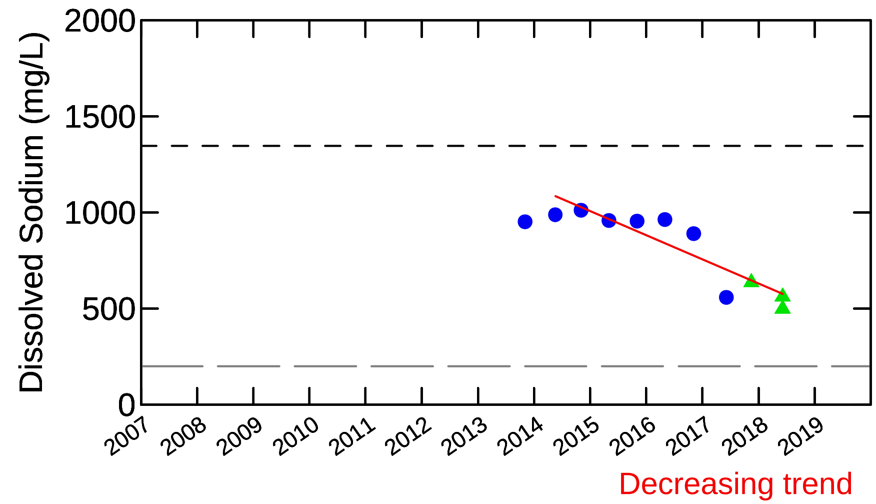
WELL TW59-13D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

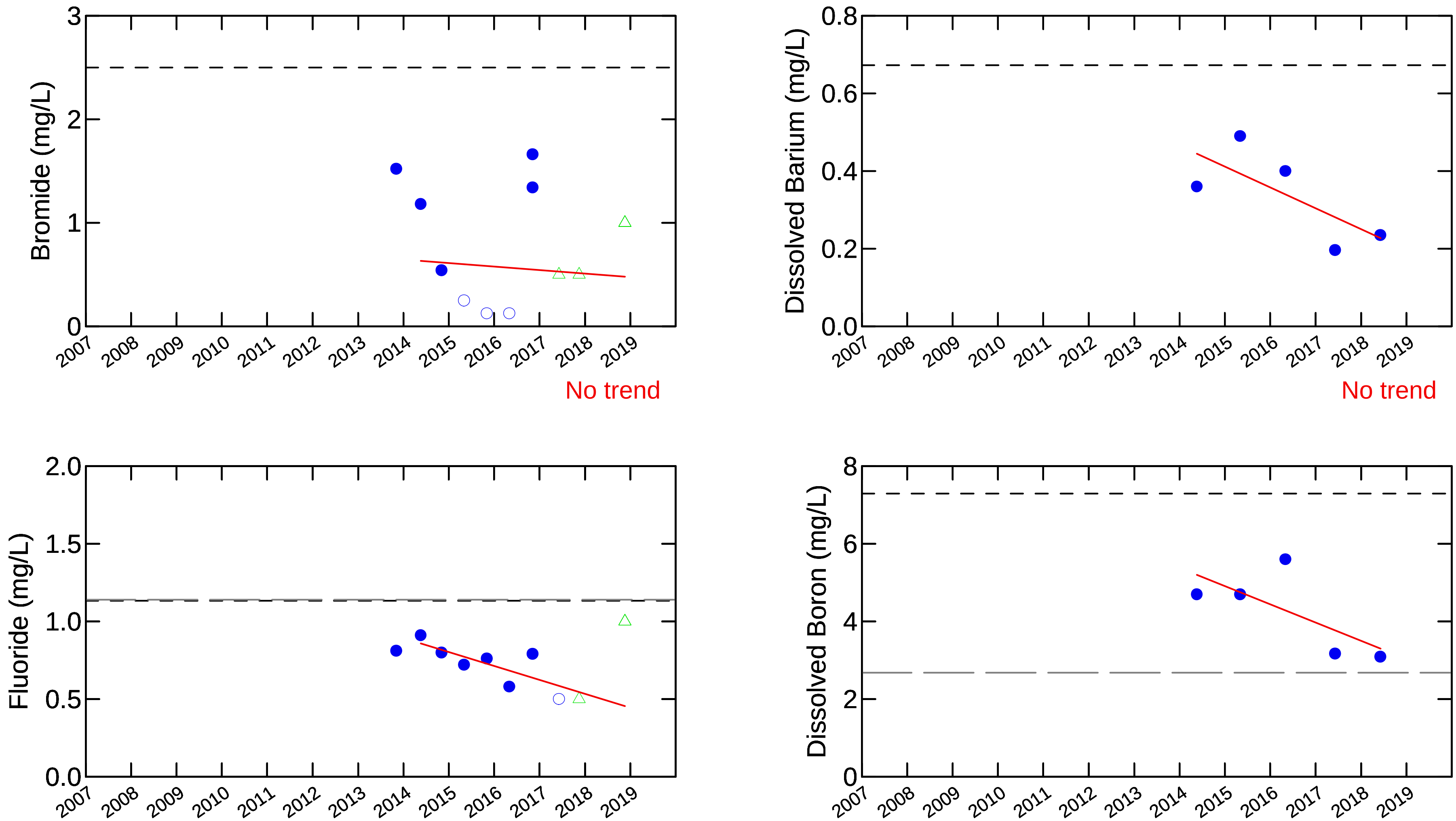
- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW60-13D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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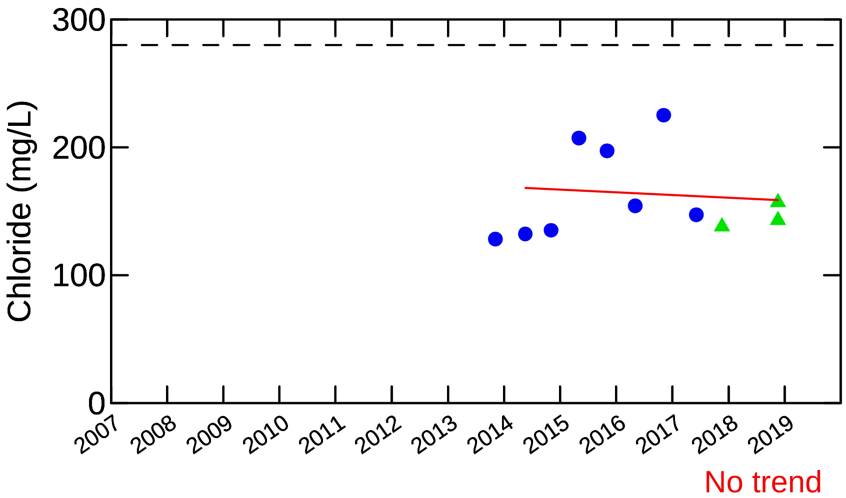
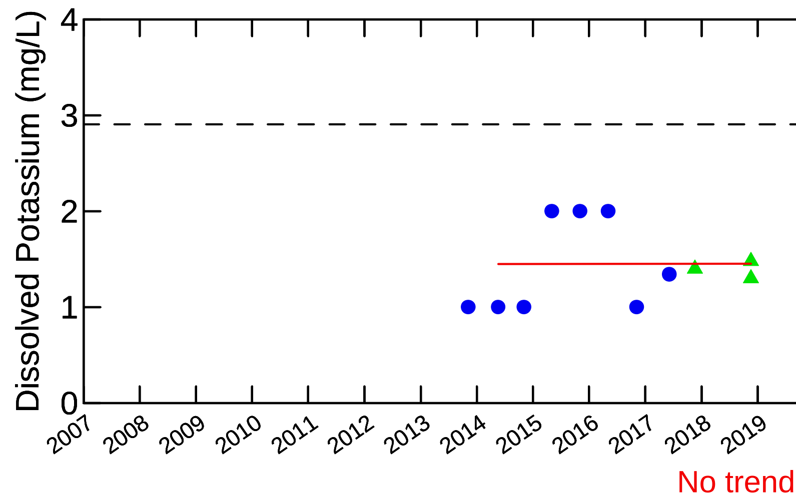
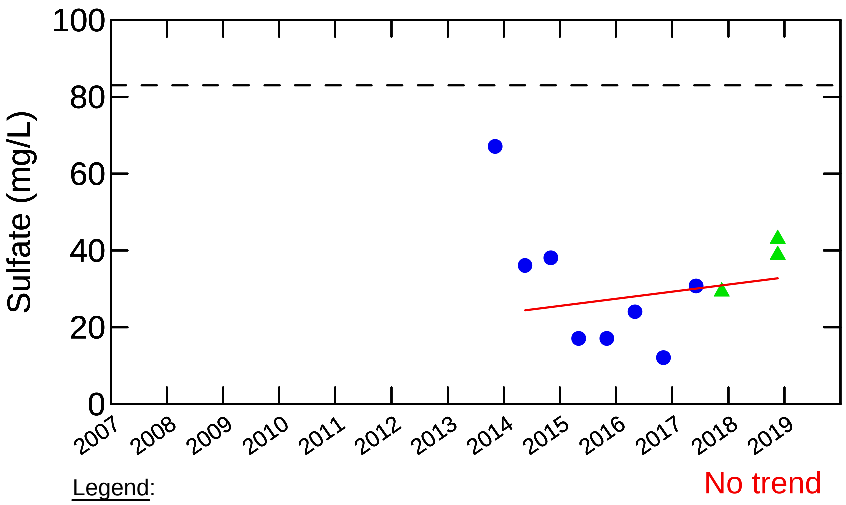
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

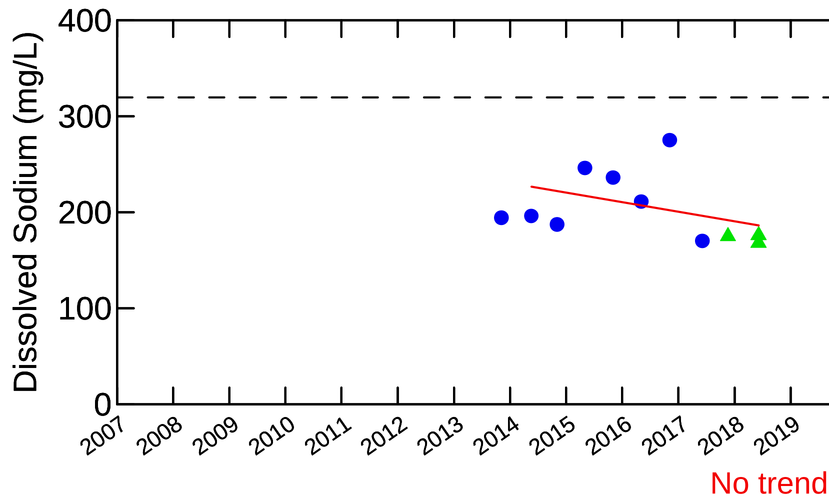
WELL TW60-13D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

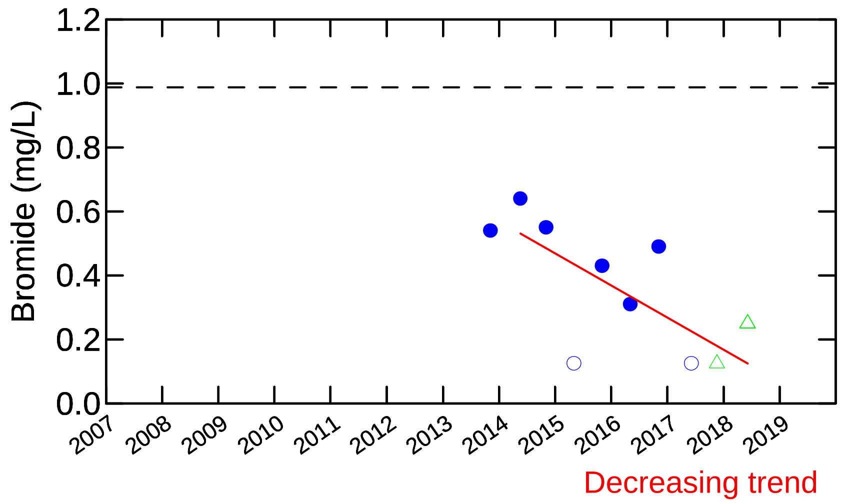
– – Baseline Upper Confidence Limit (UCL)

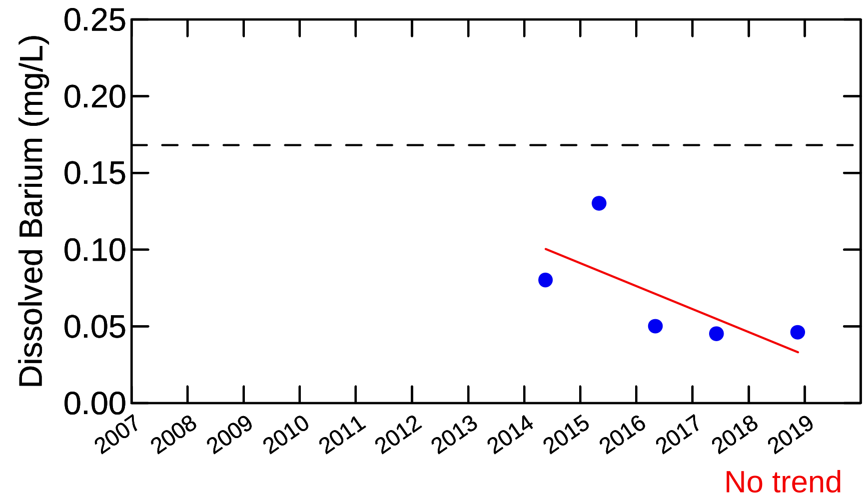
— Linear Regression line

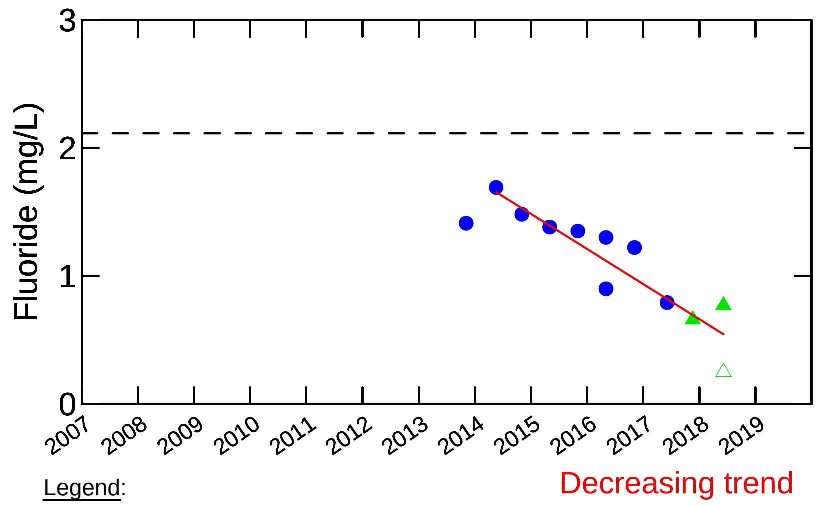
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

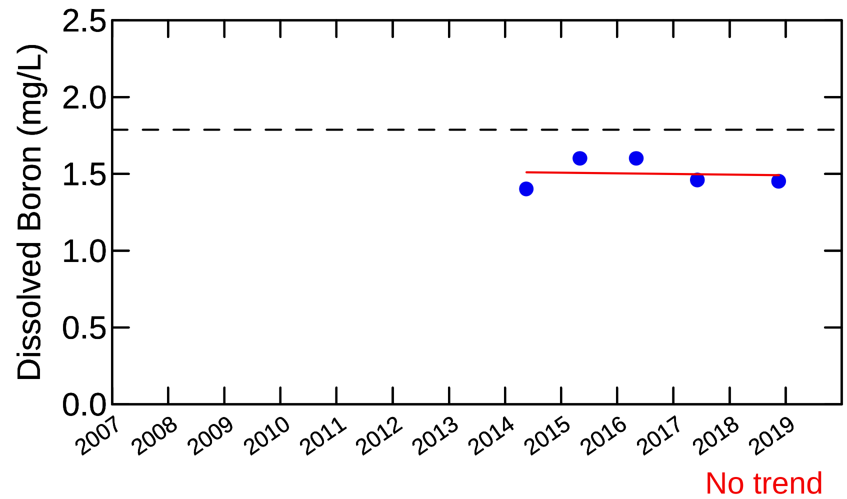
WELL TW61-13D

DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

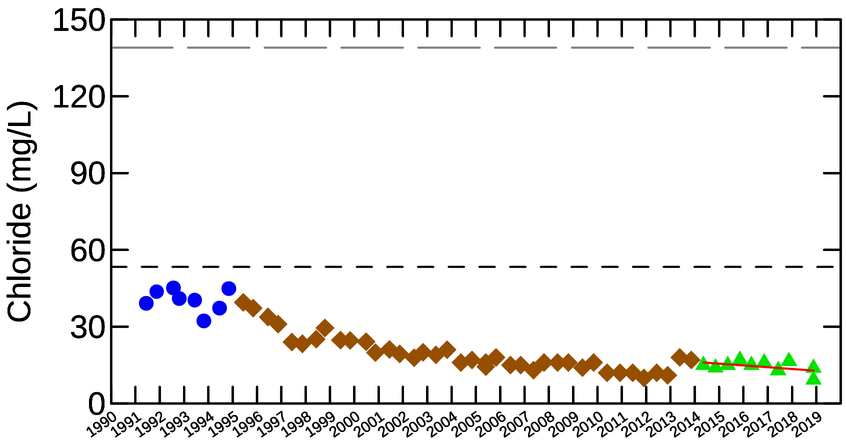
—— Linear Regression line

Notes:

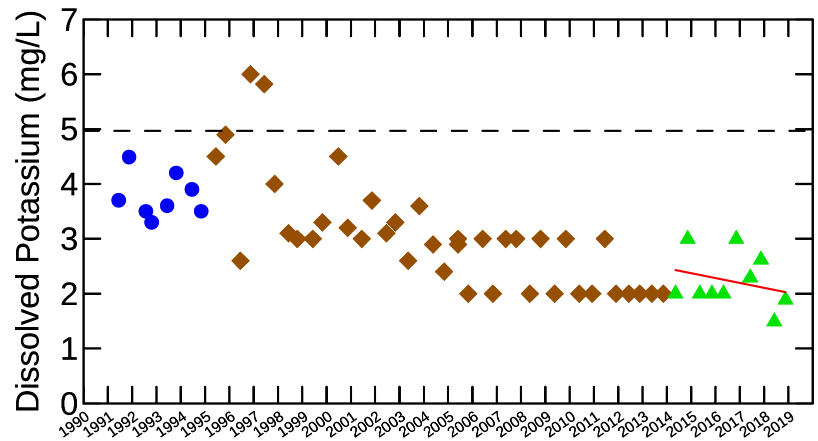
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW61-13D

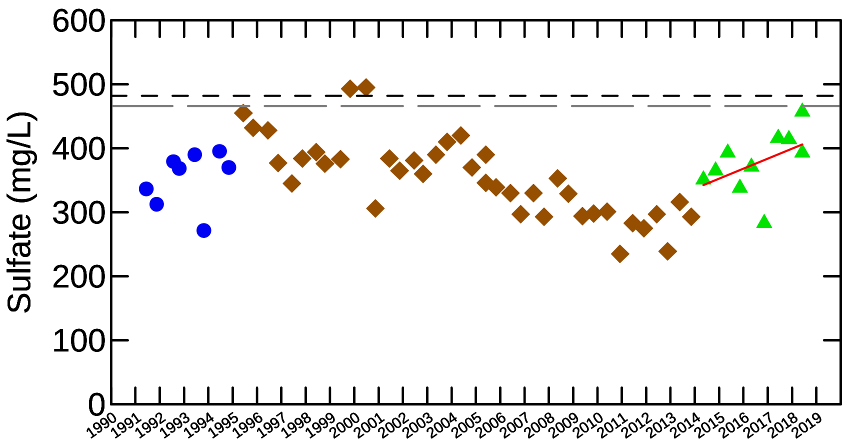
DEEP WELL (INTERFACE AQUIFER)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



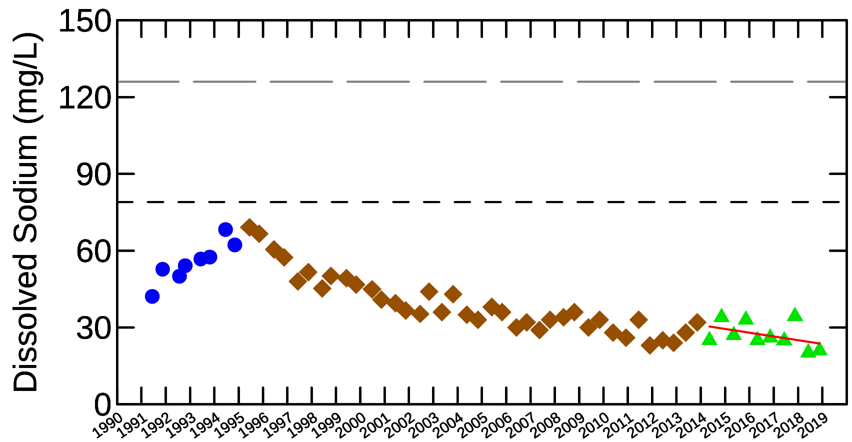
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

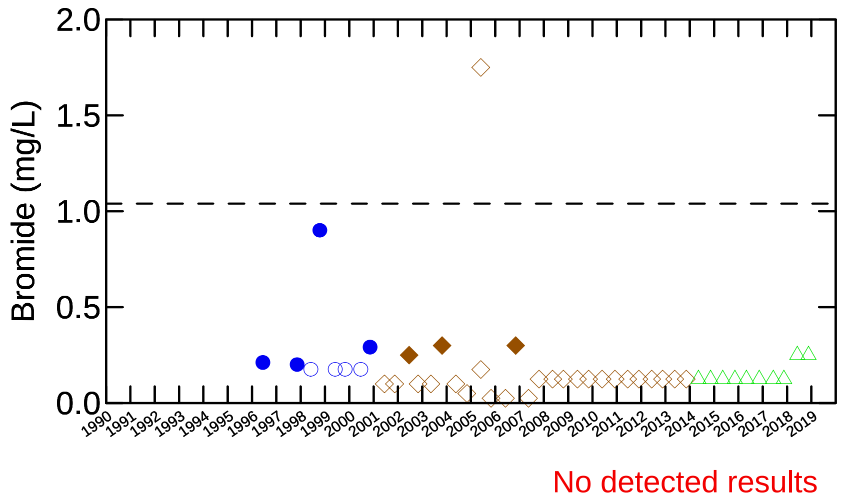
Baseline Upper Confidence Limit (UCL)

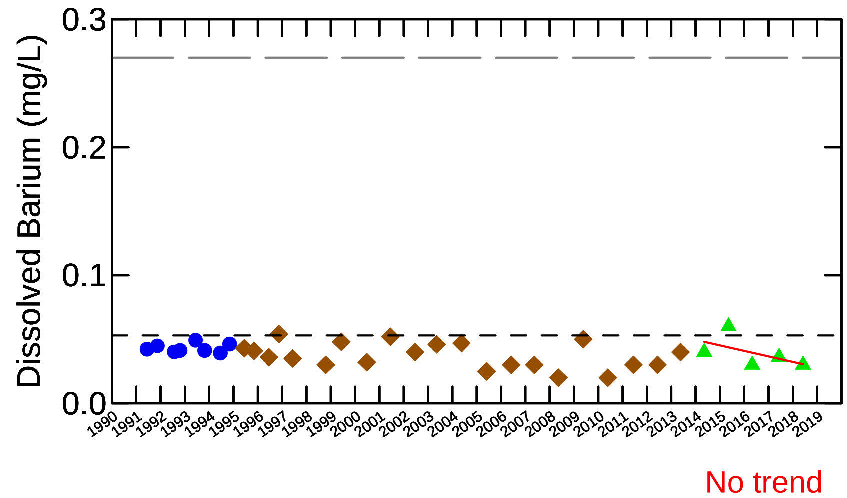
Linear Regression line

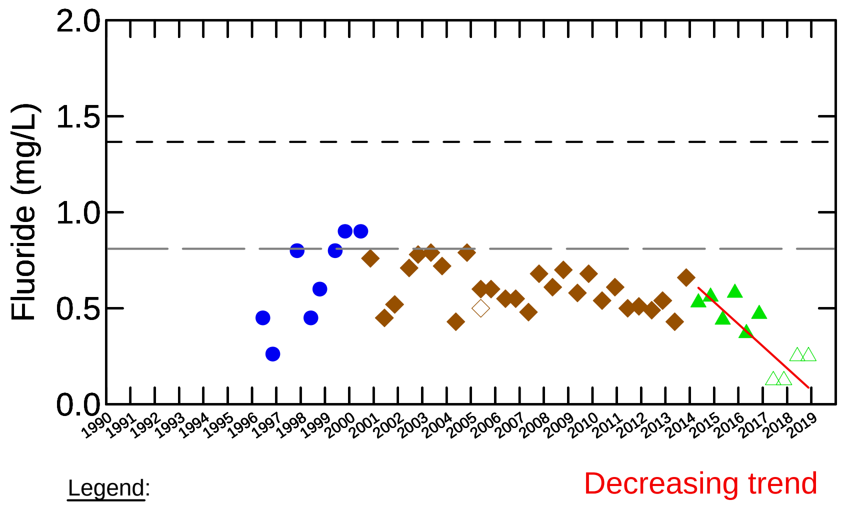
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

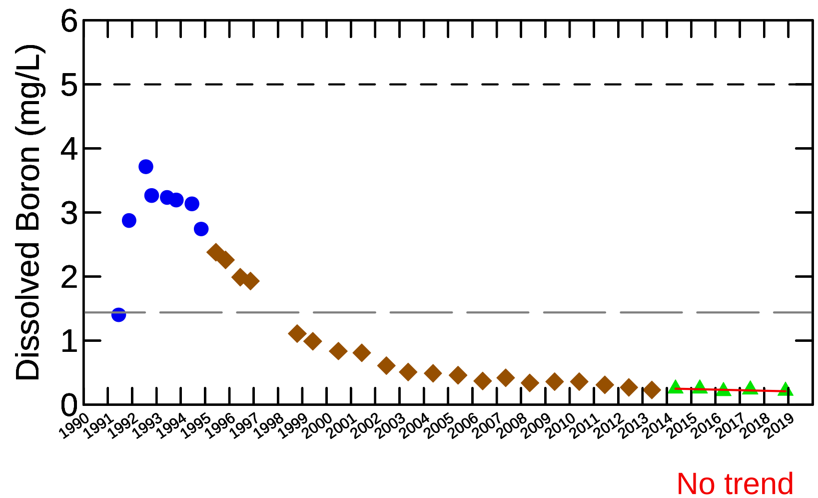
WELL OW32-90S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

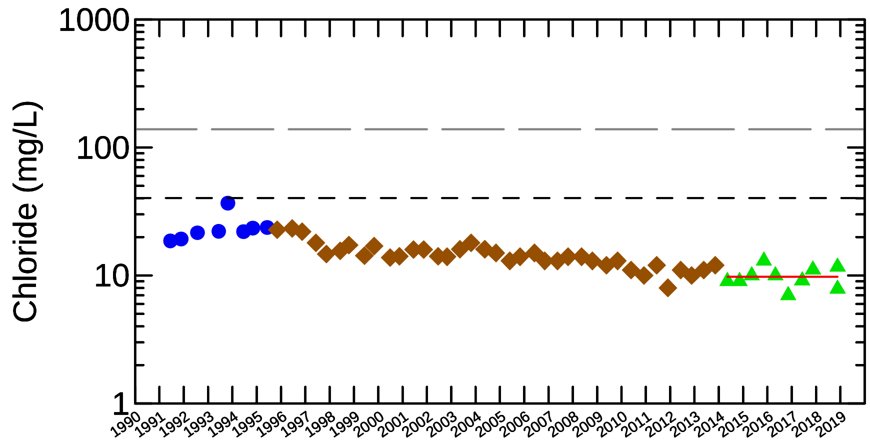
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

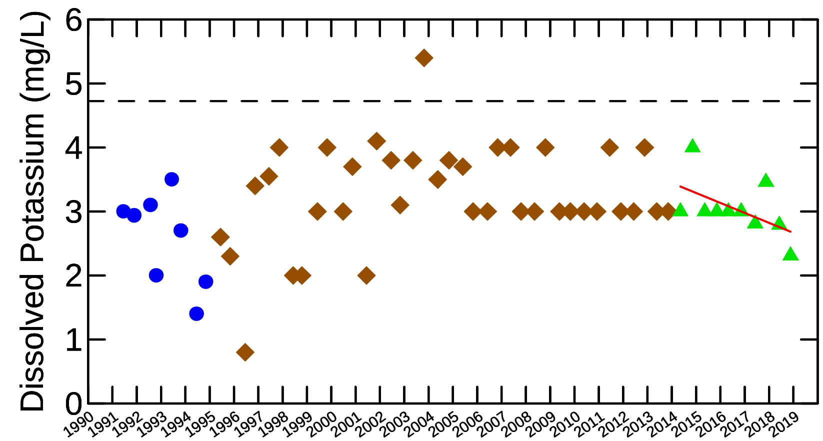
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL OW32-90S

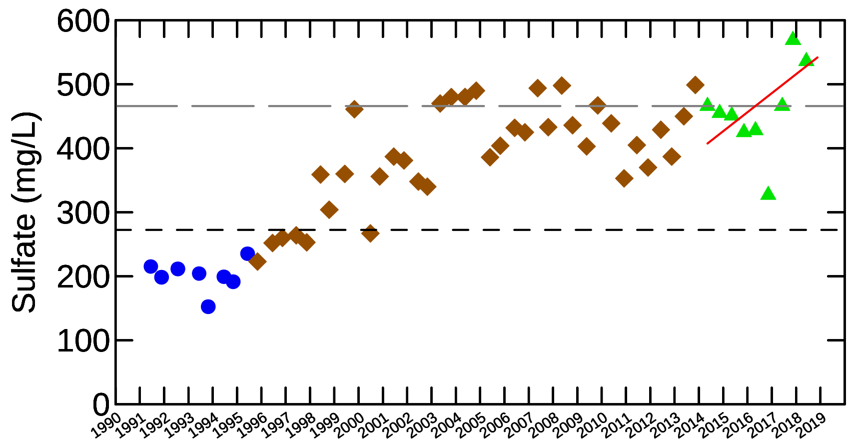
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



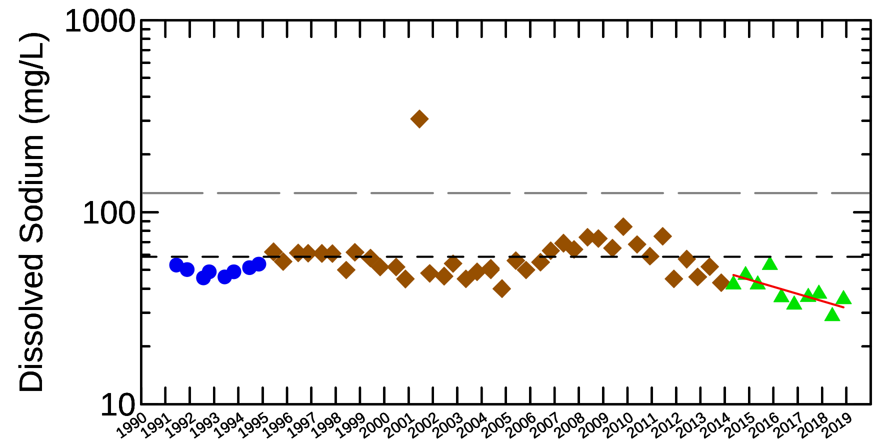
No trend



No trend



No trend



Decreasing trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

—— Reasonable Use Criteria (RUC)

– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

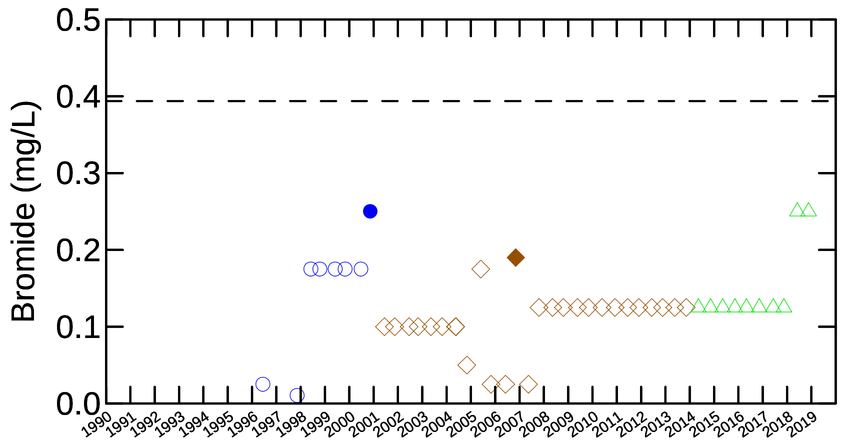
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

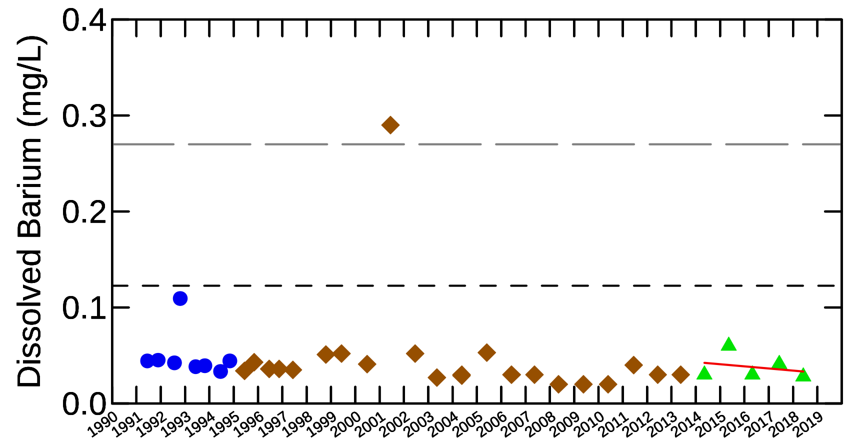
GHD

WELL OW35-90S

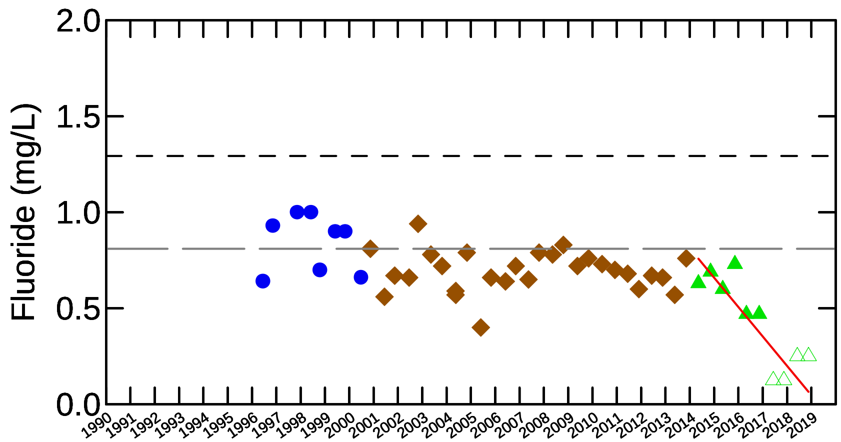
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



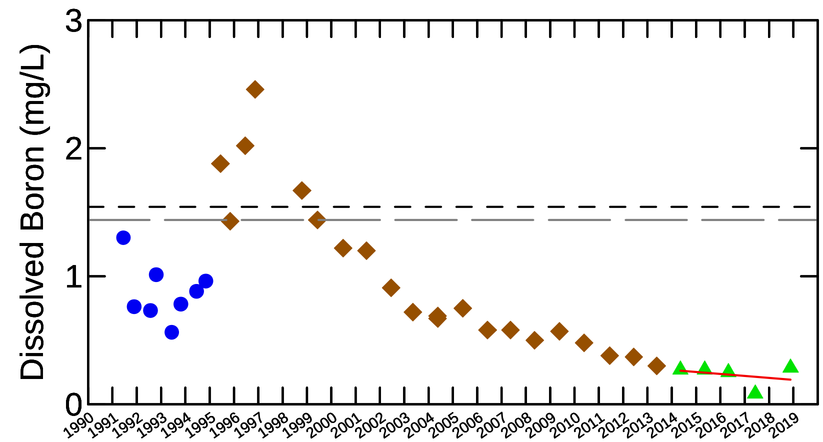
No detected results



No trend



Decreasing trend



No trend

Legend:

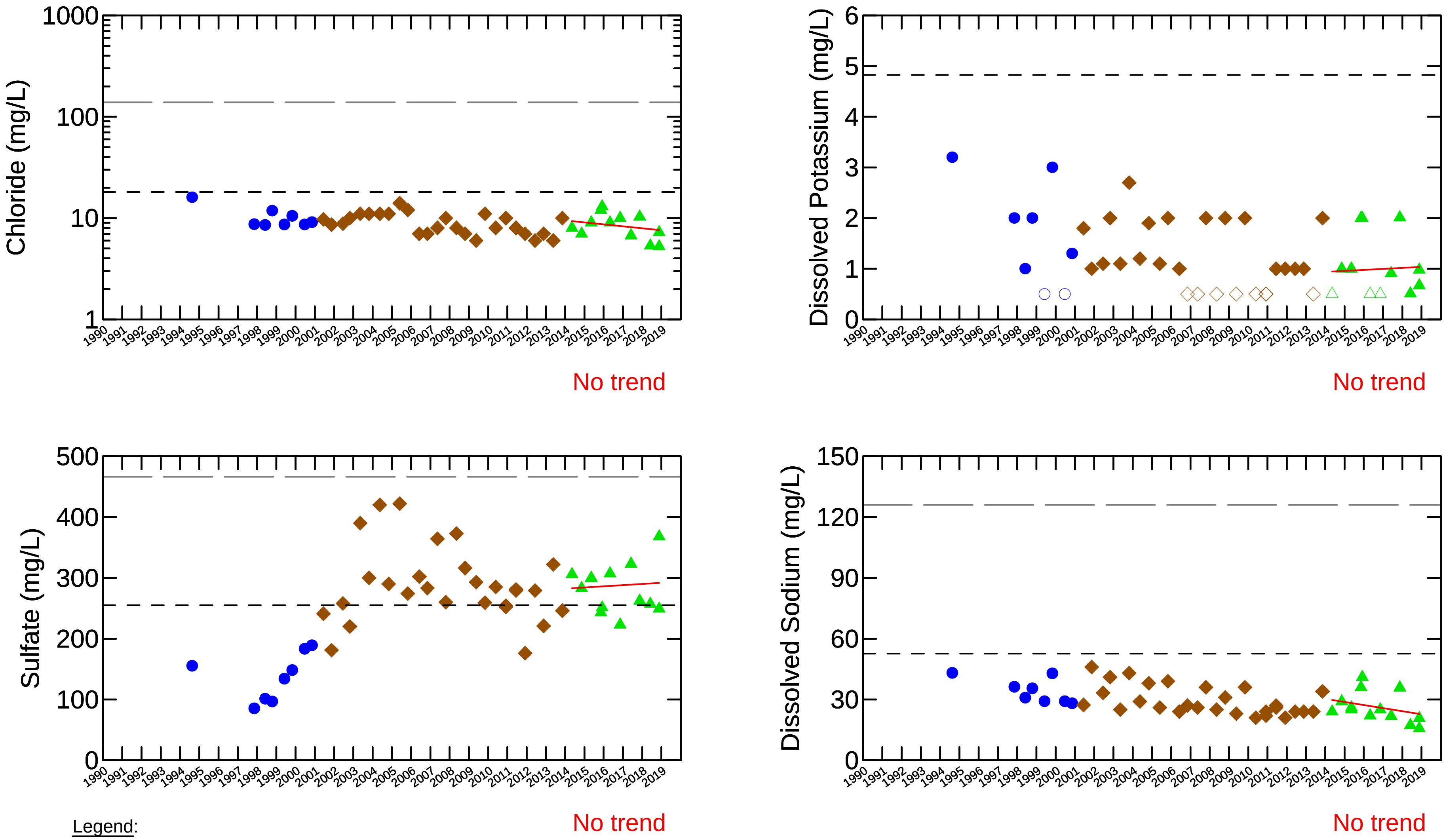
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL OW35-90S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

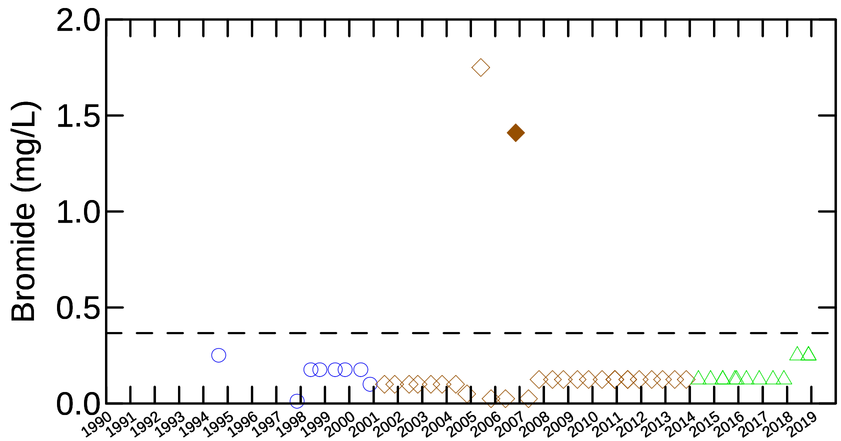
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

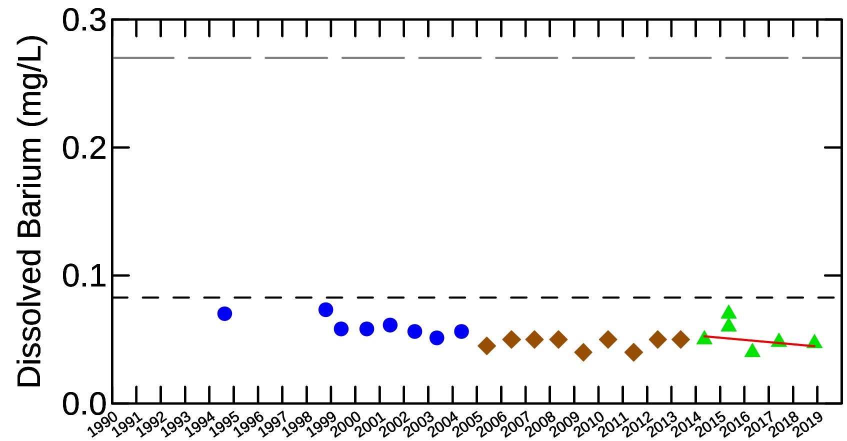
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW21-94-II

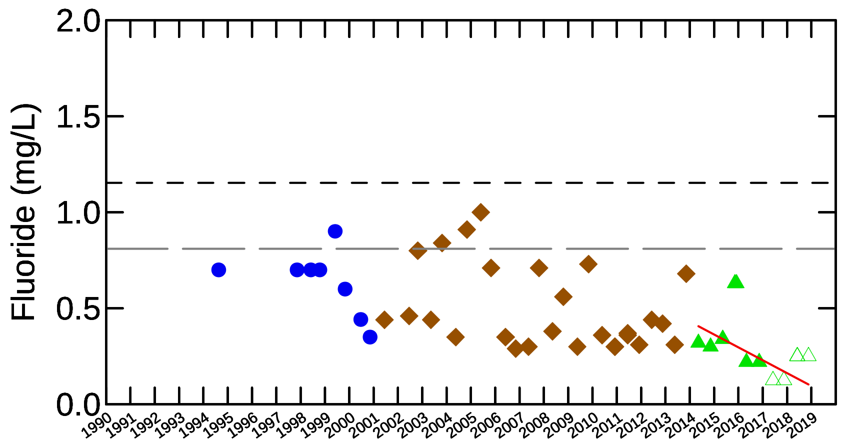
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



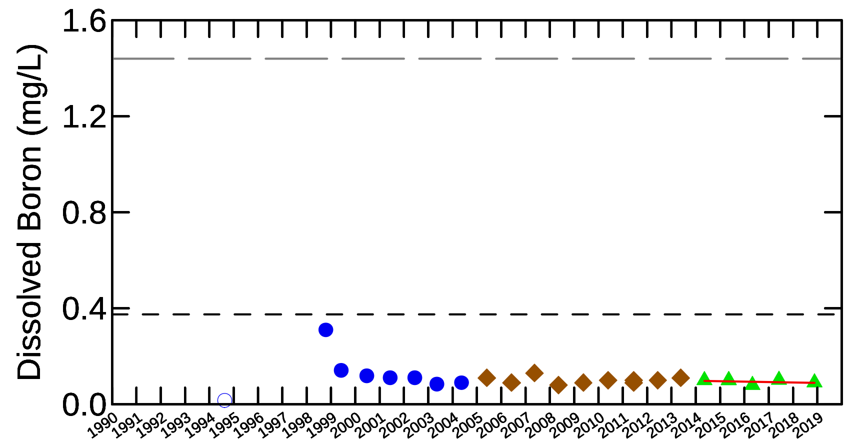
No detected results



No trend



Decreasing trend



No trend

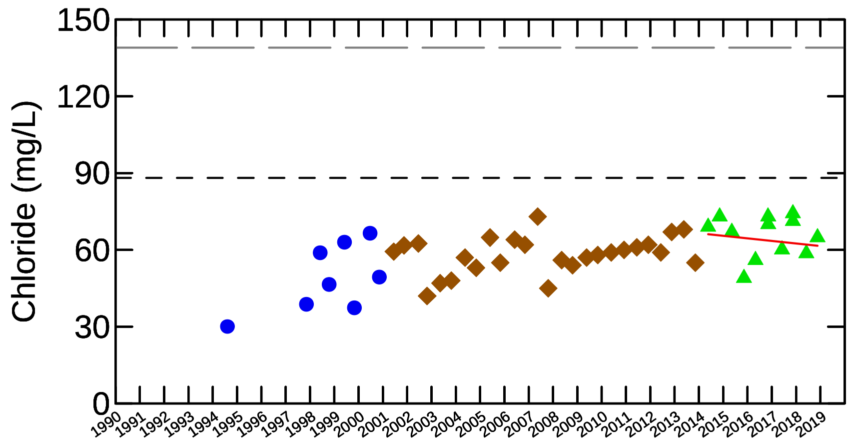
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

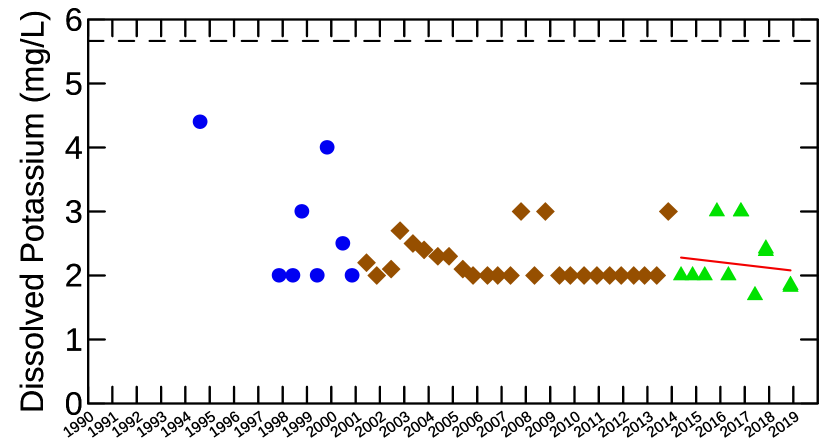
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW21-94-II

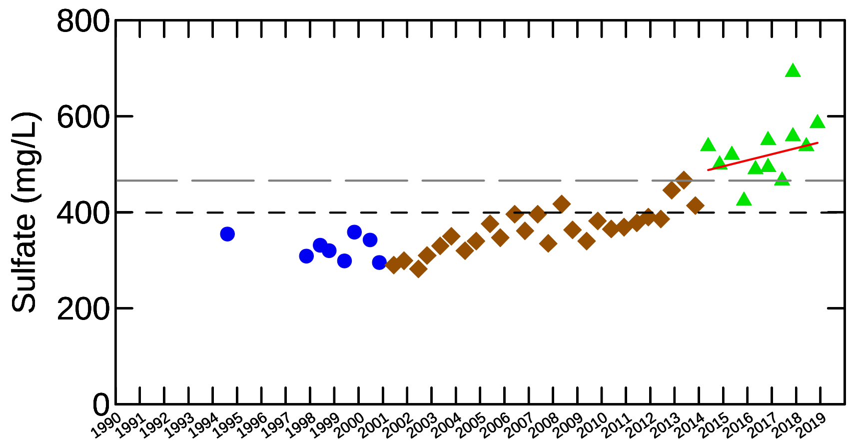
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



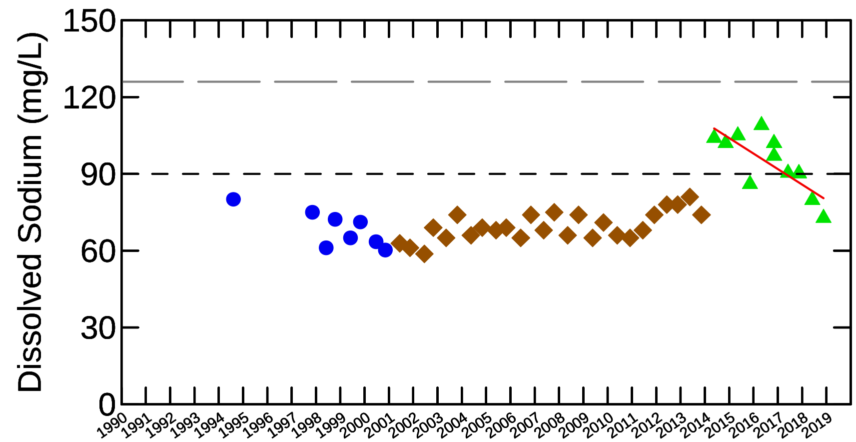
No trend



No trend



No trend



Decreasing trend

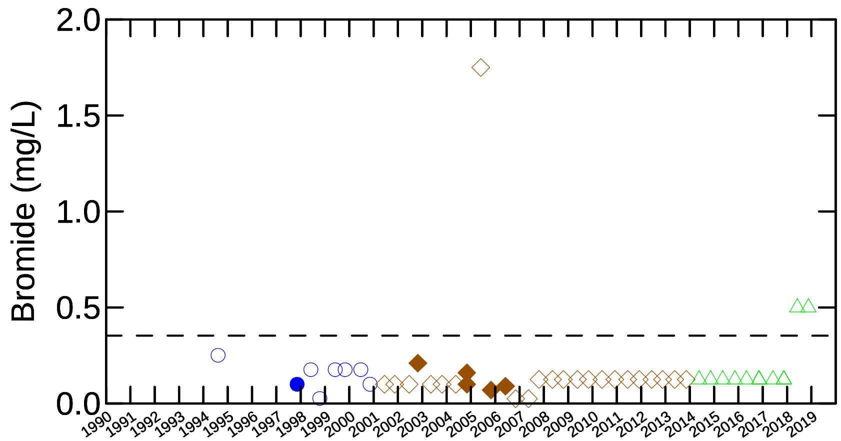
Legend:

- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

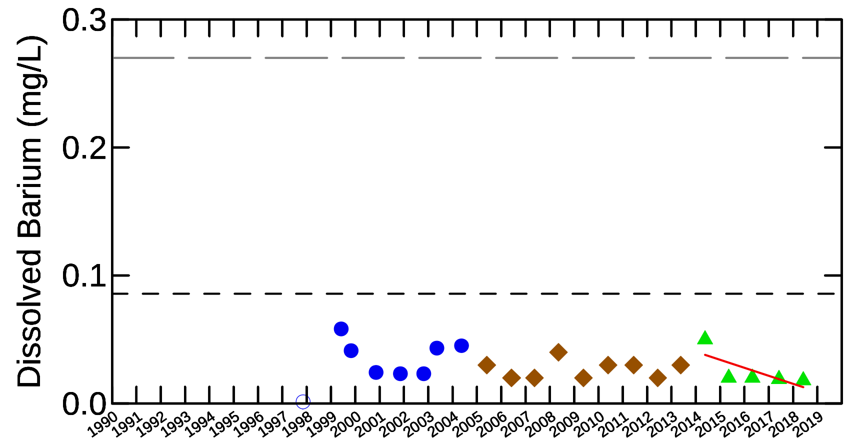
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW22-94

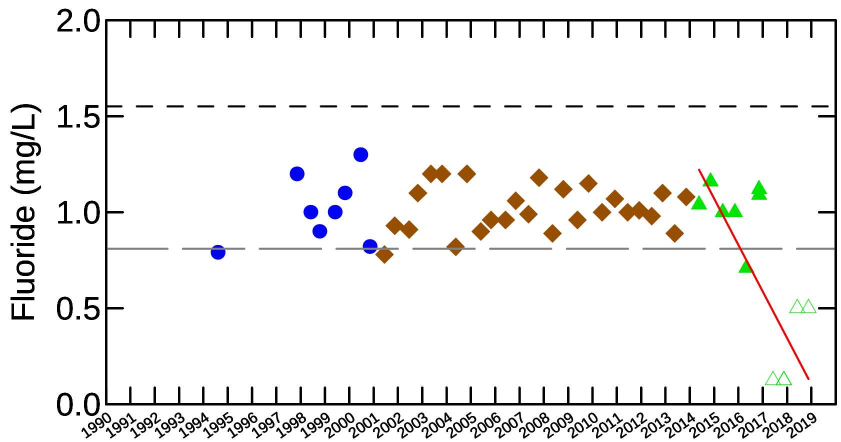
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



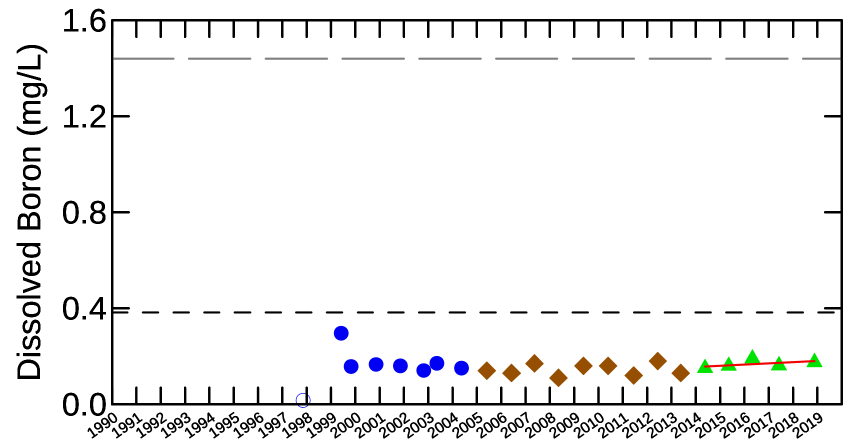
No detected results



No trend



Decreasing trend



No trend

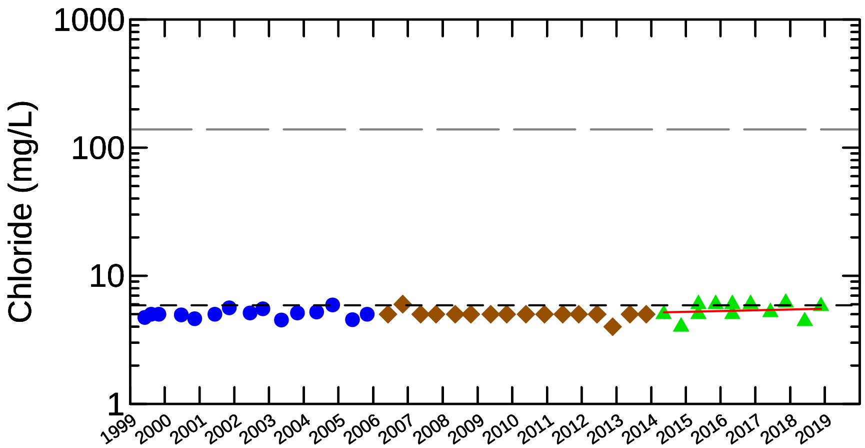
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

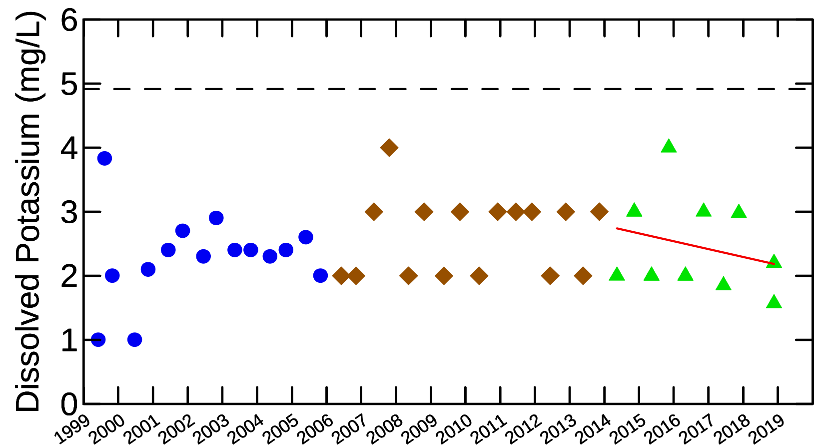
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW22-94

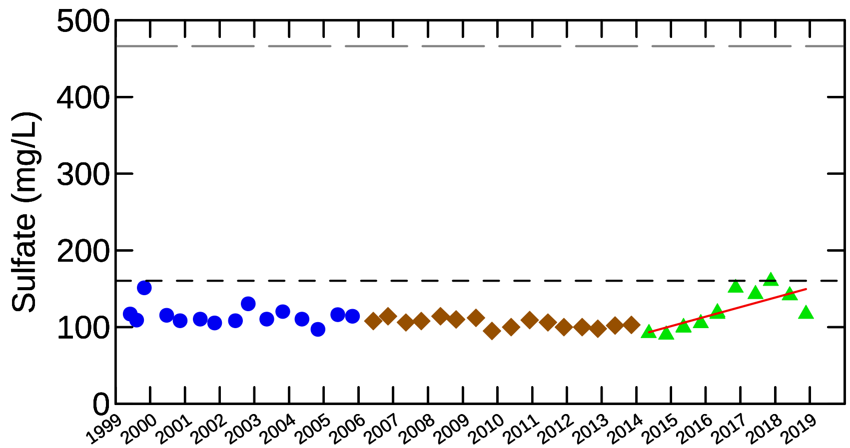
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



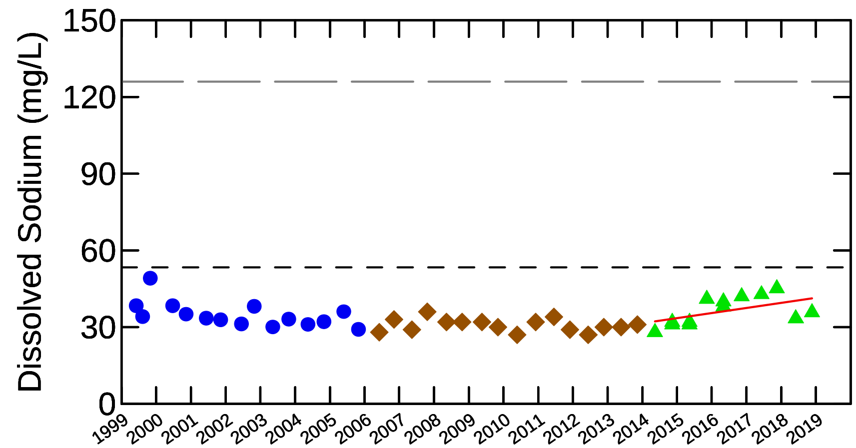
No trend



No trend



Increasing trend



No trend

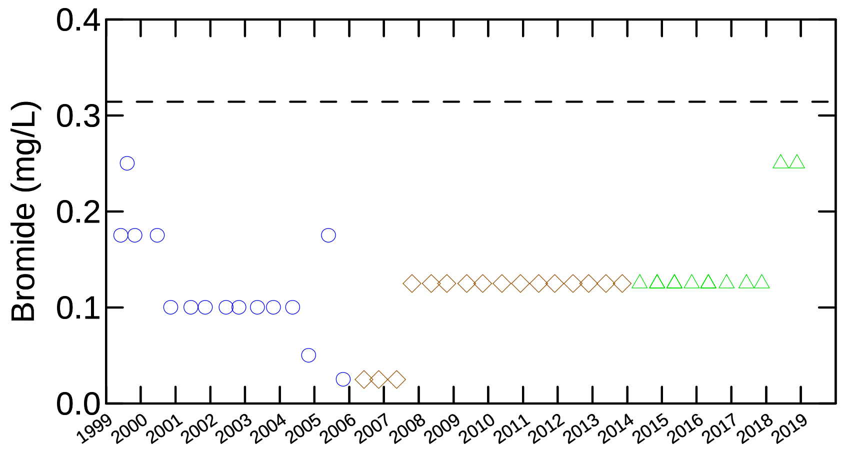
Legend:

- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- —— Reasonable Use Criteria (RUC)
- – – Baseline Upper Confidence Limit (UCL)
- —— Linear Regression line

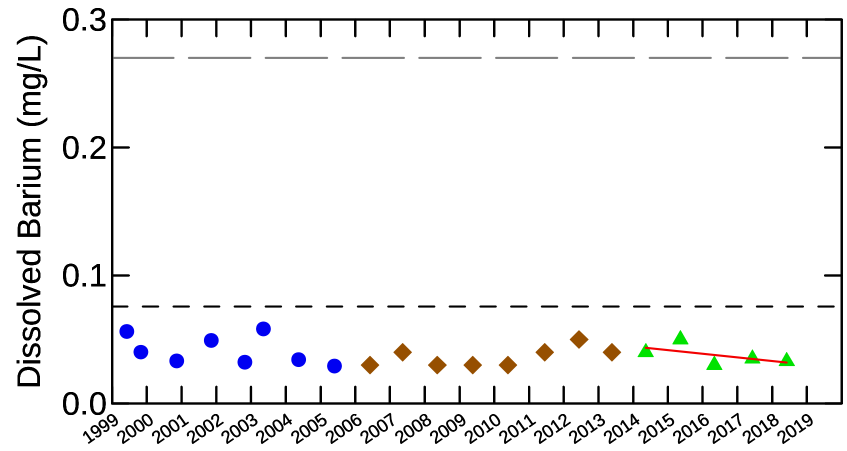
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW30-94

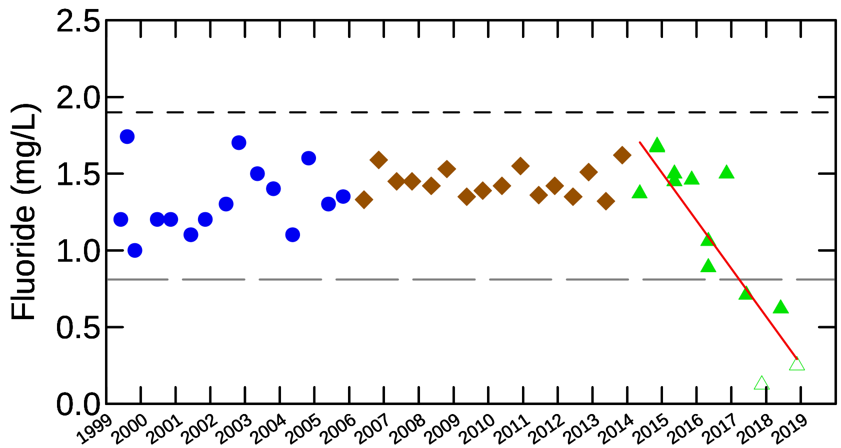
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



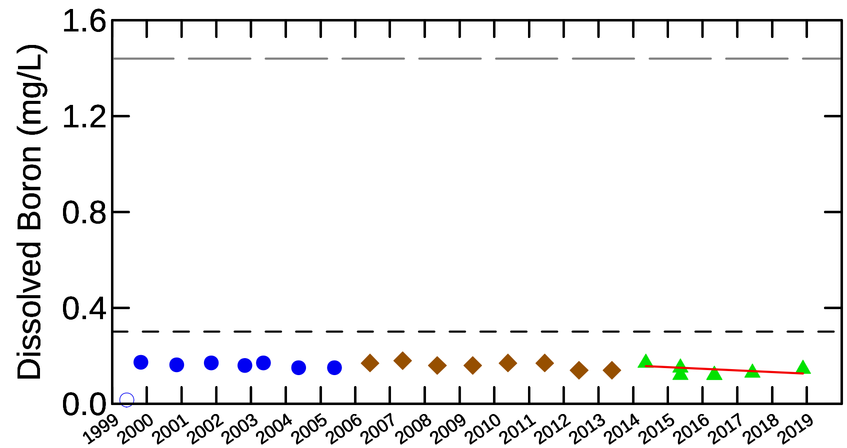
No detected results



No trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

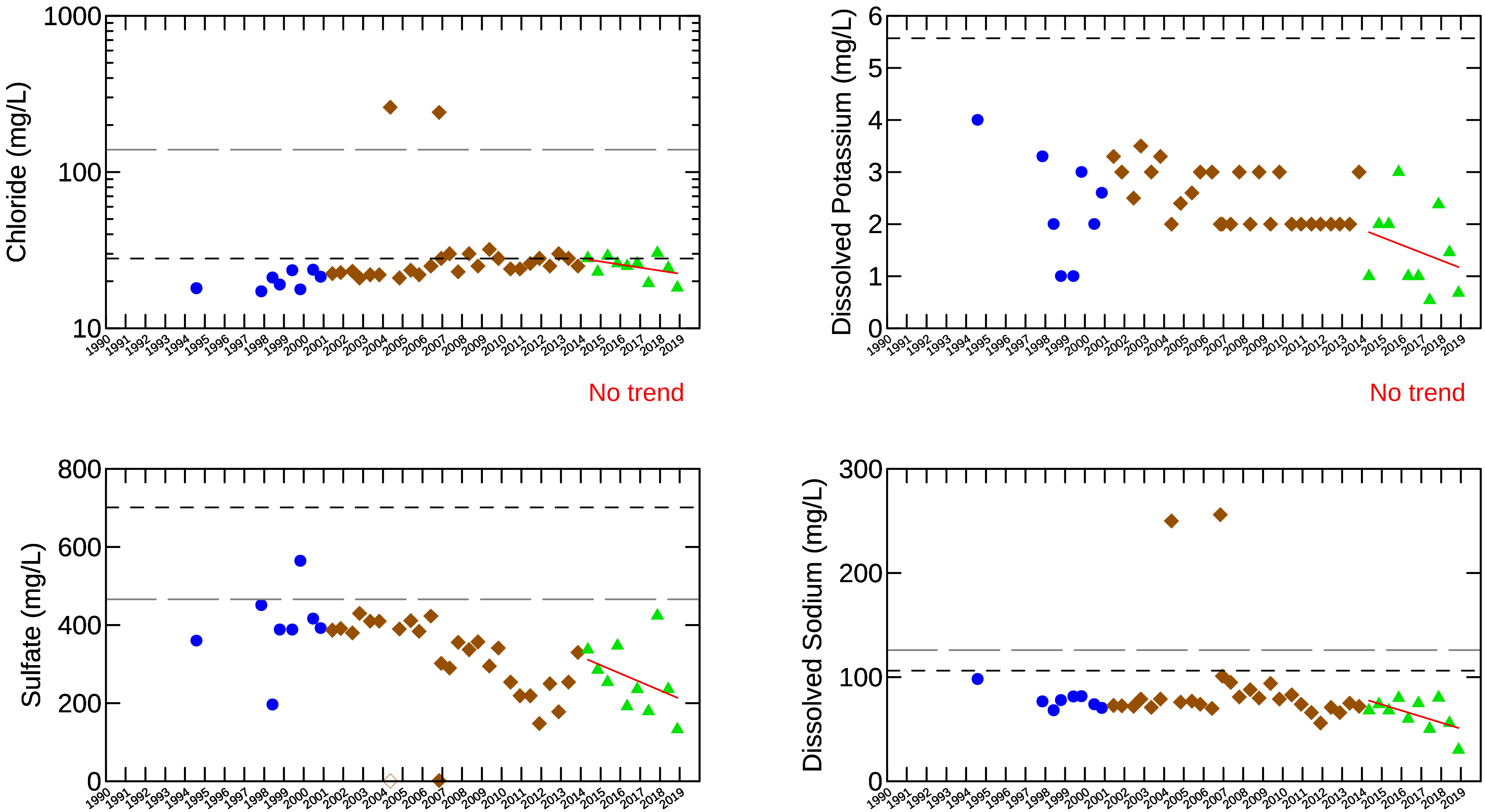
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW30-94

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



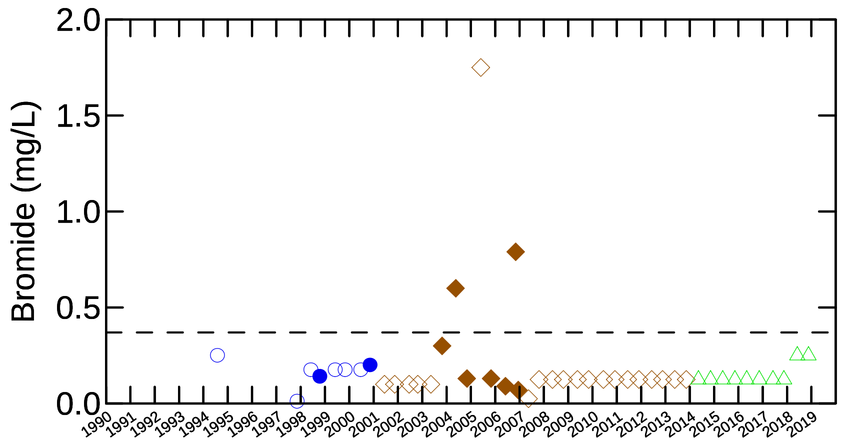
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

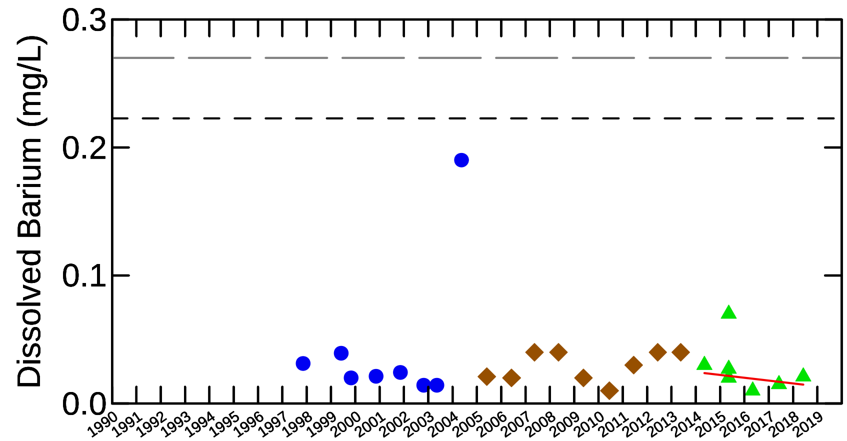
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW32-94-IV

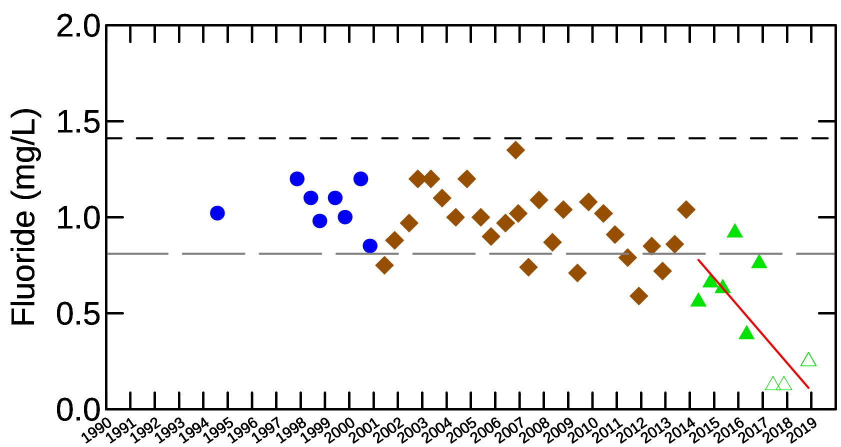
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



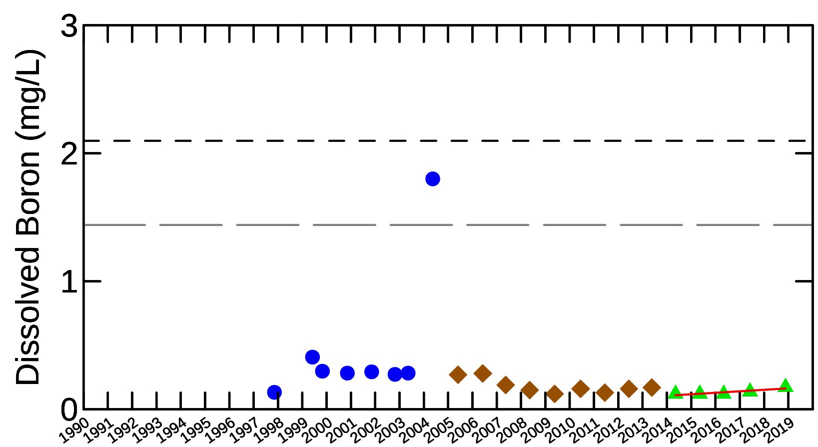
No detected results



No trend



Decreasing trend



No trend

Legend:

● Baseline result

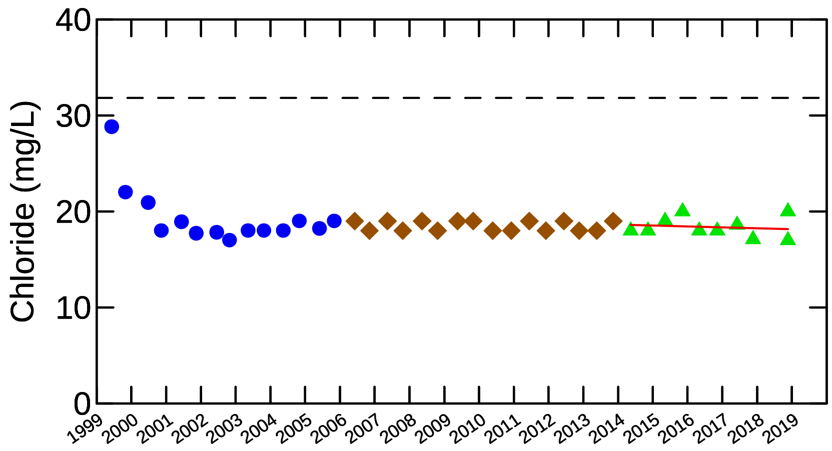
◆ Post-Baseline result ▲ Last 5 years (for trend)

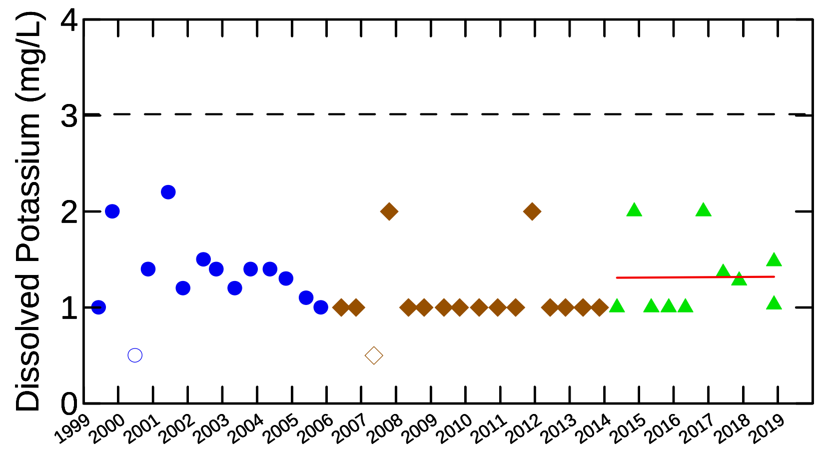
Reasonable Use Criteria (RUC)
Baseline Upper Confidence Limit (UCL)
Linear Regression line

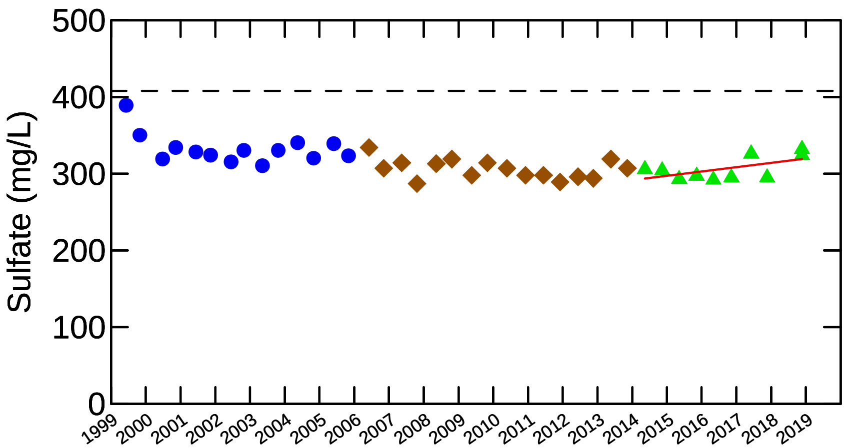
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

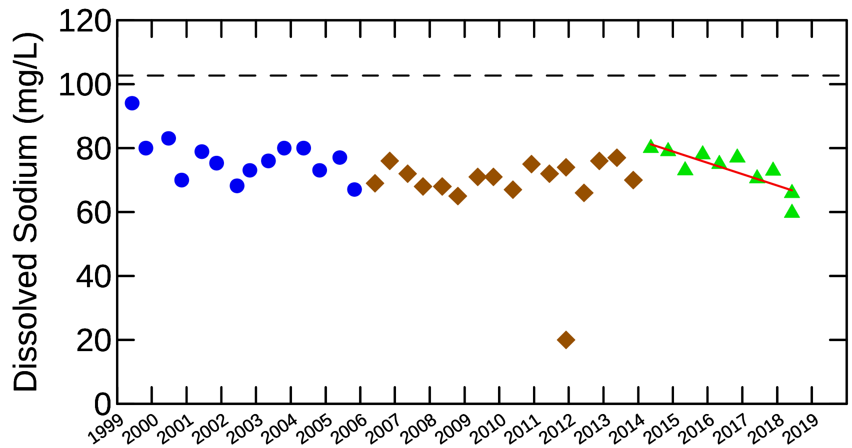
WELL TW32-94-IV

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

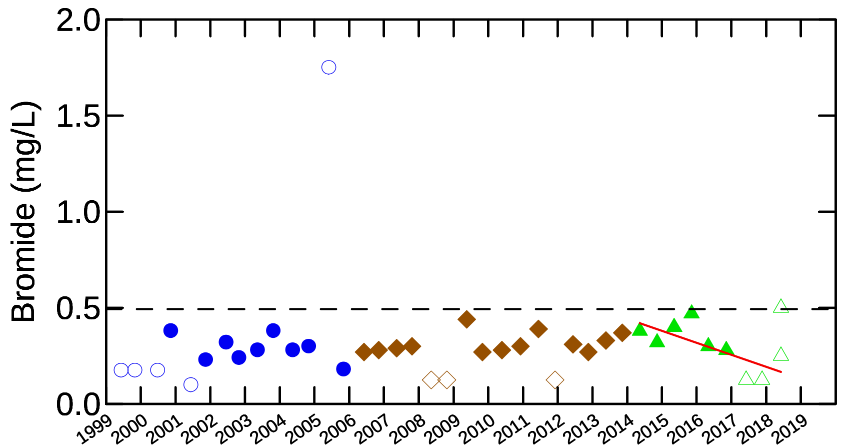
– – Baseline Upper Confidence Limit (UCL)

— Linear Regression line

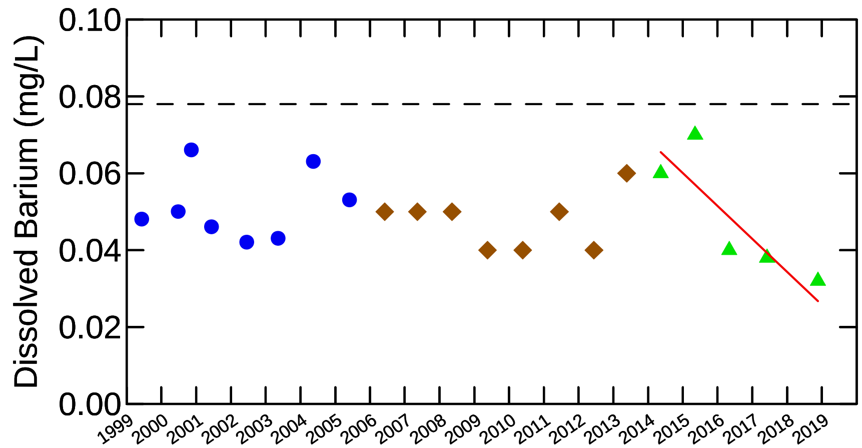
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW39-99I

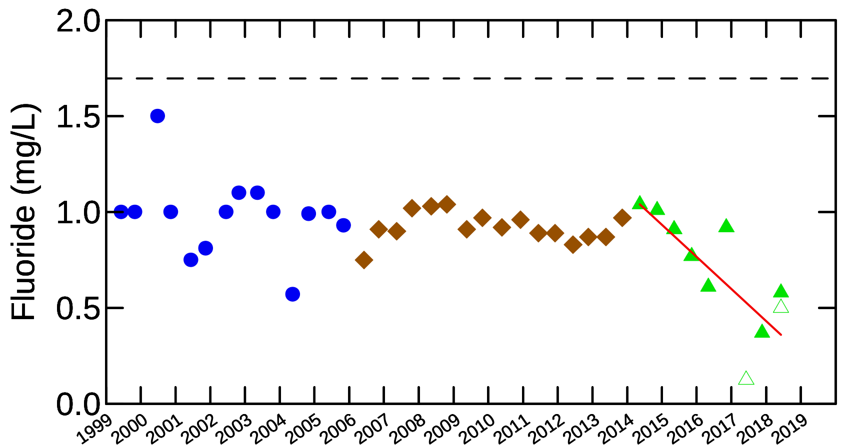
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



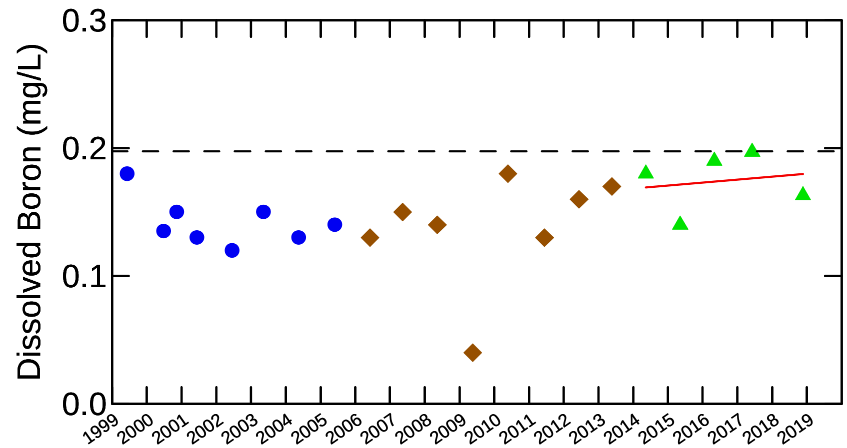
Decreasing trend



No trend



Decreasing trend



No trend

Legend:

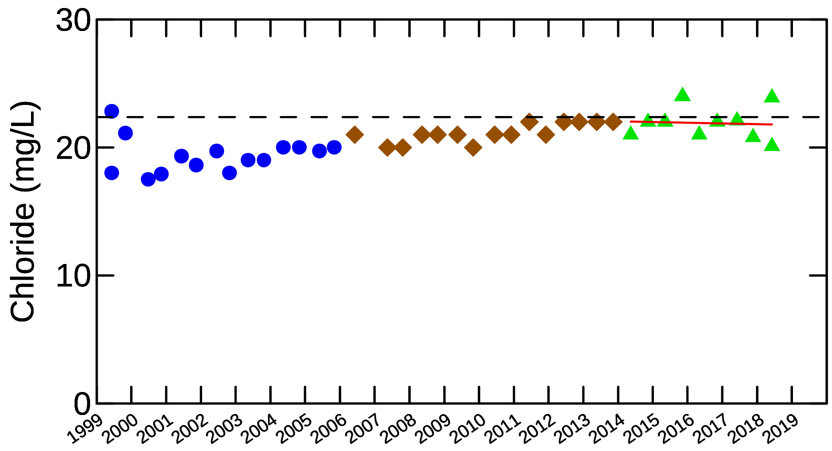
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

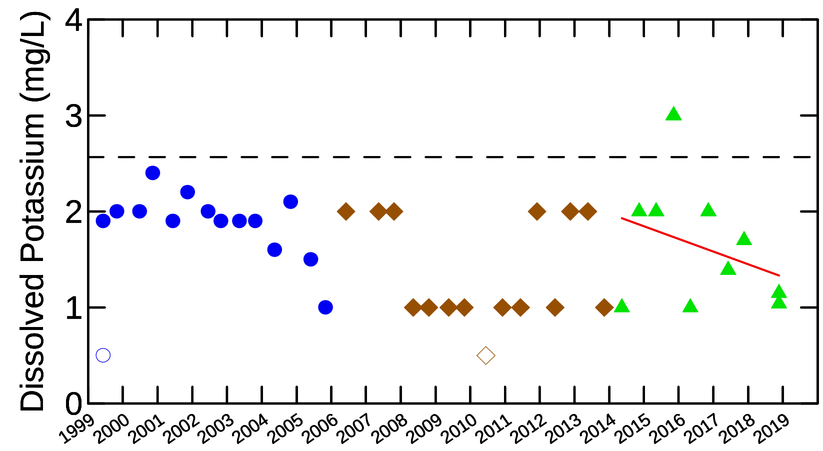
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW39-99I

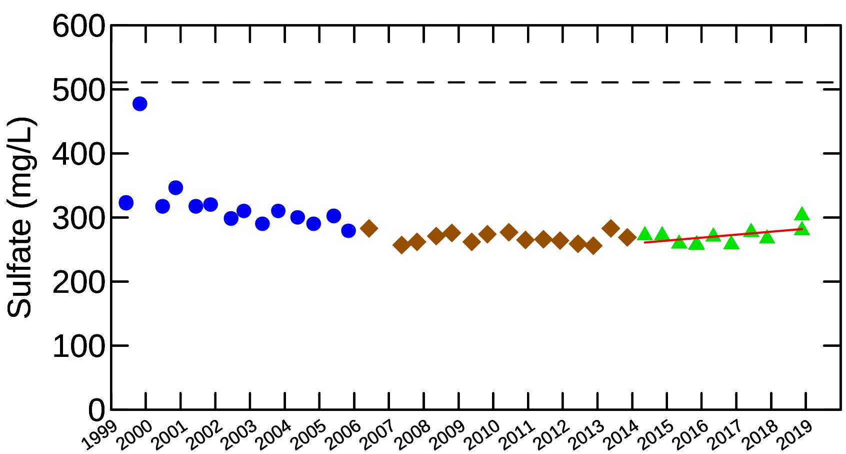
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



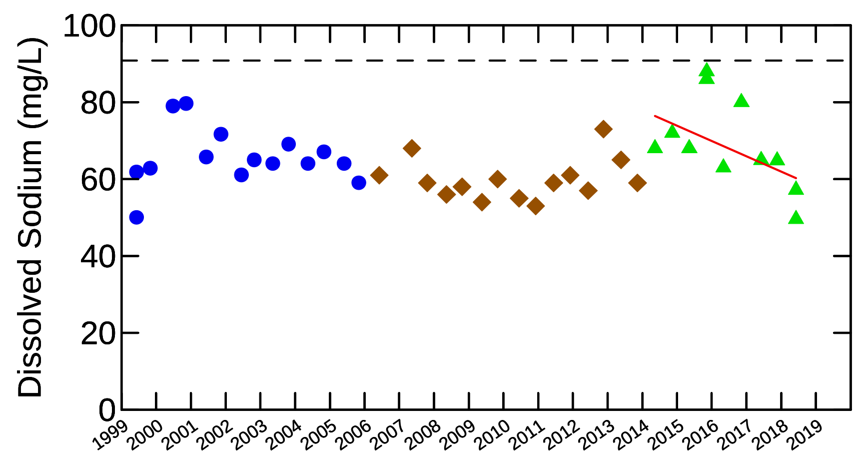
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

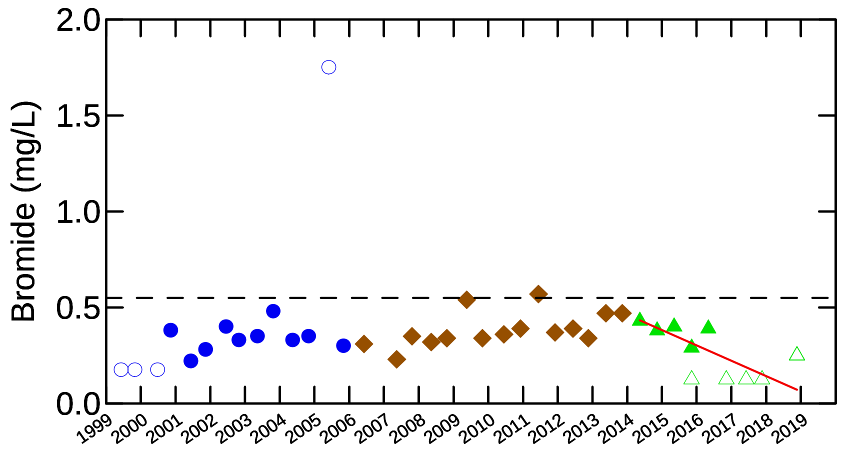
—— Linear Regression line

Notes:

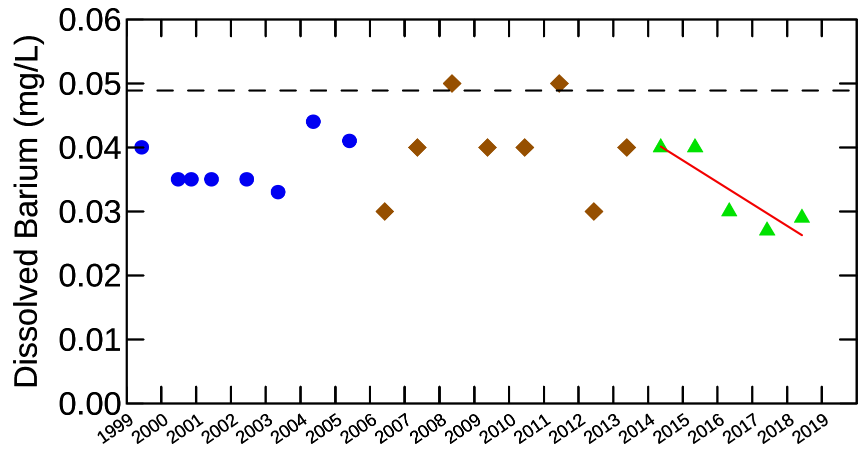
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW39-99S

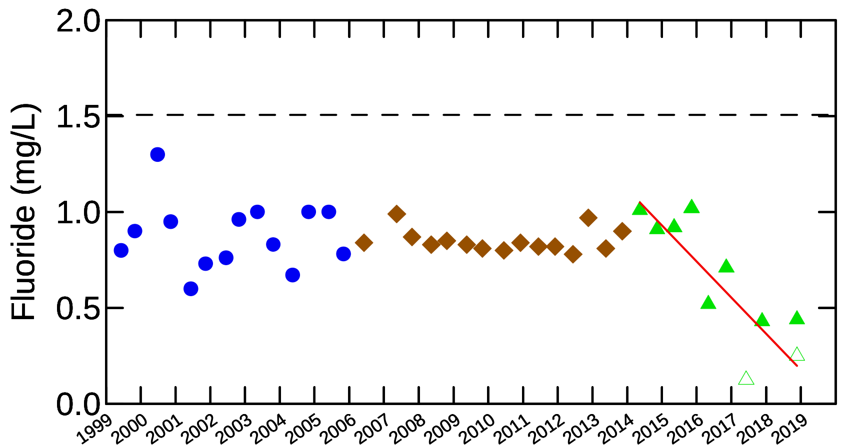
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



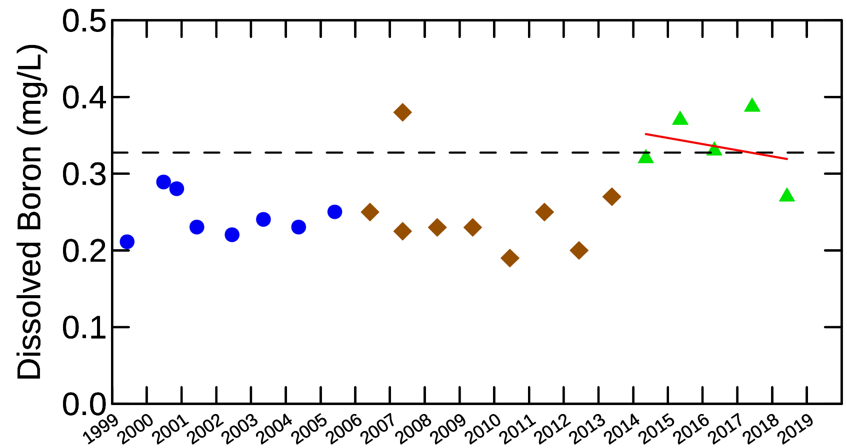
Decreasing trend



Decreasing trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

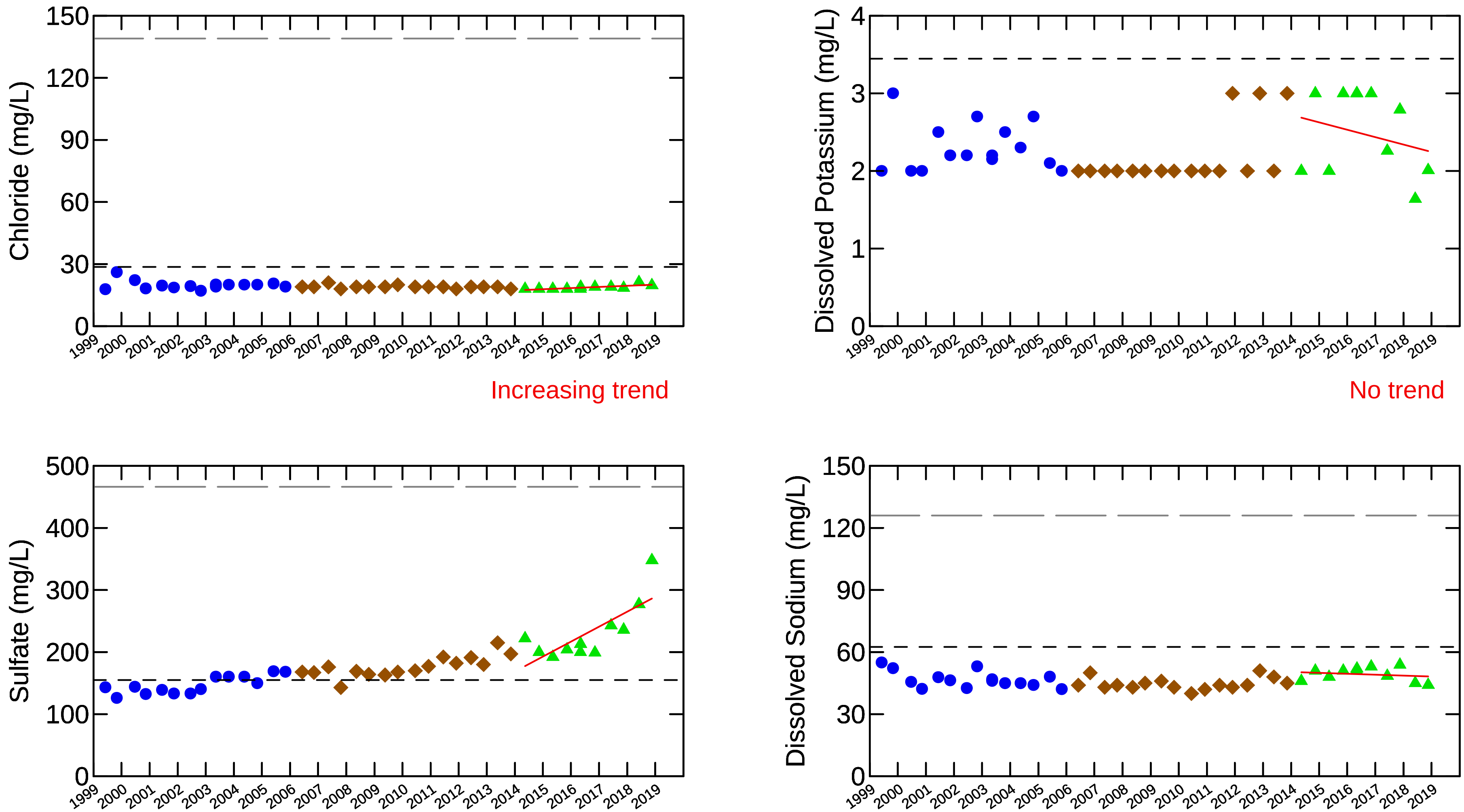
—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW39-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

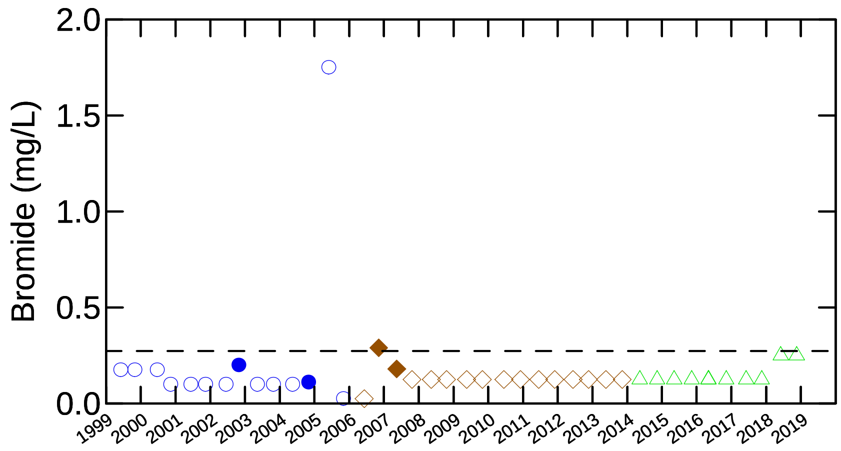
WELL TW40-99S

SHALLOW WELL (ACTIVE AQUITARD)

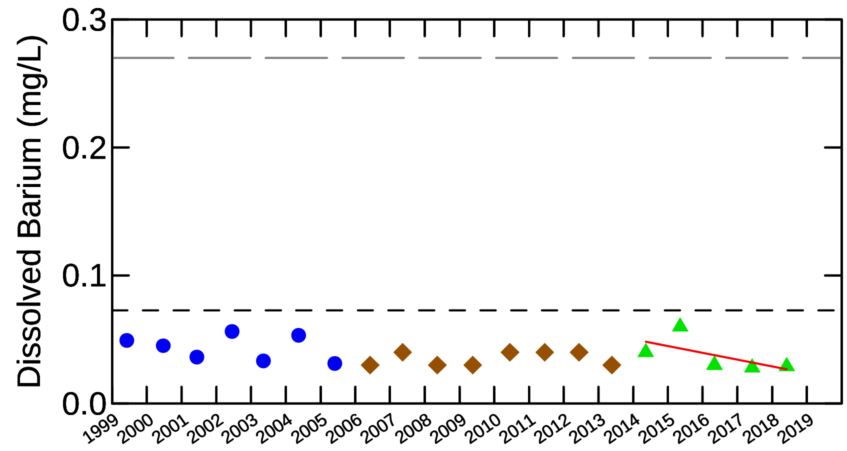
2018 GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA, INC.

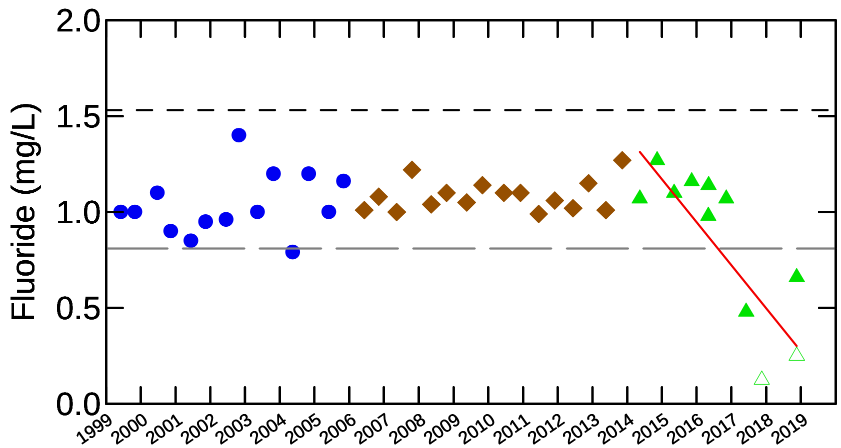
Lambton County, Ontario



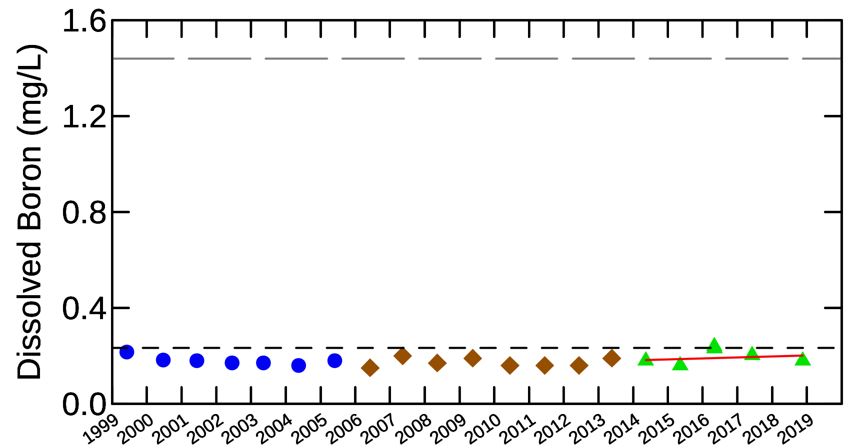
No detected results



No trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

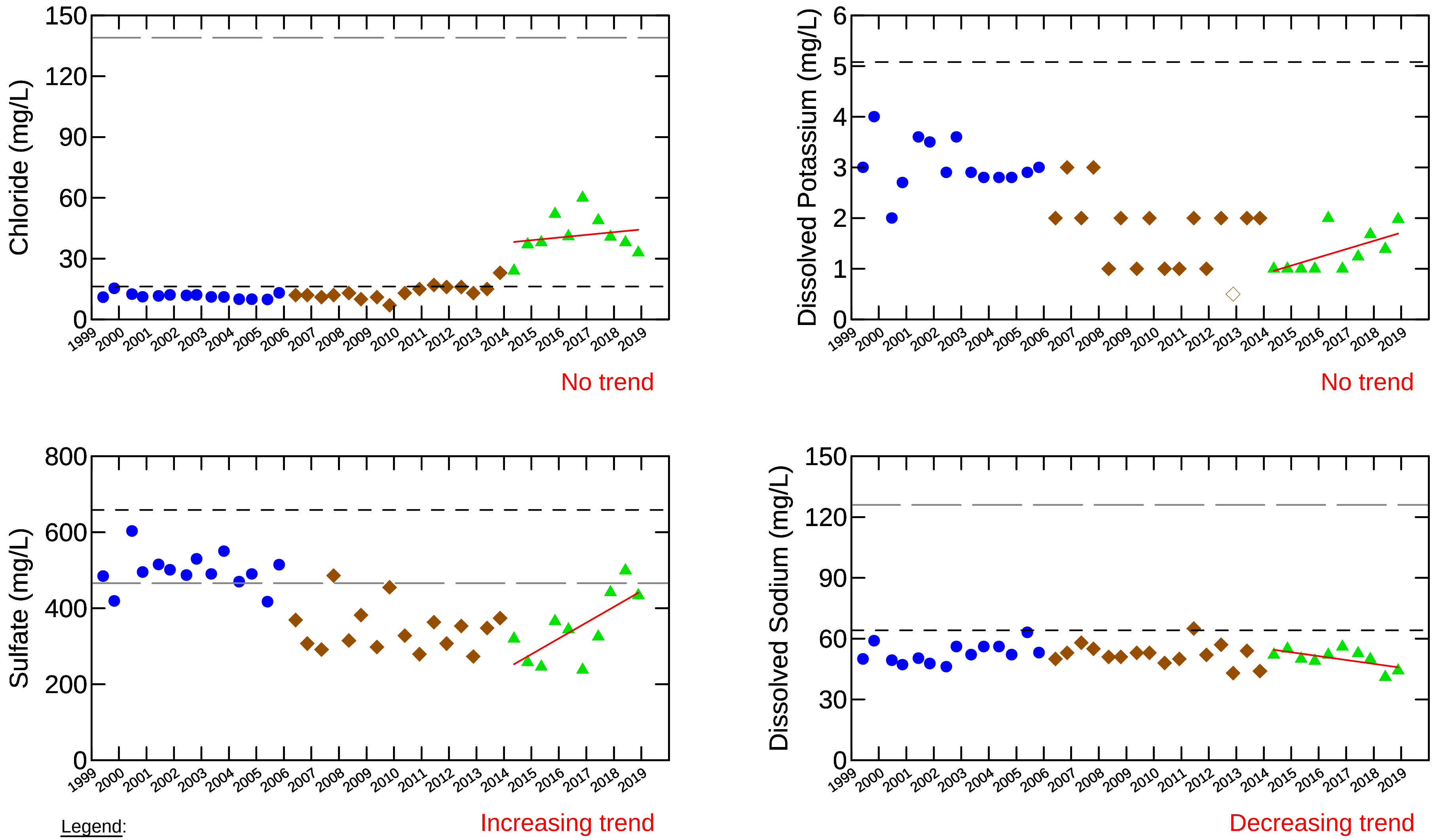
Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW40-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

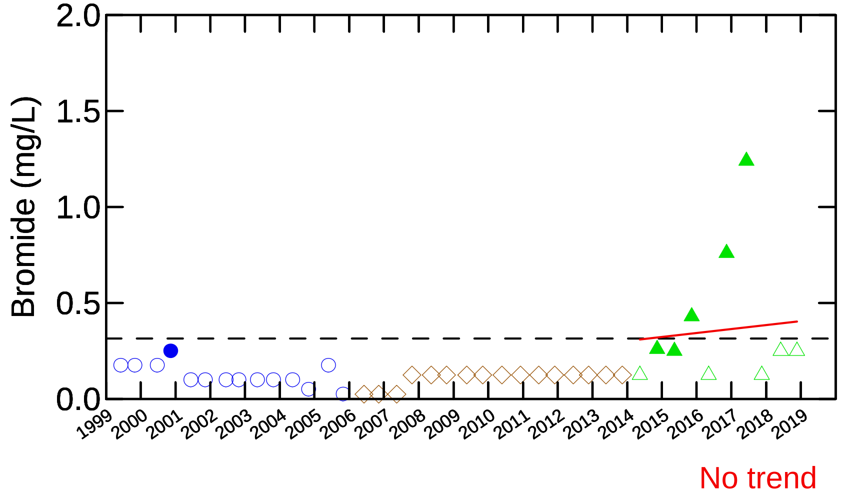
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

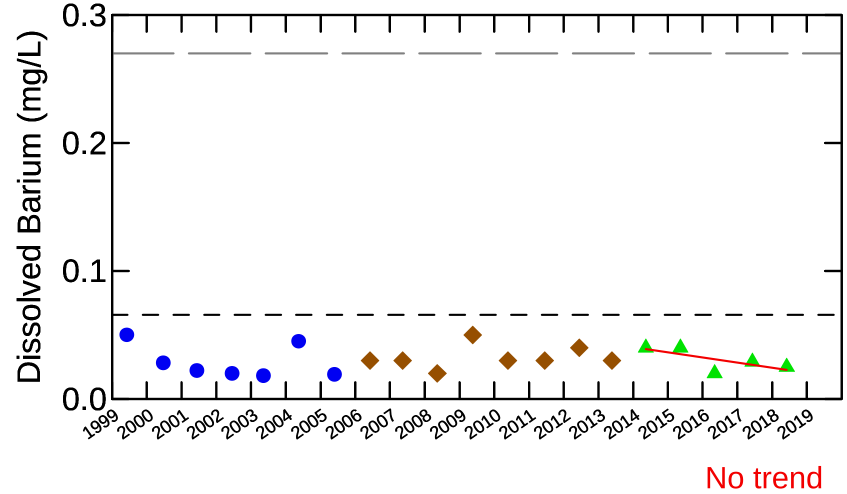
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

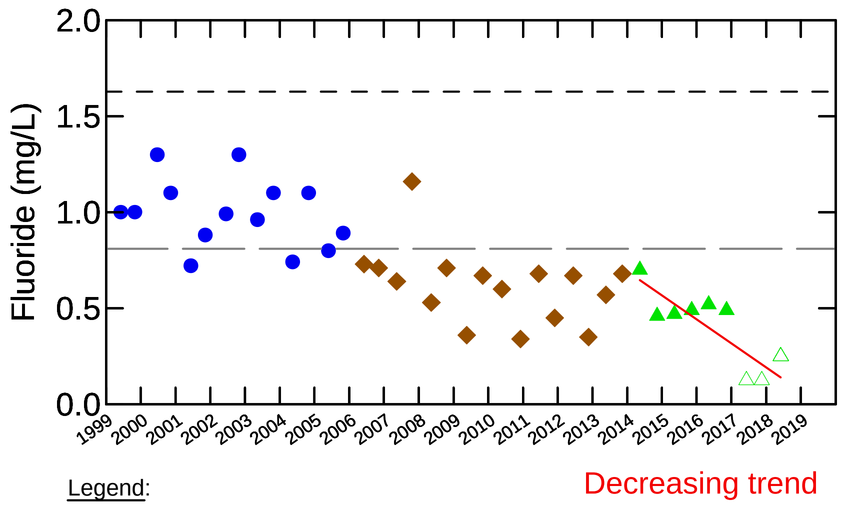
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

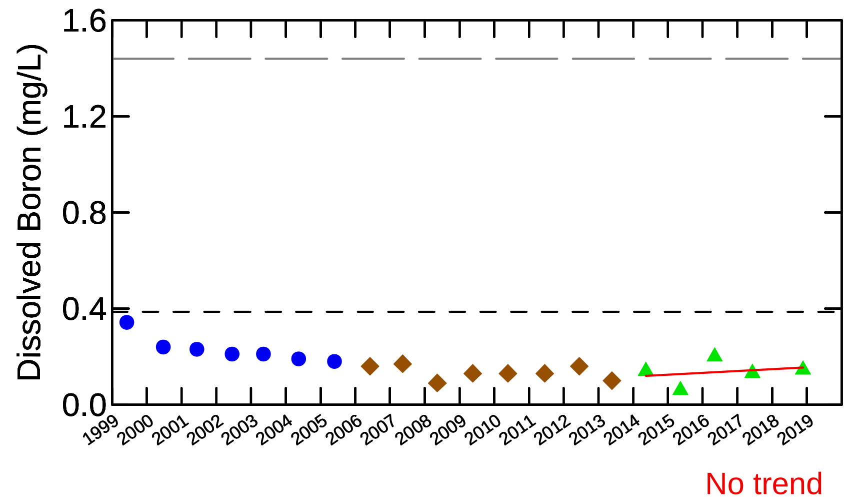
WELL TW41-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

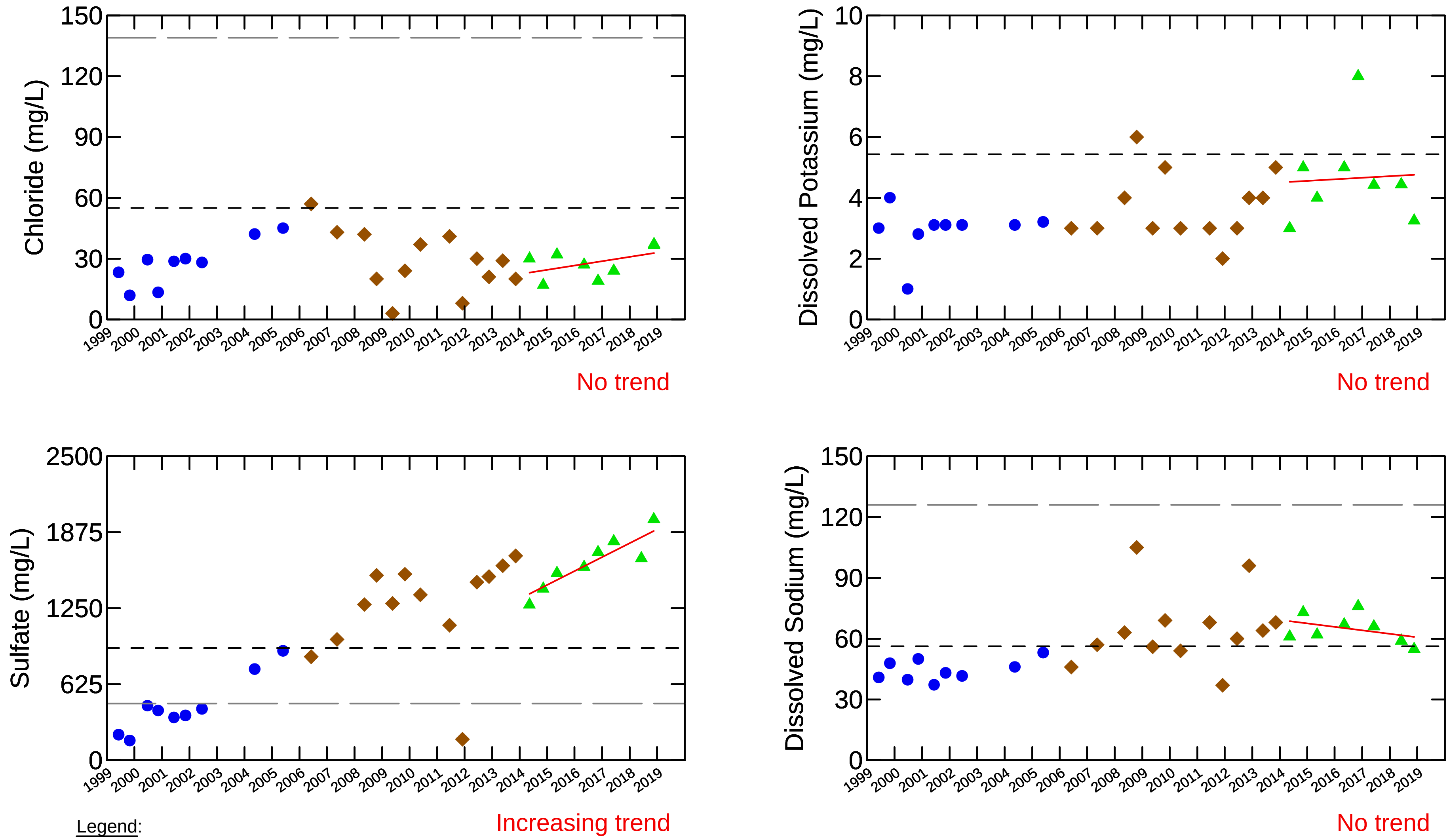
- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW41-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

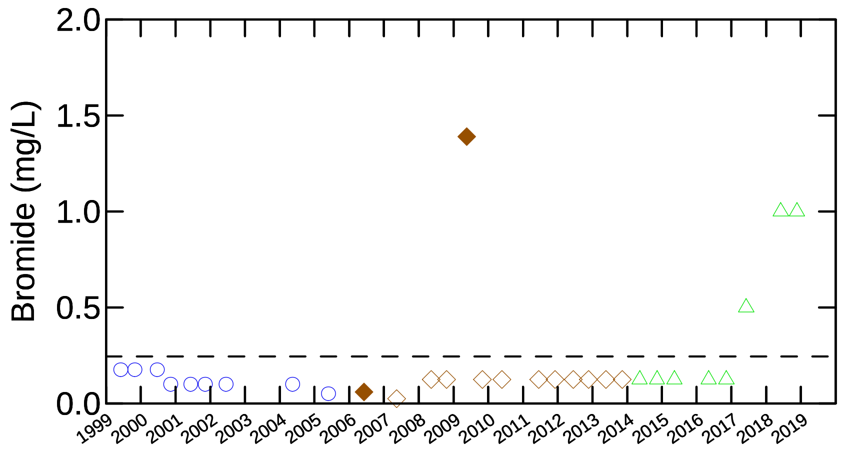
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

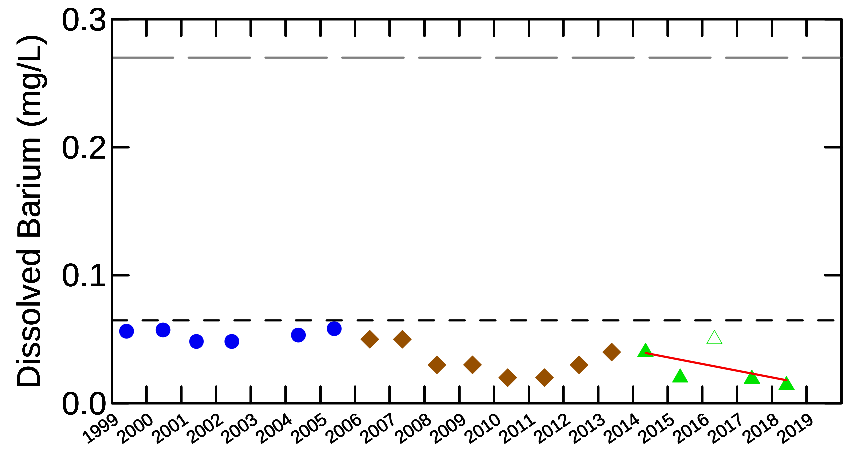
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW42-99S

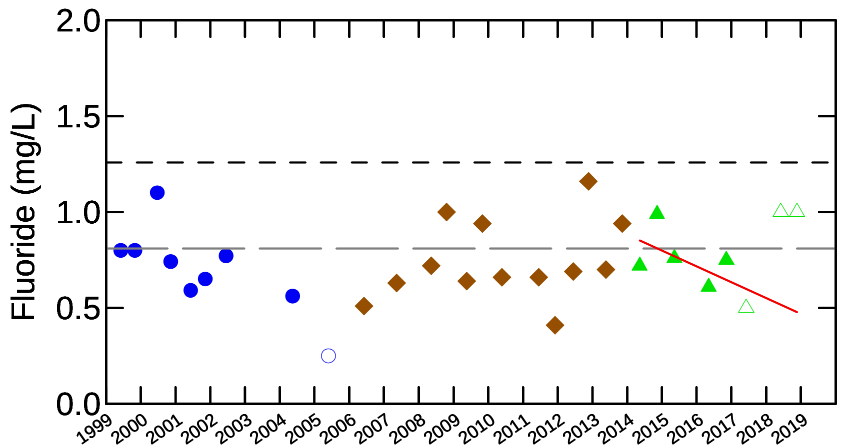
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



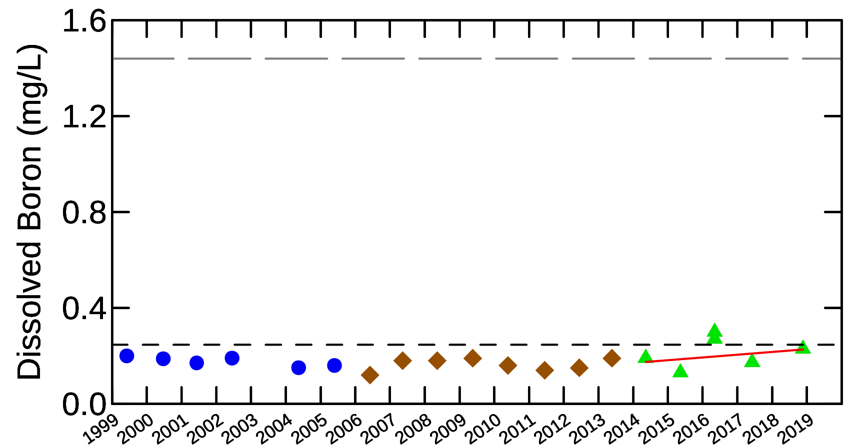
No detected results



No trend



N/A (see Table)



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

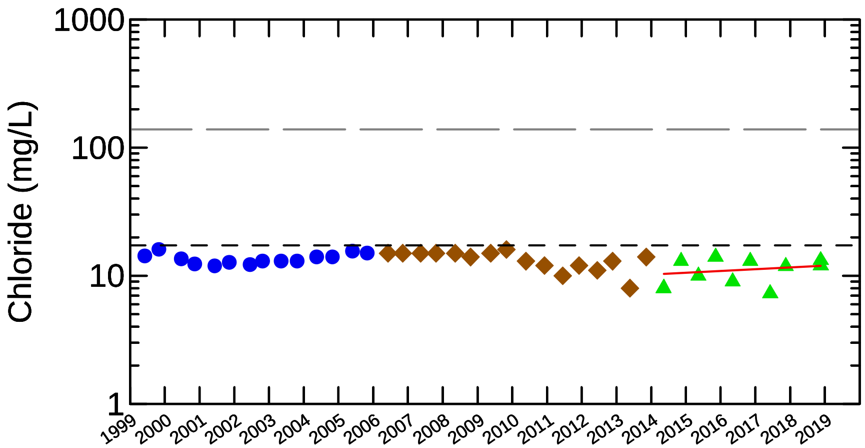
Baseline Upper Confidence Limit (UCL)

Linear Regression line

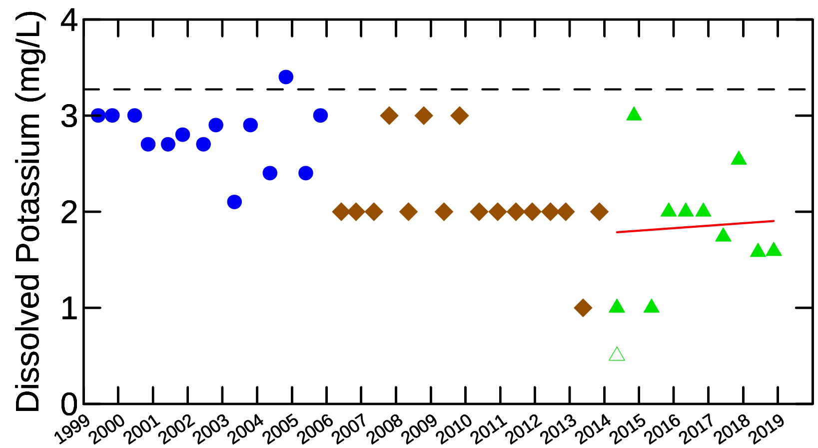
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW42-99S

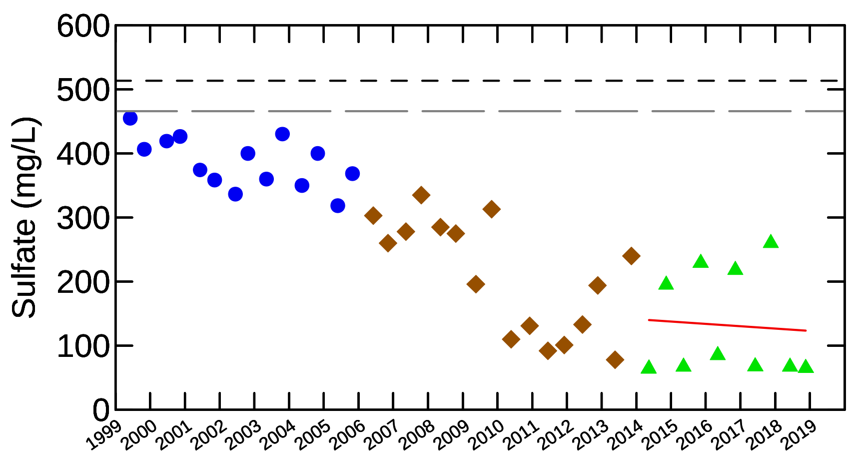
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



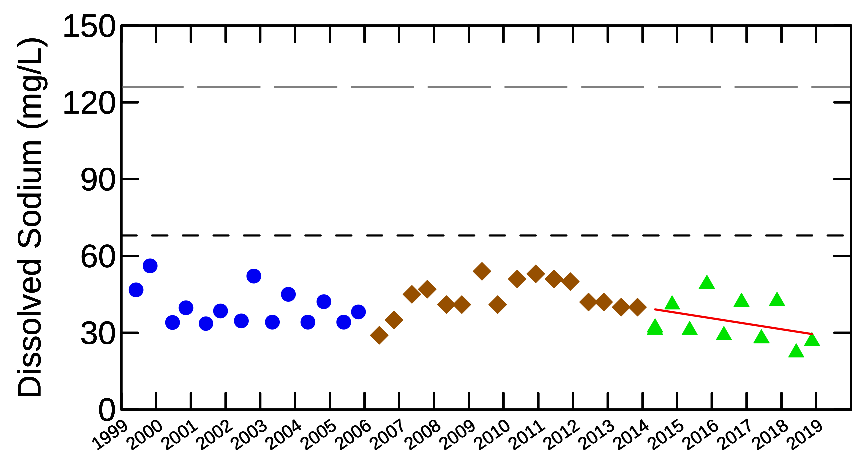
No trend



No trend



No trend



No trend

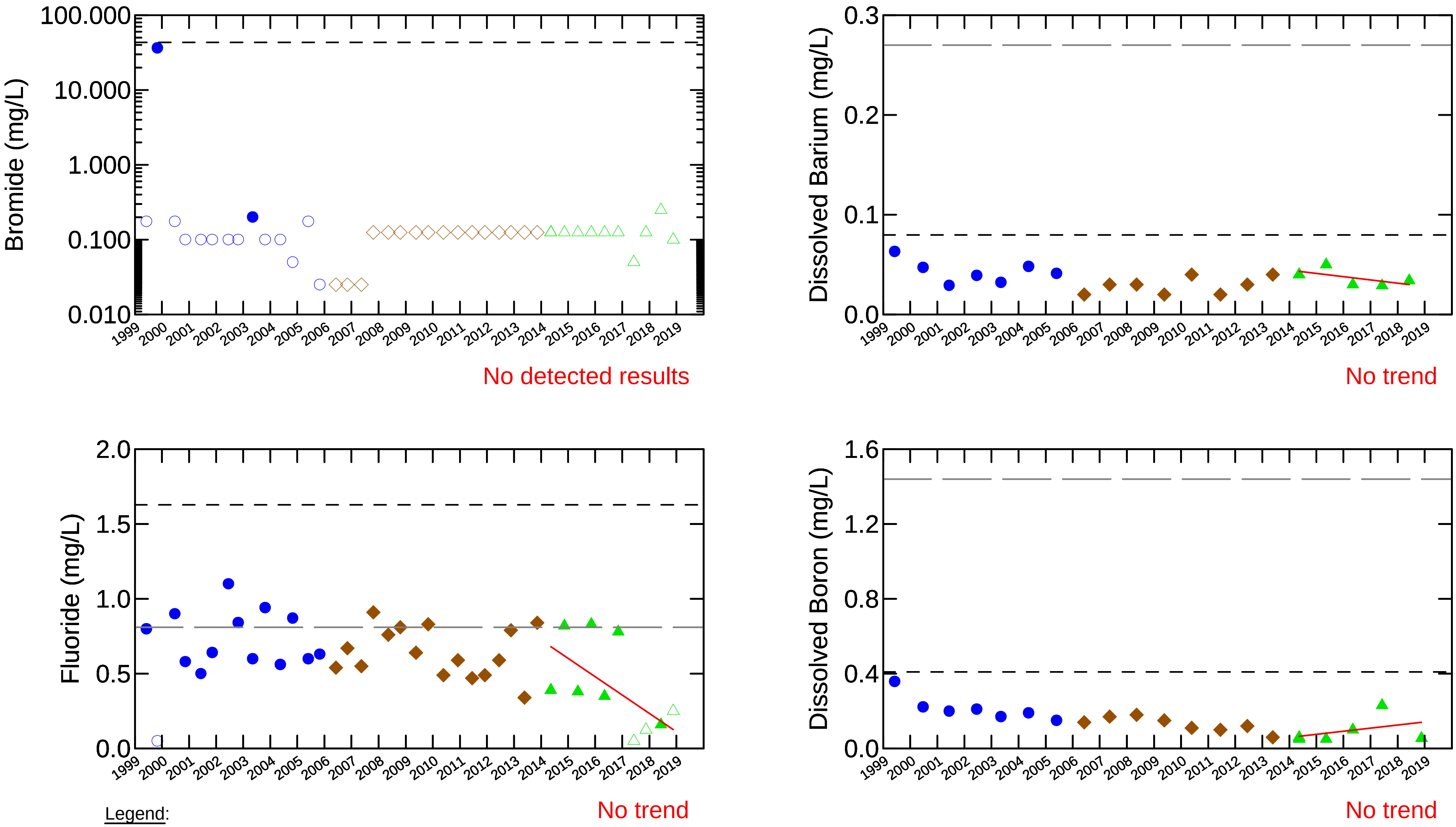
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW43-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

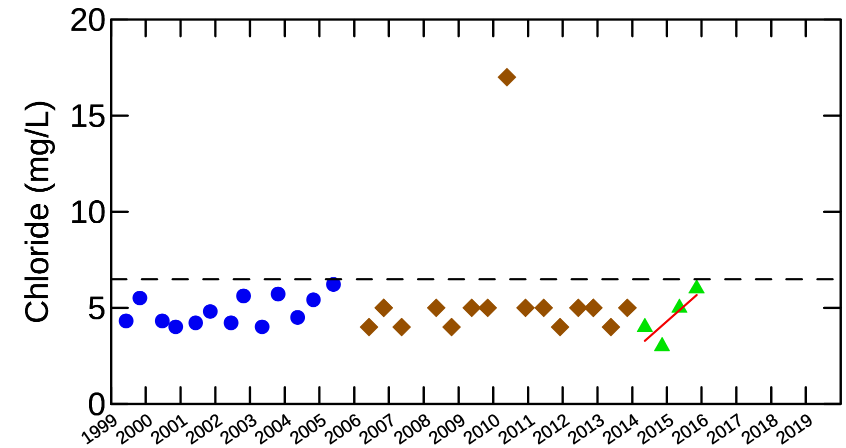
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

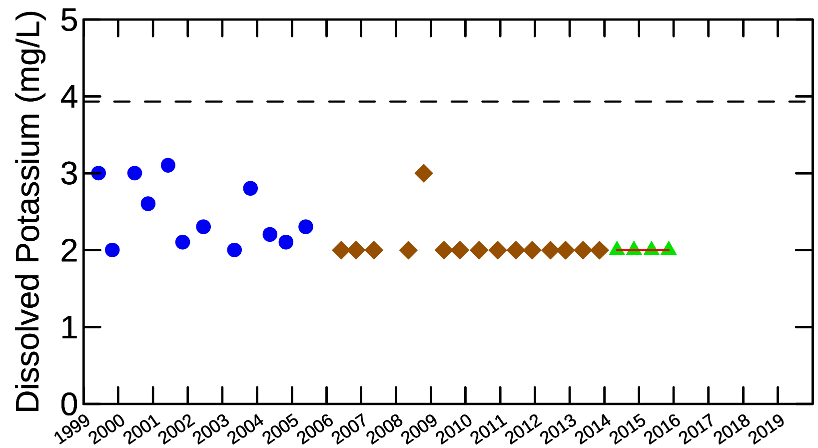
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW43-99S

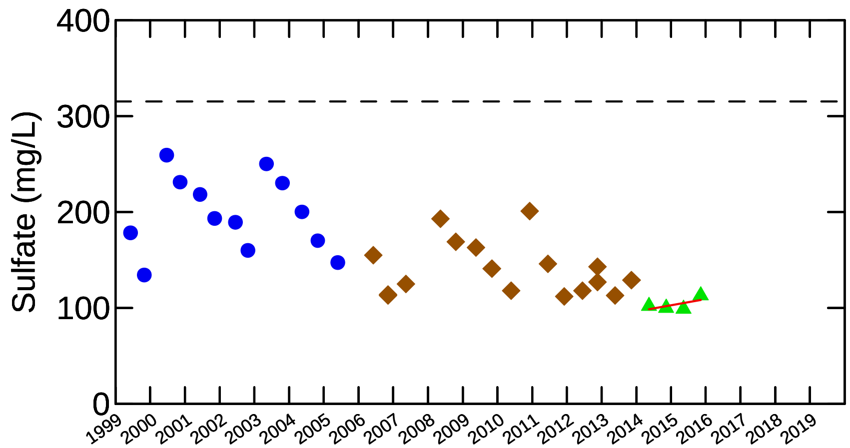
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



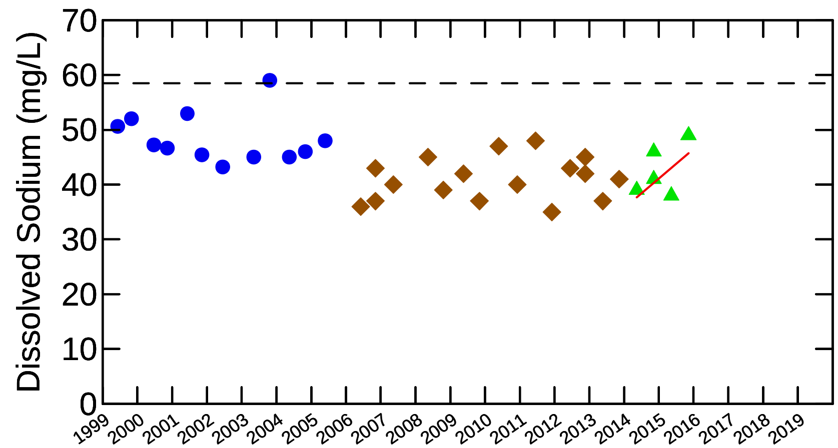
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

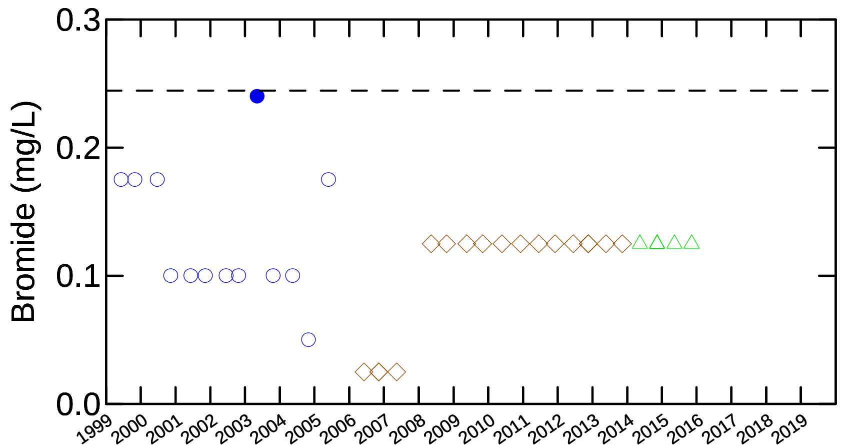
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

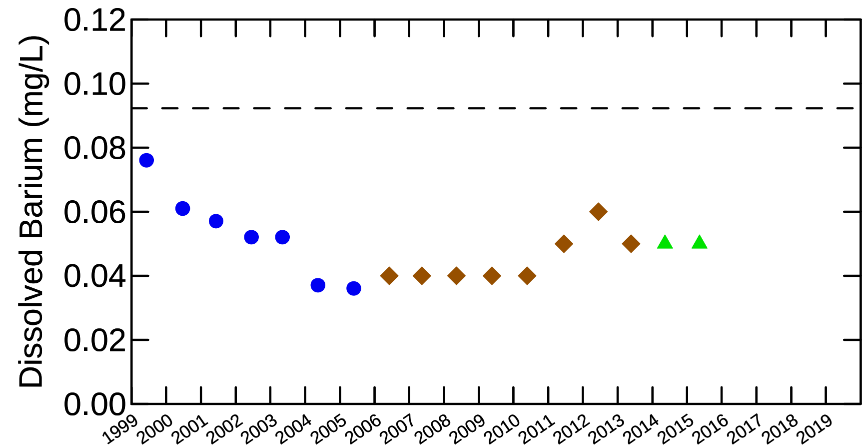
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW44-99S

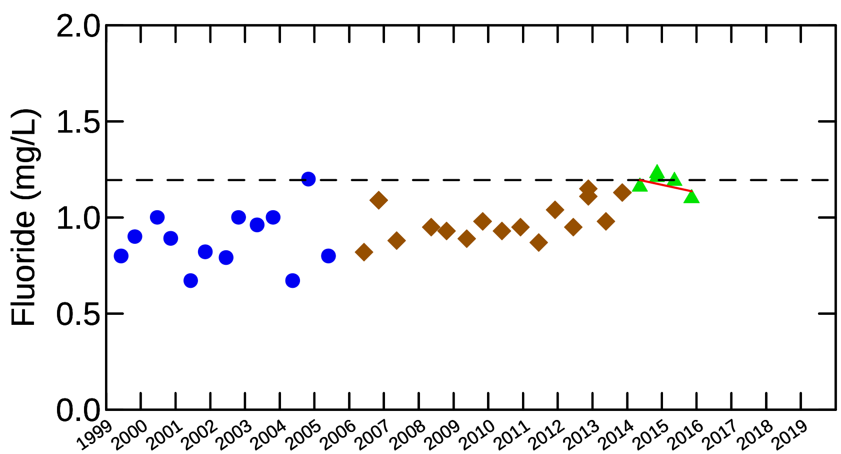
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



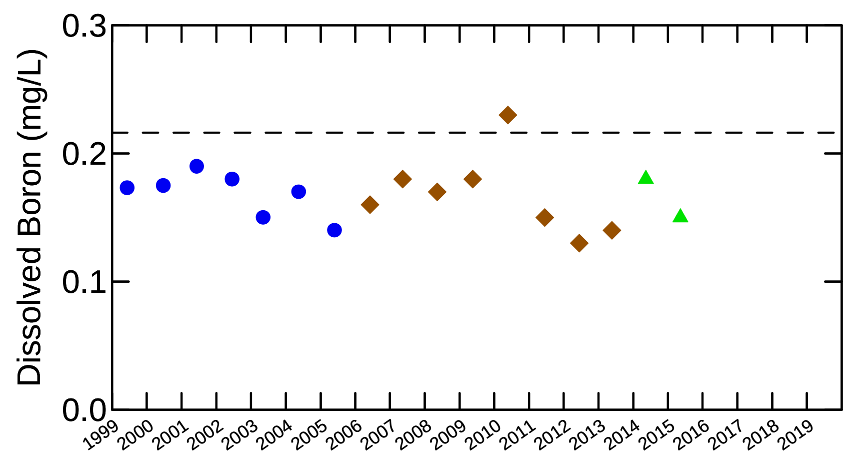
No detected results



Insufficient Data



No trend



Insufficient Data

Legend:

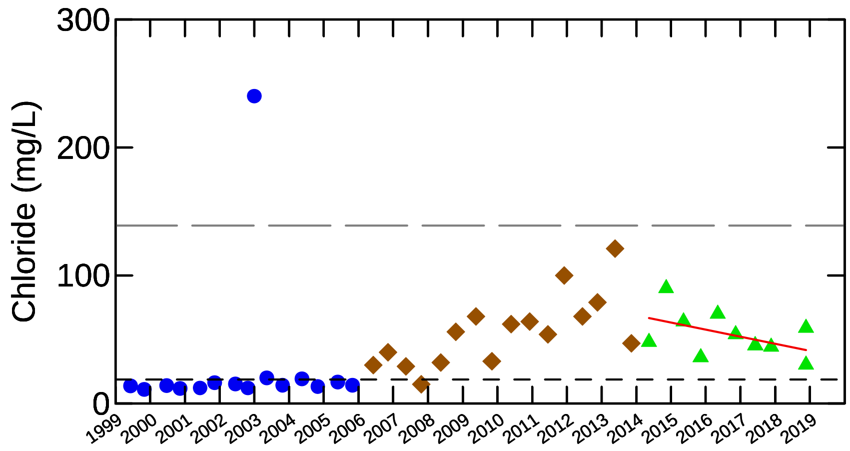
- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- — — Baseline Upper Confidence Limit (UCL)
- —— Linear Regression line

Notes:

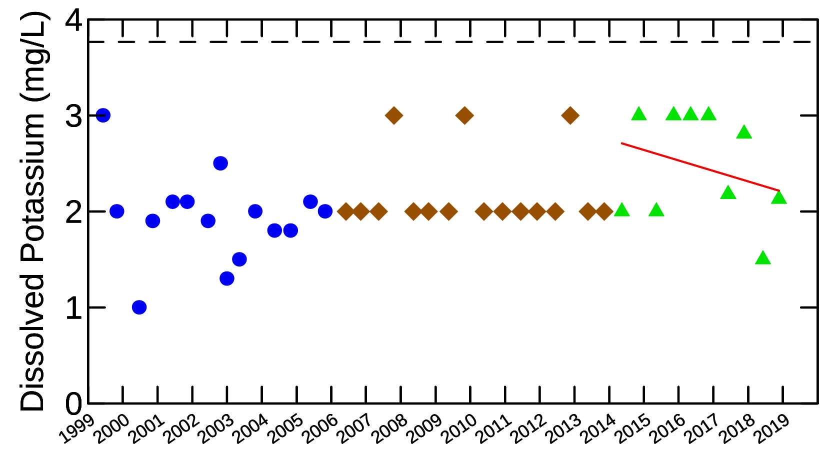
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW44-99S

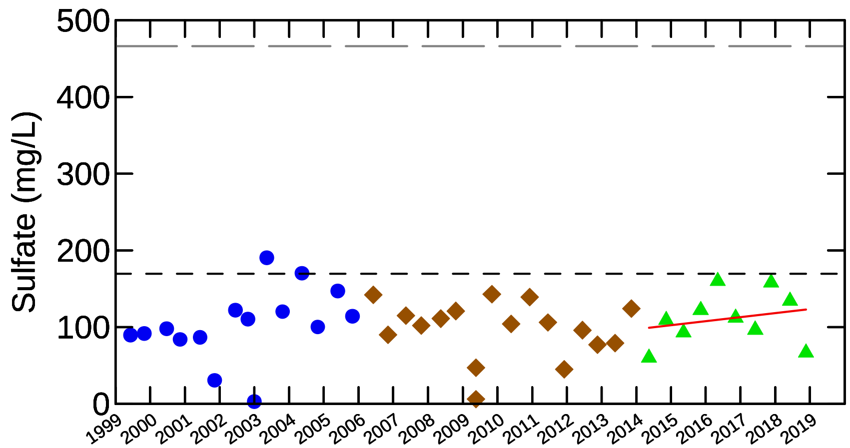
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



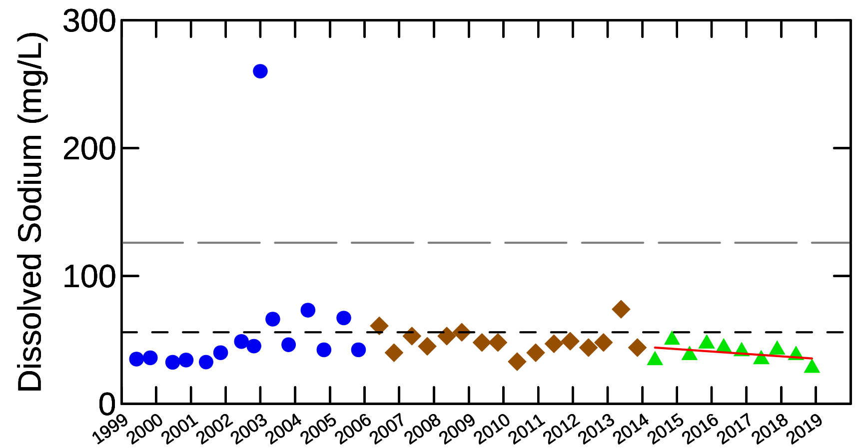
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)

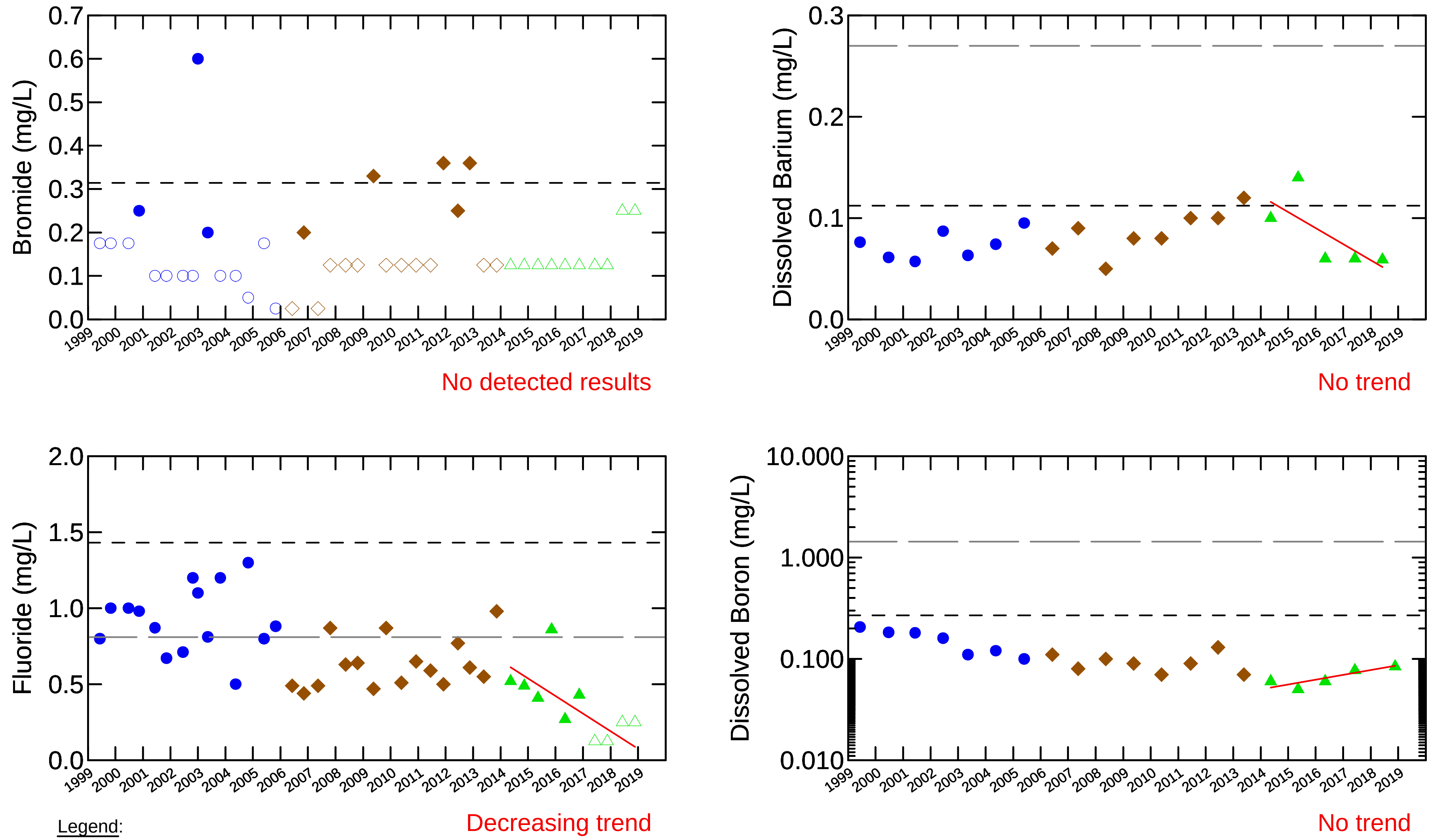
Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW45-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



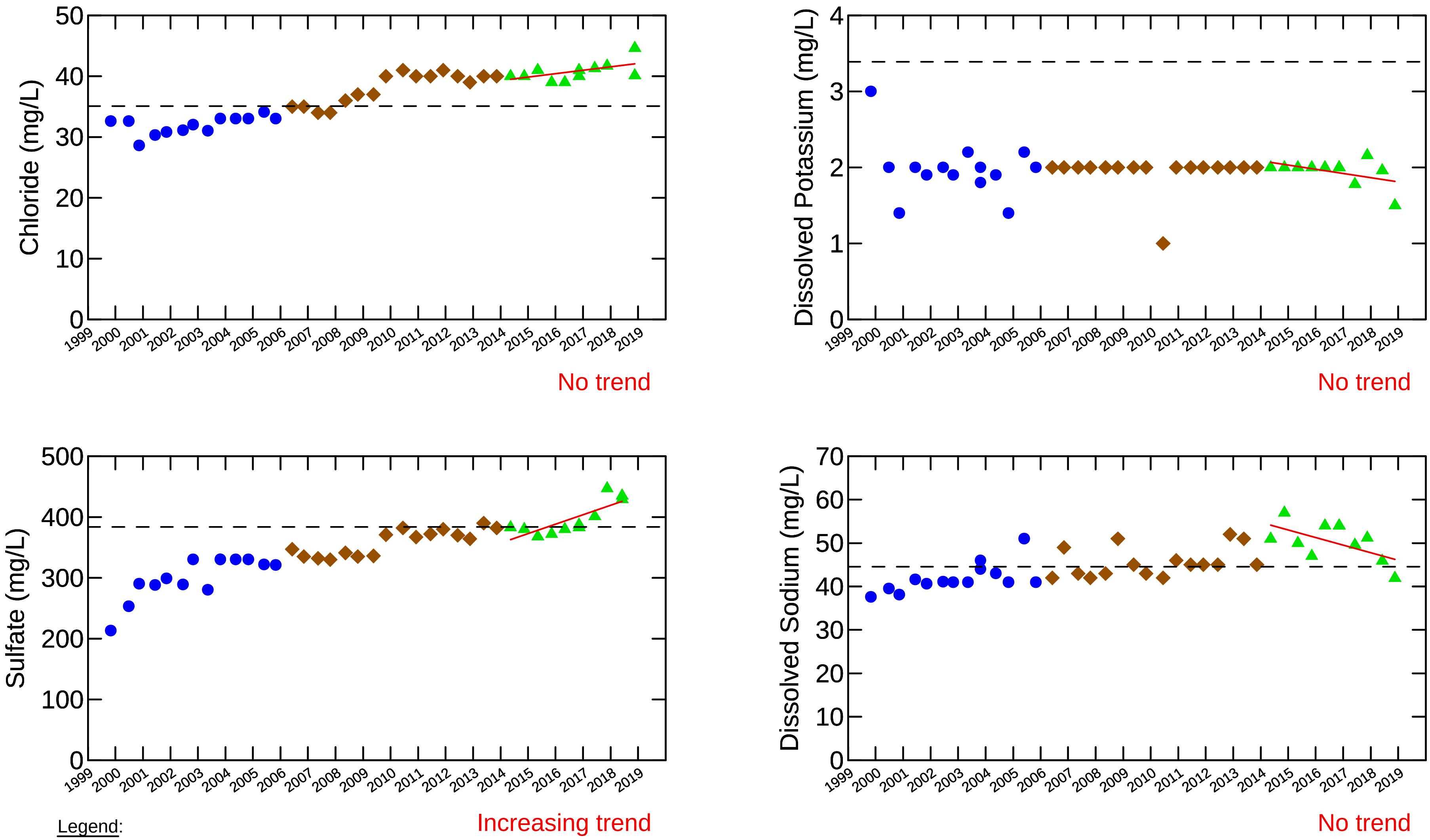
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW45-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

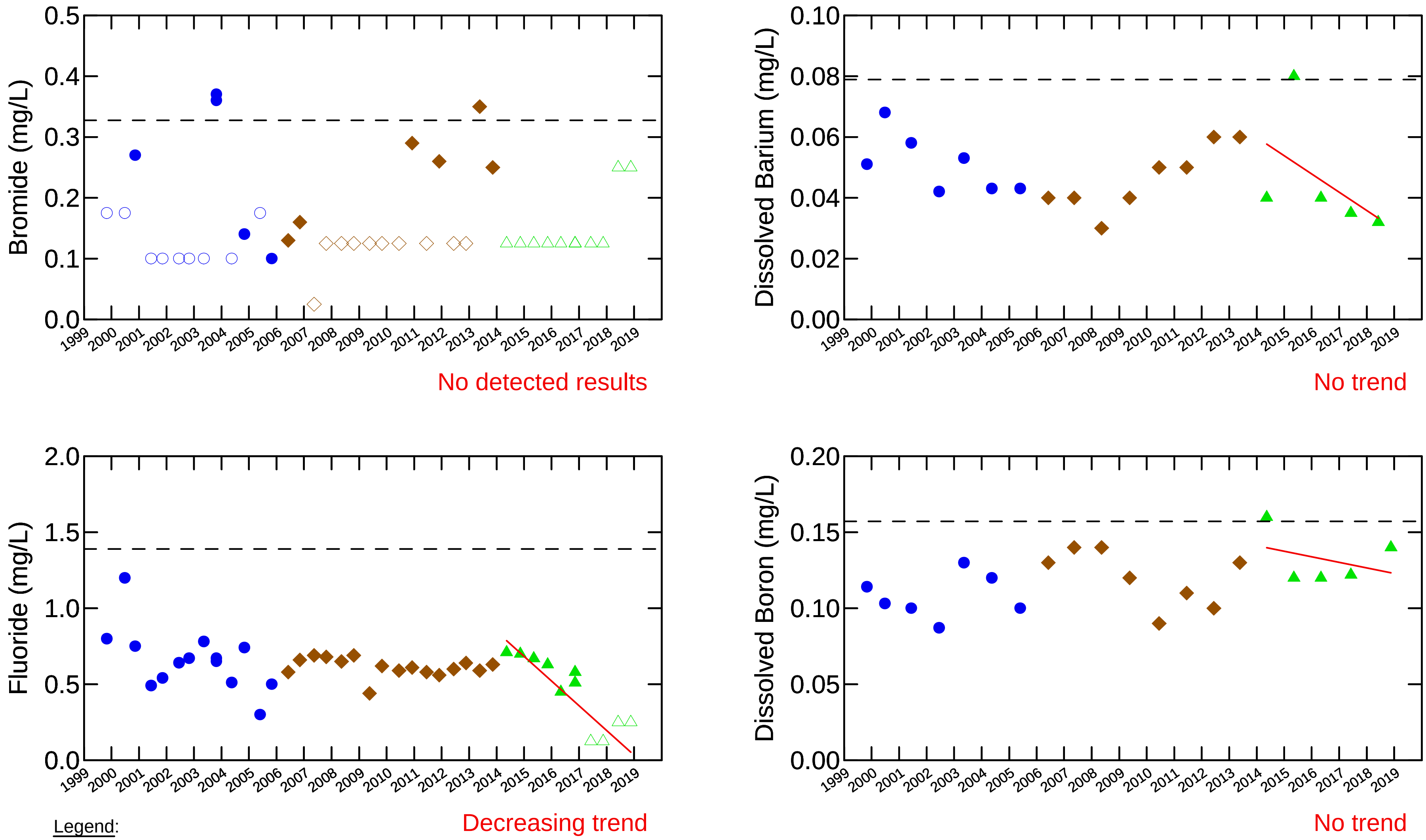
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)

Baseline Upper Confidence Limit (UCL)
Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW46-99I

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

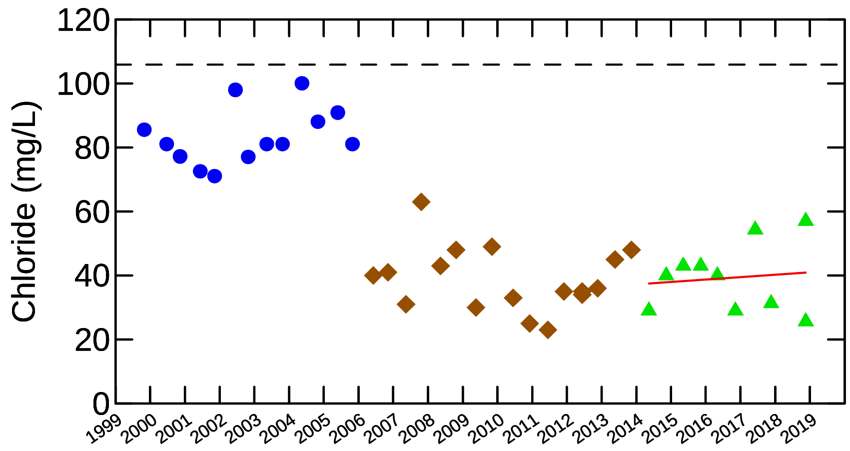
—— Linear Regression line

Notes:

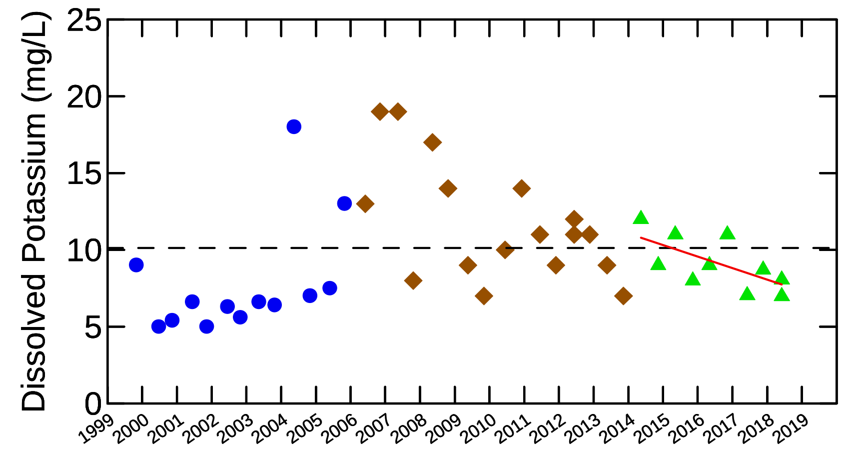
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW46-99I

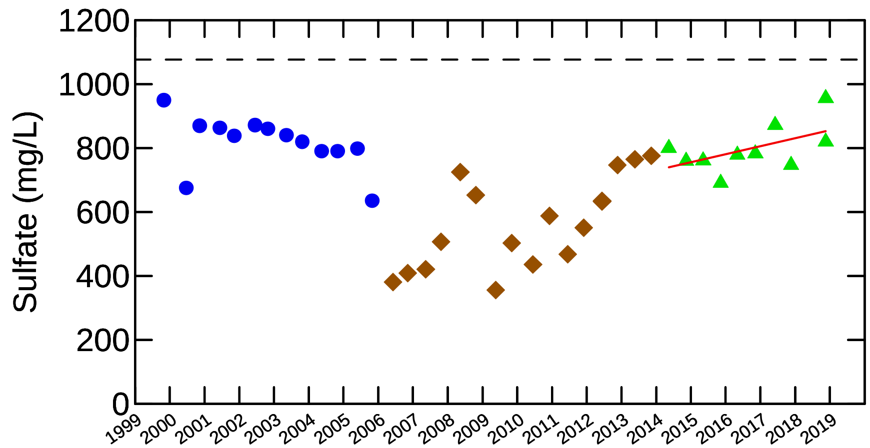
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



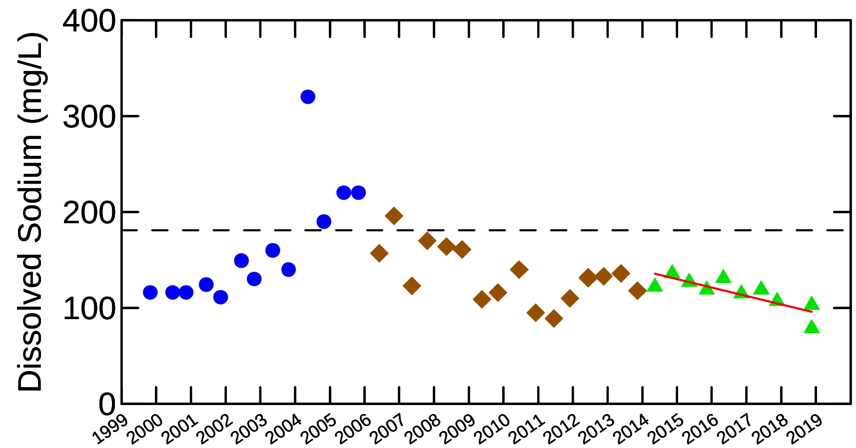
No trend



Decreasing trend



No trend



Decreasing trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

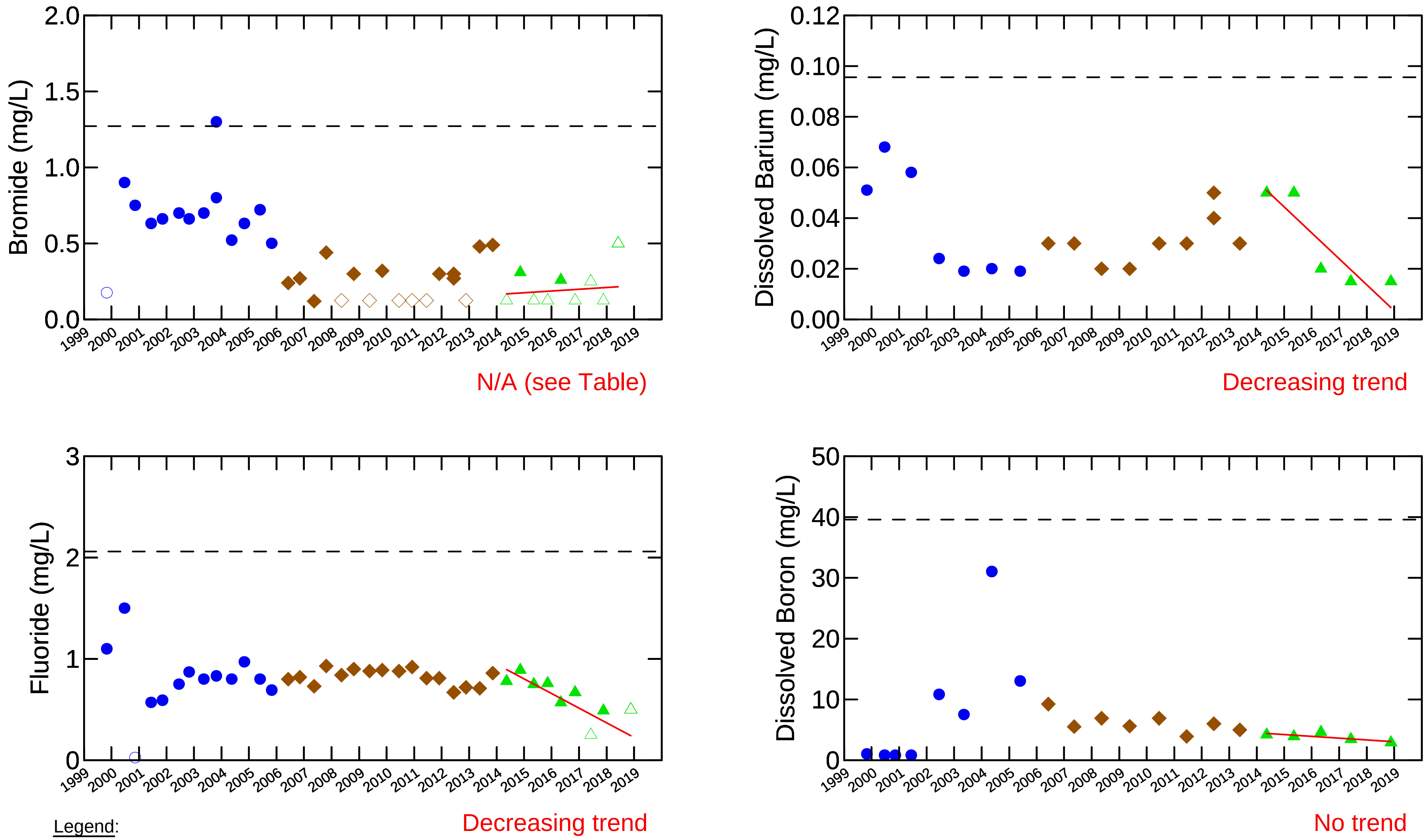
– – Baseline Upper Confidence Limit (UCL)

— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW46-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

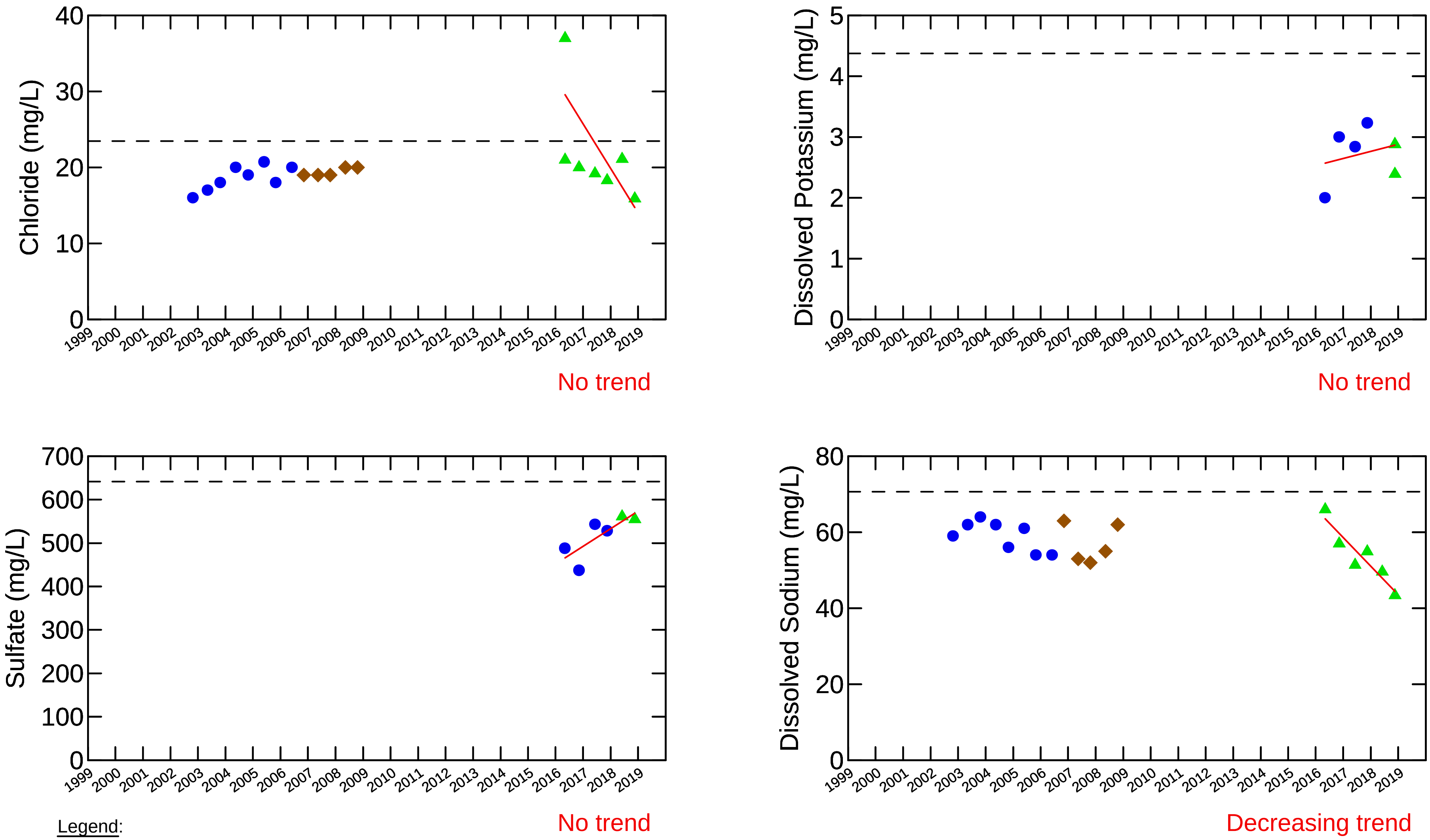
– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW46-99S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

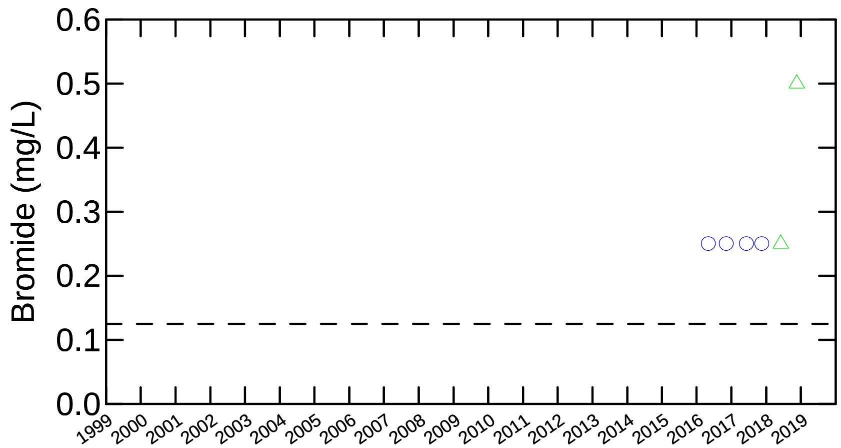
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

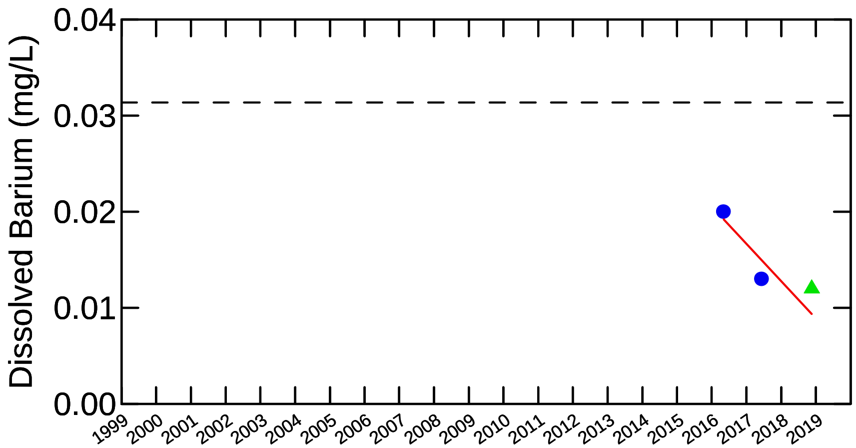
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW50-02A

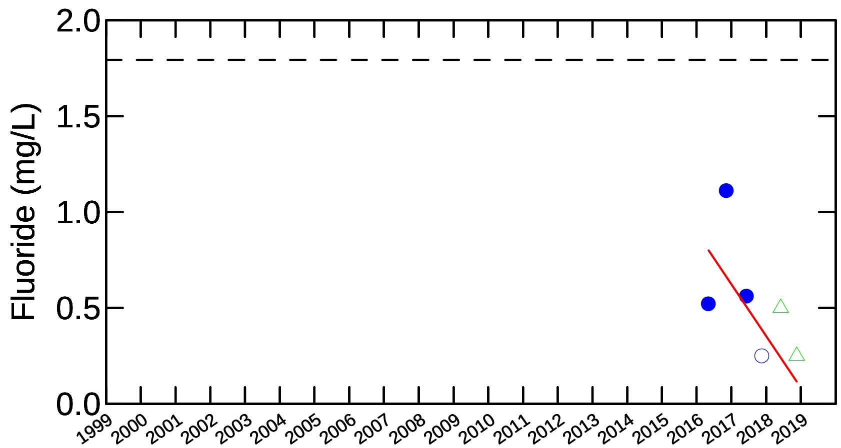
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



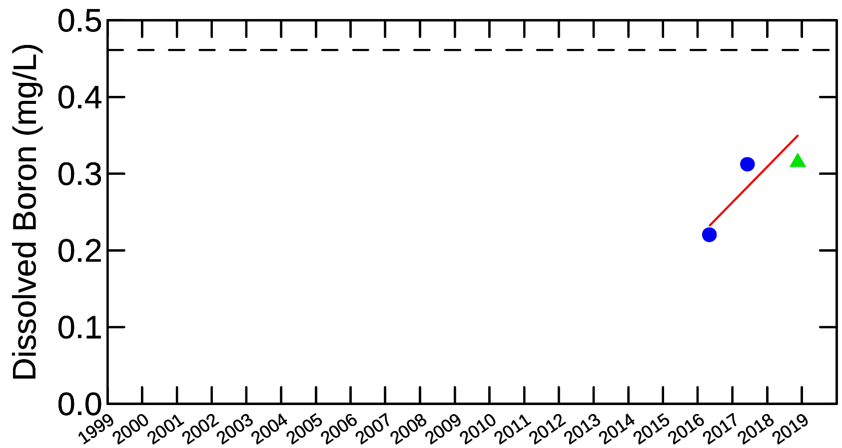
No detected results



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

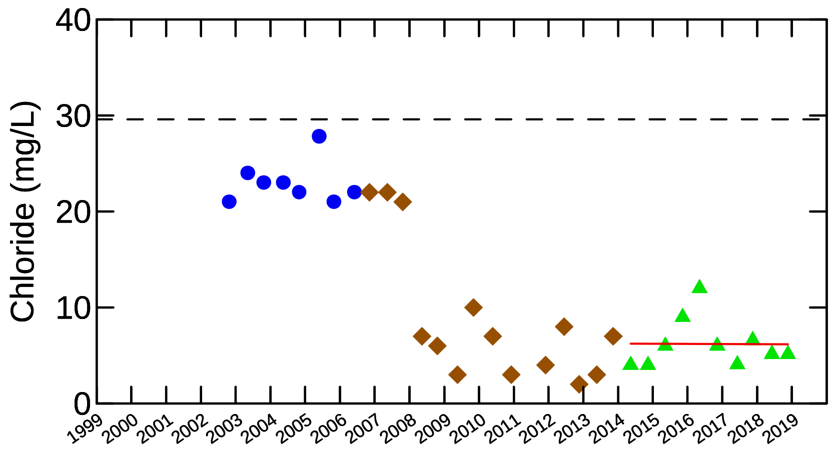
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

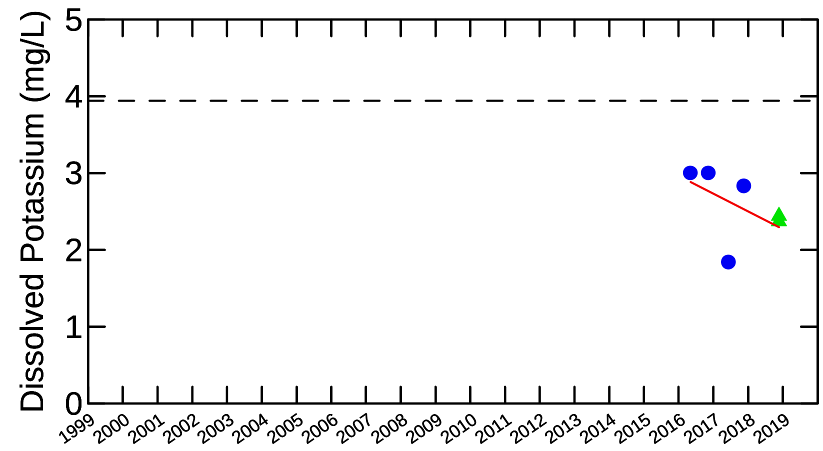
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW50-02A

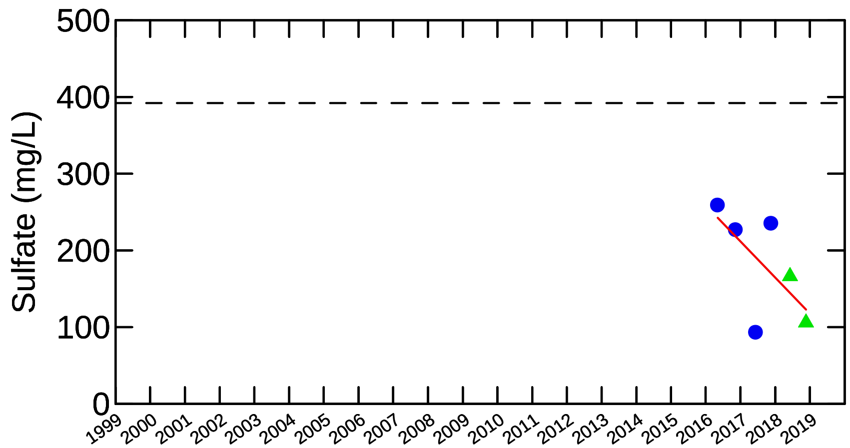
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



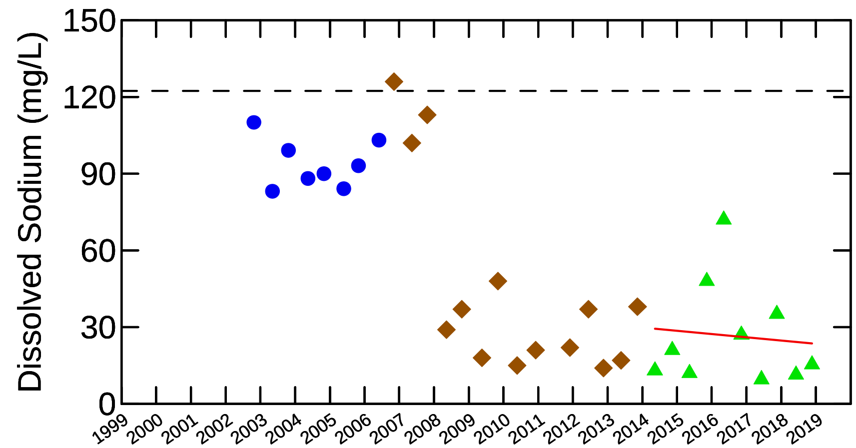
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

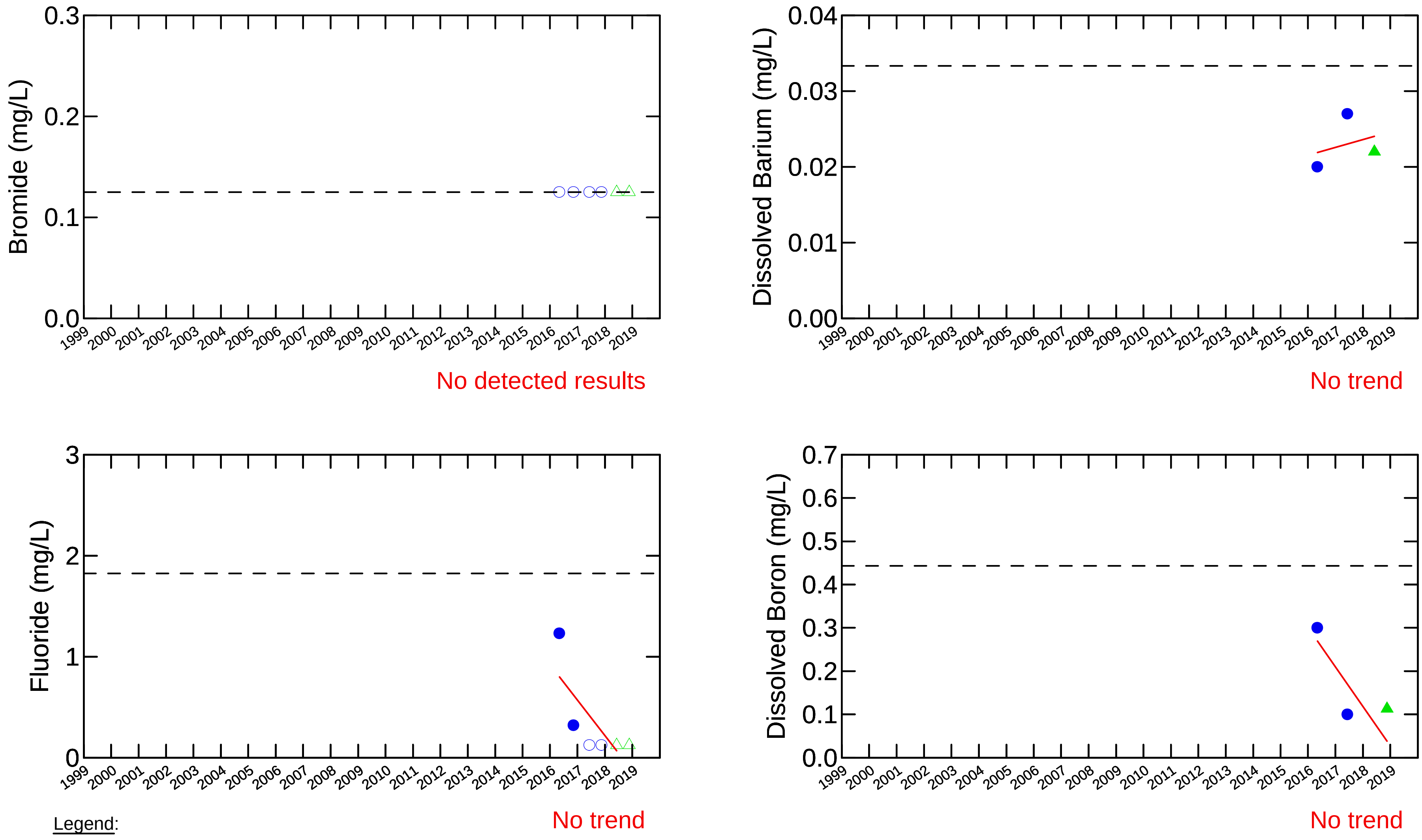
—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW50-02B

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

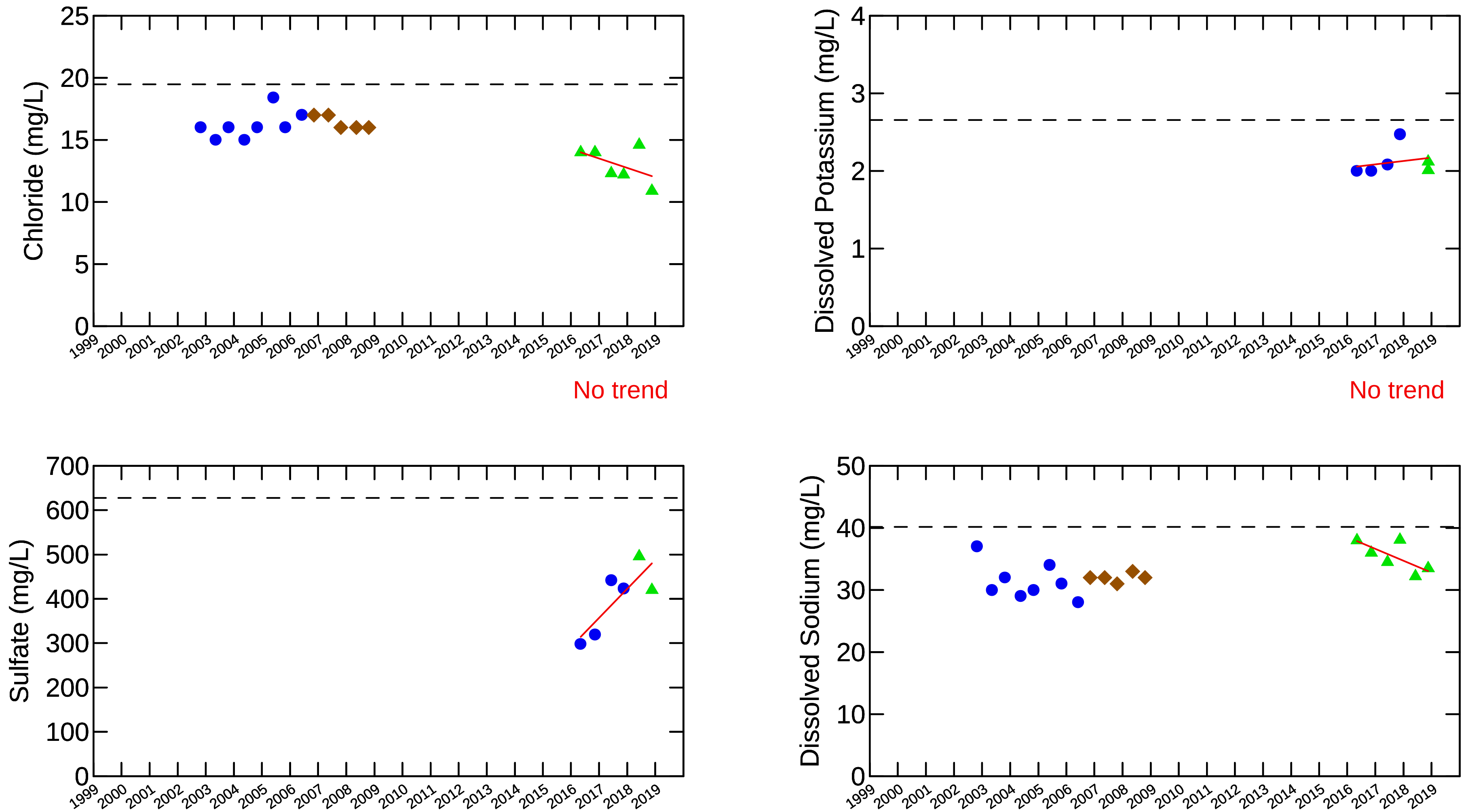
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW50-02B

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



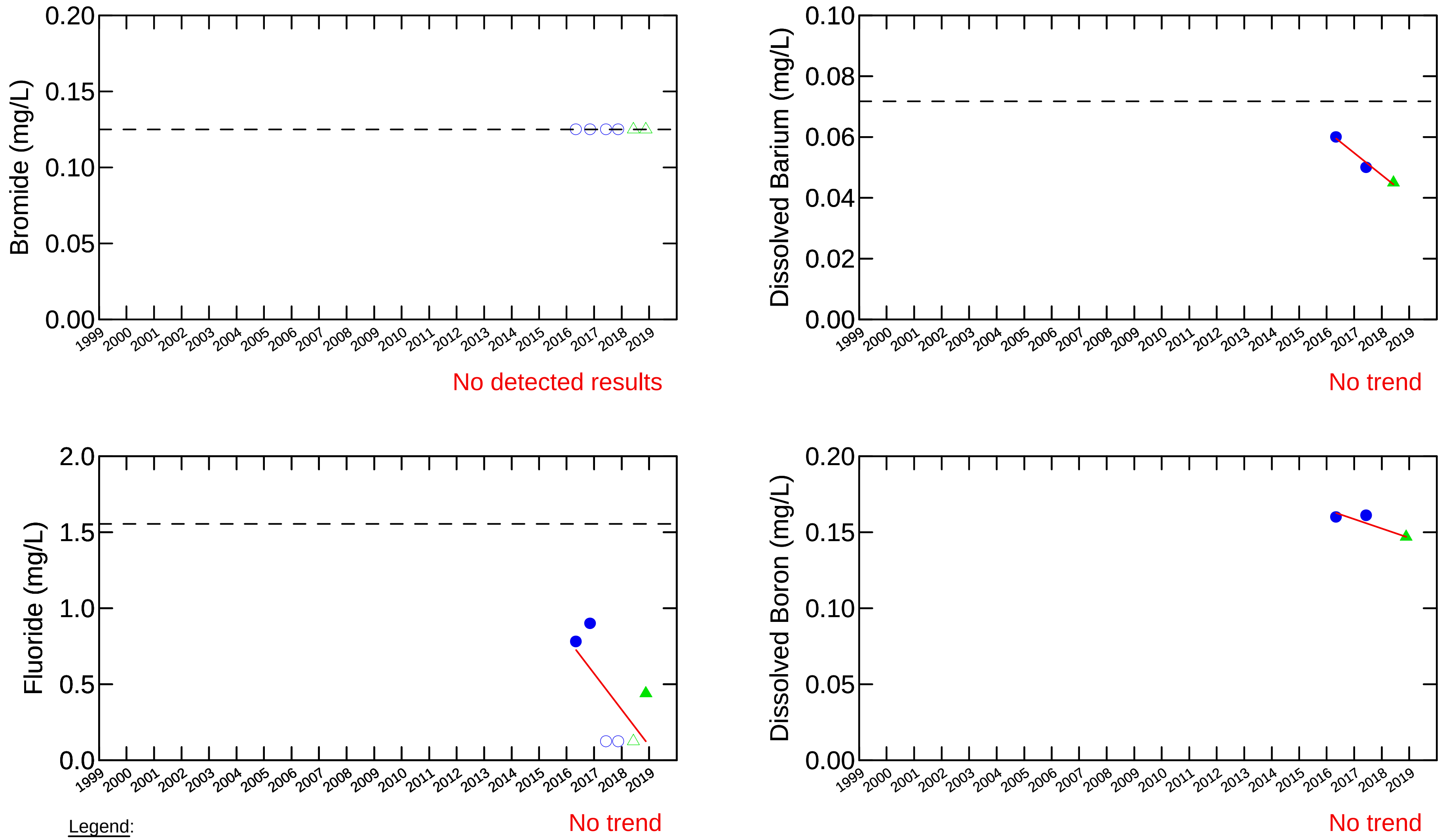
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW51-02A

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

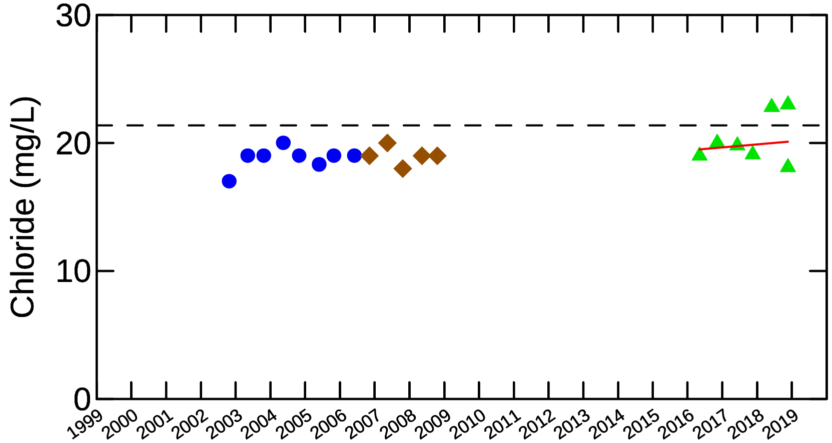
—— Linear Regression line

Notes:

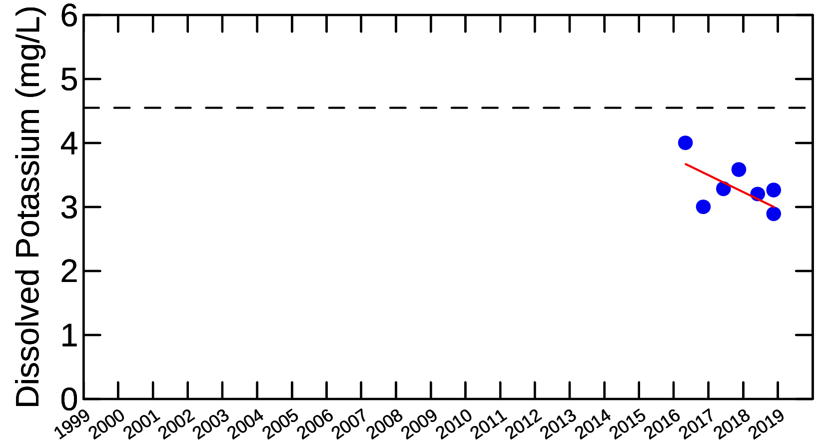
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW51-02A

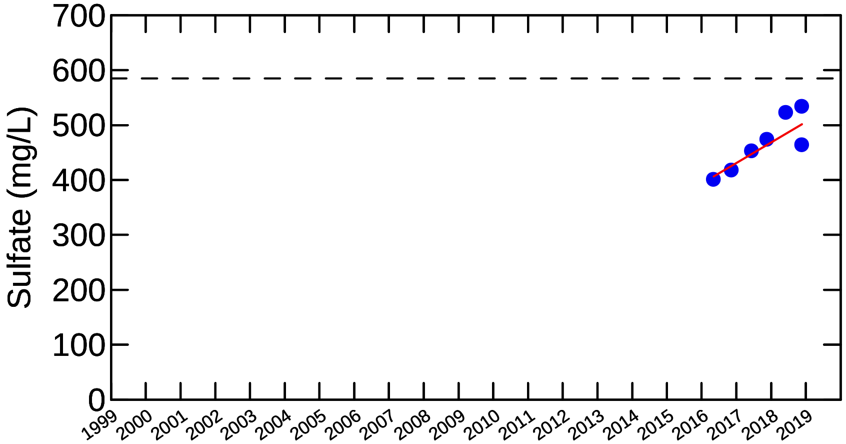
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



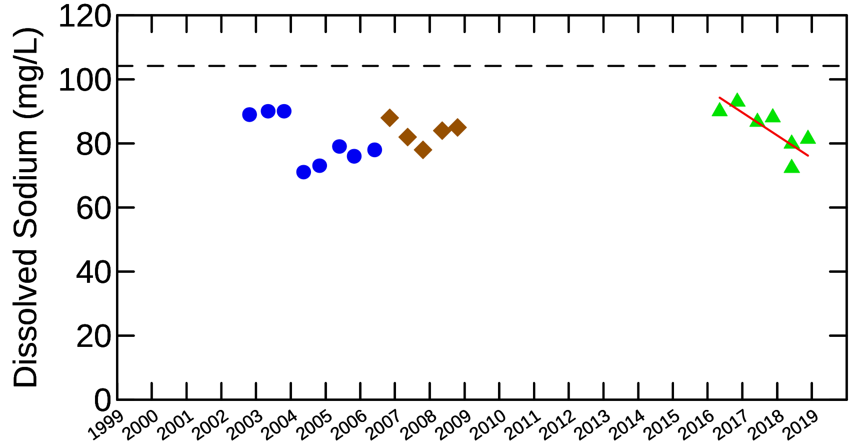
No trend



No trend



Increasing trend



Decreasing trend

Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

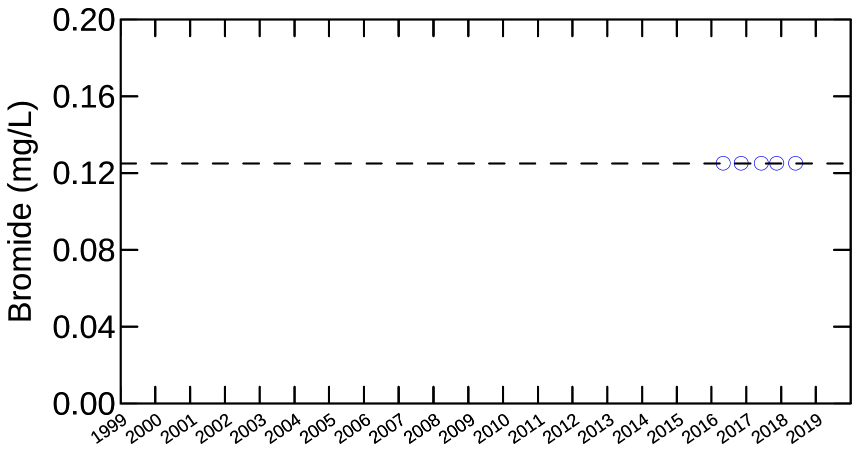
—— Linear Regression line

Notes:

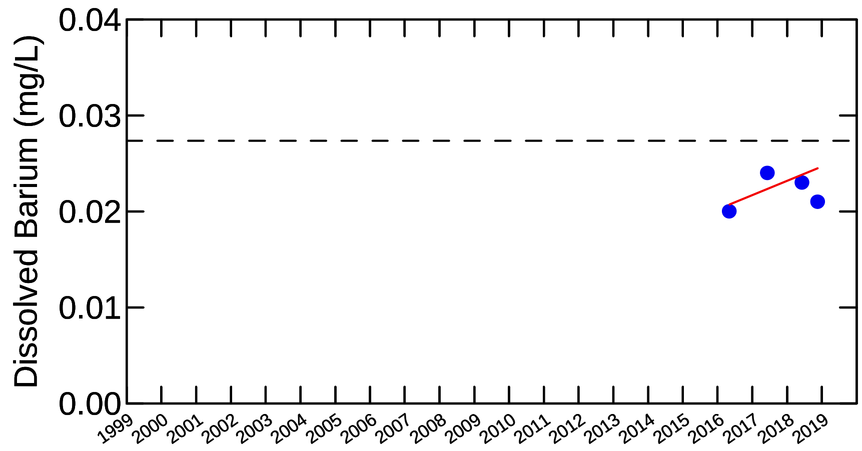
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW51-02B

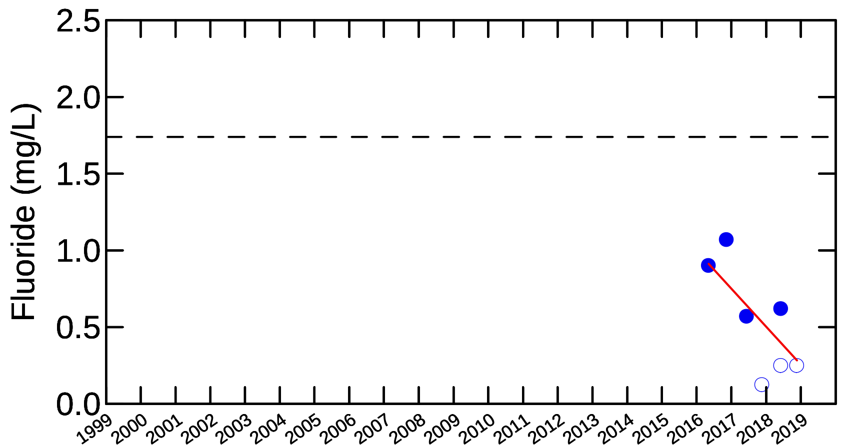
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



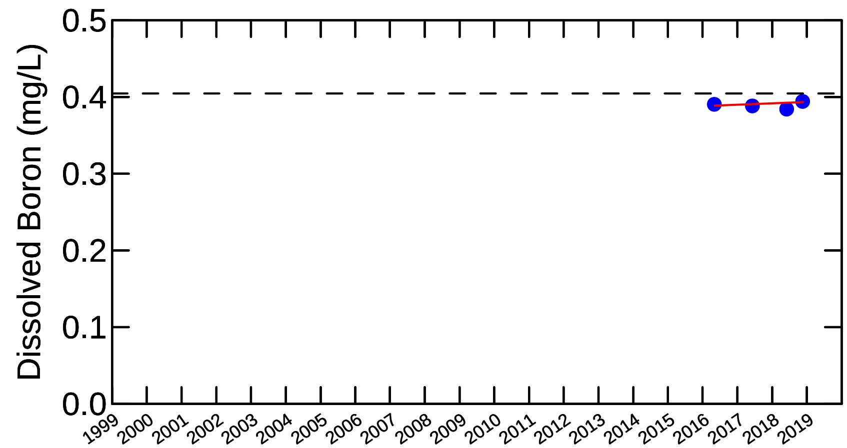
No detected results



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result

▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

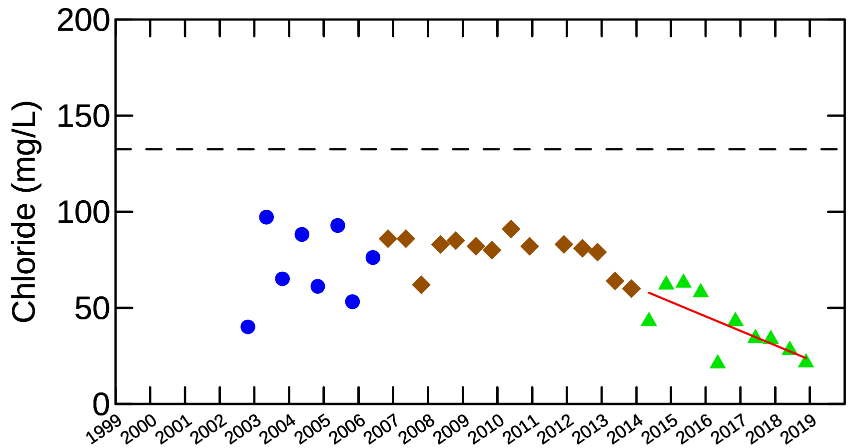
—— Linear Regression line

Notes:

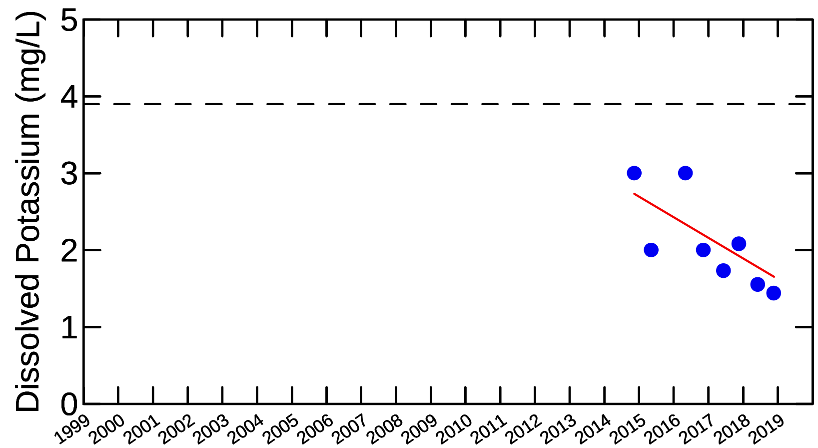
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW51-02B

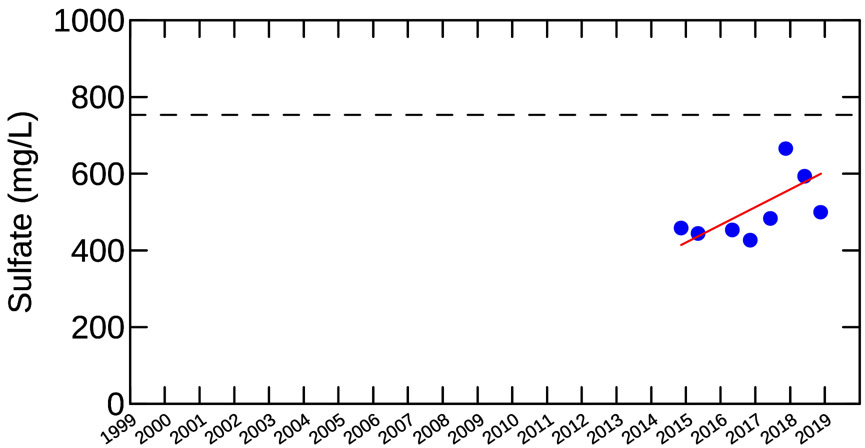
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario

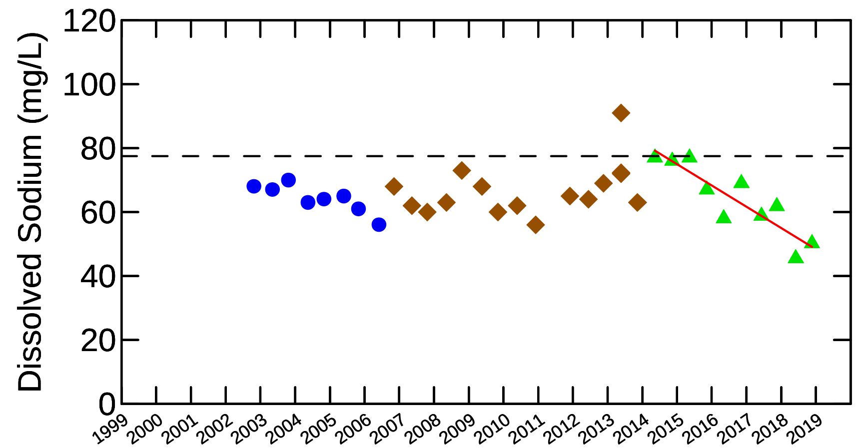


Decreasing trend



No trend





Legend:

No trend

Decreasing trend

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

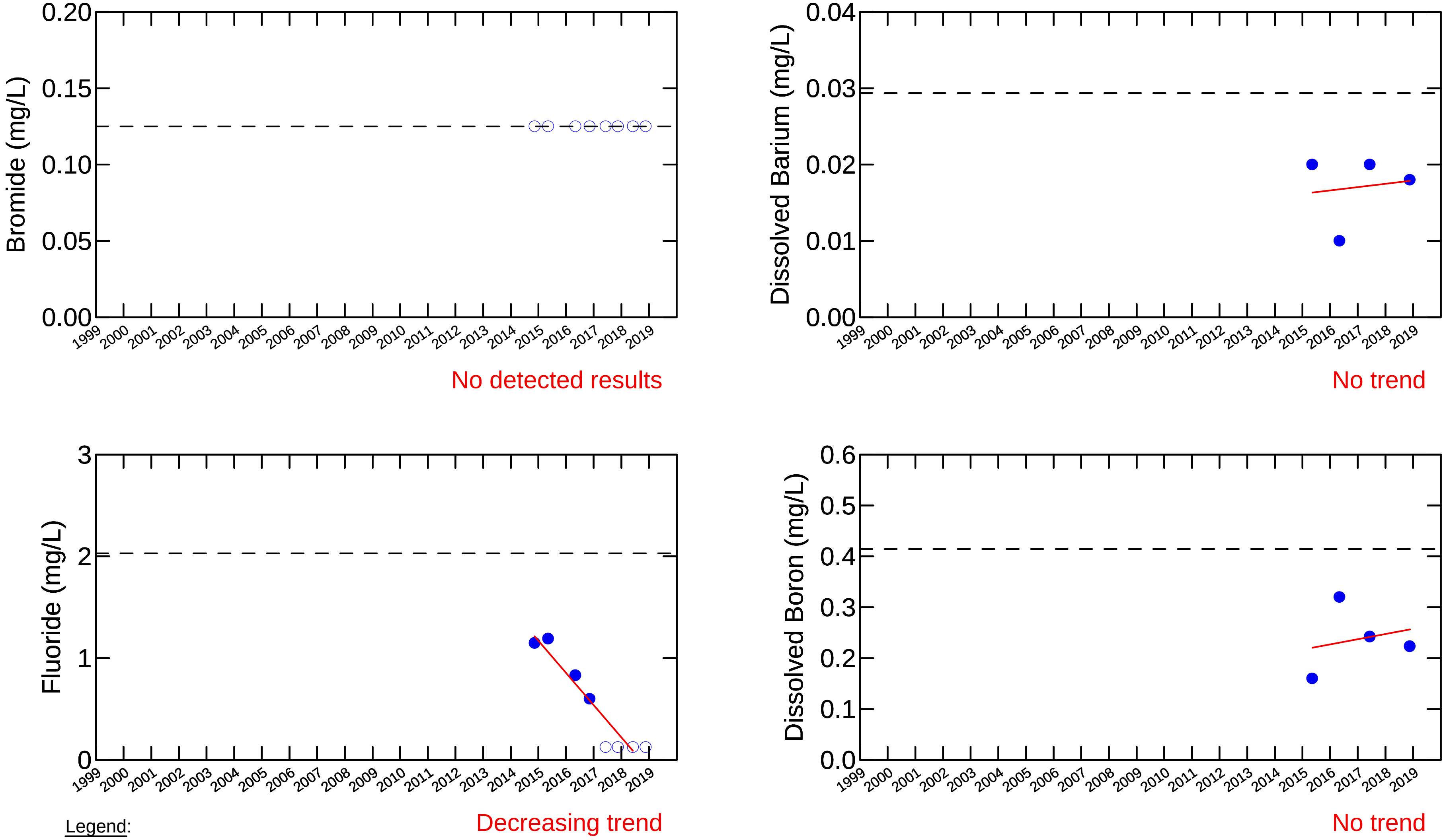
—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW52-02A

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

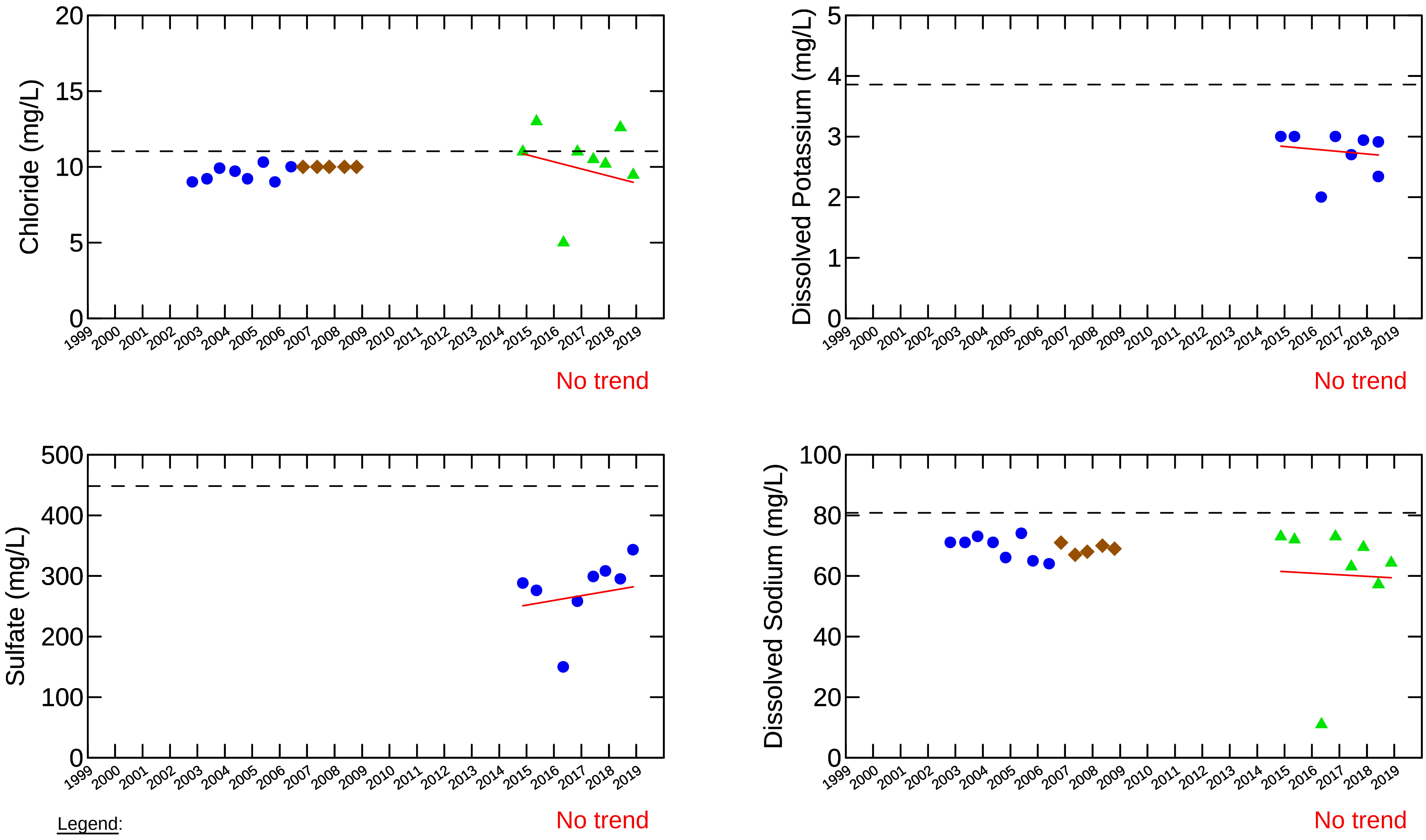
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW52-02A

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

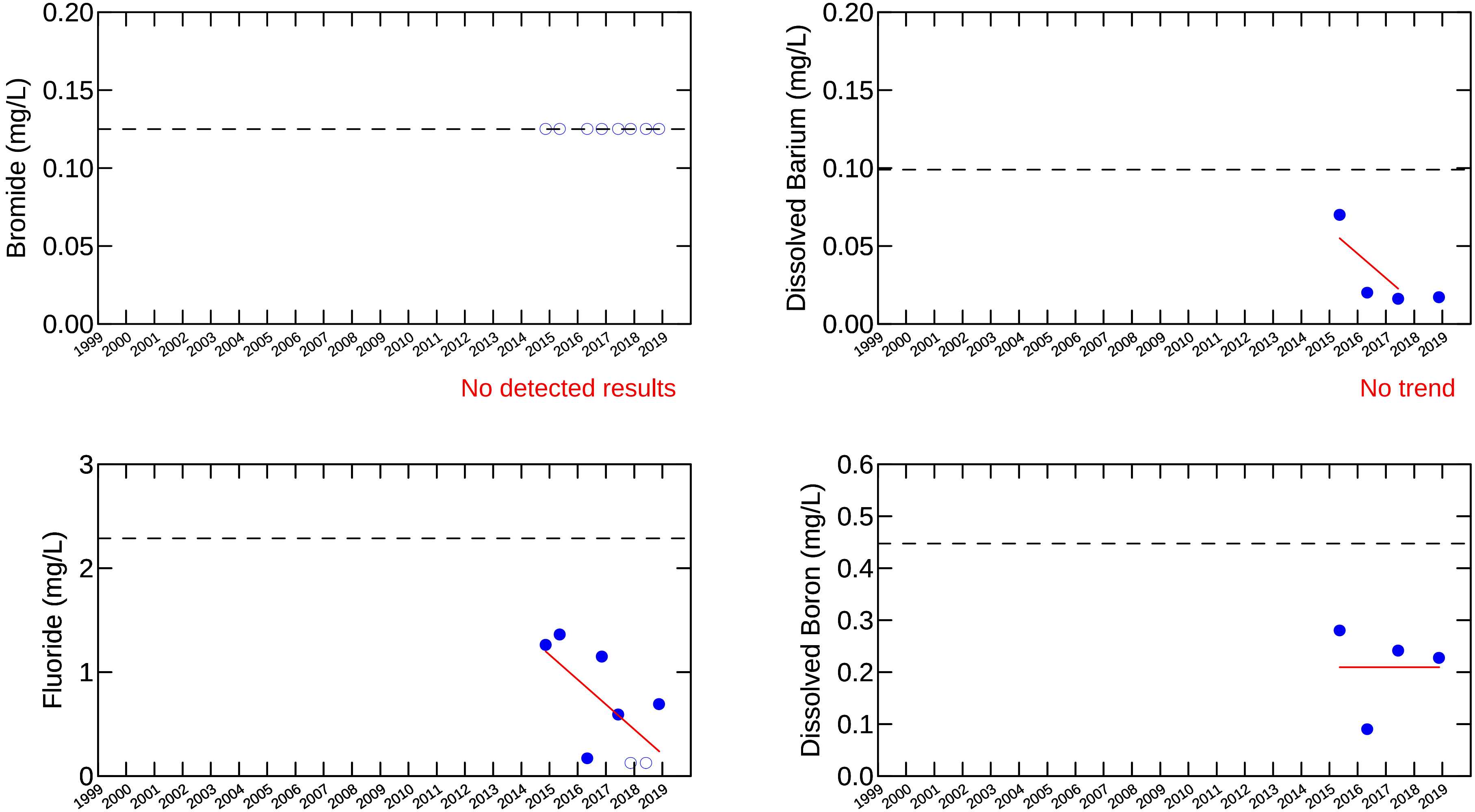
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

GHD

WELL TW52-02B

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result

▲ Last 5 years (for trend)

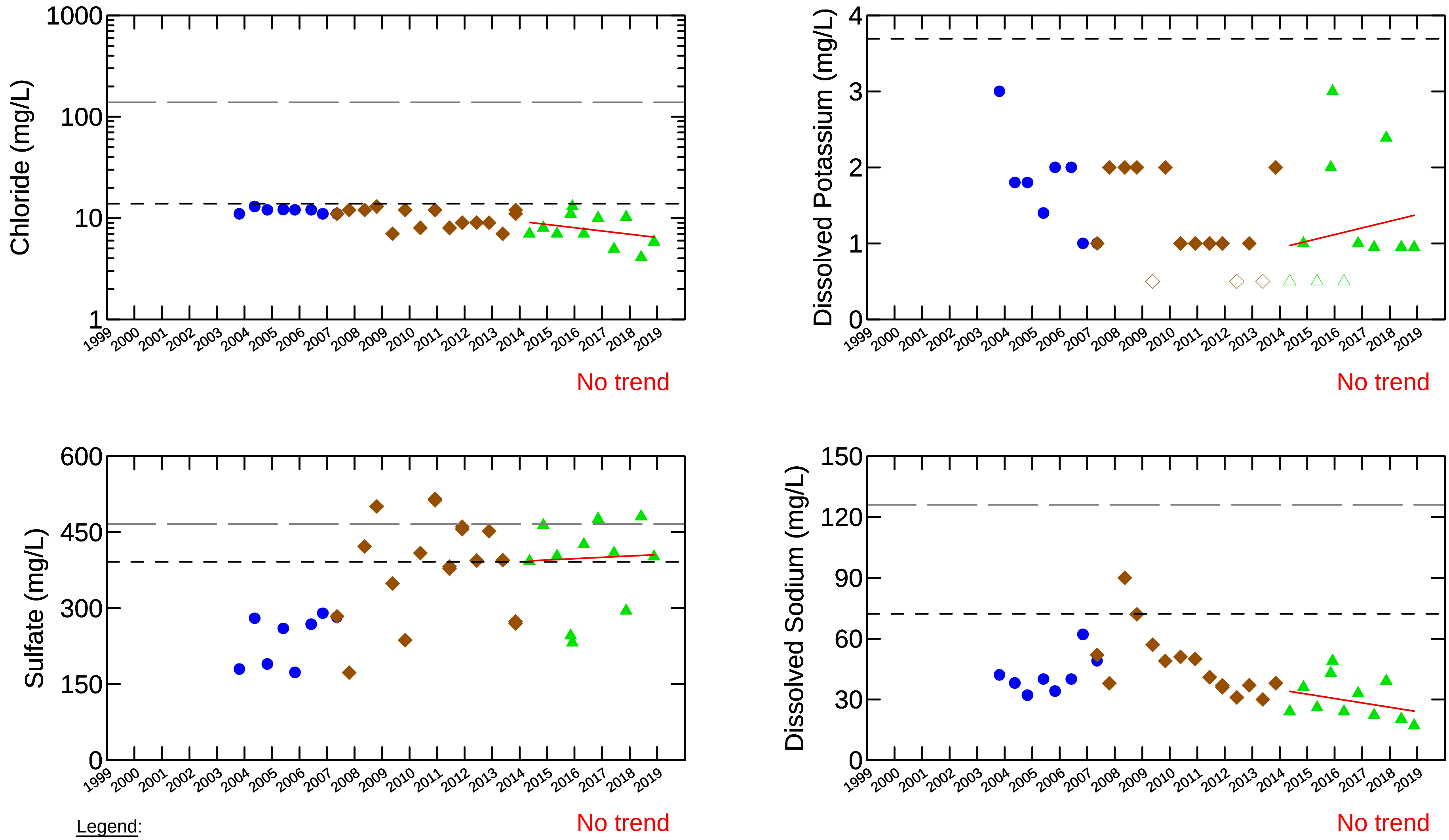
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW52-02B

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

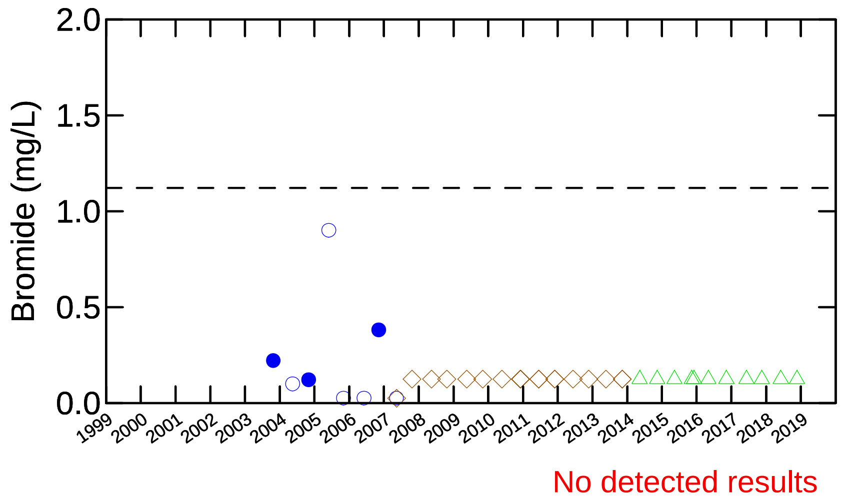
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

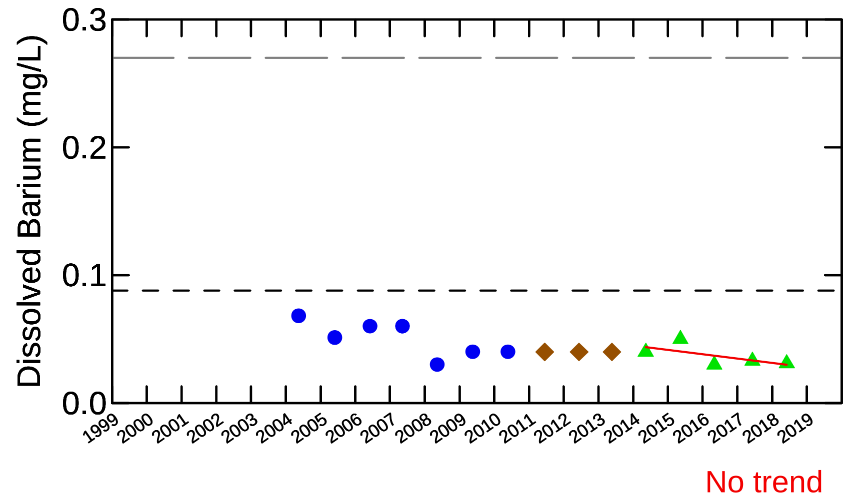
Notes:

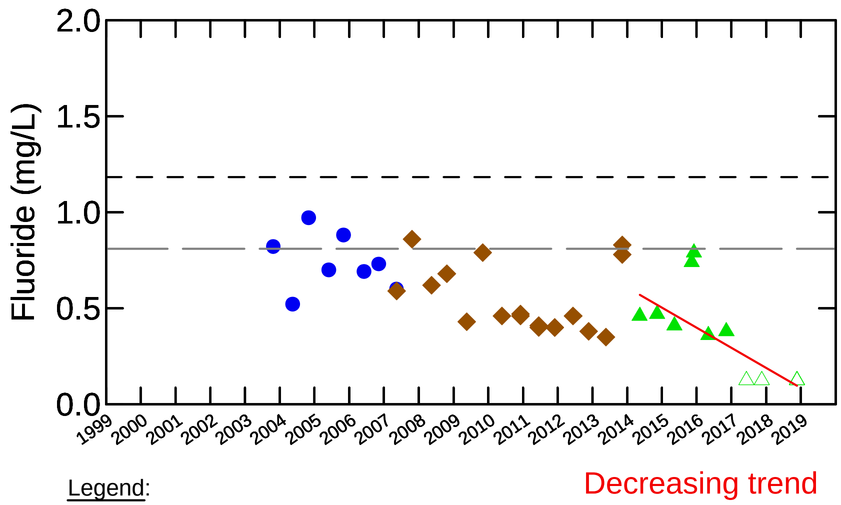
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

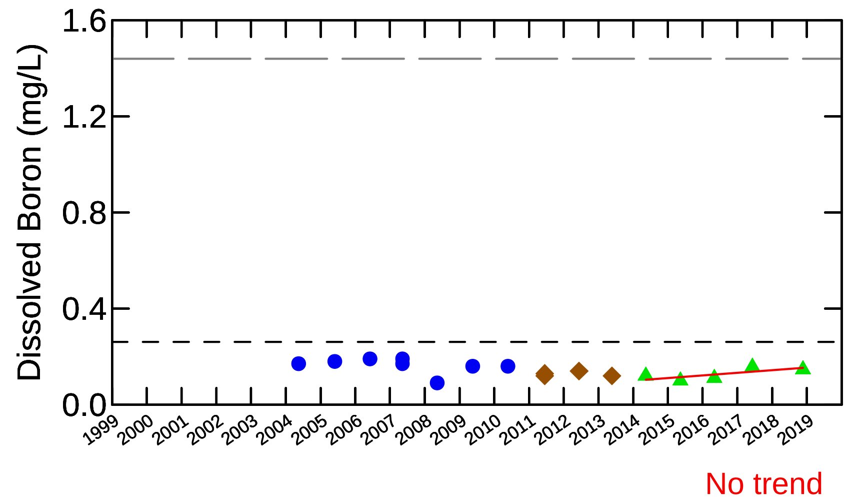
WELL TW53-03S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

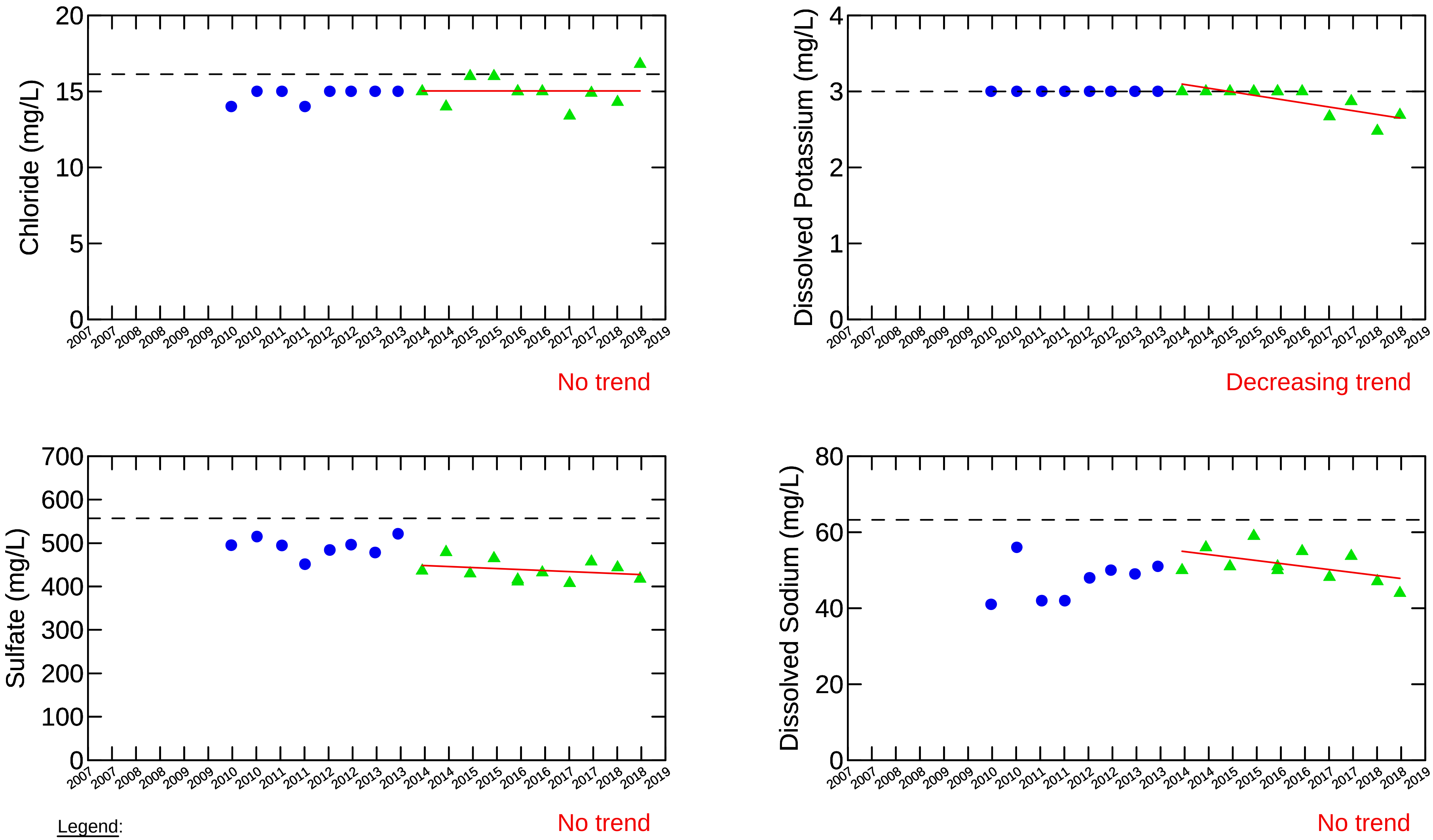
◆ Post-Baseline result ▲ Last 5 years (for trend)

Reasonable Use Criteria (RUC)
Baseline Upper Confidence Limit (UCL)
Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW53-03S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

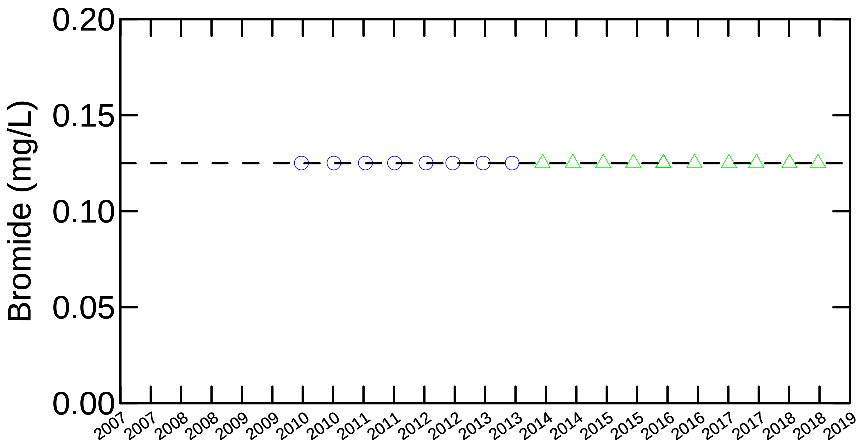
—— Linear Regression line

Notes:

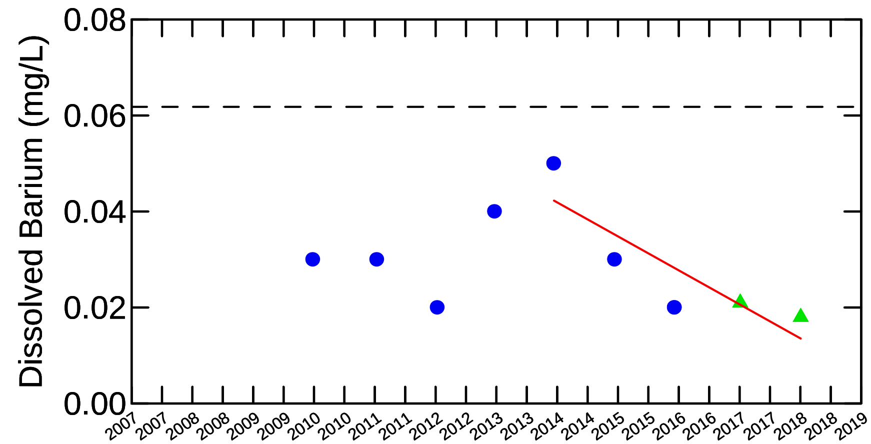
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW55-09S

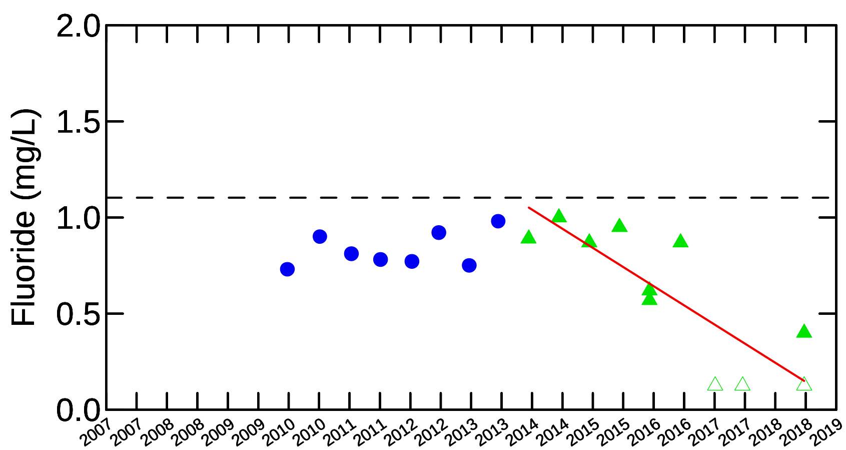
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



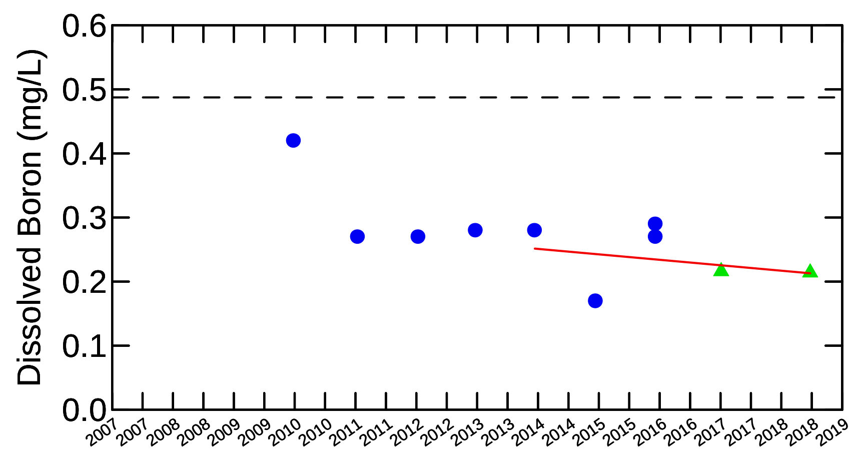
No detected results



No trend



Decreasing trend



No trend

Legend:

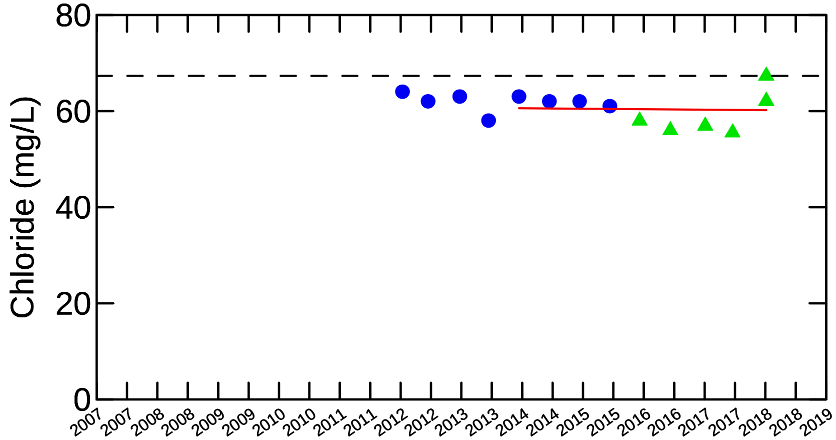
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

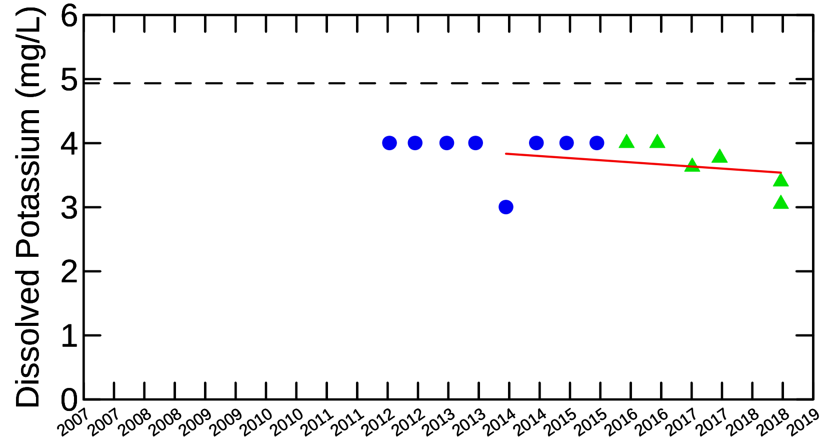
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW55-09S

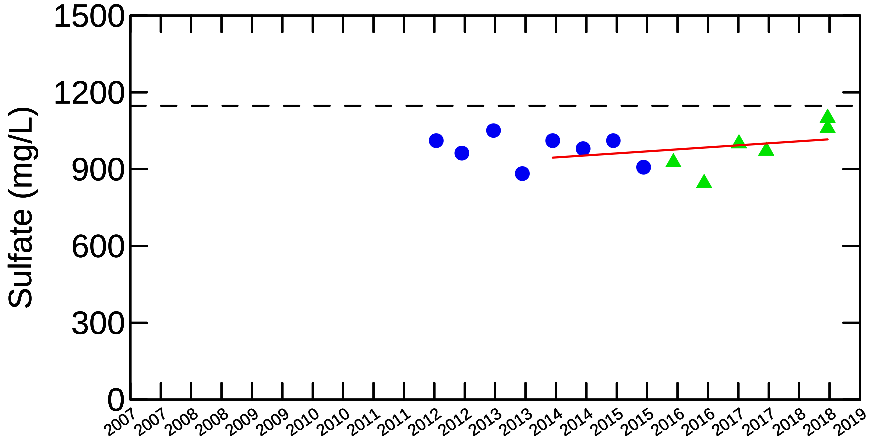
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



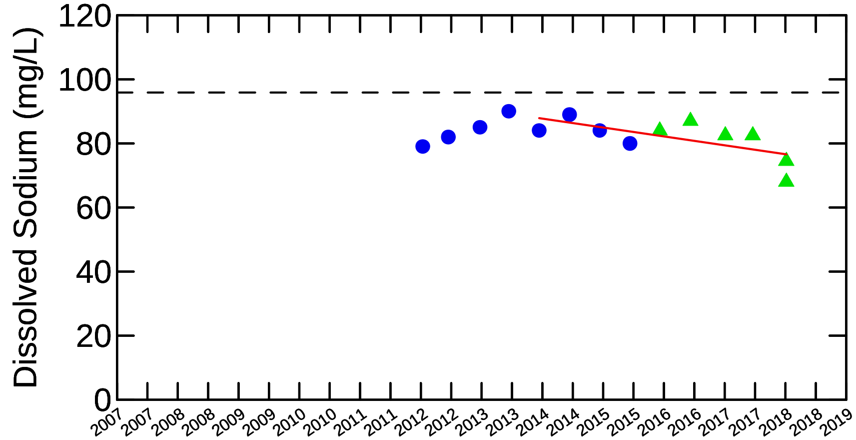
No trend



No trend



No trend



Decreasing trend

Legend:

● Baseline result

◆ Post-Baseline result

▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

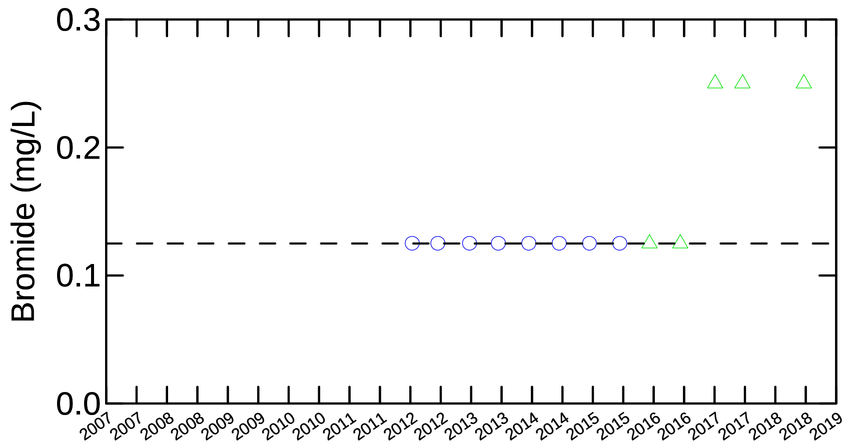
—— Linear Regression line

Notes:

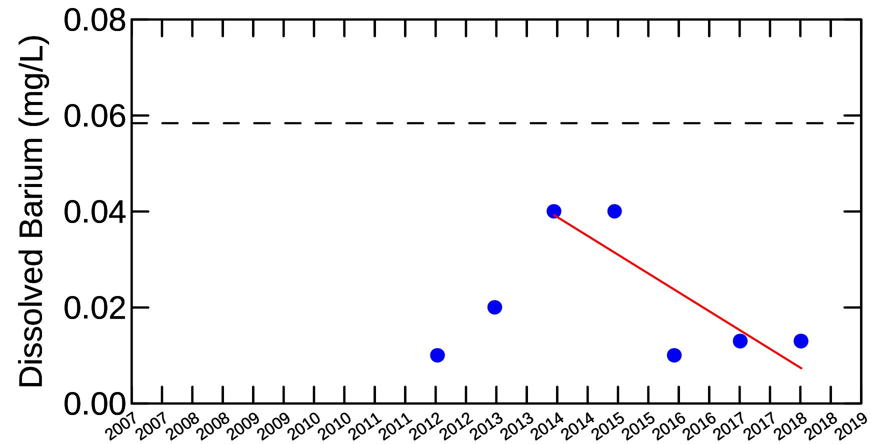
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW56-11S

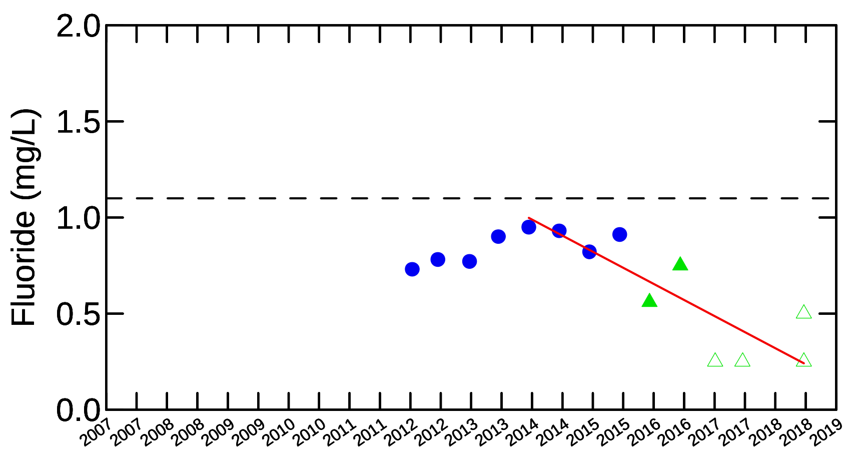
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



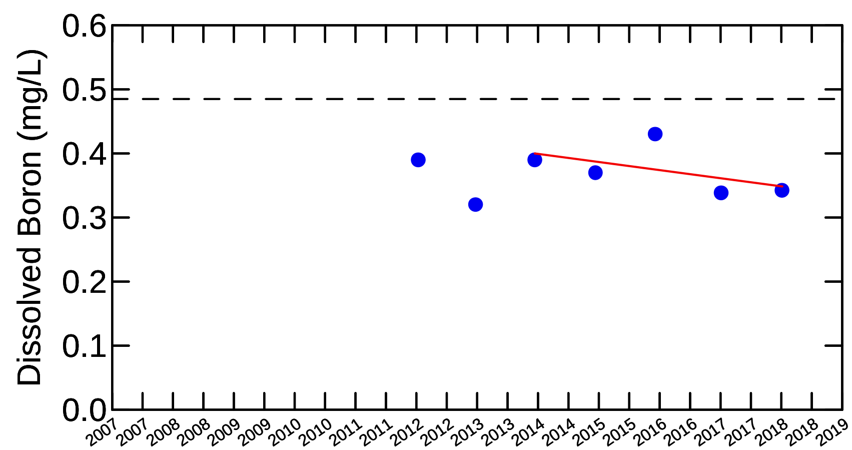
No detected results



No trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

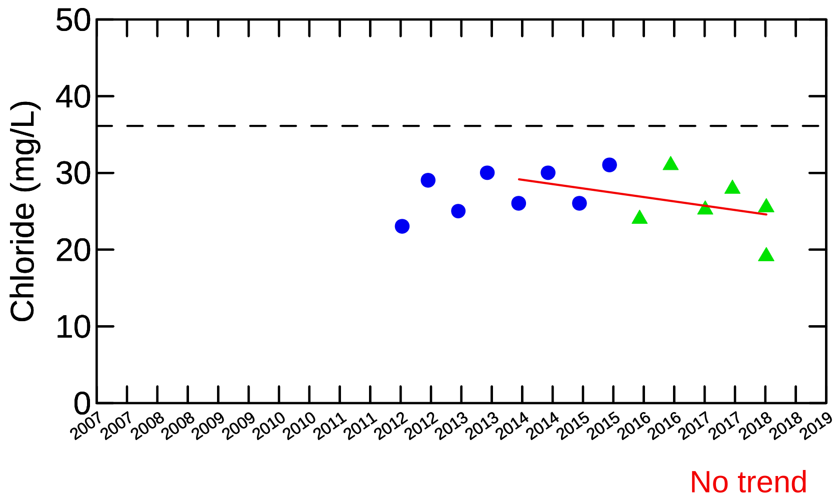
—— Linear Regression line

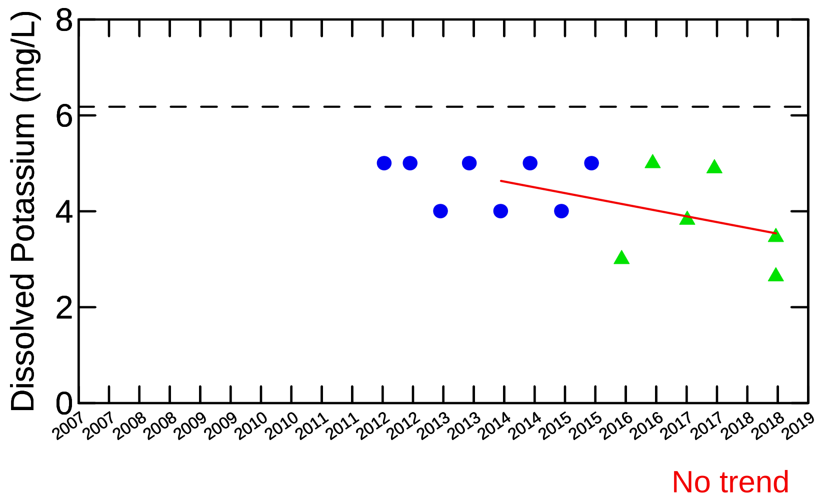
Notes:

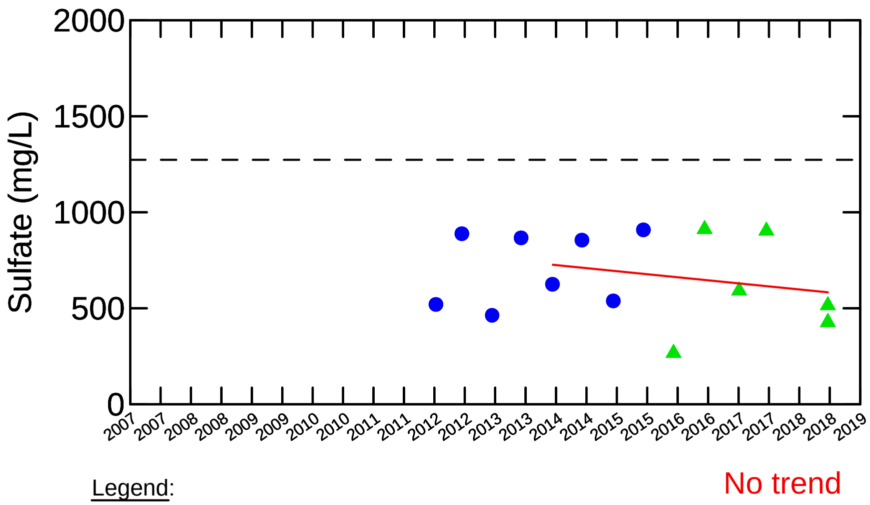
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

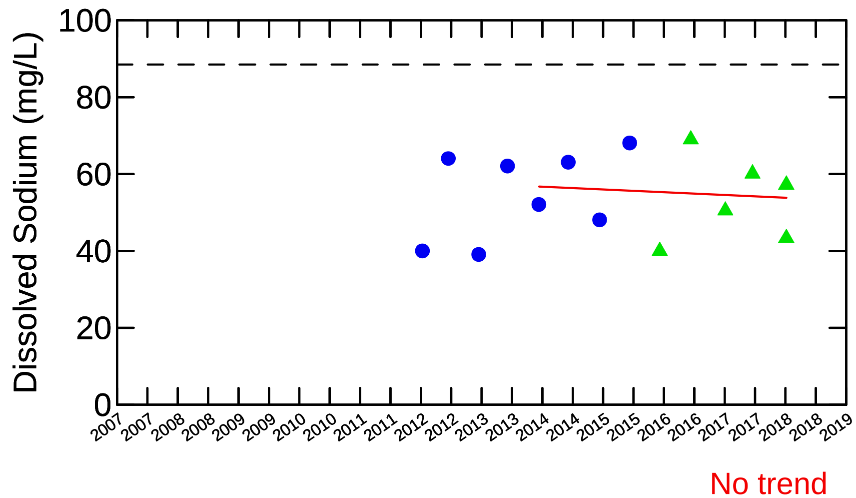
WELL TW56-11S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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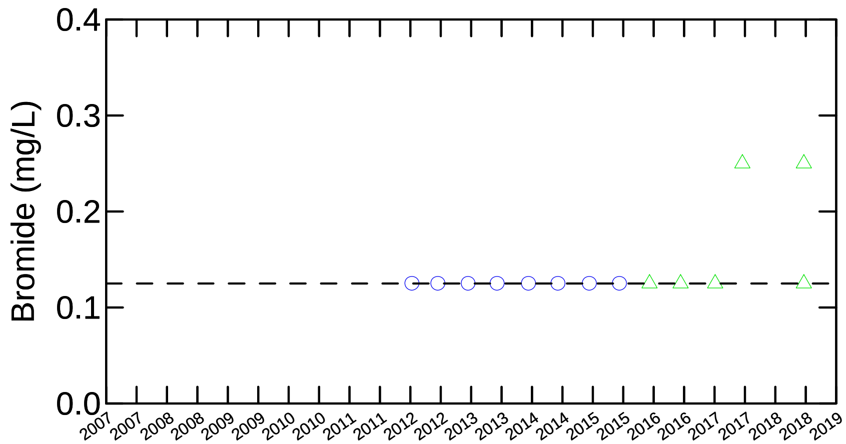
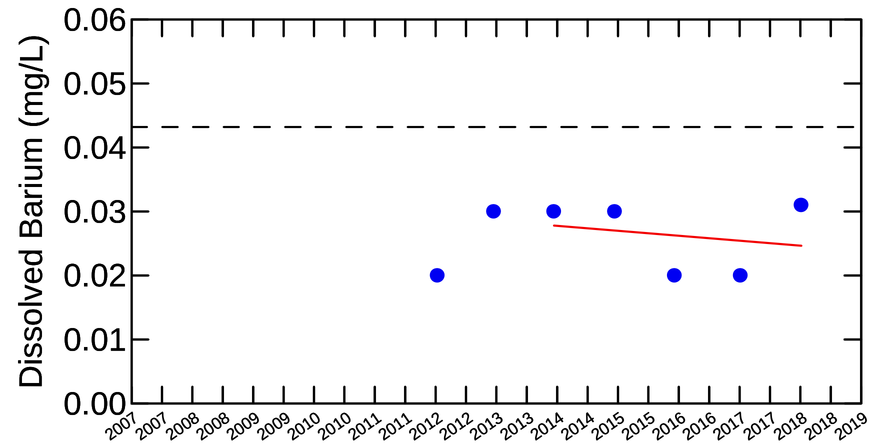
WELL TW57-11S

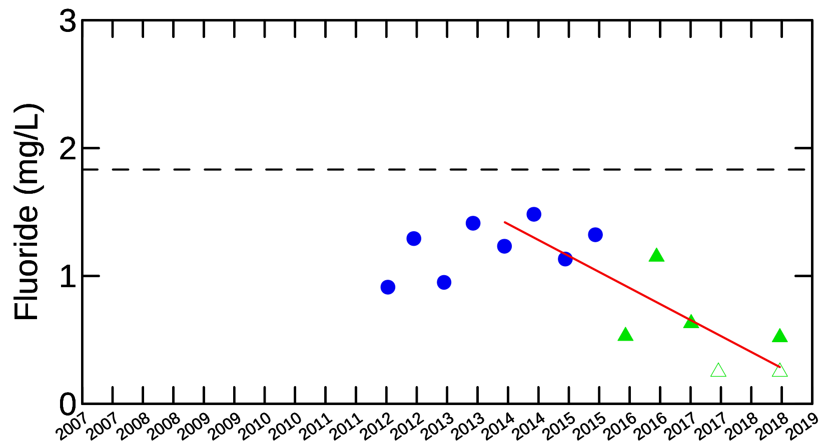
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



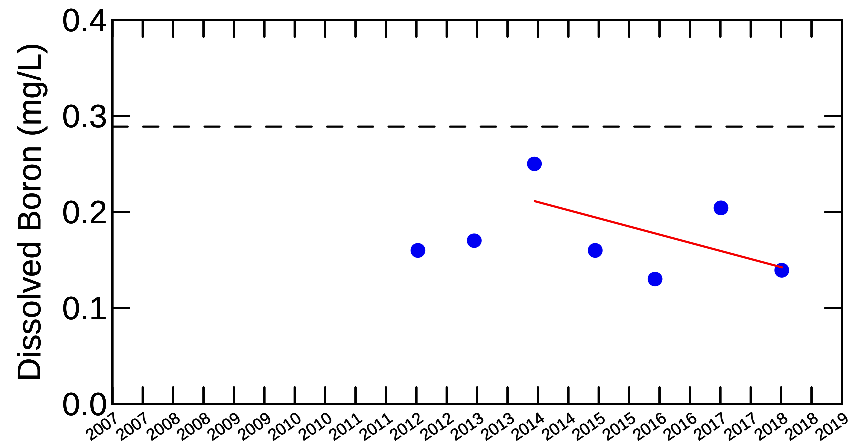
No detected results



No trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

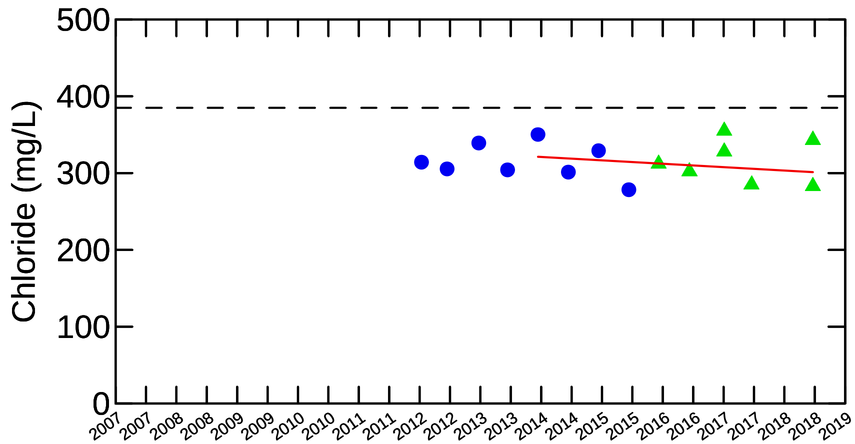
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

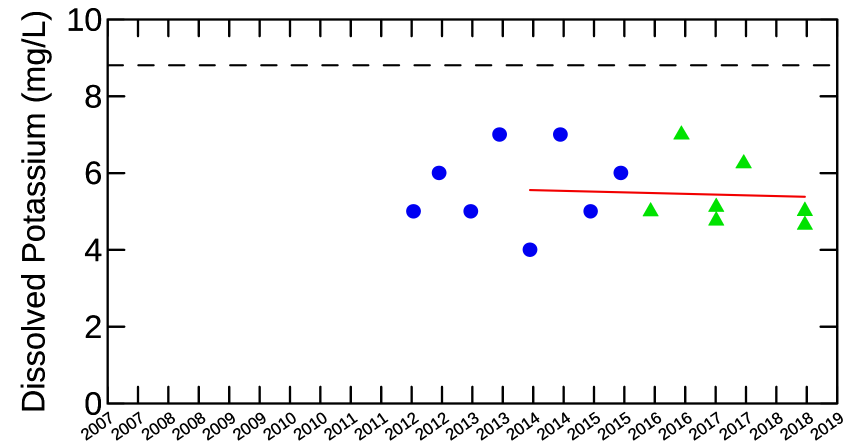
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW57-11S

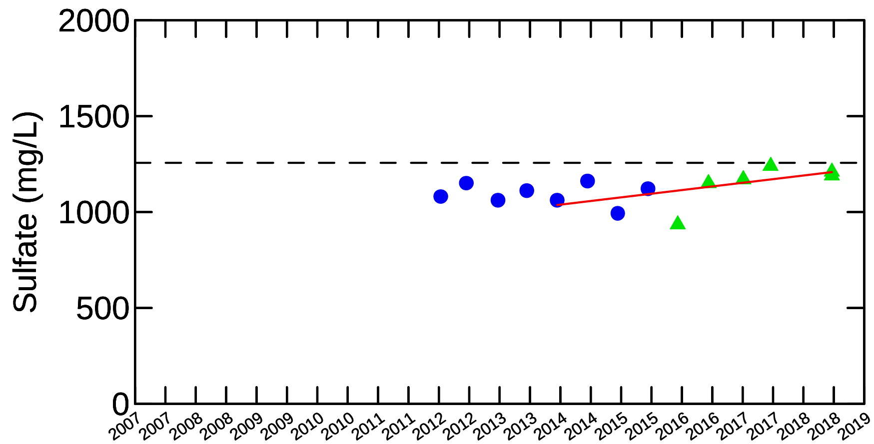
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



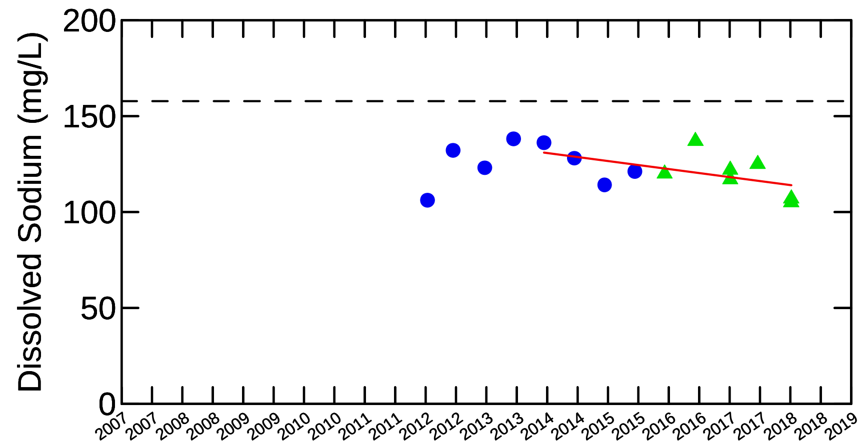
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

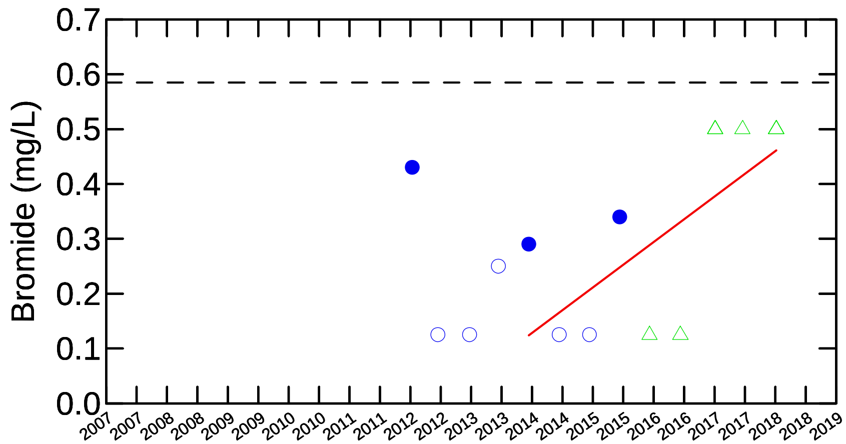
– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

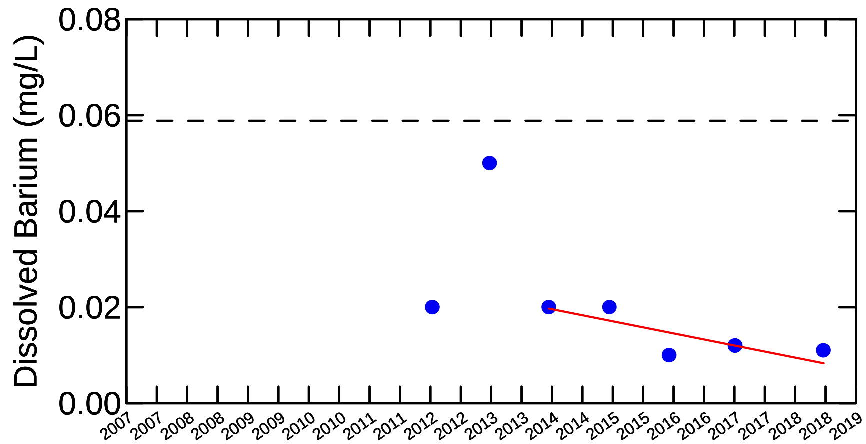
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW58-11S

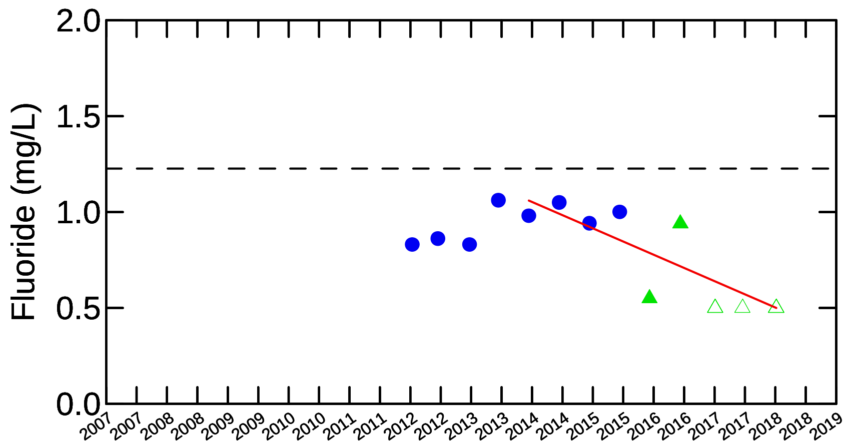
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



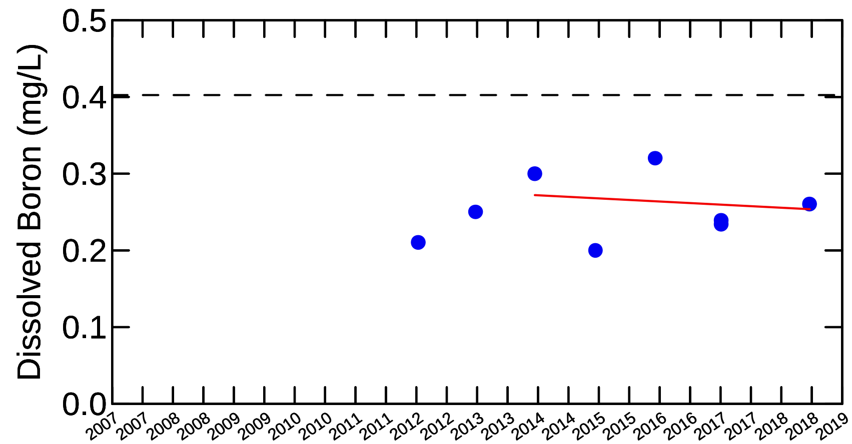
N/A (see Table)



No trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
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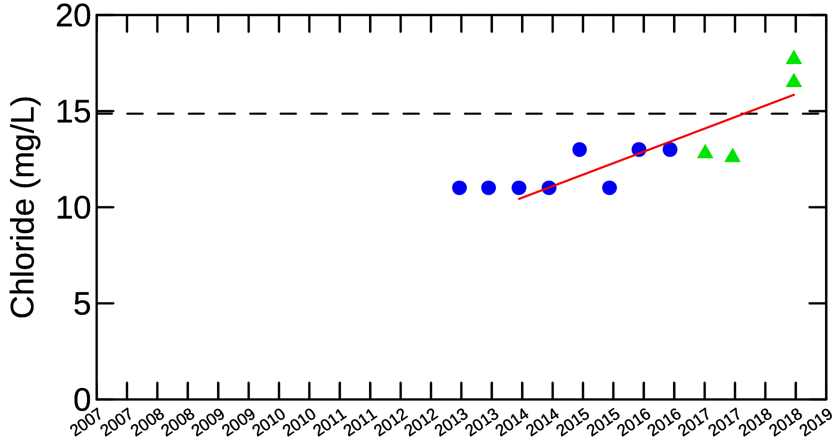
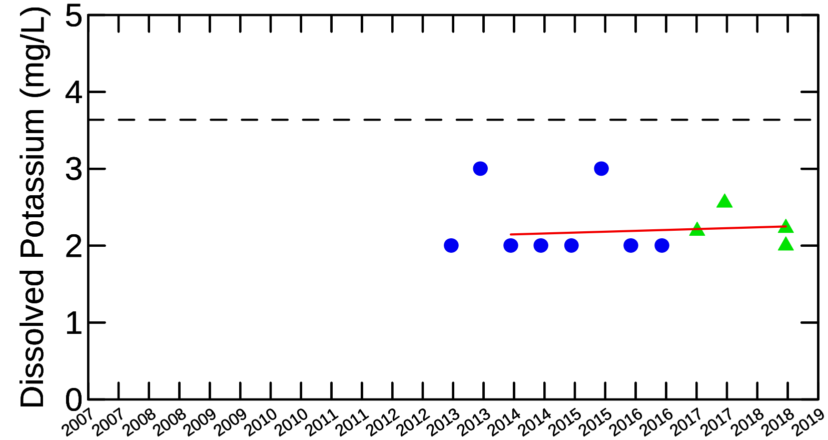
WELL TW58-11S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario

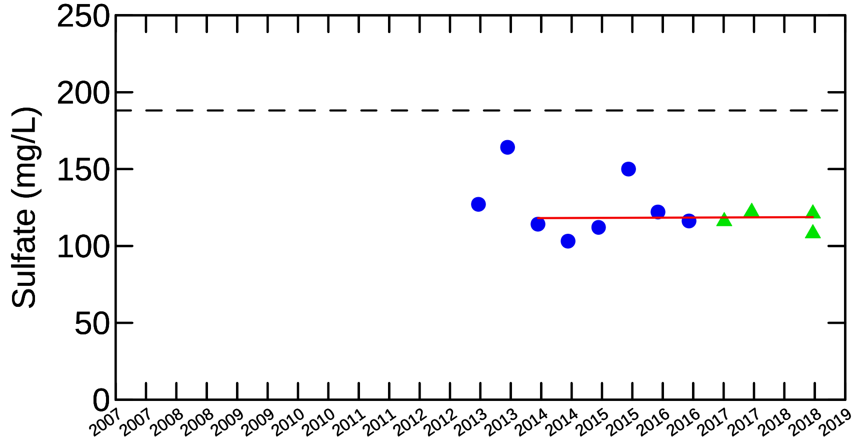
044985(RPT41) FEBRUARY 20/2019



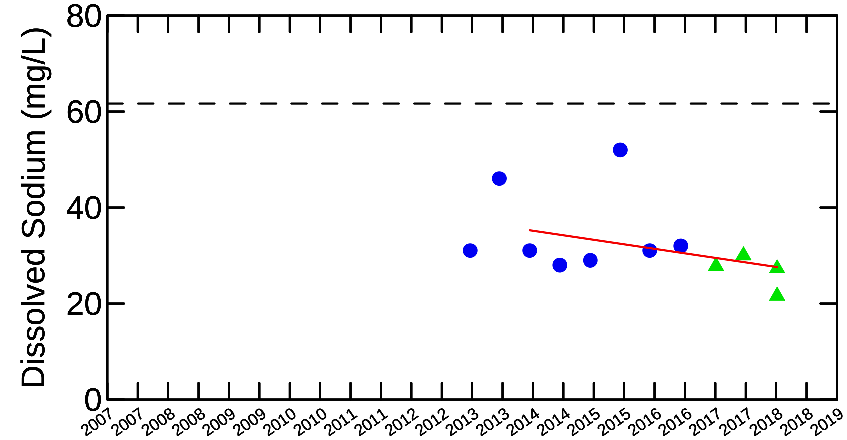
Increasing trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result

▲ Last 5 years (for trend)

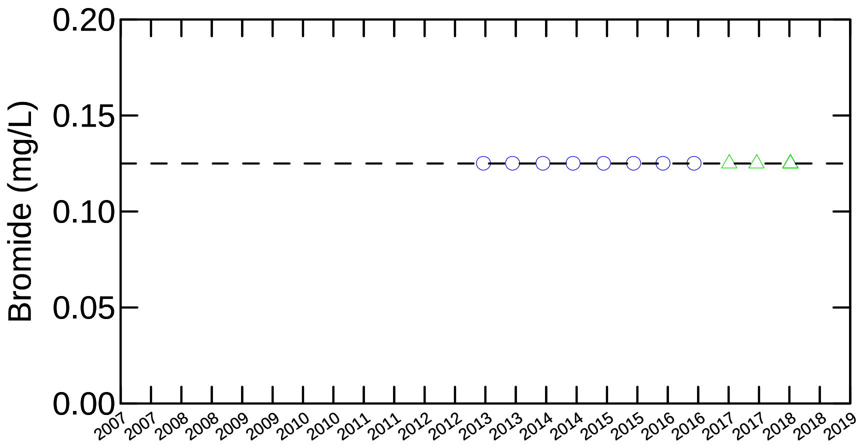
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

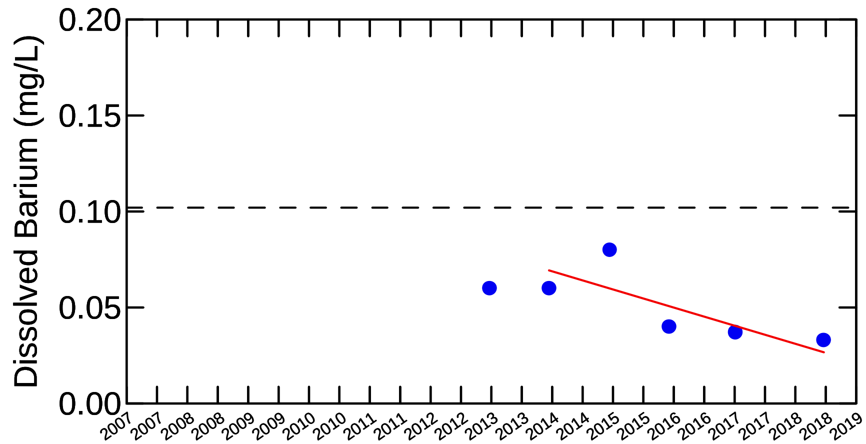
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW59-13S

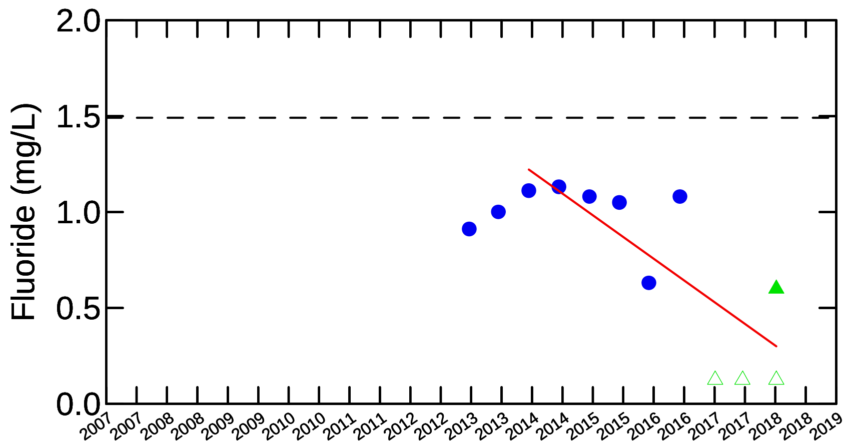
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



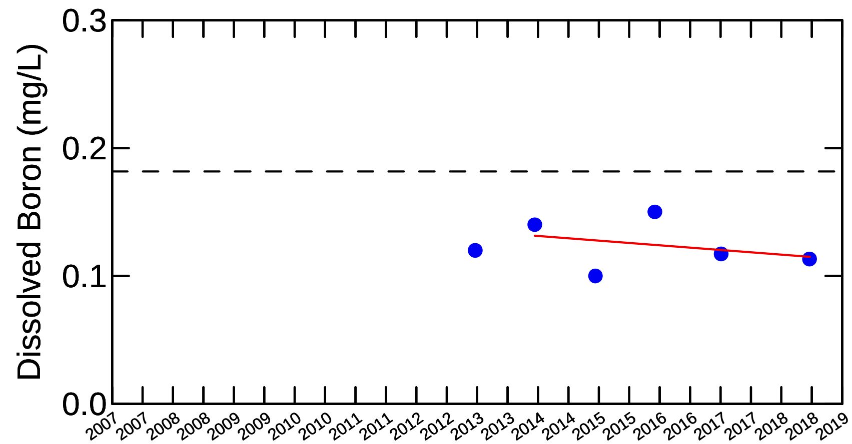
No detected results



No trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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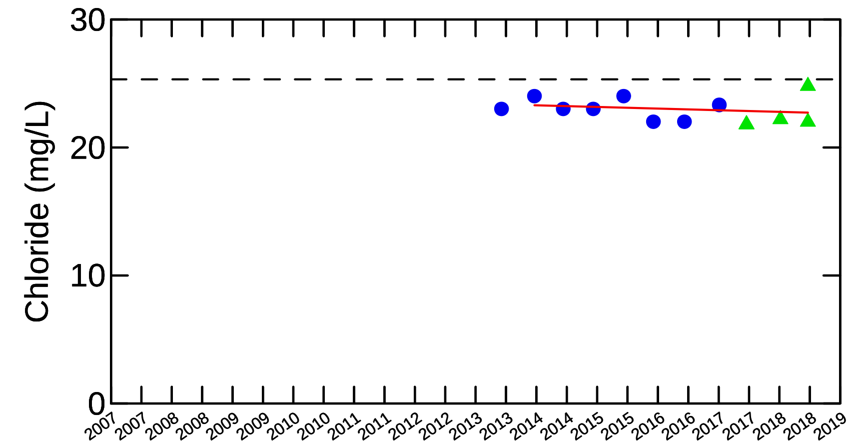
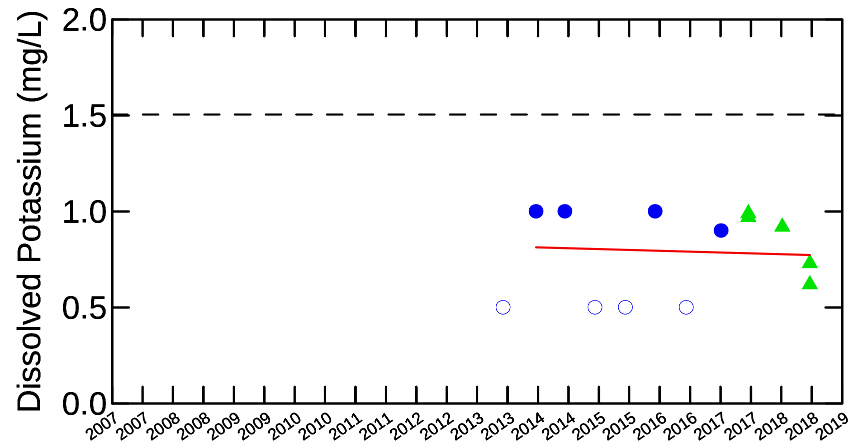
WELL TW59-13S

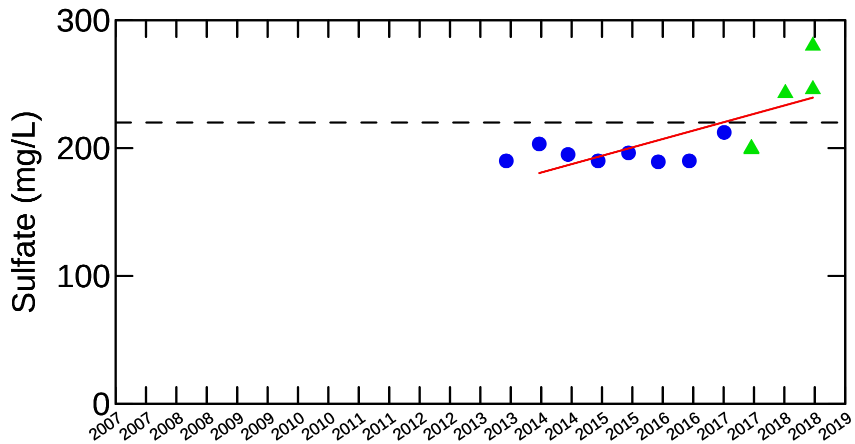
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



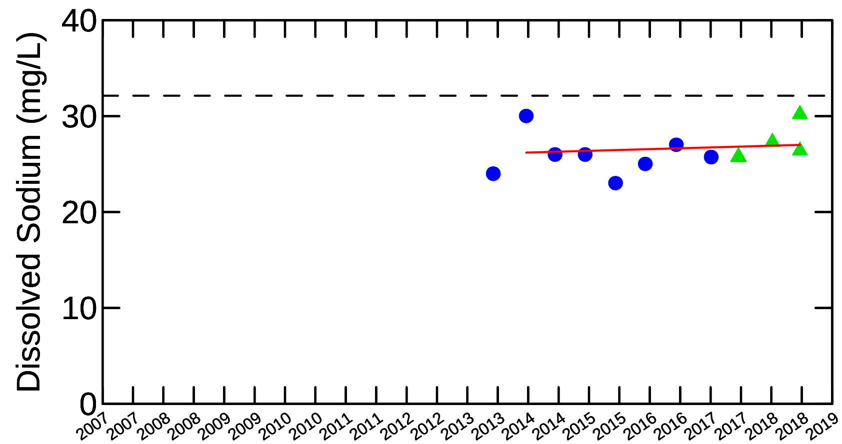
No trend



No trend



Increasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

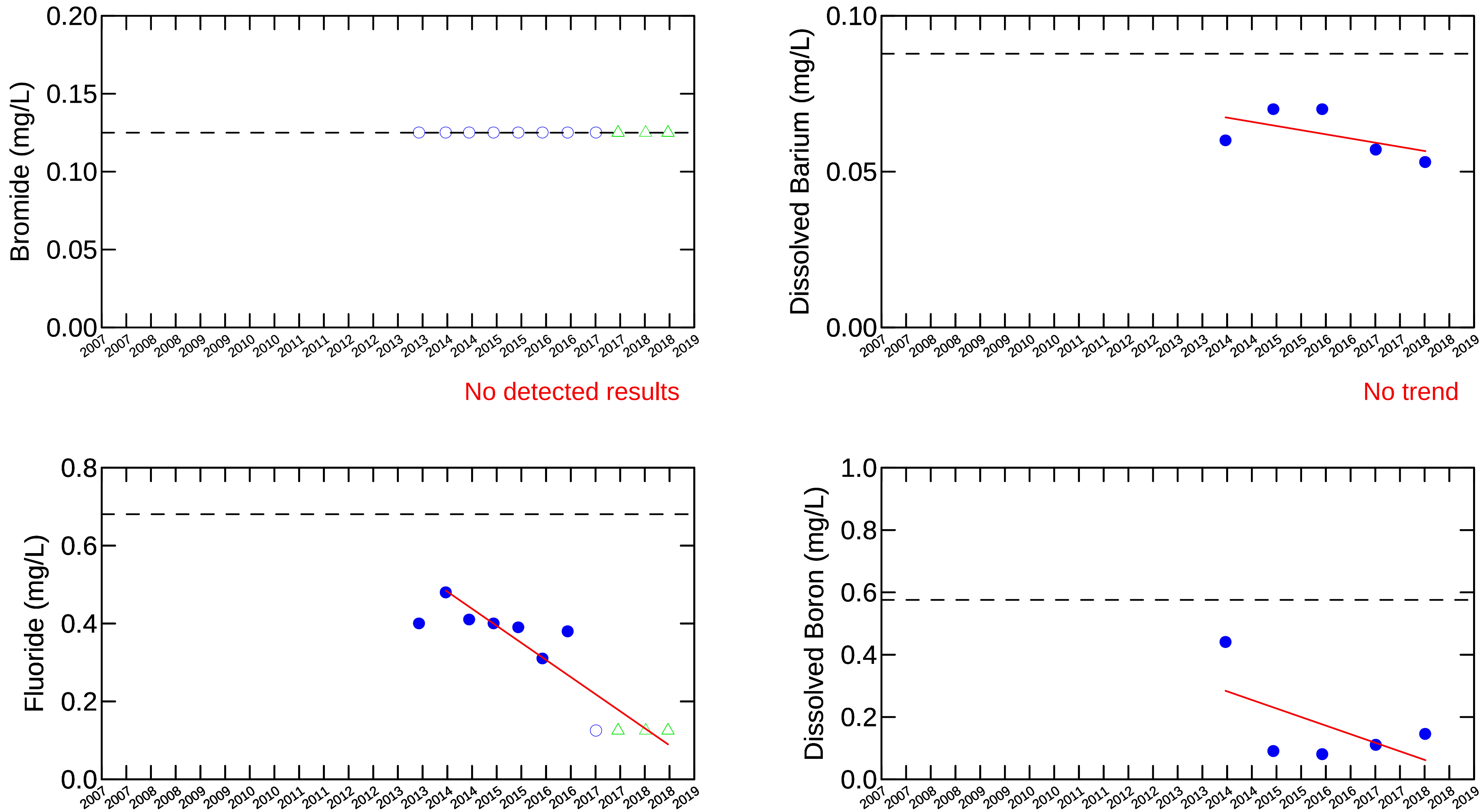
– – Baseline Upper Confidence Limit (UCL)

— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW61-13I

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

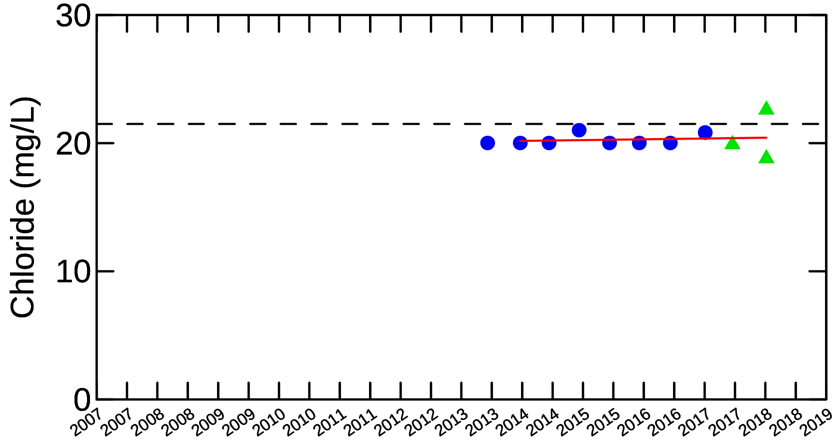
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

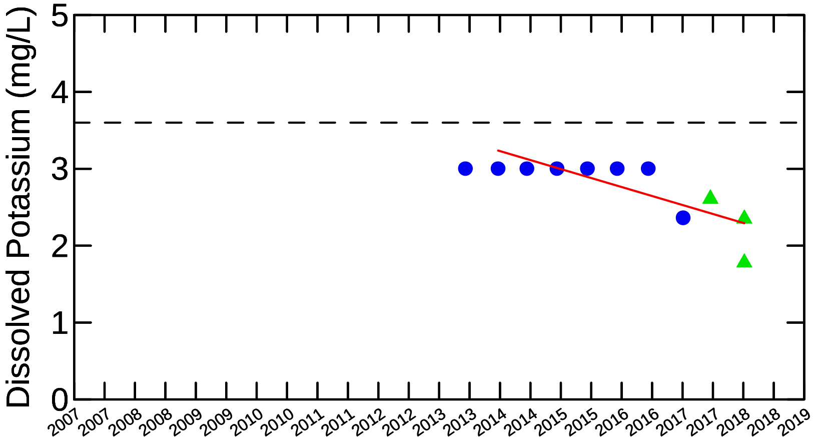
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW61-13I

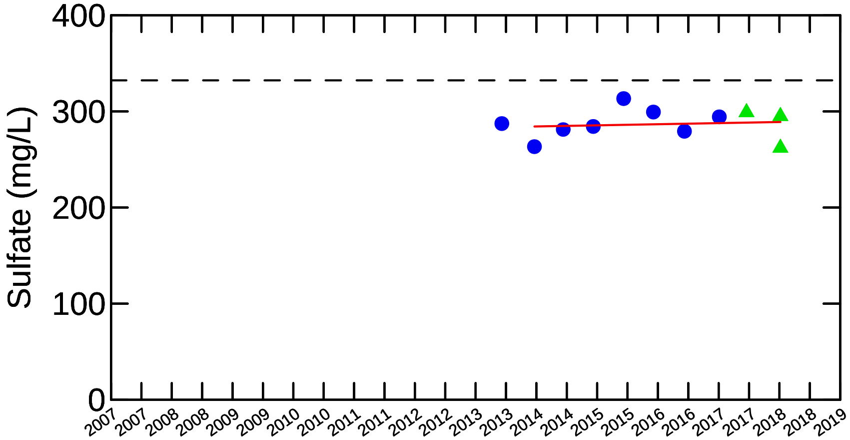
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



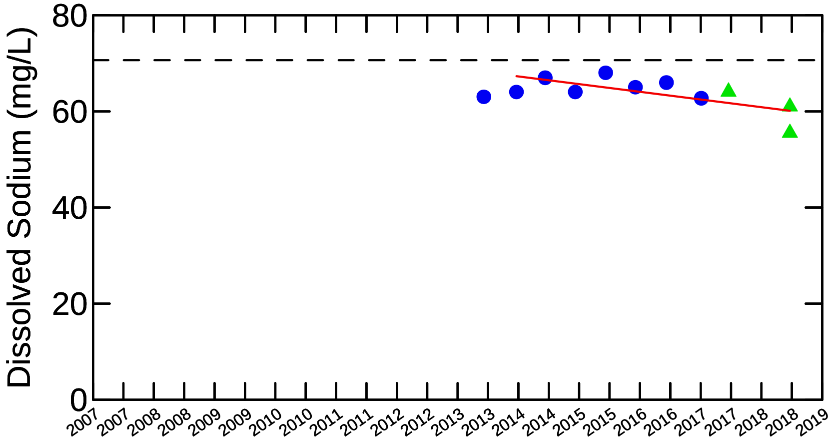
No trend



Decreasing trend



No trend



Decreasing trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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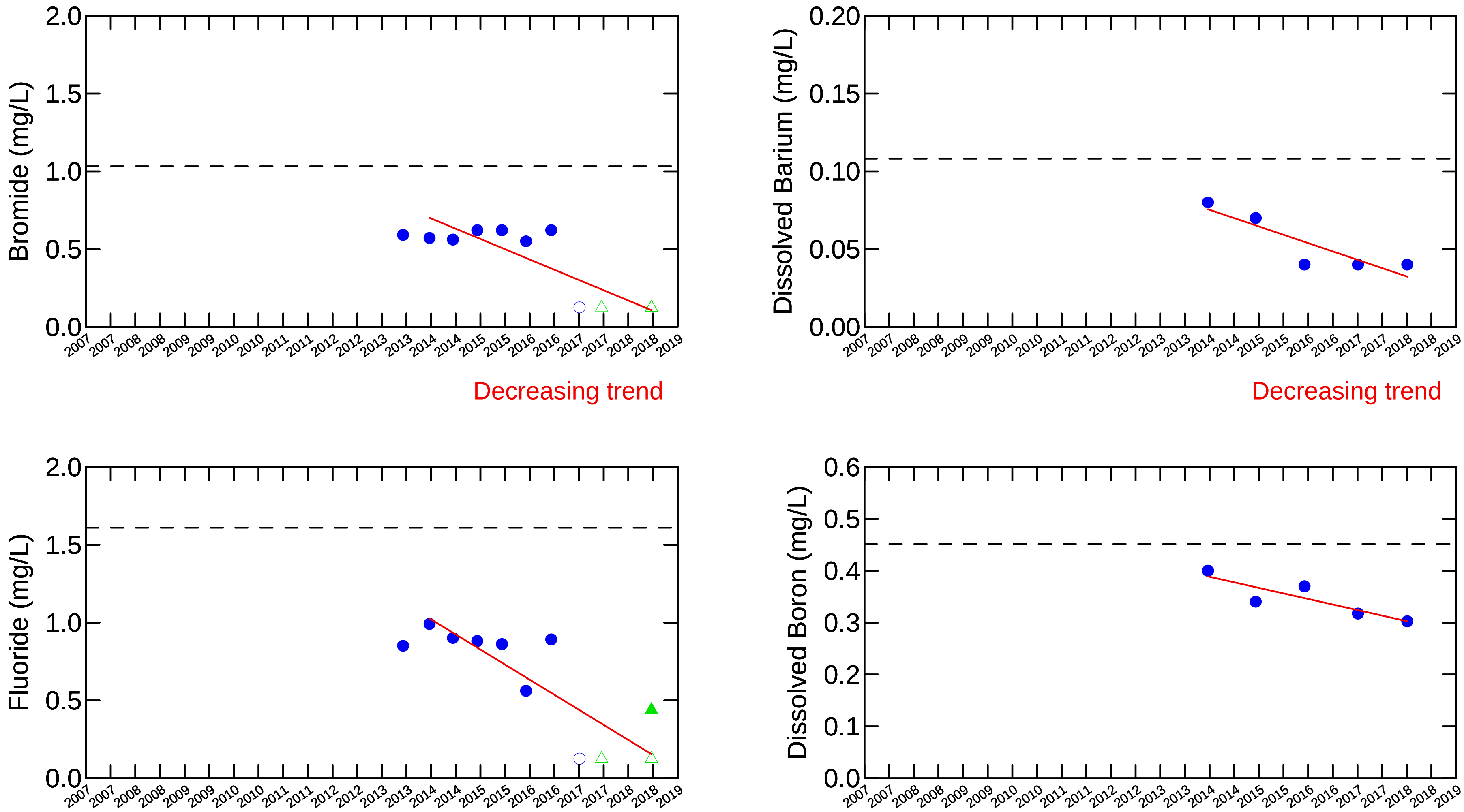
WELL TW61-13S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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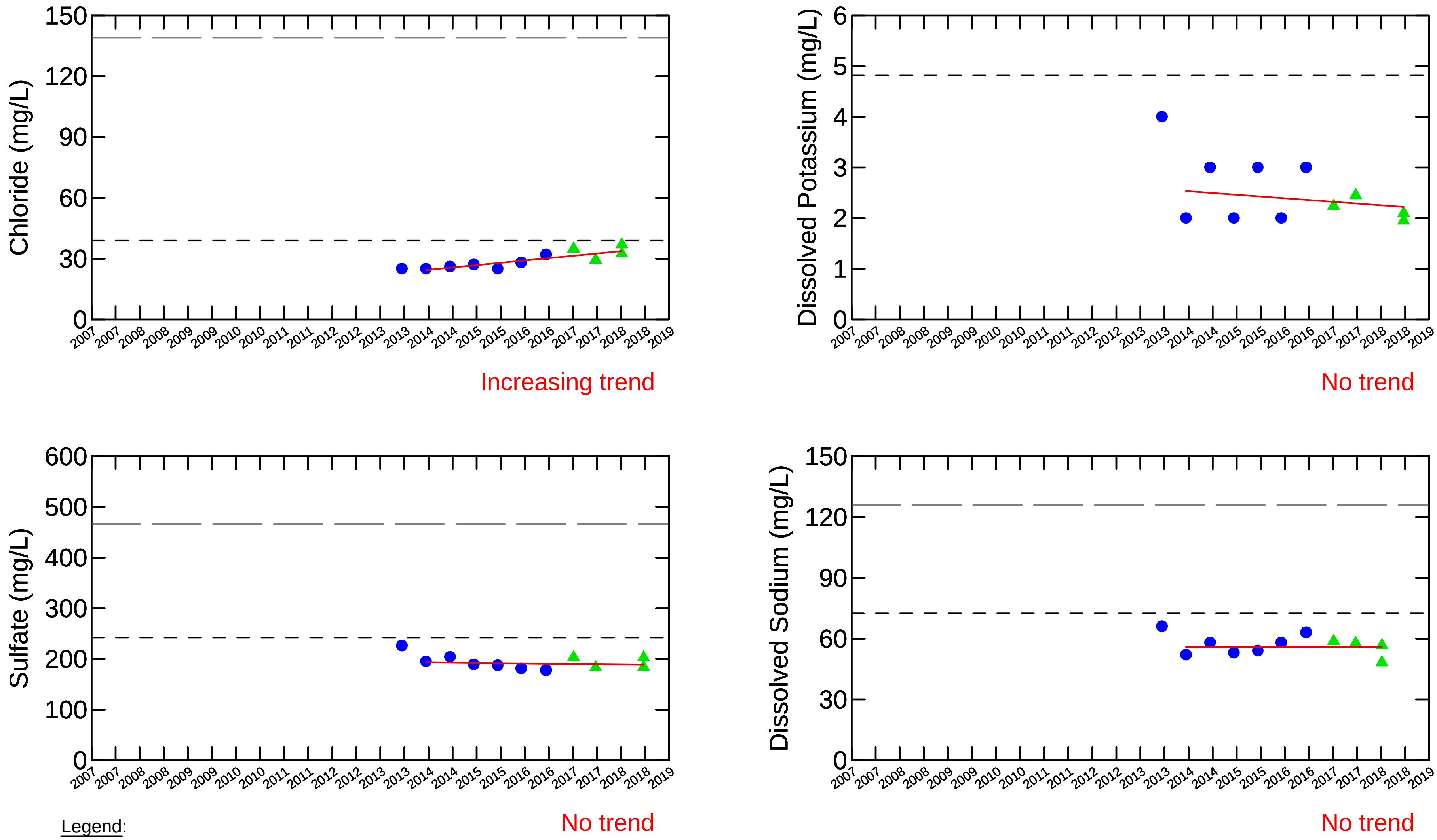
WELL TW61-13S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

Baseline result

Post-Baseline result

Last 5 years (for trend)

Reasonable Use Criteria (RUC)

Baseline Upper Confidence Limit (UCL)

Linear Regression line

Notes:

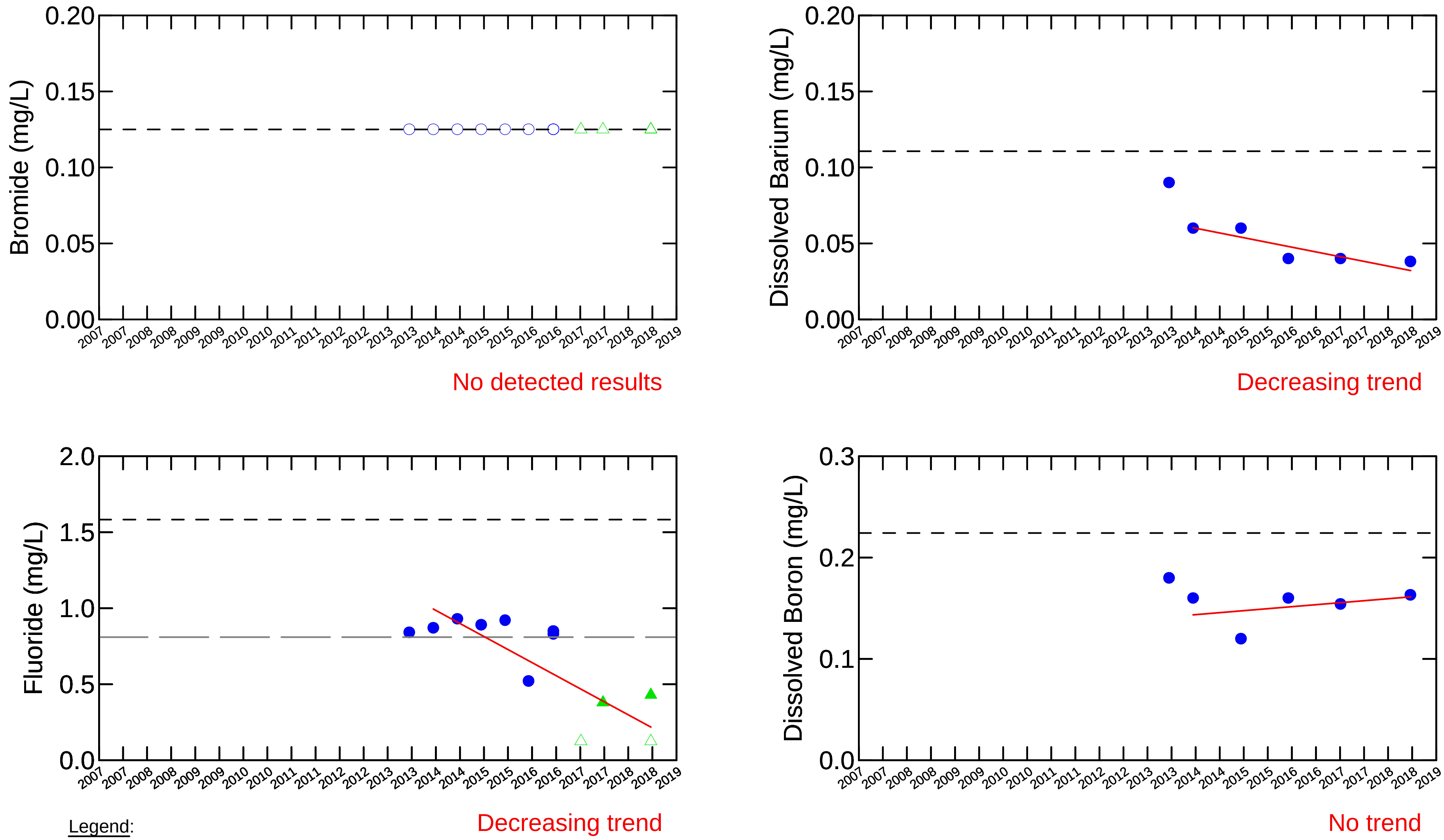
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW62-13S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

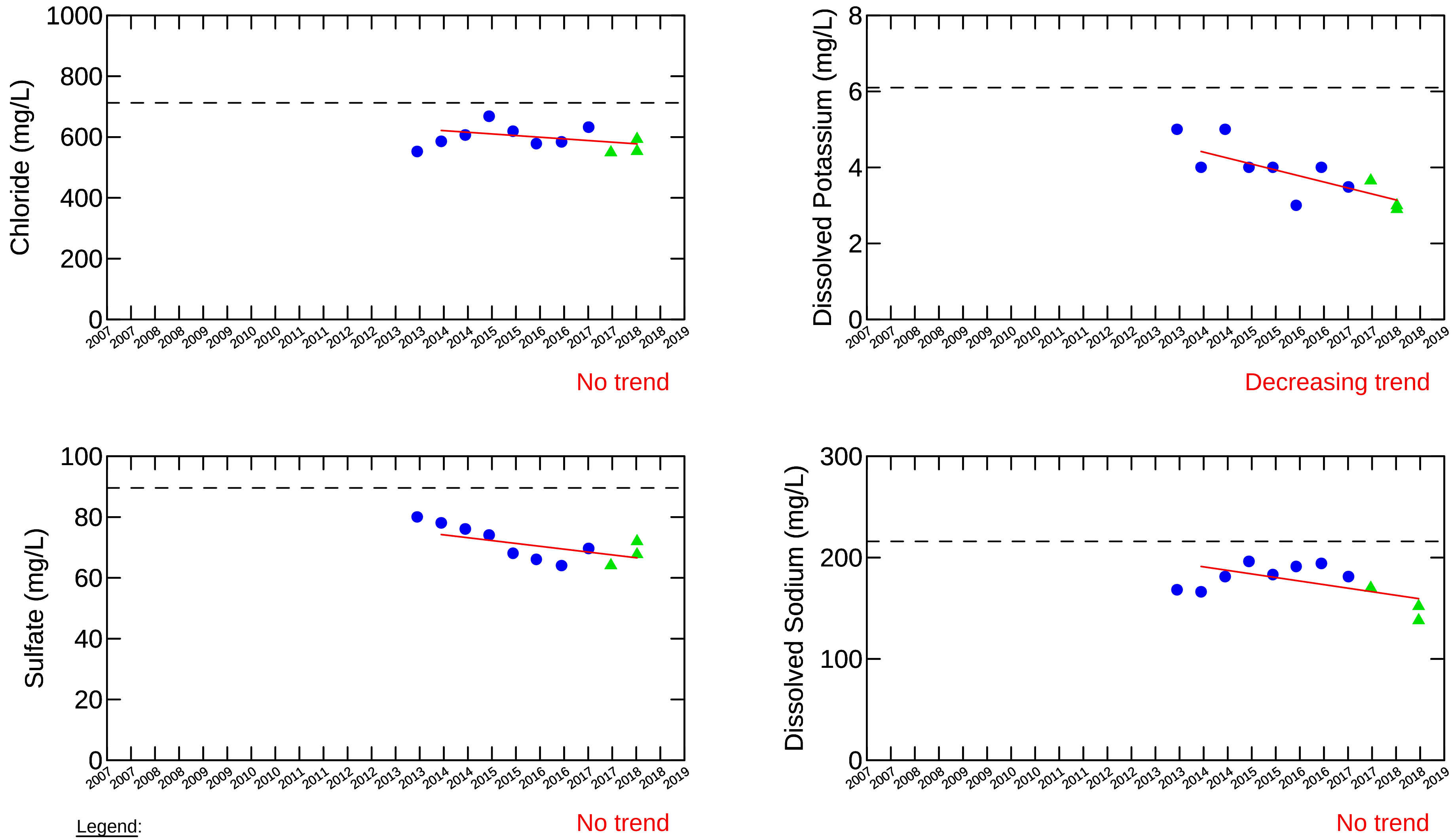
- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Reasonable Use Criteria (RUC)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW62-13S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

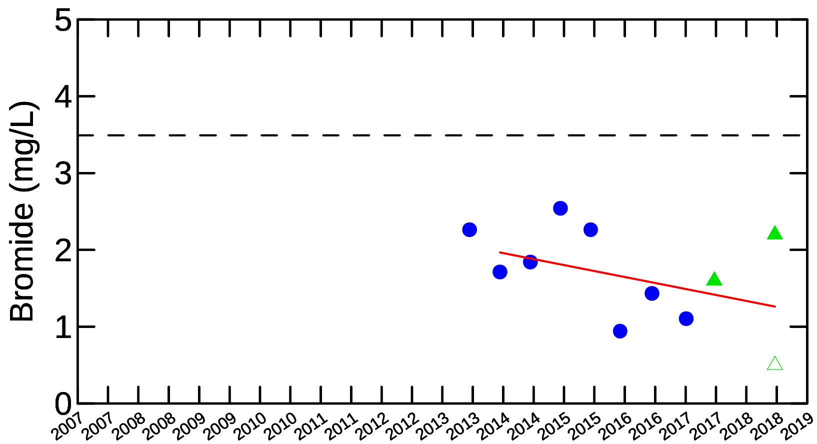
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

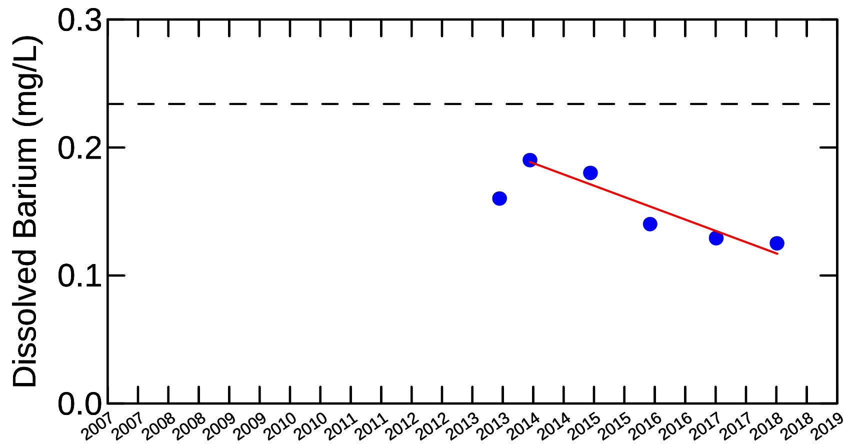
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW63-13S

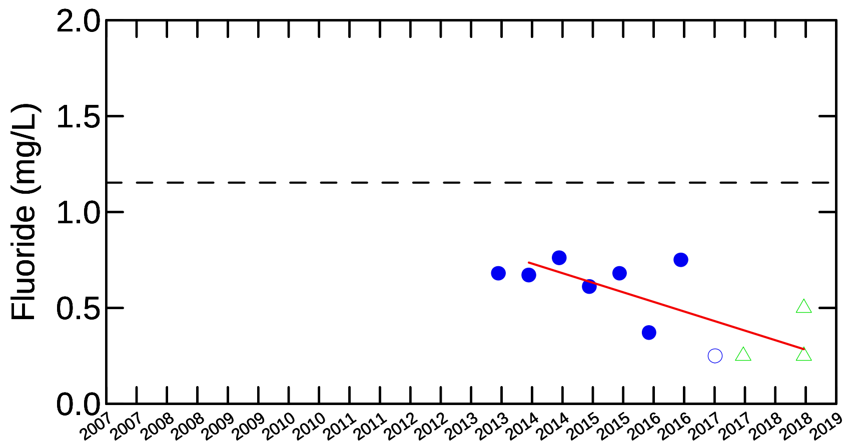
SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



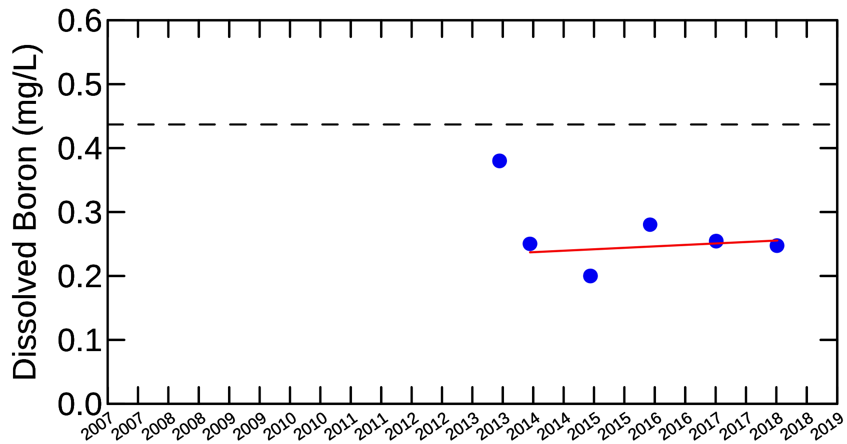
No trend



Decreasing trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

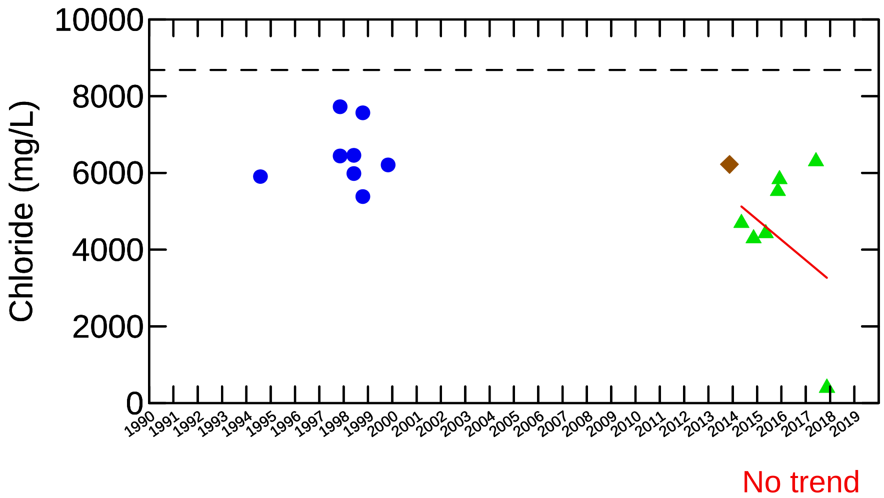
— — Baseline Upper Confidence Limit (UCL)

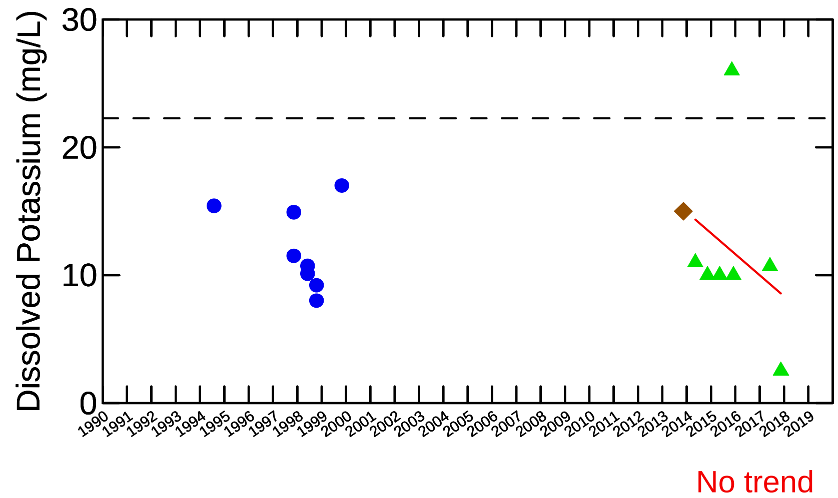
—— Linear Regression line

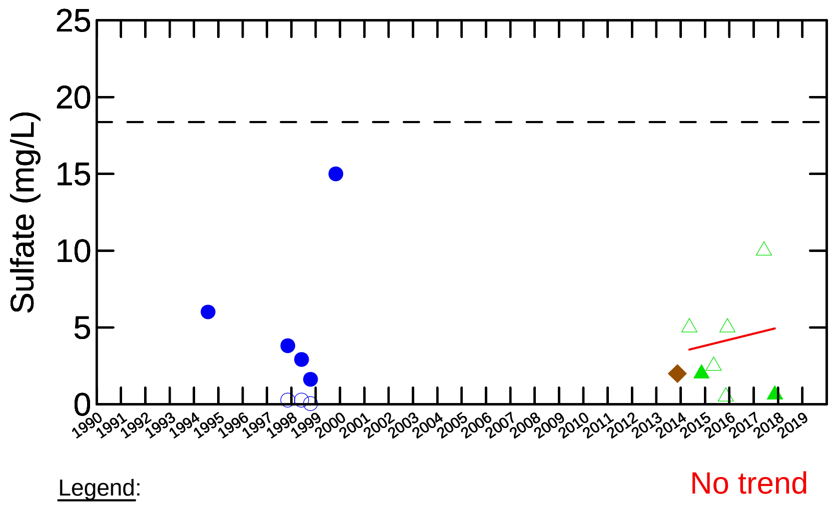
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

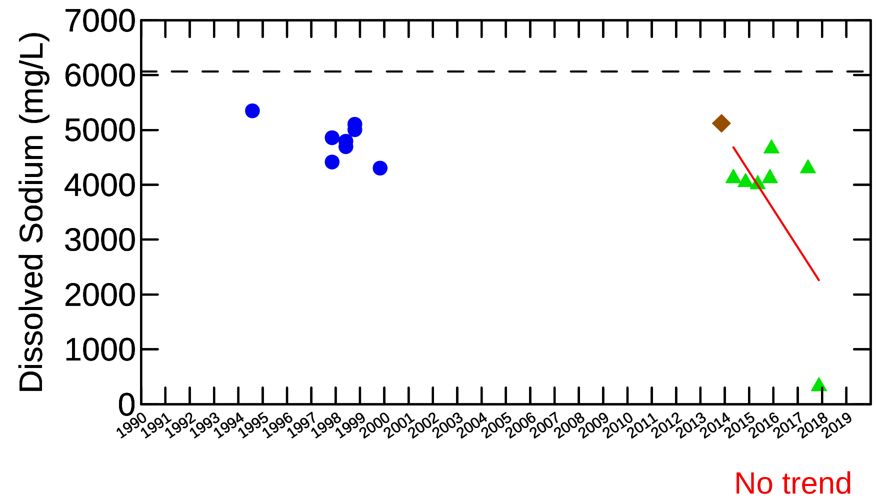
WELL TW63-13S

SHALLOW WELL (ACTIVE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









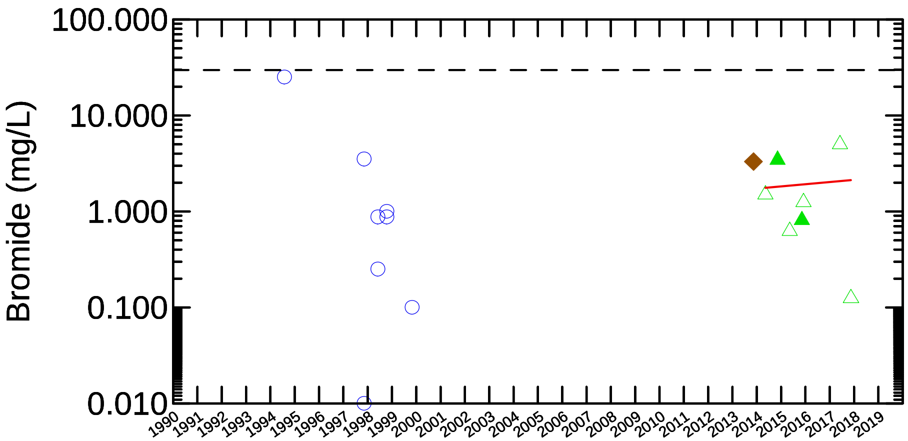
Legend:

- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- — — Baseline Upper Confidence Limit (UCL)
- —— Linear Regression line

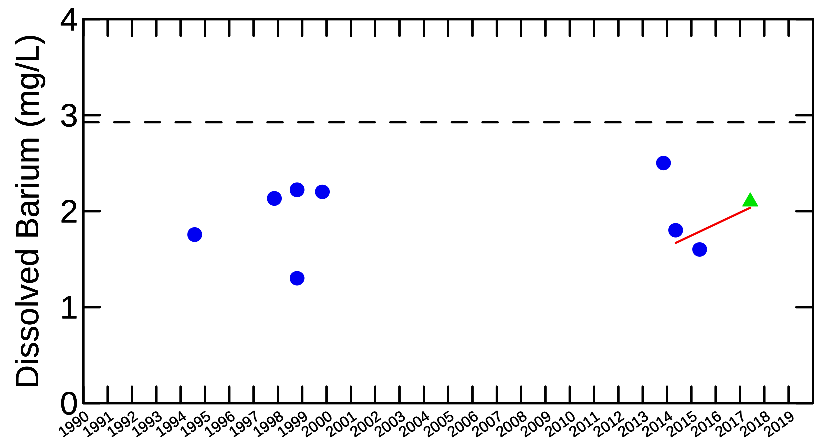
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW32-94-I

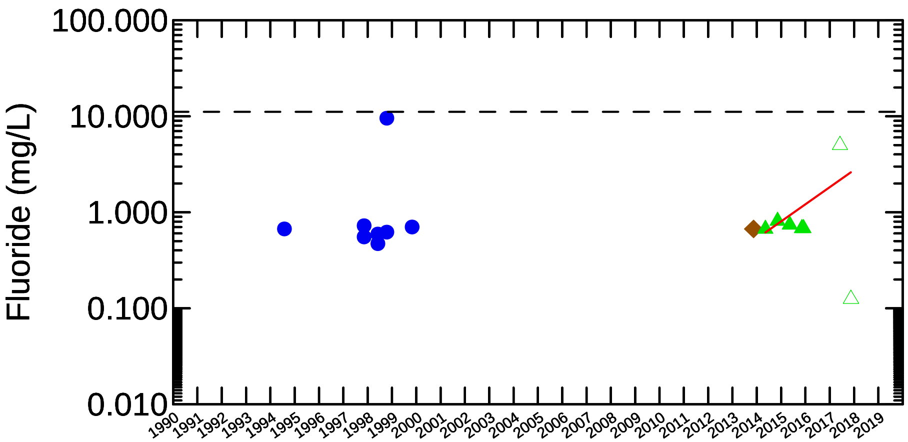
DEEP SHALE WELL (SHALE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



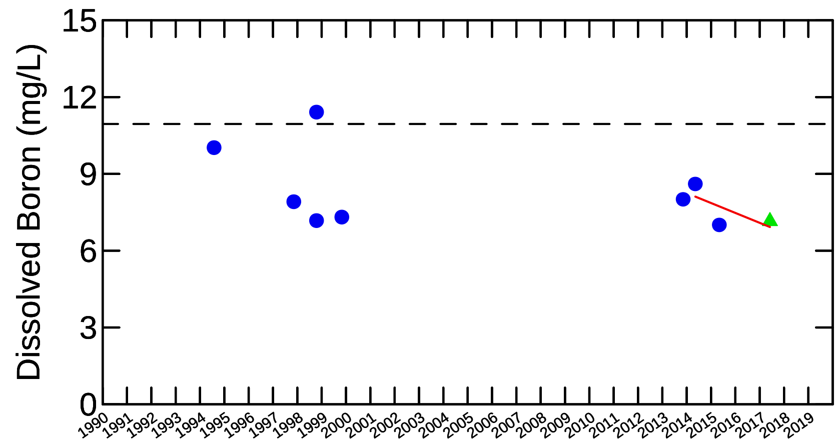
No trend



No trend



No trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

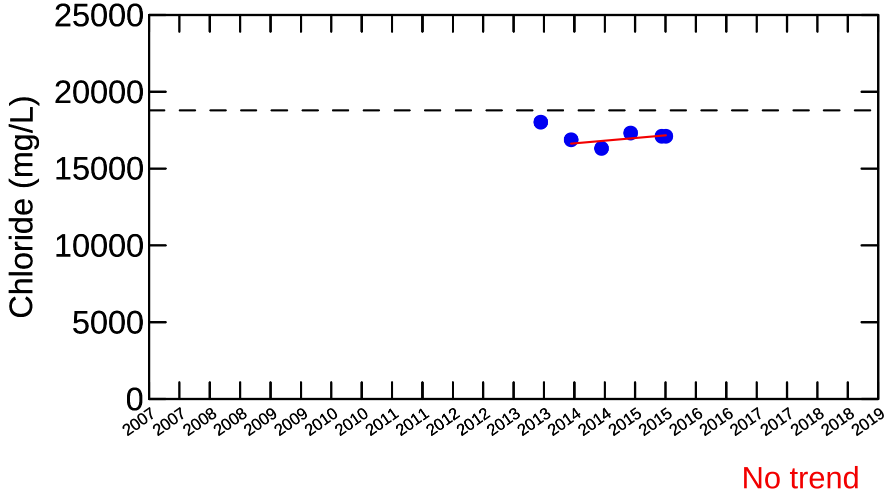
—— Linear Regression line

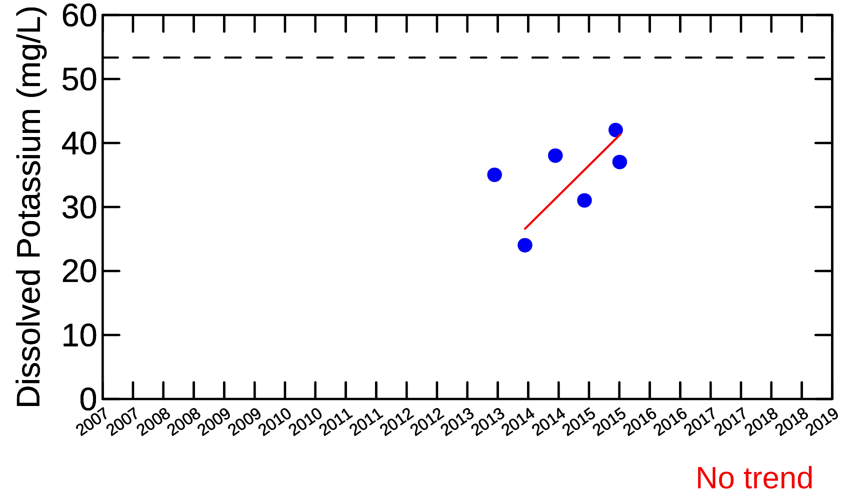
Notes:

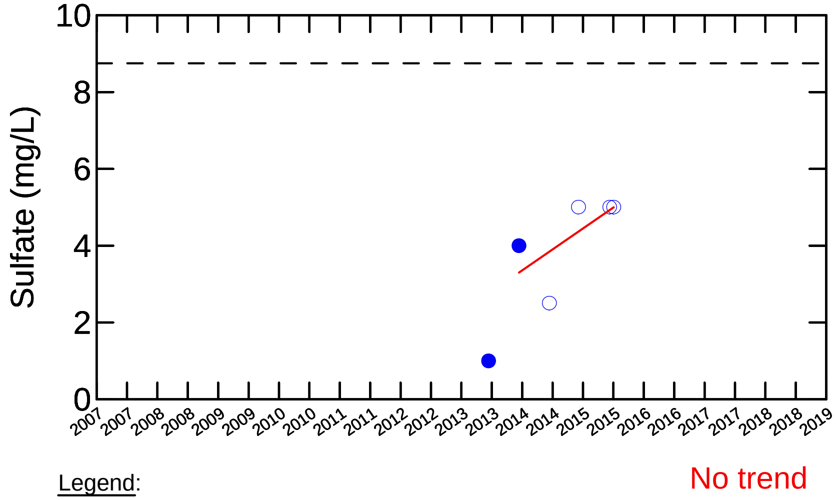
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

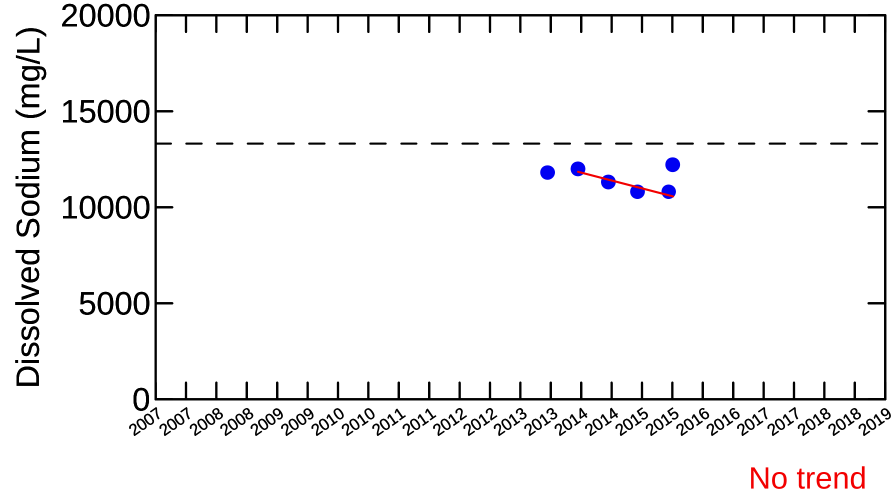
WELL TW32-94-I

DEEP SHALE WELL (SHALE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

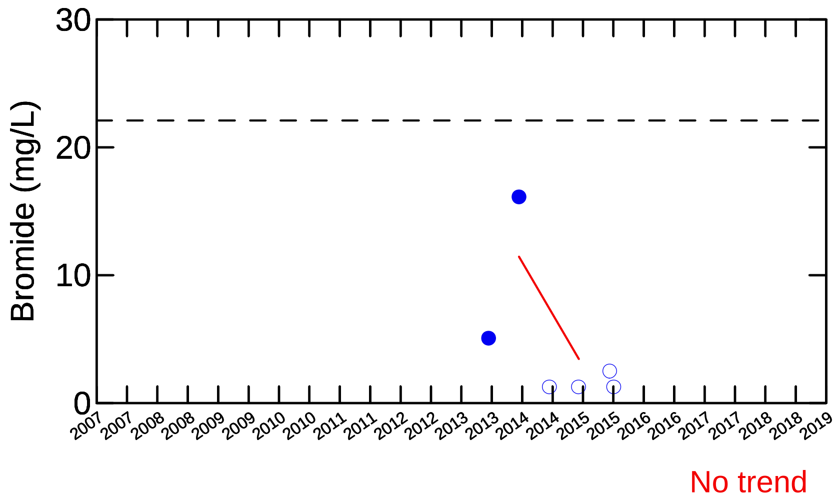
— — Baseline Upper Confidence Limit (UCL)

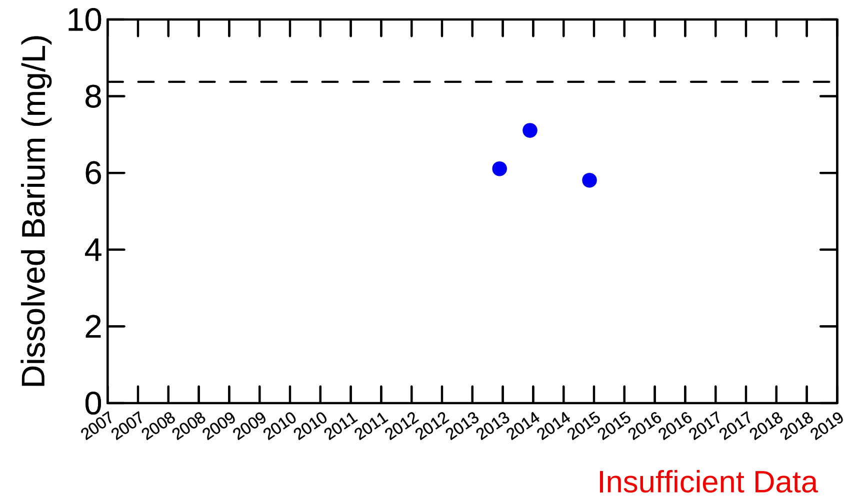
—— Linear Regression line

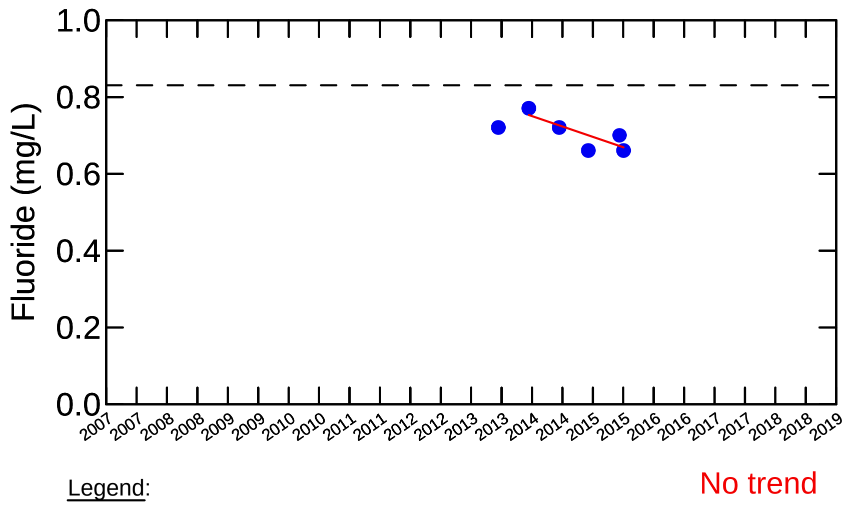
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

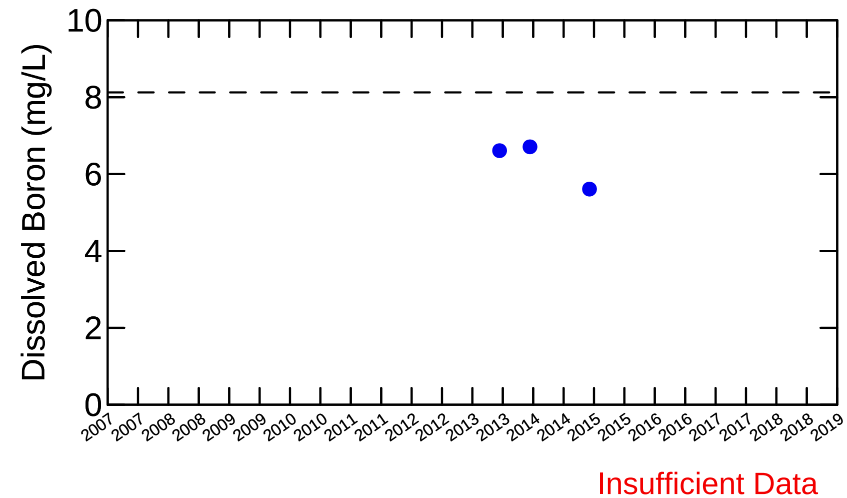
WELL TW38-94-I

DEEP SHALE WELL (SHALE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result

▲ Last 5 years (for trend)

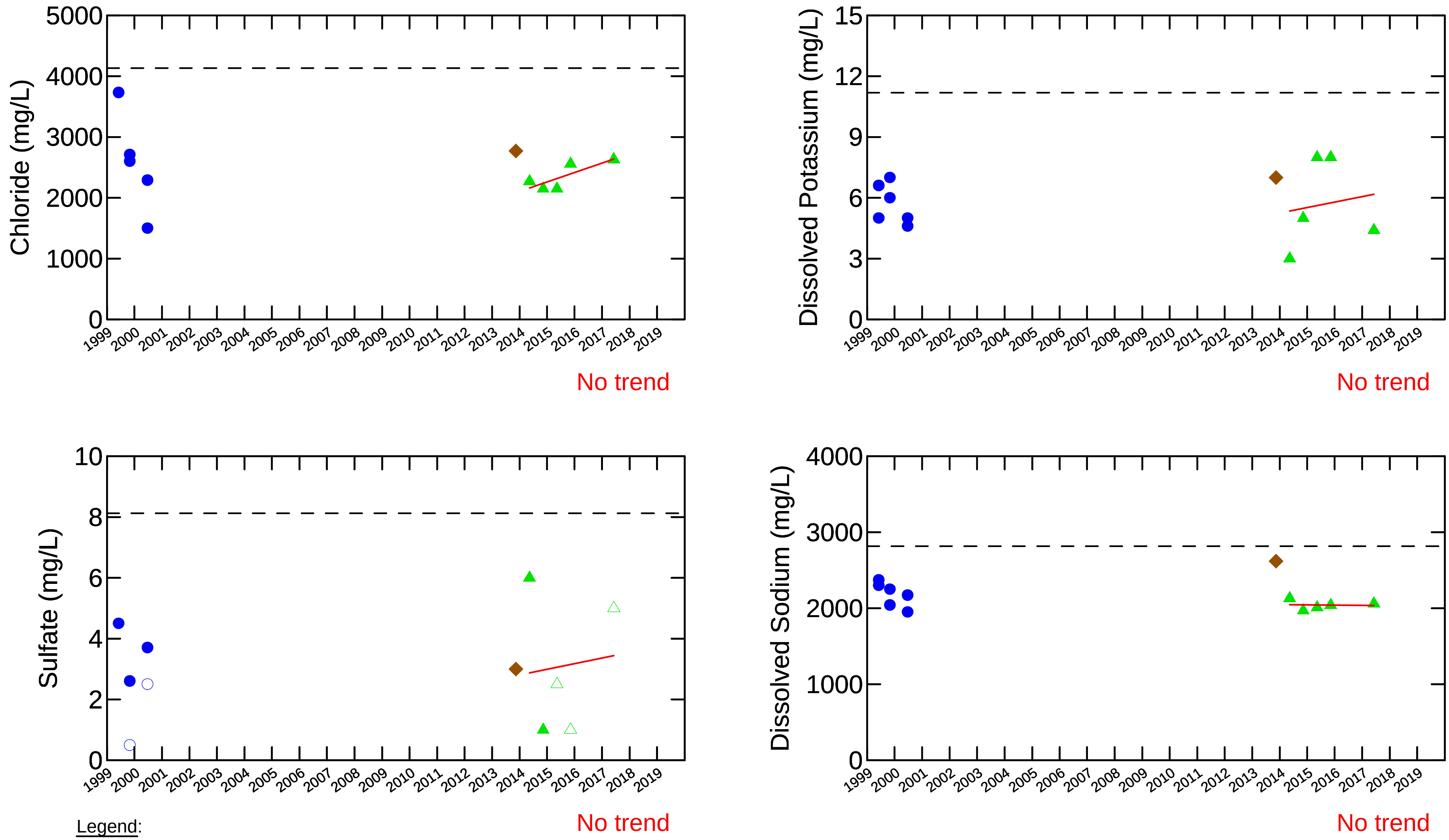
— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW38-94-I

DEEP SHALE WELL (SHALE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

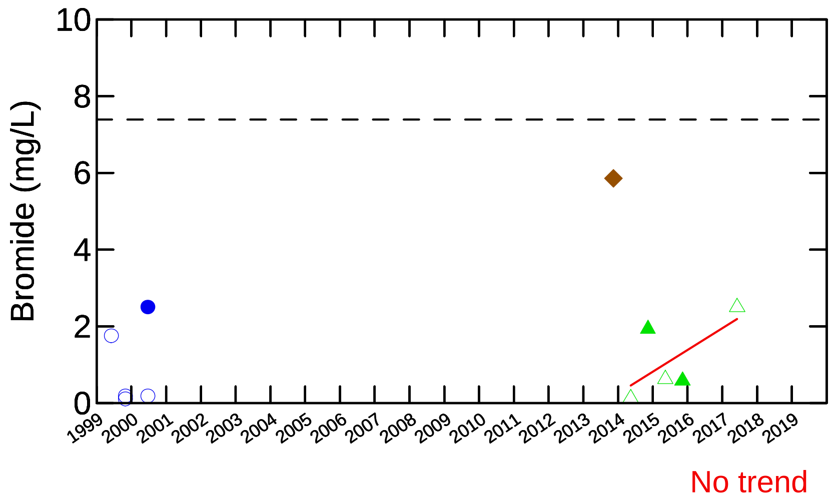
– – Baseline Upper Confidence Limit (UCL)

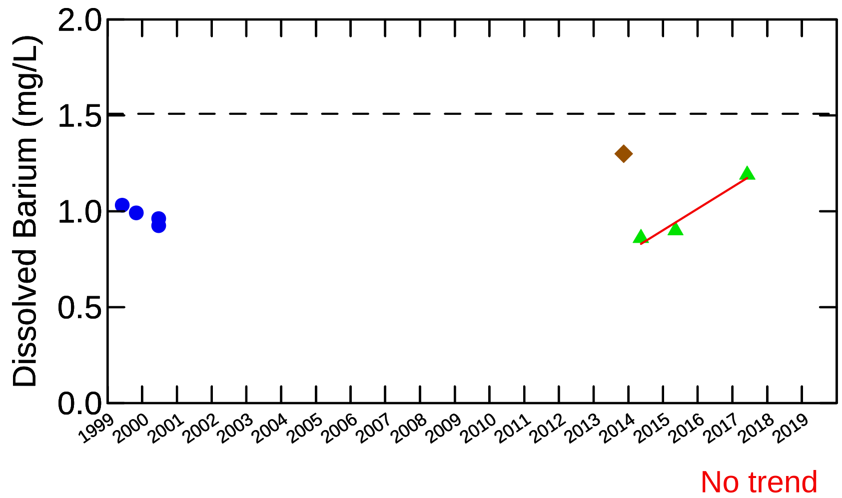
—— Linear Regression line

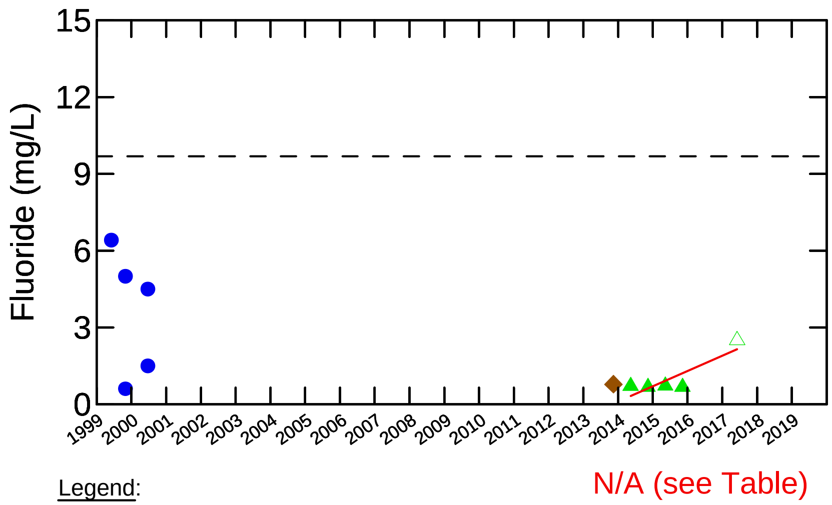
Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

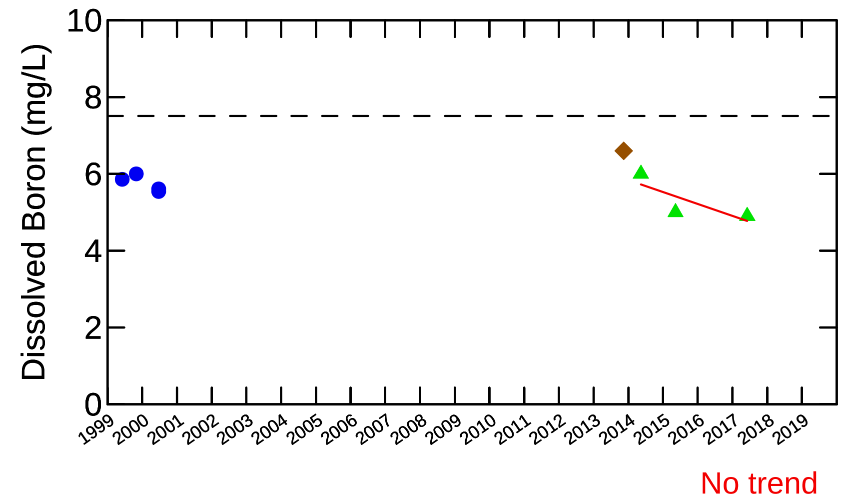
WELL TW42-99D

DEEP SHALE WELL (SHALE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario









Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)

Baseline Upper Confidence Limit (UCL)

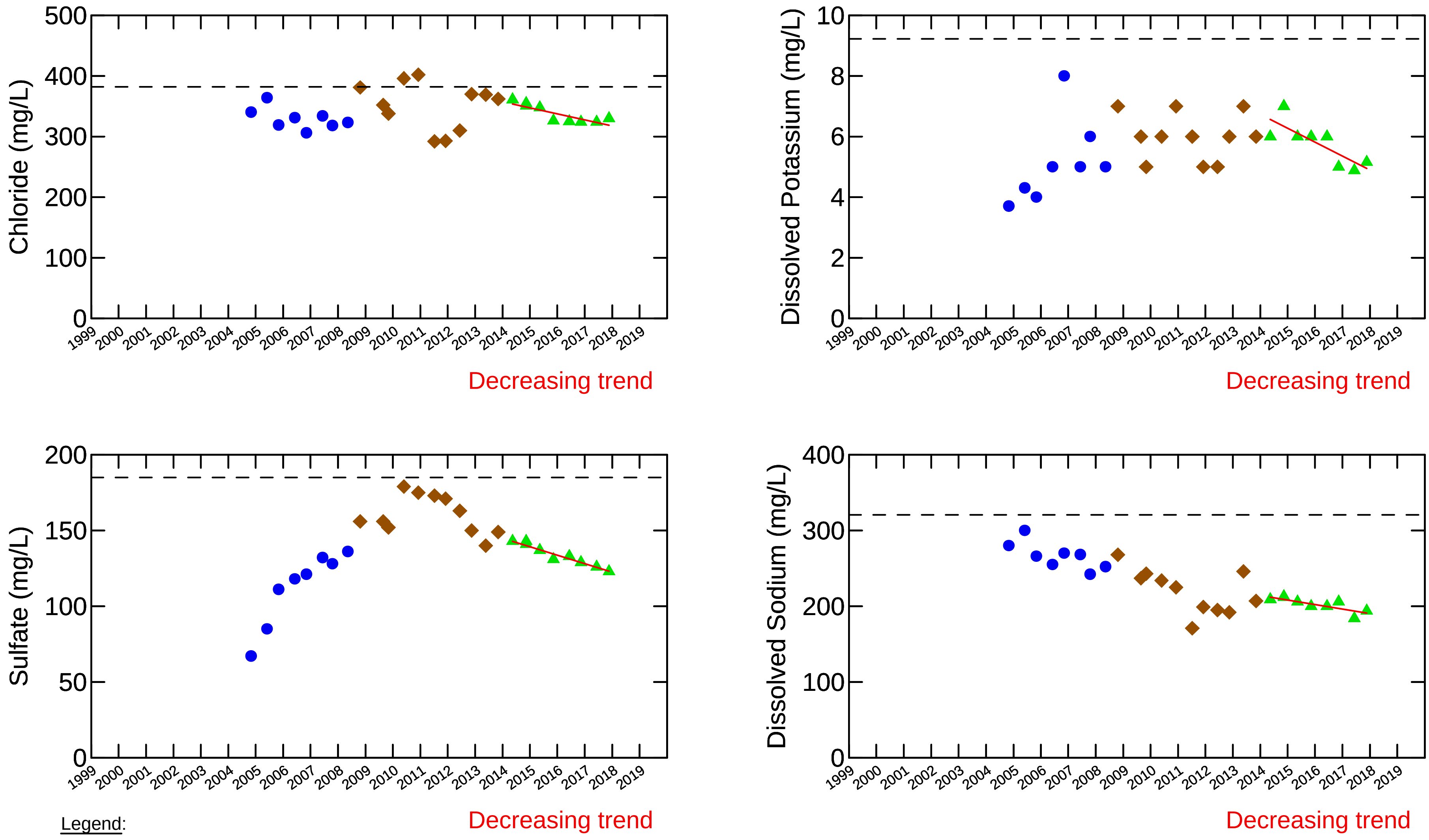
Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL TW42-99D

DEEP SHALE WELL (SHALE AQUITARD)
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

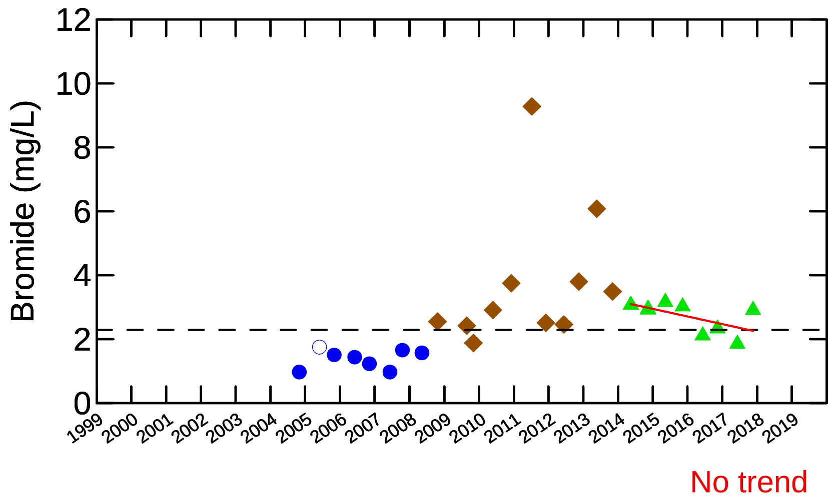
WELL EW1a-01

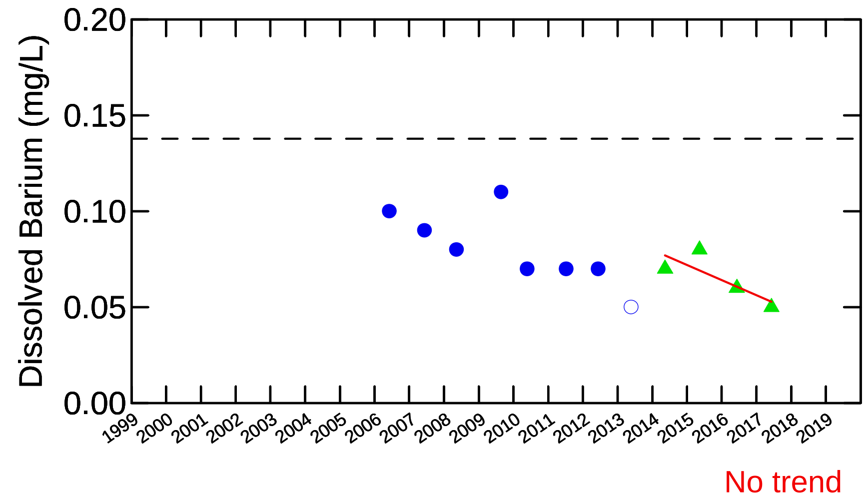
SUB-CELL 3

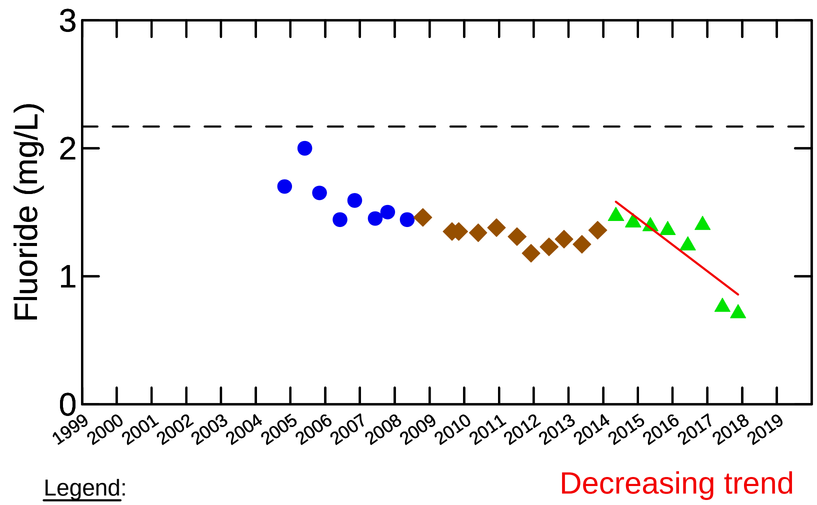
2018 GROUNDWATER MONITORING REPORT

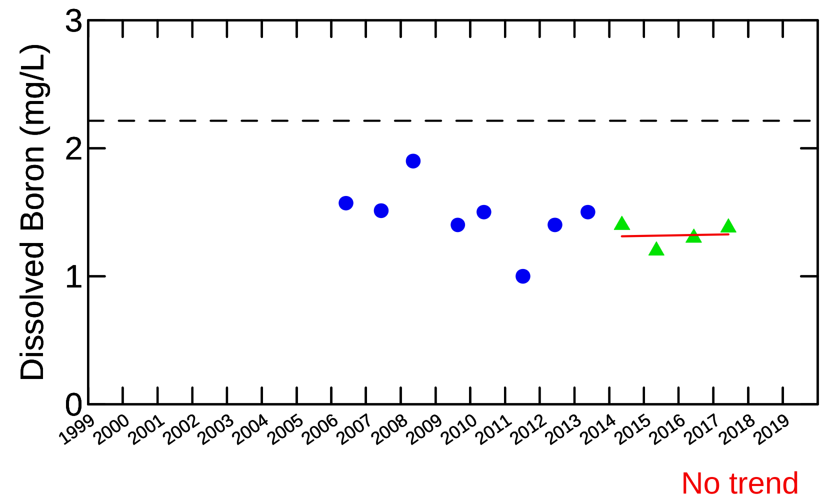
CLEAN HARBORS CANADA, INC.

Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

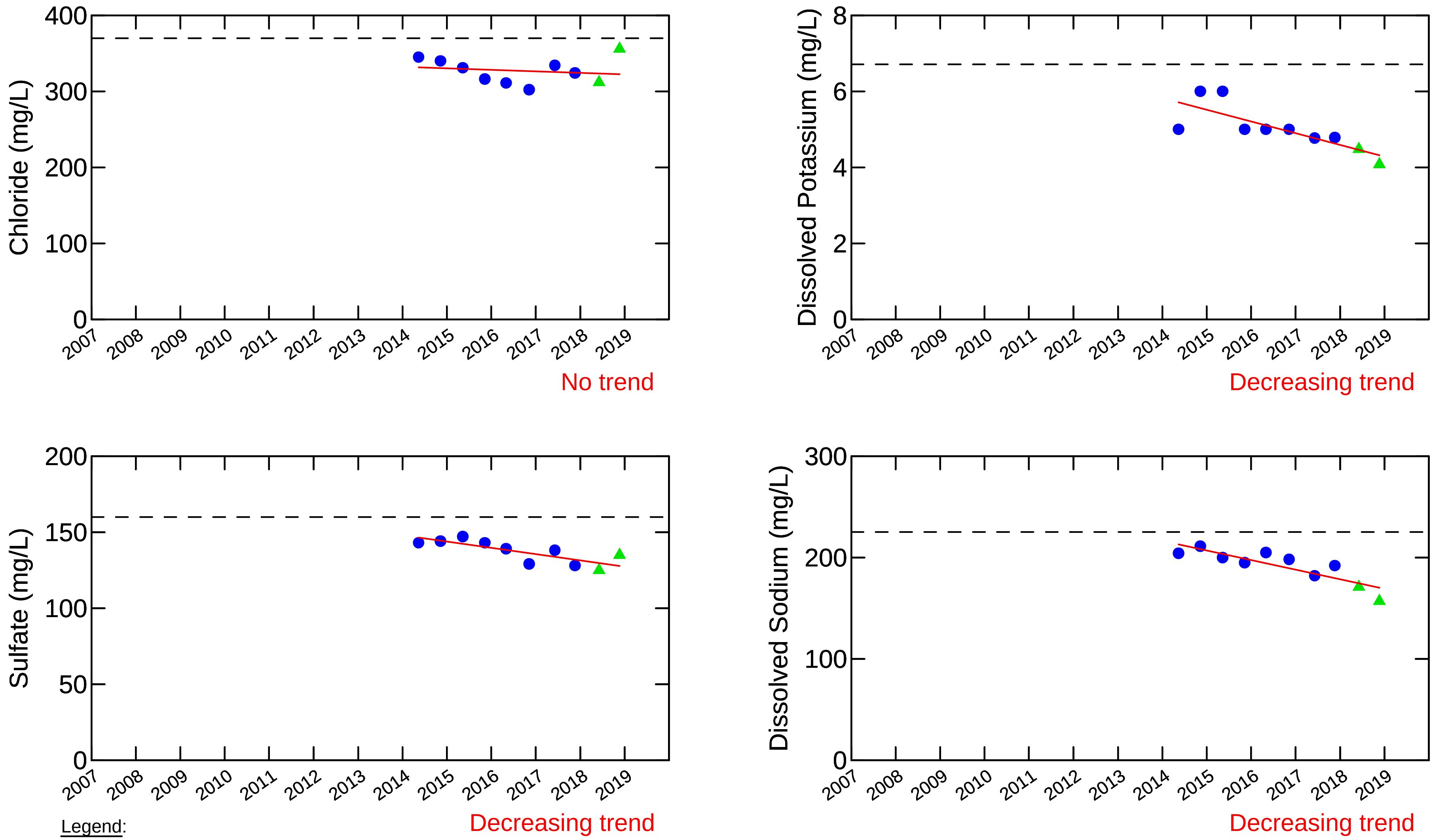
WELL EW1a-01

SUB-CELL 3

2018 GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA, INC.

Lambton County, Ontario



Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

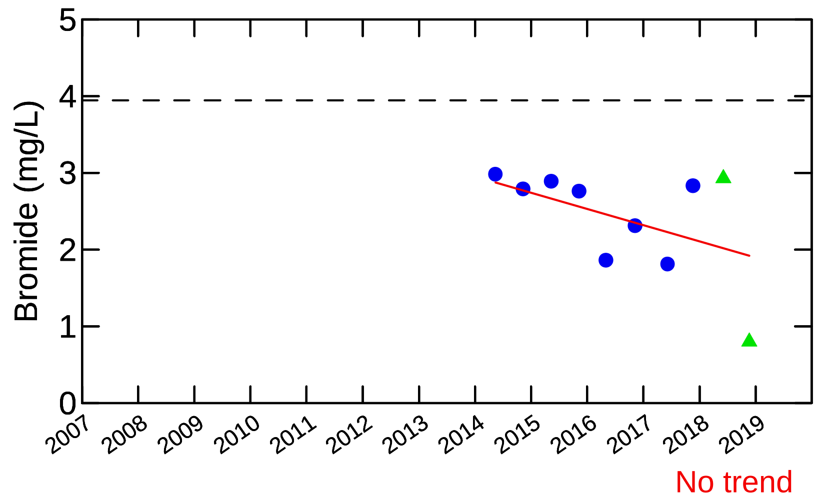
WELL EW1b-13

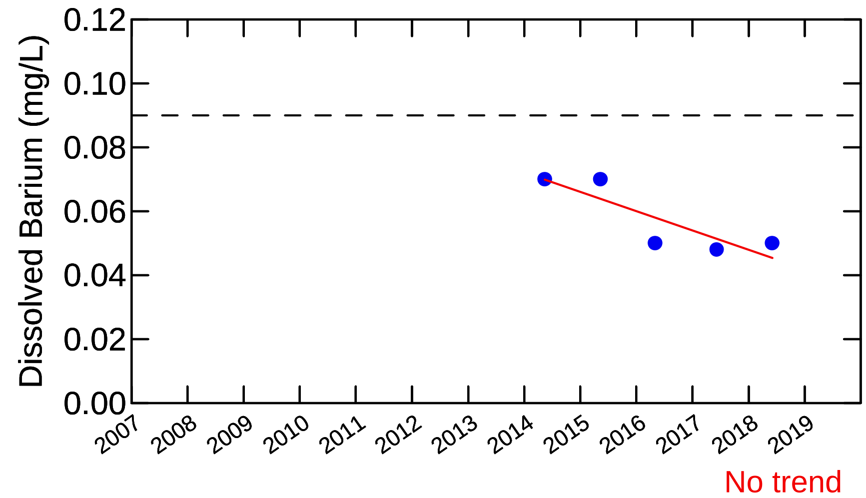
SUB-CELL 3

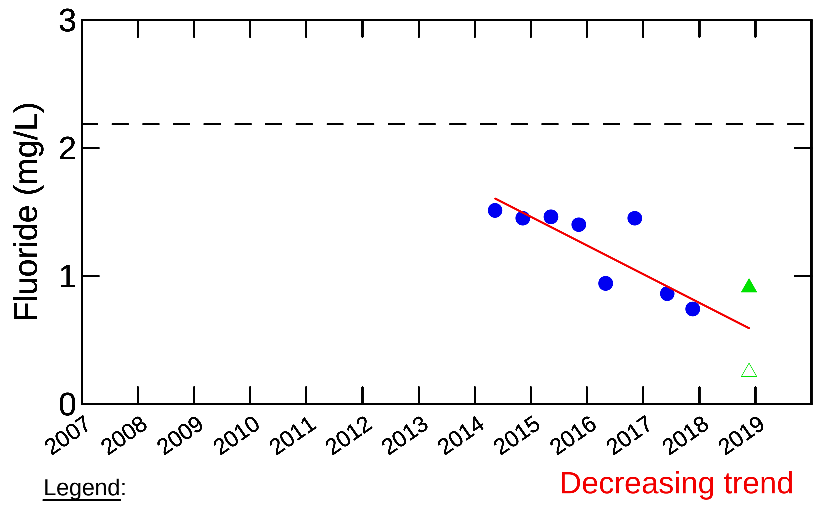
2018 GROUNDWATER MONITORING REPORT

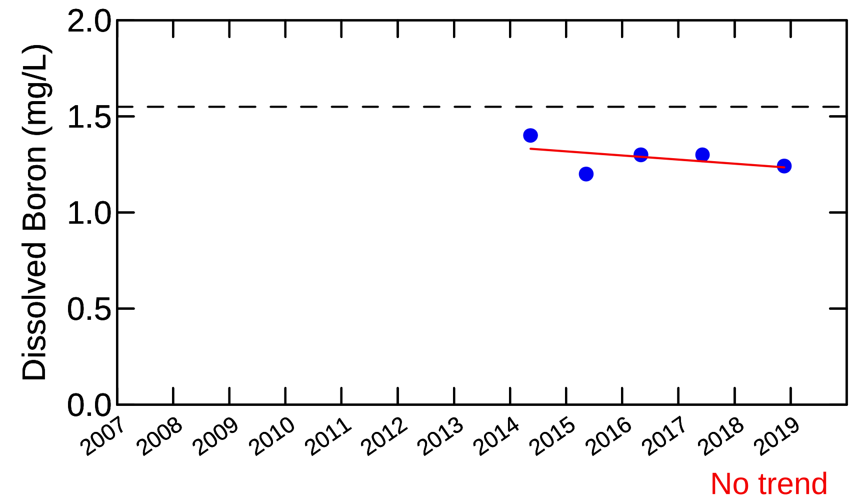
CLEAN HARBORS CANADA, INC.

Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

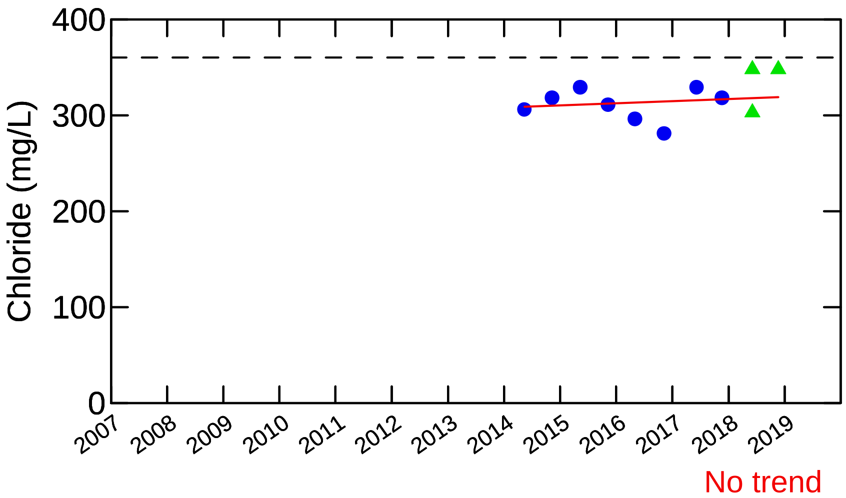
WELL EW1b-13

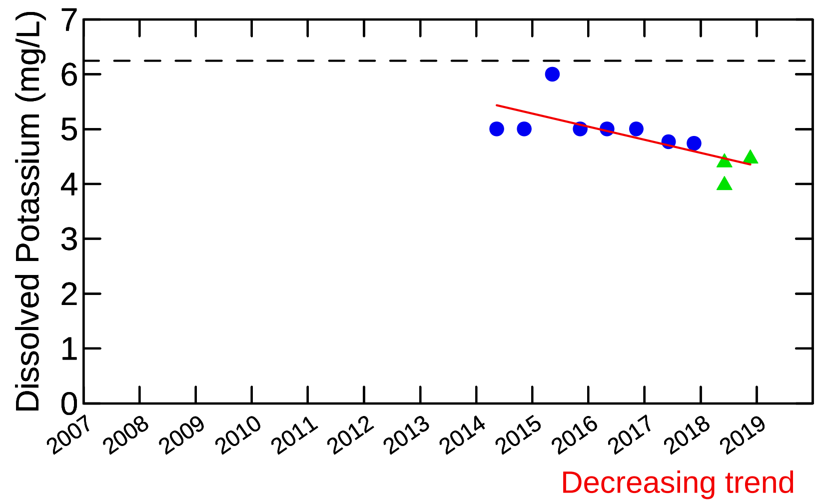
SUB-CELL 3

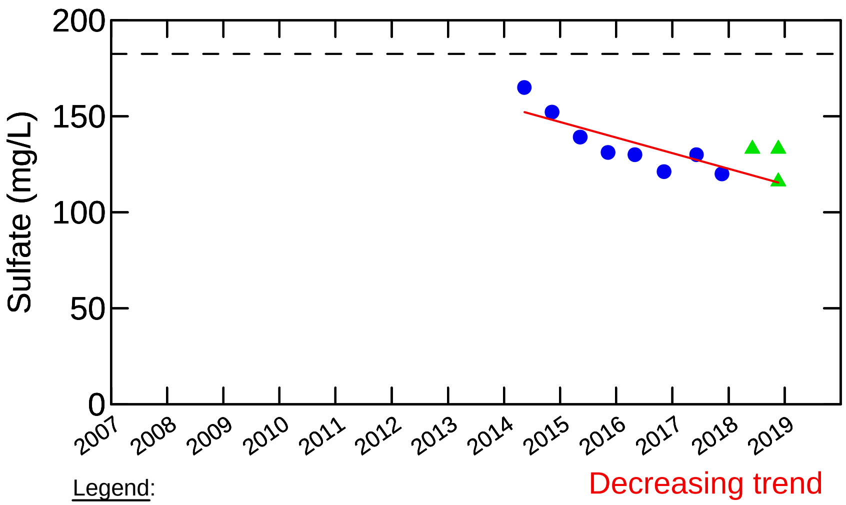
2018 GROUNDWATER MONITORING REPORT

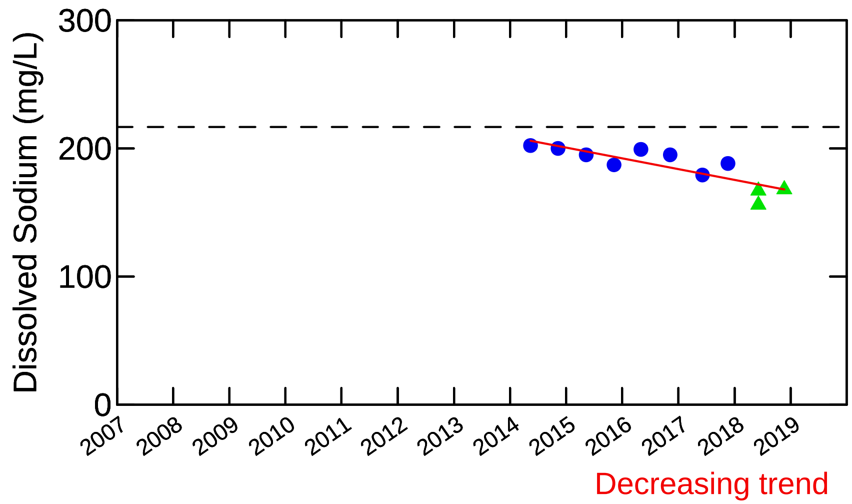
CLEAN HARBORS CANADA, INC.

Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

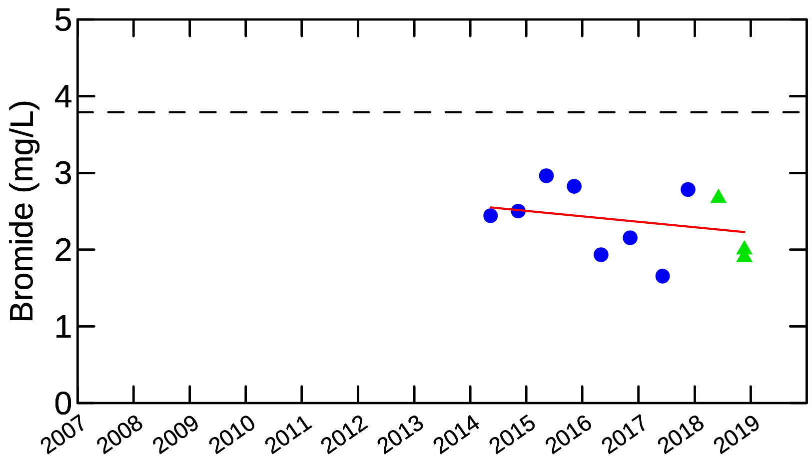
— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

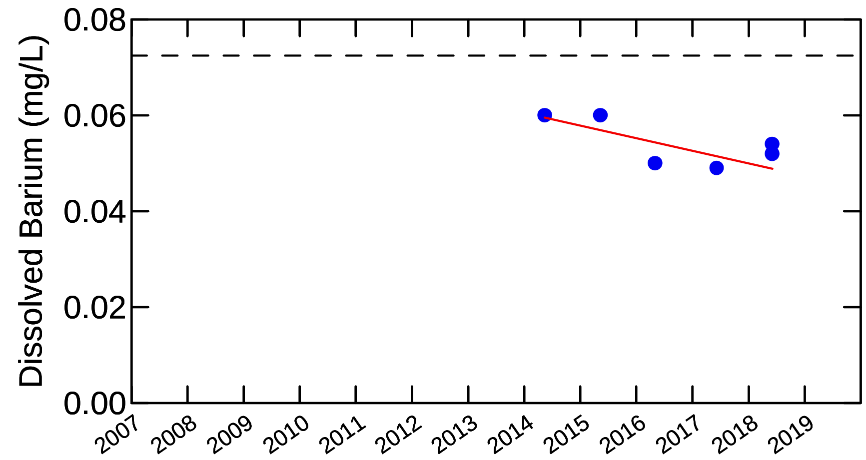
WELL EW1c-13

SUB-CELL 3

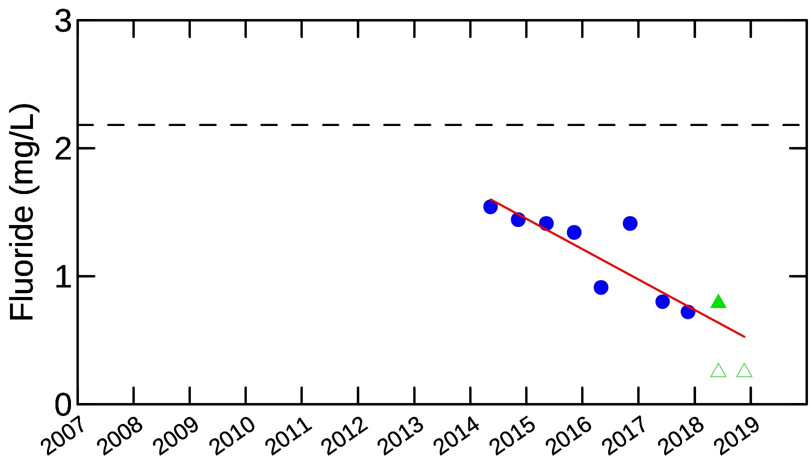
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



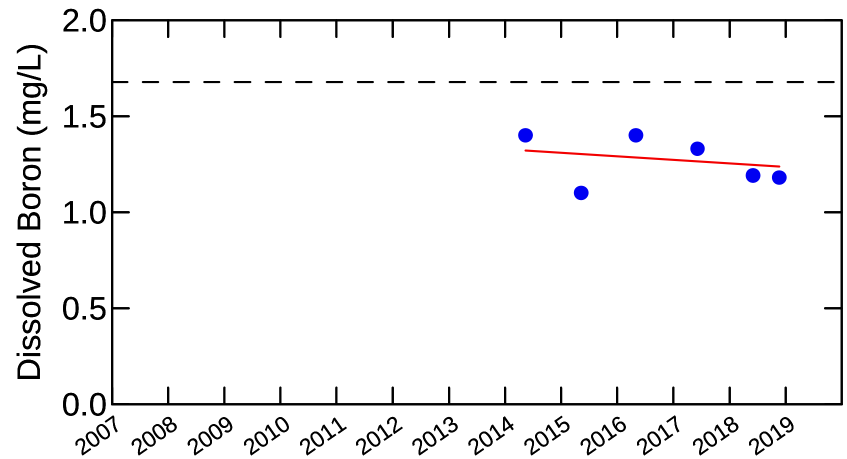
No trend



No trend



Decreasing trend



No trend

Legend:

● Baseline result

◆ Post-Baseline result

▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

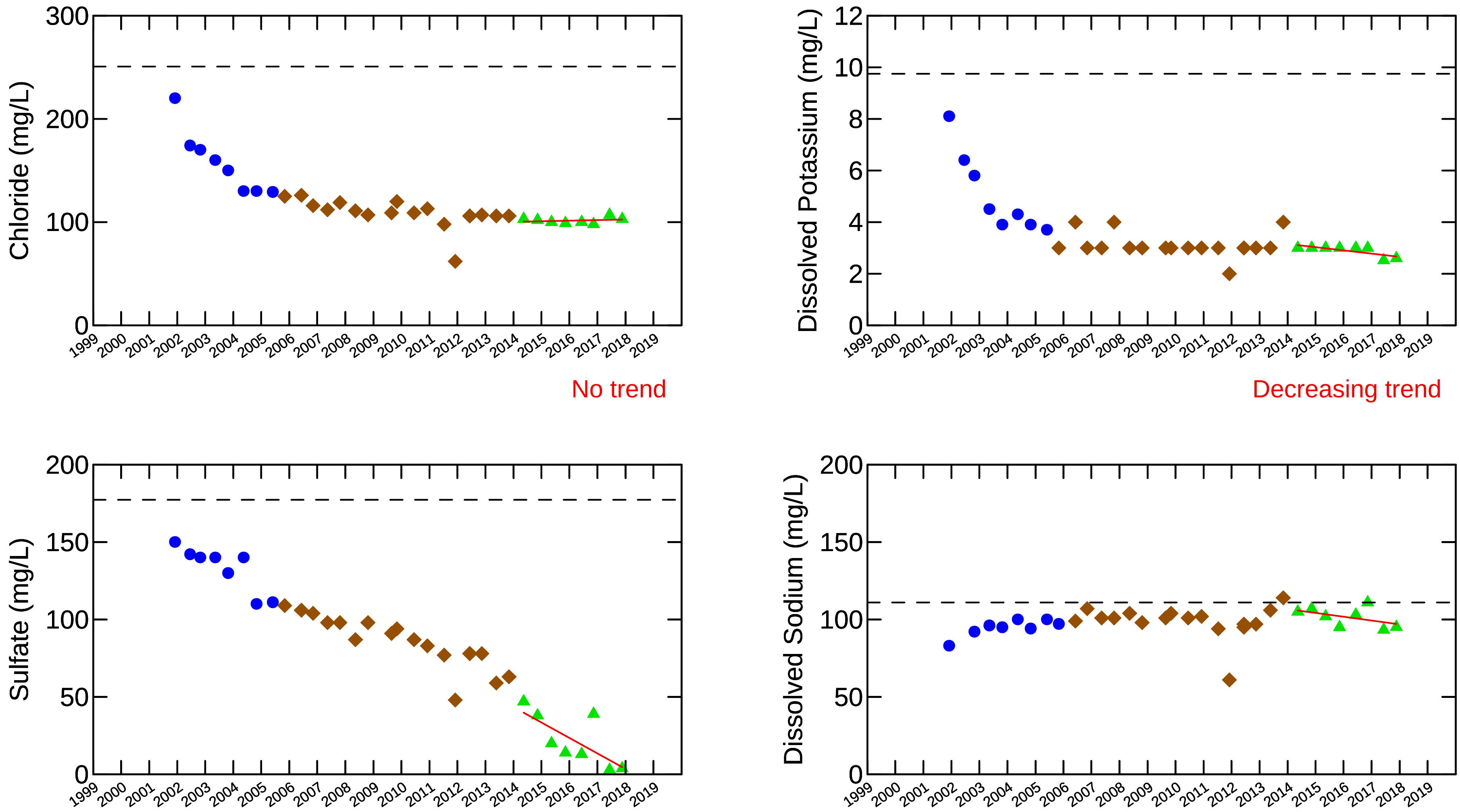
Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL EW1c-13

SUB-CELL 3

2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

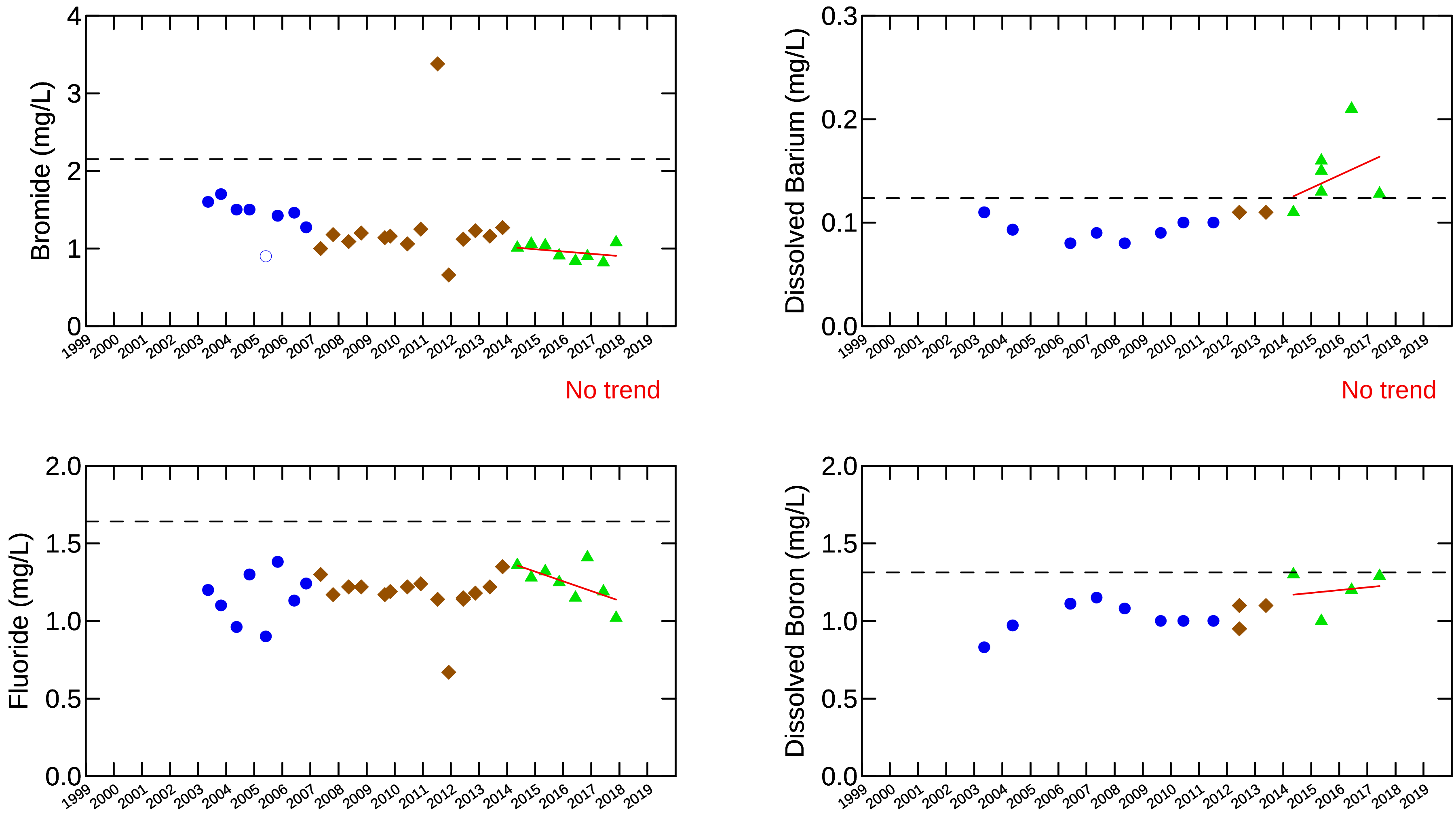
— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL EW2a-01

SUB-CELL 3

2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario

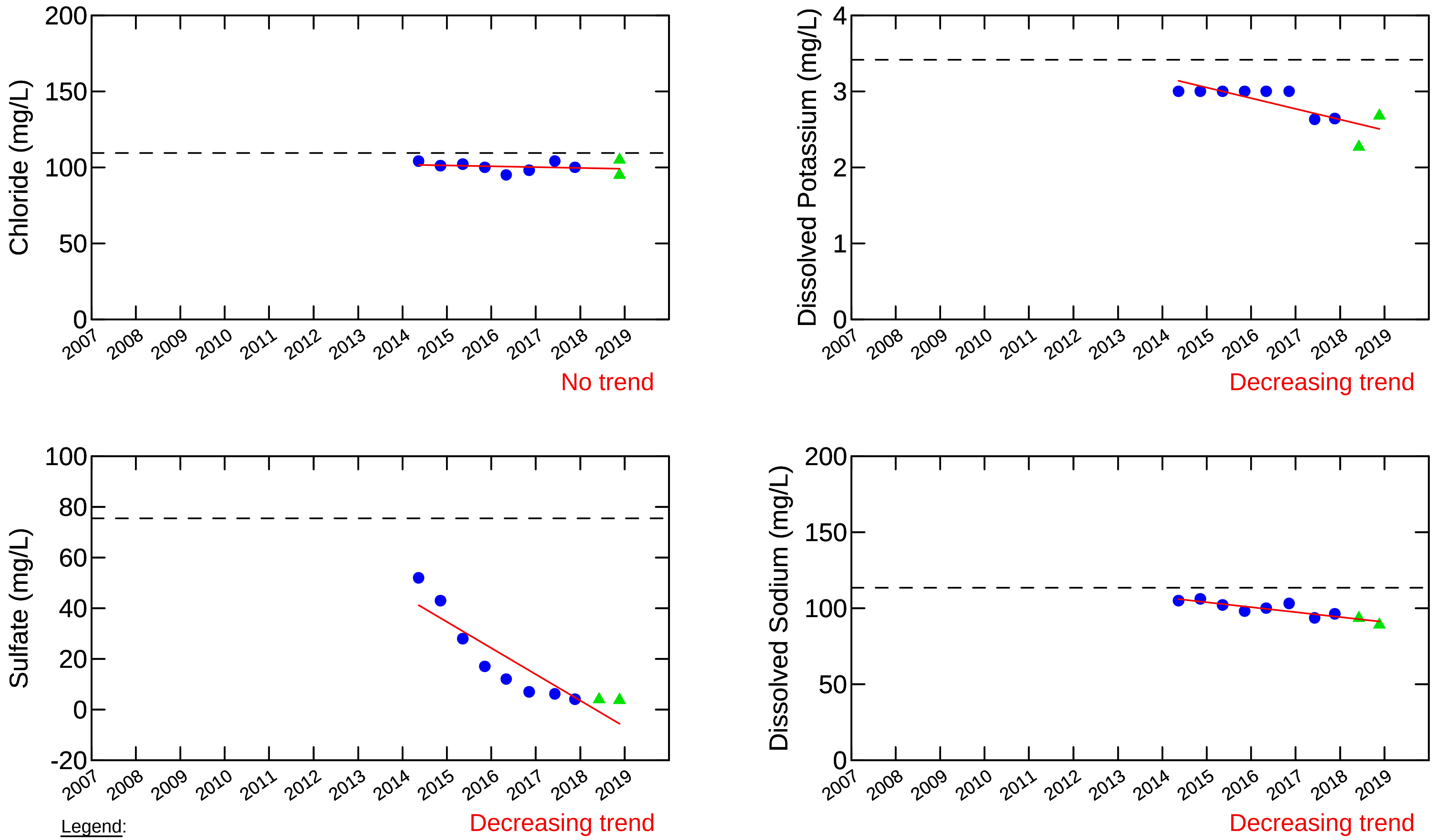


Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL EW2a-01
SUB-CELL 3
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

– – Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

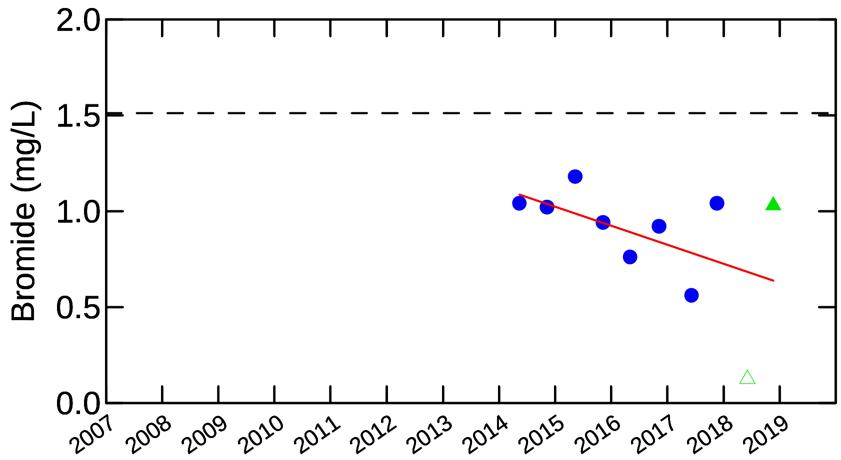
WELL EW2b-13

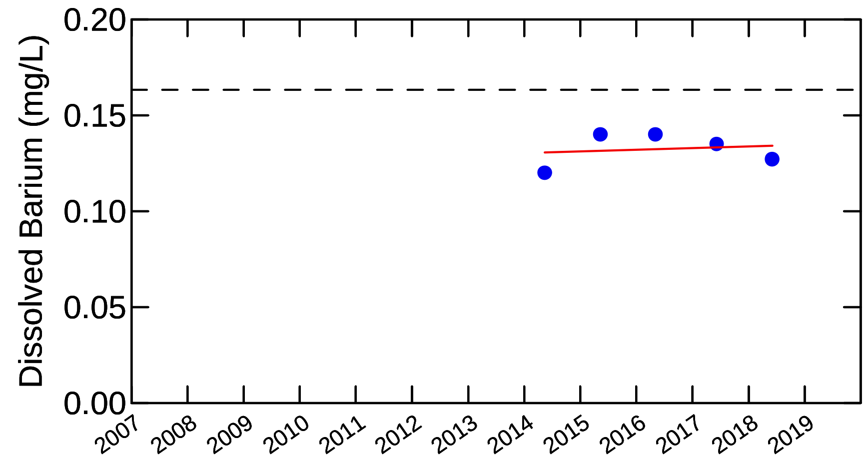
SUB-CELL 3

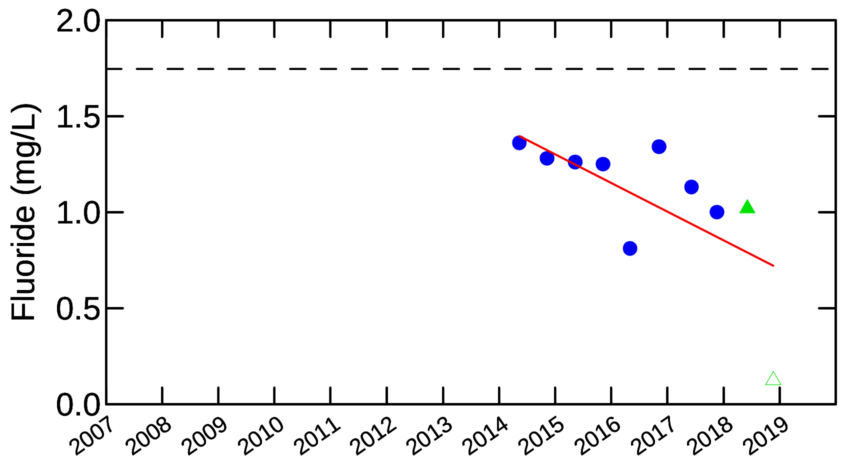
2018 GROUNDWATER MONITORING REPORT

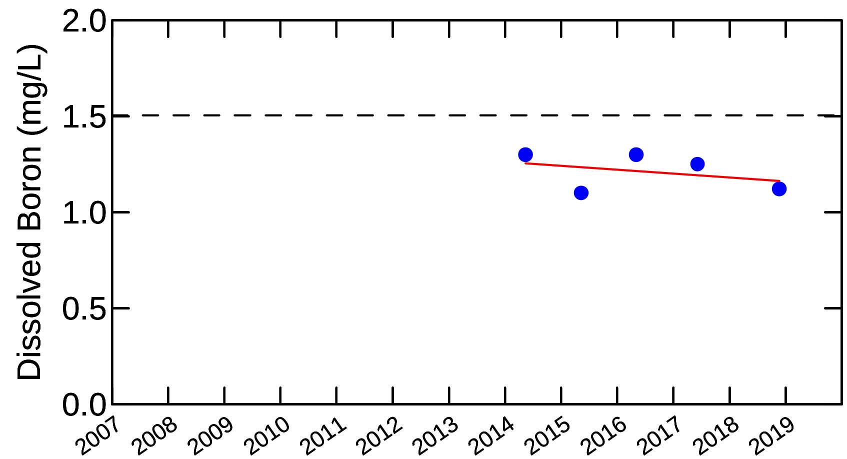
CLEAN HARBORS CANADA, INC.

Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

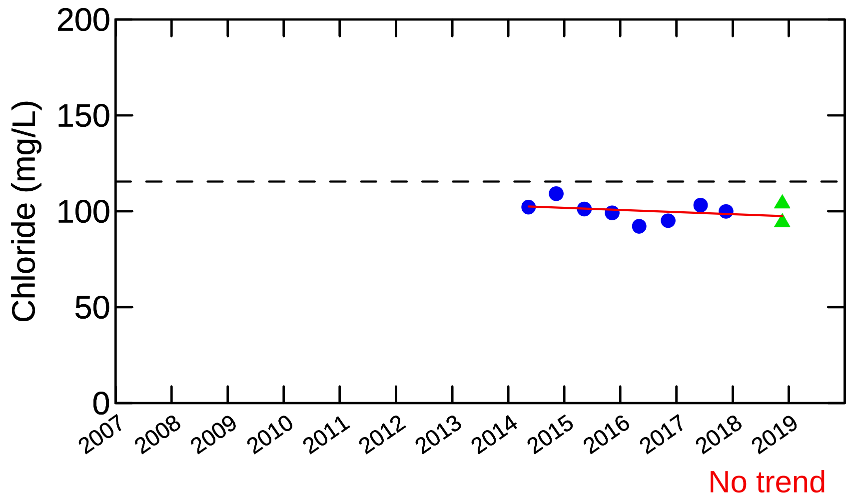
WELL EW2b-13

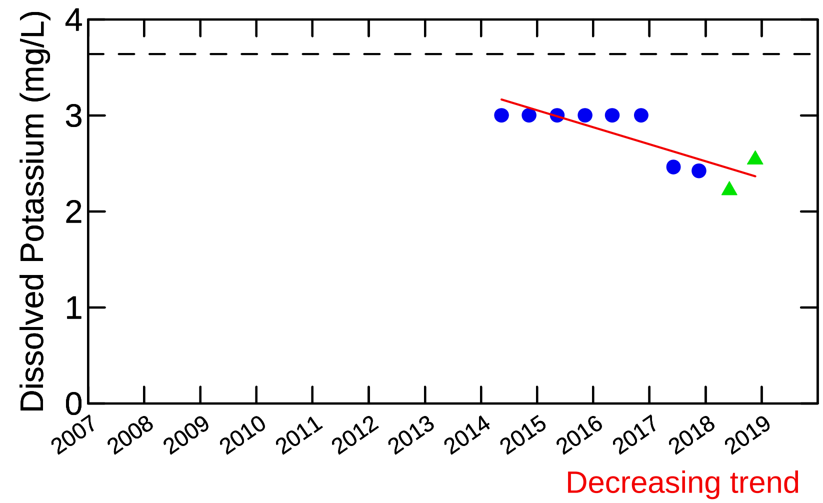
SUB-CELL 3

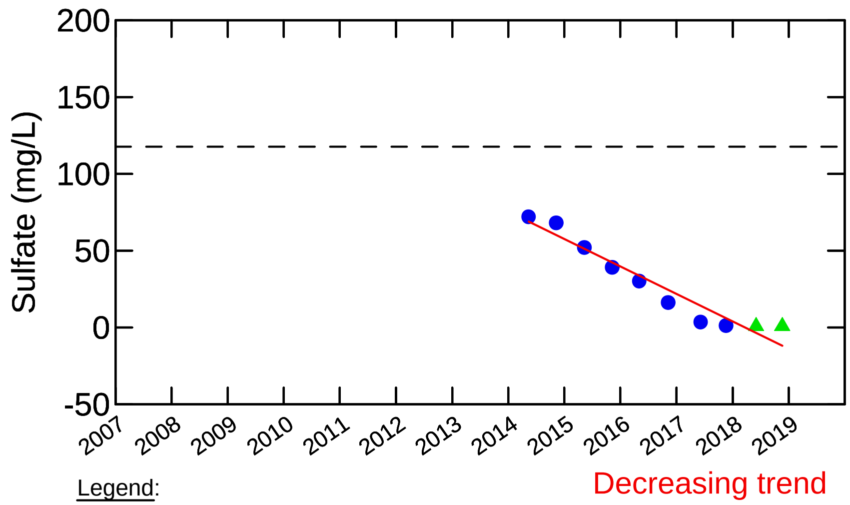
2018 GROUNDWATER MONITORING REPORT

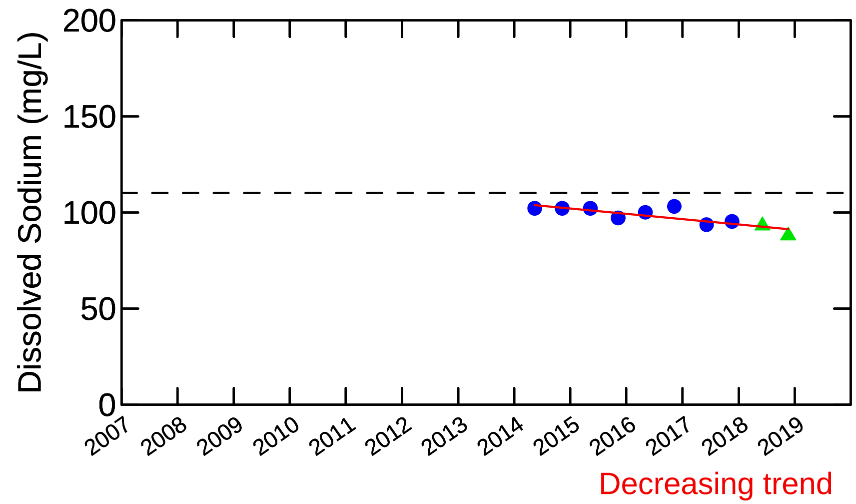
CLEAN HARBORS CANADA, INC.

Lambton County, Ontario









Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

GHD

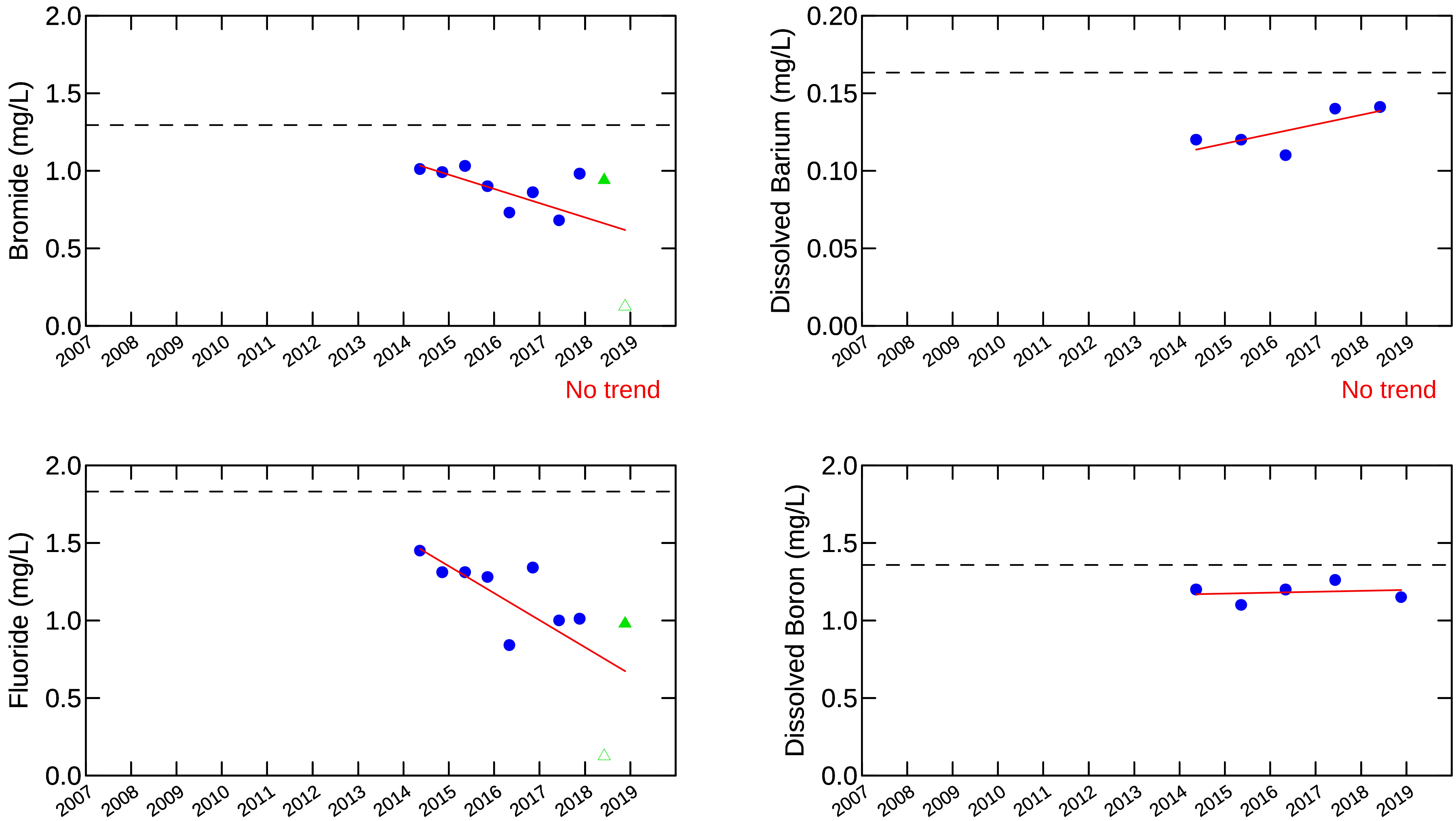
WELL EW2c-13

SUB-CELL 3

2018 GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA, INC.

Lambton County, Ontario



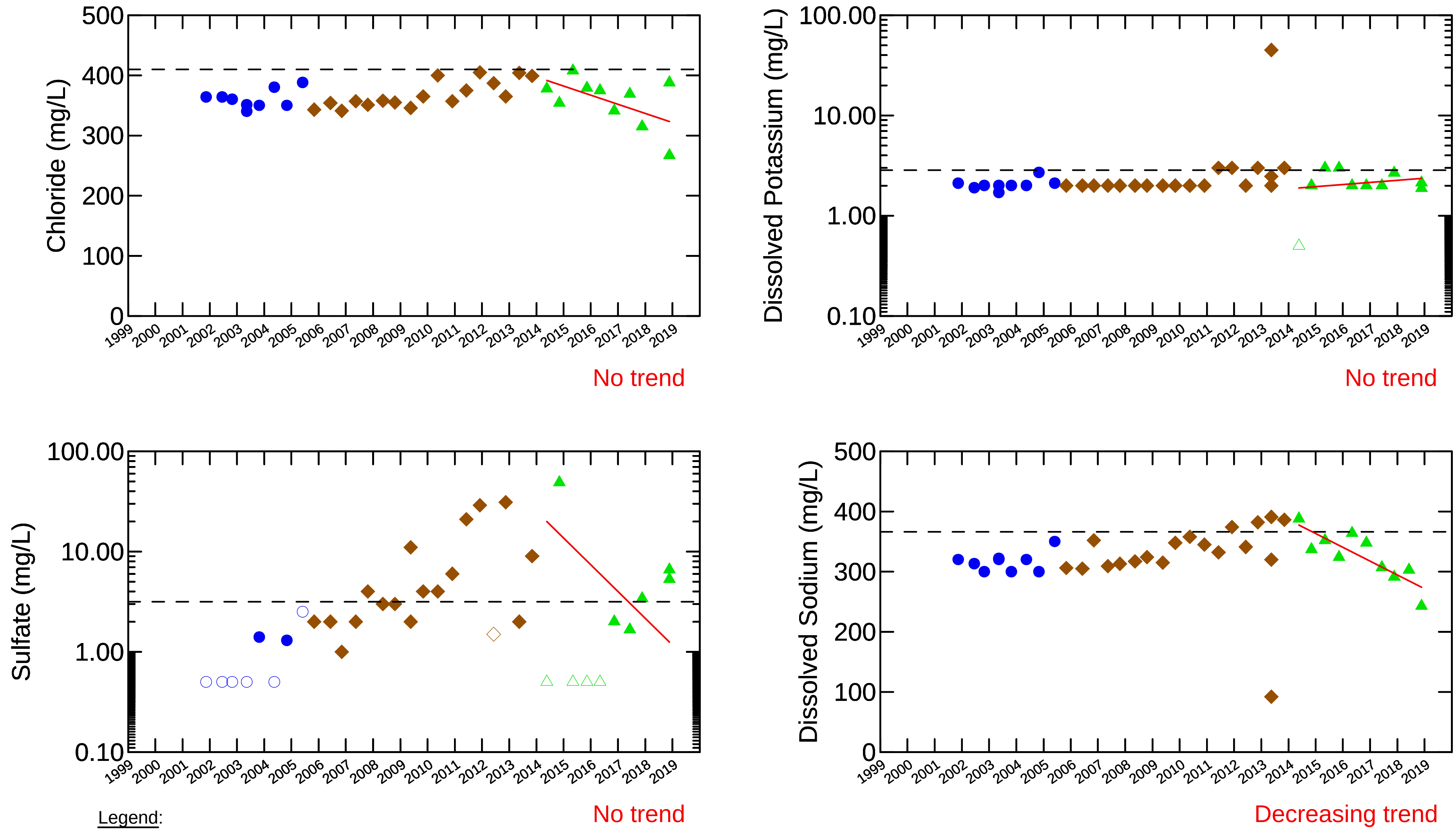
Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL EW2c-13

SUB-CELL 3
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



Legend:

- Baseline result
- Post-Baseline result
- Last 5 years (for trend)
- Baseline Upper Confidence Limit (UCL)
- Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

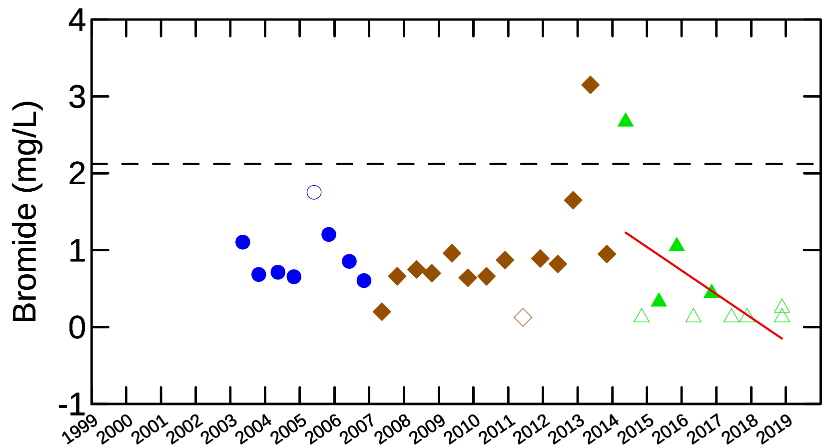
WELL PW1-N

SUB-CELL 3

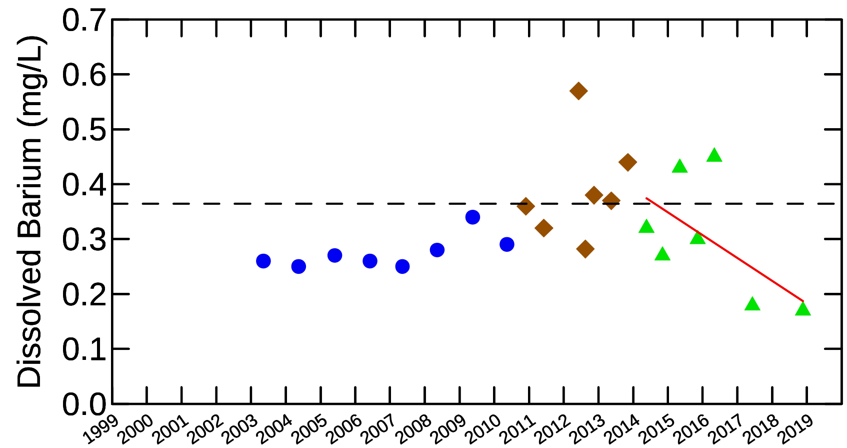
2018 GROUNDWATER MONITORING REPORT

CLEAN HARBORS CANADA, INC.

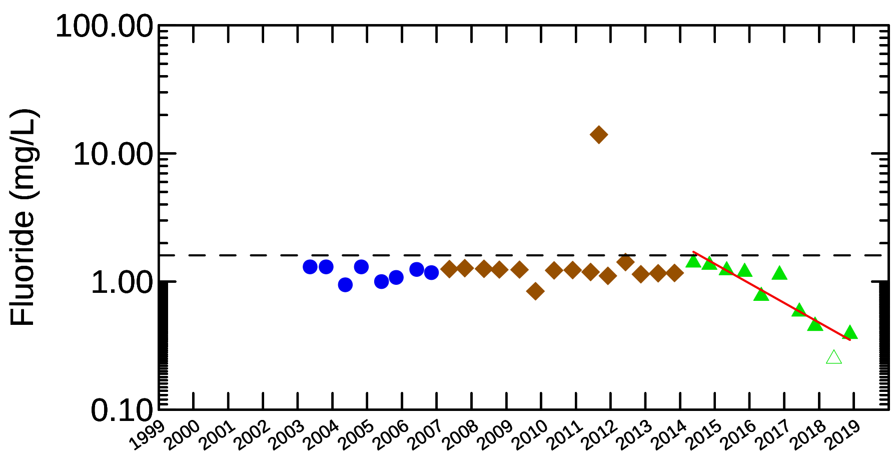
Lambton County, Ontario



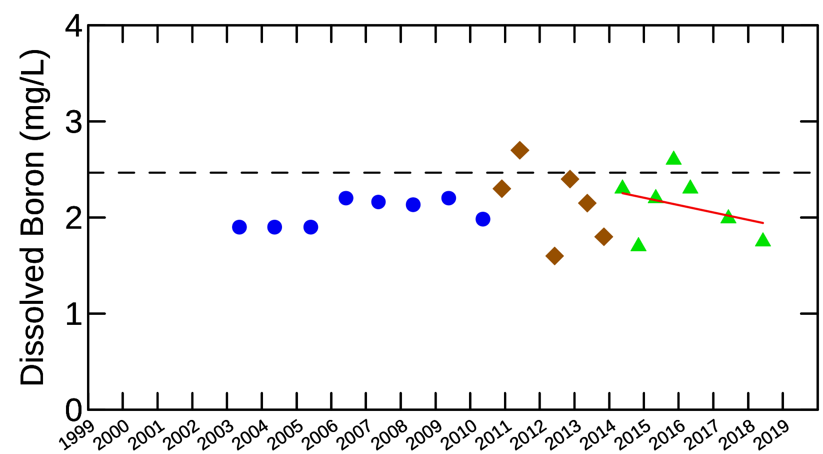
No trend



No trend



Decreasing trend



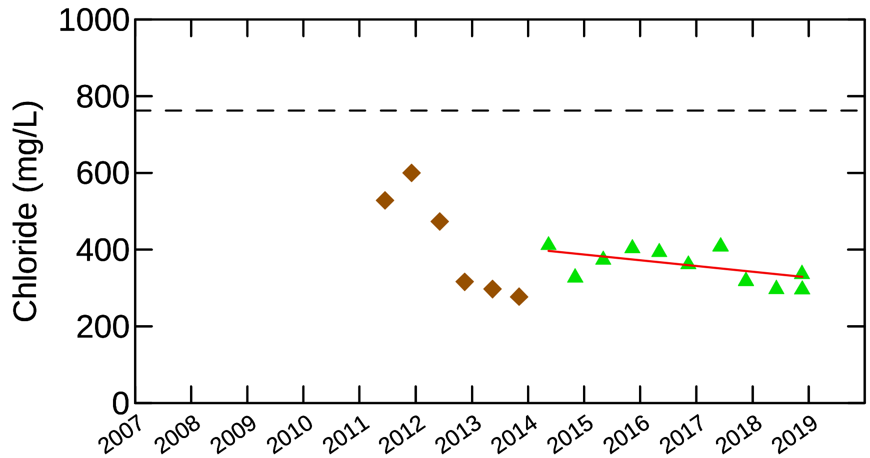
No trend

Legend:

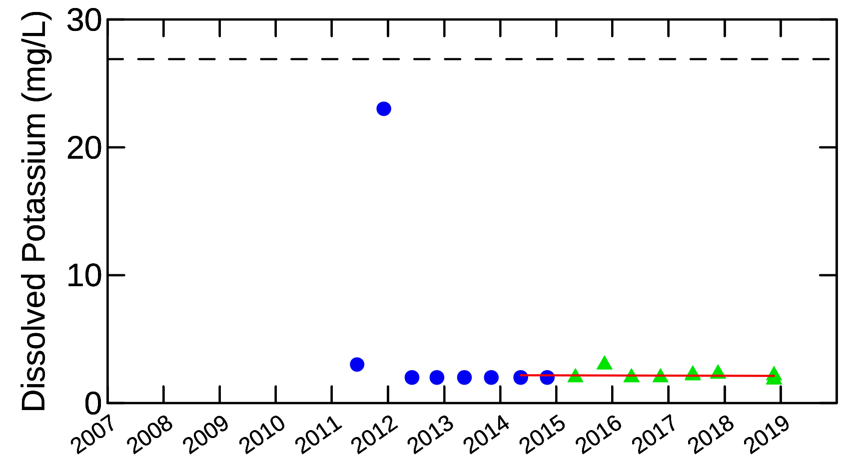
- ● Baseline result
- ◆ Post-Baseline result
- ▲ Last 5 years (for trend)
- – – Baseline Upper Confidence Limit (UCL)
- —— Linear Regression line

Notes:
(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
(2) Baseline UCLs were calculated using data from the initial 8 sampling events.
(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

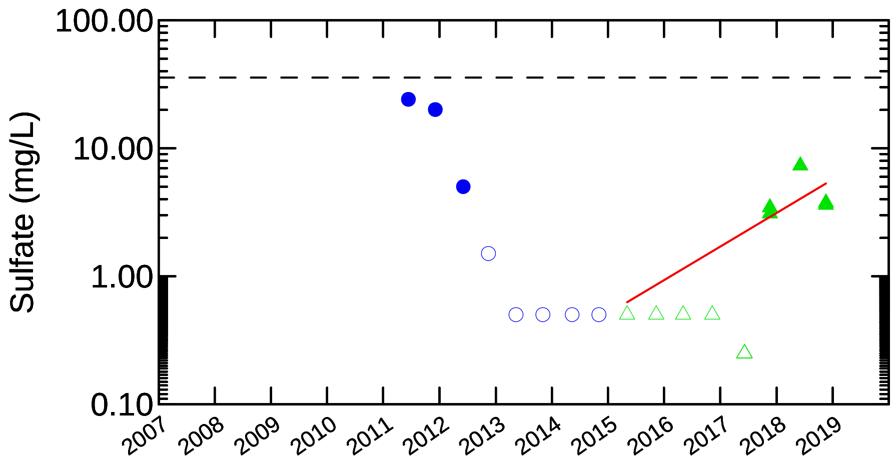
WELL PW1-N
SUB-CELL 3
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario



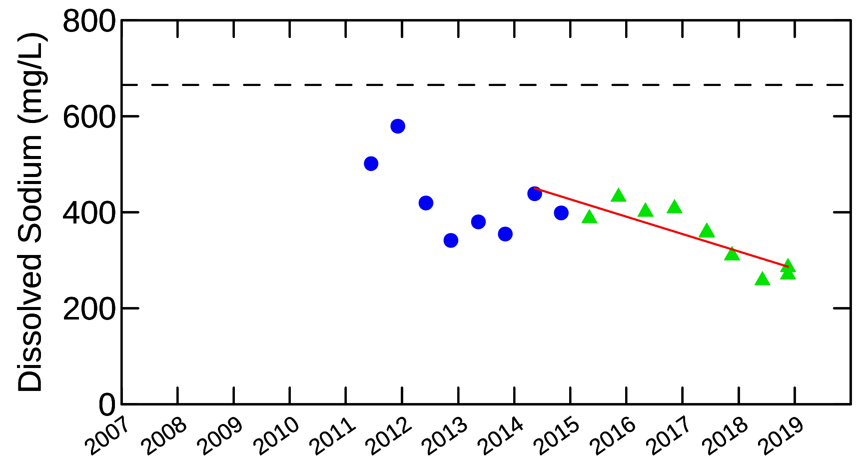
No trend



No trend



Increasing trend



Decreasing trend

Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.

(2) Baseline UCLs were calculated using data from the initial 8 sampling events.

(3) Trends were evaluated considering linear regression on data from the last 5 years (2014 - 2018), using a 95 percent confidence level.

WELL PW2-S(R11)

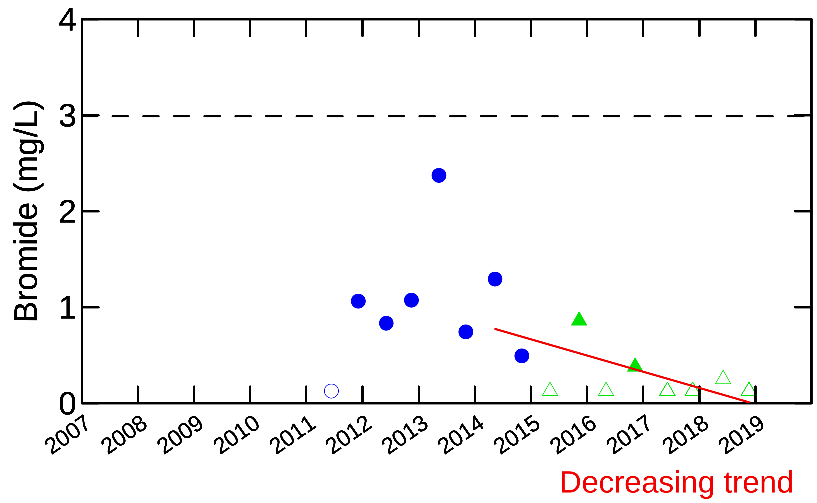
SUB-CELL 3

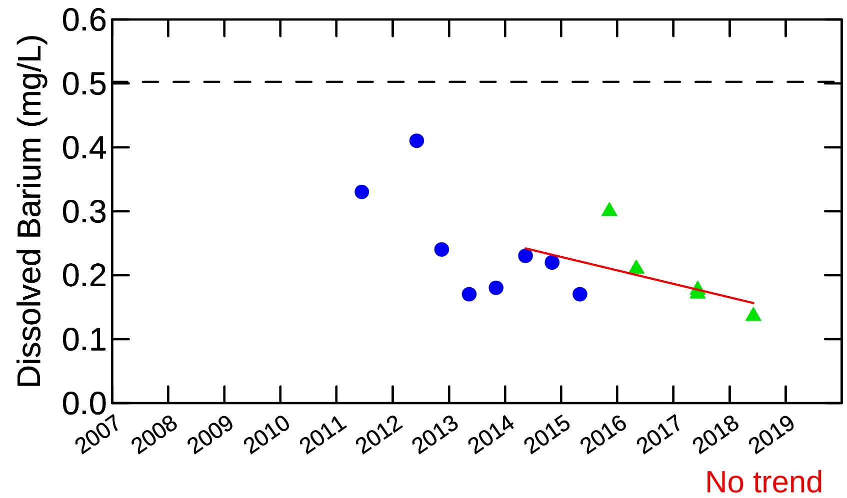
2018 GROUNDWATER MONITORING REPORT

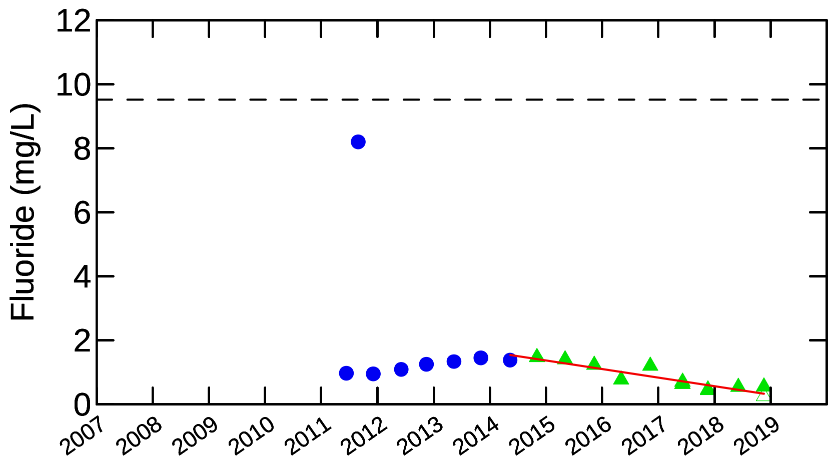
CLEAN HARBORS CANADA, INC.

Lambton County, Ontario

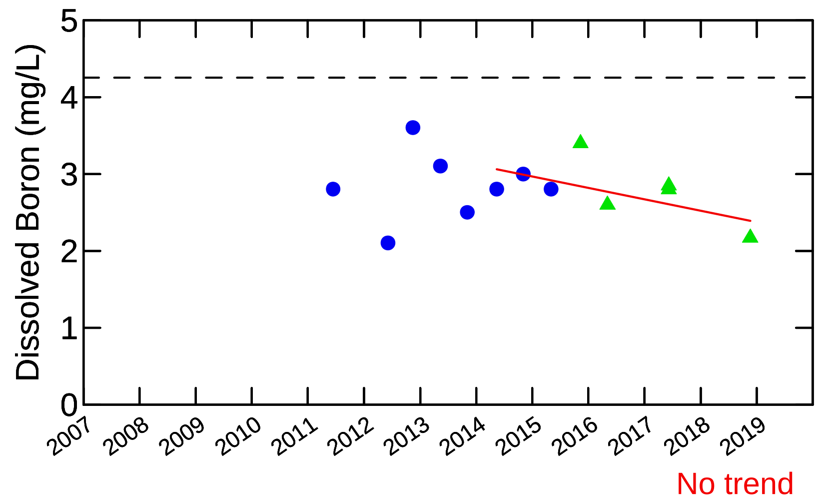
044985(RPT41) FEBRUARY 22/2019







Decreasing trend



Legend:

● Baseline result

◆ Post-Baseline result ▲ Last 5 years (for trend)

— — Baseline Upper Confidence Limit (UCL)

—— Linear Regression line

Notes:

(1) Non-detects (indicated by empty symbols) are plotted at one half the detection limit.
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WELL PW2-S(R11)
SUB-CELL 3
2018 GROUNDWATER MONITORING REPORT
CLEAN HARBORS CANADA, INC.
Lambton County, Ontario

Appendix E
Laboratory Analytical Reports

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

CLIENT NAME:	**GHD LIMITED 651 COLBY DRIVE WATERLOO, ON N2V1C2 (519) 884-0510**
ATTENTION TO:	**Jennifer Balkwill**
PROJECT:	**0044985-GD-Sarnia**
AGAT WORK ORDER:	**18T347938**
TRACE ORGANICS REVIEWED BY:	**Oksana Gushyla, Trace Organics Lab Supervisor**
WATER ANALYSIS REVIEWED BY:	**Mike Muneswar, BSc (Chem), Senior Inorganic Analyst**
DATE REPORTED:	**Jul 04, 2018**
PAGES (INCLUDING COVER):	**69**
VERSION*:	**2**

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

*NOTES

VERSION 2:Revised report issued July 04, 2018.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

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AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060418-DD-41D	GW-44985-060418-DD-30D	GW-44985-060418-DD-411D	GW-44985-060418-DD-32D	GW-44985-060418-DD-53D	GW-44985-060418-DD-35D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04
						9311560	9311567	9311579	9311581	9311586	9311588
Dichlorodifluoromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Vinyl Chloride	µg/L		0.17	2018-06-12	2018-06-13	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1 Dichloroethylene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2 - Dichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	ug/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,1,2-Trichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
2-Hexanone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Certified By:

Results relate only to the items tested and to all the items tested

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

CLIENT NAME: GHD LIMITED
SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07
DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-41D	GW-44985-060418-DD-30D	GW-44985-060418-DD-411D	GW-44985-060418-DD-32D	GW-44985-060418-DD-53D	GW-44985-060418-DD-35D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311560**	**9311567**	**9311579**	**9311581**	**9311586**	**9311588**
Dibromochloromethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Bromoform	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,4-Trichlorobenzene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
1,3-Dichloropropene (Cis + Trans)	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture (Total)	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8	% Recovery	50-140		2018-06-12	2018-06-13	91	110	84	99	95	96
4-Bromofluorobenzene	% Recovery	50-140		2018-06-12	2018-06-13	80	82	82	89	83	87

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060418-DD-46D	RDL	GW-44985-060418-DD-32II	GW-44985-060418-DD-40D	GW-44985-060418-DD-47D	GW-44985-060518-DD-61D
					SAMPLE TYPE:	Water		Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04		2018-06-04	2018-06-04	2018-06-04	2018-06-05
						9311591		9311596	9311598	9311600	9311603
Dichlorodifluoromethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Chloromethane	µg/L		1.60	2018-06-12	2018-06-13	<1.60	0.40	<0.40	<0.40	<0.40	<0.40
Vinyl Chloride	µg/L		0.68	2018-06-12	2018-06-13	<0.68	0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Chloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		1.60	2018-06-12	2018-06-13	<1.60	0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
1,1 Dichloroethylene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-dichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,2 - Dichloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	0.41
1,2-Dichloropropane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	ug/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
1,1,2-Trichloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	2.1	<0.20	<0.20	<0.20
2-Hexanone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**

SAMPLING SITE: **SAMPLED BY:**

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060418-DD-46D	RDL	GW-44985-060418-DD-32II	GW-44985-060418-DD-40D	GW-44985-060418-DD-47D	GW-44985-060518-DD-61D
					SAMPLE TYPE:	Water		Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04		2018-06-04	2018-06-04	2018-06-04	2018-06-05
						9311591		9311596	9311598	9311600	9311603
Ethylene Dibromide	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Bromoform	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,2,4-Trichlorobenzene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
1,3-Dichloropropene (Cis + Trans)	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture (Total)	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8	% Recovery	50-140		2018-06-12	2018-06-13	90		120	96	88	97
4-Bromofluorobenzene	% Recovery	50-140		2018-06-12	2018-06-13	83		81	80	86	81

Certified By:

Certificate of Analysis

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-22D	GW-44985-060518-DD-60D	GW-44985-060518-DD-39D	GW-44985-060518-DD-54D		GW-44985-060518-DD-PW2
					SAMPLE TYPE:	Water	Water	Water	Water		Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-05	2018-06-05		2018-06-05
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311605	9311606	9311607	9311612	RDL	9311613
Dichlorodifluoromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Chloromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40	<0.40	1.60	<1.60
Vinyl Chloride	µg/L		0.17	2018-06-12	2018-06-13	<0.17	<0.17	<0.17	<0.17	0.68	<0.68
Bromomethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Chloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Trichlorofluoromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40	<0.40	1.60	<1.60
Acetone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	4.0	<4.0
1,1 Dichloroethylene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	1.20	<1.20
Methylene Chloride	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	1.20	<1.20
trans- 1,2-dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Methyl tert-butyl ether	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
1,1-Dichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	1.20	<1.20
Methyl Ethyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	4.0	<4.0
cis- 1,2-Dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Chloroform	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
1,2 - Dichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
1,1,1-Trichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	1.20	<1.20
Carbon Tetrachloride	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Benzene	µg/L		0.20	2018-06-12	2018-06-13	0.31	0.39	<0.20	<0.20	0.80	<0.80
1,2-Dichloropropane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Trichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	2.1	<0.20	<0.20	<0.20	0.80	<0.80
Bromodichloromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
cis-1,3-Dichloropropene	ug/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Methyl Isobutyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	4.0	<4.0
trans-1,3-Dichloropropene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	1.20	<1.20
1,1,2-Trichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Toluene	µg/L		0.20	2018-06-12	2018-06-13	0.77	1.2	<0.20	<0.20	0.80	<0.80
2-Hexanone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	4.0	<4.0
Dibromochloromethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-22D	GW-44985-060518-DD-60D	GW-44985-060518-DD-39D	GW-44985-060518-DD-54D		GW-44985-060518-DD-PW2
					SAMPLE TYPE:	Water	Water	Water	Water		Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-05	2018-06-05		2018-06-05
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311605**	**9311606**	**9311607**	**9311612**	**RDL**	**9311613**
Ethylene Dibromide	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
Tetrachloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
1,1,1,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
Chlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
Ethylbenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
m & p-Xylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	0.22	<0.20	<0.20	0.80	<0.80
Bromoform	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
Styrene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
1,1,2,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
o-Xylene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
1,3-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
1,4-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
1,2-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	0.40	<0.40
1,2,4-Trichlorobenzene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	1.20	<1.20
1,3-Dichloropropene (Cis + Trans)	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	1.20	<1.20
Xylene Mixture (Total)	µg/L		0.20	2018-06-12	2018-06-13	<0.20	0.22	<0.20	<0.20	0.80	<0.80
n-Hexane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	0.80	<0.80
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8	% Recovery	50-140		2018-06-12	2018-06-13	94	91	92	100		89
4-Bromofluorobenzene	% Recovery	50-140		2018-06-12	2018-06-13	89	90	80	100		92

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060518-DD-EW2C	GW-44985-060518-DD-EW2B	GW-44985-060518-DD-EW1C	GW-44985-060518-DD-EW11C	GW-44985-060518-DD-EW1B
					SAMPLE TYPE:	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-05	2018-06-05	2018-06-05
						9311614	9311615	9311616	9311617	9311618
Dichlorodifluoromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Chloromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40	<0.40	<0.40
Vinyl Chloride	µg/L		0.17	2018-06-12	2018-06-13	<0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0
1,1 Dichloroethylene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
1,2 - Dichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	ug/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30
1,1,2-Trichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
2-Hexanone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0	<1.0	<1.0

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CLIENT NAME: GHD LIMITED
SAMPLING SITE:
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-EW2C	GW-44985-060518-DD-EW2B	GW-44985-060518-DD-EW1C	GW-44985-060518-DD-EW11C	GW-44985-060518-DD-EW1B
					SAMPLE TYPE:	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-05	2018-06-05	2018-06-05
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311614**	**9311615**	**9311616**	**9311617**	**9311618**
Dibromochloromethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Bromoform	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10	<0.10	<0.10
1,2,4-Trichlorobenzene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30
1,3-Dichloropropene (Cis + Trans)	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture (Total)	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**								
Toluene-d8	% Recovery	50-140		2018-06-12	2018-06-13	84	90	94	90	92
4-Bromofluorobenzene	% Recovery	50-140		2018-06-12	2018-06-13	80	82	82	85	86

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AGAT Laboratories

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-PW1		GW-44985-060618-DD-48D		GW-44985-060618-DD-45D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-05		2018-06-06		2018-06-06
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311619**	**RDL**	**9311627**	**RDL**	**9311629**
Dichlorodifluoromethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Chloromethane	µg/L		1.60	2018-06-12	2018-06-13	<1.60	0.40	<0.40	0.80	<0.80
Vinyl Chloride	µg/L		0.68	2018-06-12	2018-06-13	<0.68	0.17	<0.17	0.34	<0.34
Bromomethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Chloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Trichlorofluoromethane	µg/L		1.60	2018-06-12	2018-06-13	<1.60	0.40	<0.40	0.80	<0.80
Acetone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	2.0	<2.0
1,1 Dichloroethylene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	0.60	<0.60
Methylene Chloride	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	0.60	<0.60
trans- 1,2-dichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Methyl tert-butyl ether	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
1,1-Dichloroethane	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	0.60	<0.60
Methyl Ethyl Ketone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	2.0	<2.0
cis- 1,2-Dichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Chloroform	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
1,2 - Dichloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
1,1,1-Trichloroethane	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	0.60	<0.60
Carbon Tetrachloride	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Benzene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	0.94
1,2-Dichloropropane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Trichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Bromodichloromethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
cis-1,3-Dichloropropene	ug/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Methyl Isobutyl Ketone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	2.0	<2.0
trans-1,3-Dichloropropene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	0.60	<0.60
1,1,2-Trichloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Toluene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	0.41	0.40	<0.40
2-Hexanone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	2.0	<2.0
Dibromochloromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-PW1		GW-44985-060618-DD-48D		GW-44985-060618-DD-45D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-05		2018-06-06		2018-06-06
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311619**	**RDL**	**9311627**	**RDL**	**9311629**
Ethylene Dibromide	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
Tetrachloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
1,1,1,2-Tetrachloroethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
Chlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
Ethylbenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
m & p-Xylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Bromoform	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
Styrene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
1,1,2,2-Tetrachloroethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
o-Xylene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
1,3-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
1,4-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
1,2-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	0.20	<0.20
1,2,4-Trichlorobenzene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	0.60	<0.60
1,3-Dichloropropene (Cis + Trans)	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	0.60	<0.60
Xylene Mixture (Total)	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
n-Hexane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	0.40	<0.40
Surrogate	**Unit**	**Acceptable Limits**								
Toluene-d8	% Recovery	50-140		2018-06-12	2018-06-13	98		91		93
4-Bromofluorobenzene	% Recovery	50-140		2018-06-12	2018-06-13	79		86		104

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Results relate only to the items tested and to all the items tested

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Certificate of Analysis

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED
SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07
DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060618-DD-59D		GW-44985-060618-DD-43D	GW-44985-060618-DD-49D	GW-44985-060618-DD-55D	GW-44985-060718-DD-FB2
					SAMPLE TYPE:	Water		Water	Water	Water	Water
					DATE SAMPLED:	2018-06-06		2018-06-06	2018-06-06	2018-06-06	2018-06-07
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311634**	**RDL**	**9311640**	**9311641**	**9311645**	**9311648**
Dichlorodifluoromethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Chloromethane	µg/L		1.60	2018-06-12	2018-06-13	<1.60	0.40	<0.40	<0.40	<0.40	<0.40
Vinyl Chloride	µg/L		0.68	2018-06-12	2018-06-13	<0.68	0.17	<0.17	<0.17	<0.17	<0.17
Bromomethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Chloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		1.60	2018-06-12	2018-06-13	<1.60	0.40	<0.40	<0.40	<0.40	<0.40
Acetone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
1,1 Dichloroethylene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Methylene Chloride	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
trans- 1,2-dichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Chloroform	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,2 - Dichloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Benzene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,2-Dichloropropane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	ug/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
1,1,2-Trichloroethane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Toluene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
2-Hexanone	µg/L		4.0	2018-06-12	2018-06-13	<4.0	1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060618-DD-59D	RDL	GW-44985-060618-DD-43D	GW-44985-060618-DD-49D	GW-44985-060618-DD-55D	GW-44985-060718-DD-FB2
					SAMPLE TYPE:	Water		Water	Water	Water	Water
					DATE SAMPLED:	2018-06-06		2018-06-06	2018-06-06	2018-06-06	2018-06-07
						9311634		9311640	9311641	9311645	9311648
Ethylene Dibromide	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Ethylbenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Bromoform	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
Styrene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,3-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.40	2018-06-12	2018-06-13	<0.40	0.10	<0.10	<0.10	<0.10	<0.10
1,2,4-Trichlorobenzene	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
1,3-Dichloropropene (Cis + Trans)	µg/L		1.20	2018-06-12	2018-06-13	<1.20	0.30	<0.30	<0.30	<0.30	<0.30
Xylene Mixture (Total)	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
n-Hexane	µg/L		0.80	2018-06-12	2018-06-13	<0.80	0.20	<0.20	<0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**									
Toluene-d8	% Recovery	50-140		2018-06-12	2018-06-13	93		86	90	87	98
4-Bromofluorobenzene	% Recovery	50-140		2018-06-12	2018-06-13	78		104	109	102	82

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CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07
DATE REPORTED: 2018-07-04

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060718-DD-FB3	GW-44985-060718-DD-57D	GW-44985-060418-DD-Trip Blank
					SAMPLE TYPE:	Water	Water	Water
					DATE SAMPLED:	2018-06-07	2018-06-07	2018-06-04
						9311649	9311650	9311664
Dichlorodifluoromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Chloromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40
Vinyl Chloride	µg/L		0.17	2018-06-12	2018-06-13	<0.17	<0.17	<0.17
Bromomethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Chloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Trichlorofluoromethane	µg/L		0.40	2018-06-12	2018-06-13	<0.40	<0.40	<0.40
Acetone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0
1,1 Dichloroethylene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30
Methylene Chloride	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30
trans- 1,2-dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Methyl tert-butyl ether	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
1,1-Dichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30
Methyl Ethyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0
cis- 1,2-Dichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Chloroform	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
1,2 - Dichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30
Carbon Tetrachloride	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Benzene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	5.0	<0.20
1,2-Dichloropropane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Trichloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Bromodichloromethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
cis-1,3-Dichloropropene	ug/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Methyl Isobutyl Ketone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30
1,1,2-Trichloroethane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Toluene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	1.0	<0.20
2-Hexanone	µg/L		1.0	2018-06-12	2018-06-13	<1.0	<1.0	<1.0

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AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Volatile Organic Compounds in Water

DATE RECEIVED: 2018-06-07
DATE REPORTED: 2018-07-04

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060718-DD-FB3	GW-44985-060718-DD-57D	GW-44985-060418-DD-Trip Blank
					SAMPLE TYPE:	Water	Water	Water
					DATE SAMPLED:	2018-06-07	2018-06-07	2018-06-04
						9311649	9311650	9311664
Dibromochloromethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
Ethylene Dibromide	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
Tetrachloroethylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
1,1,1,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
Chlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
Ethylbenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	2018-06-12	2018-06-13	<0.20	0.31	<0.20
Bromoform	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
Styrene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
1,1,2,2-Tetrachloroethane	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
o-Xylene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	0.15	<0.10
1,3-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
1,4-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
1,2-Dichlorobenzene	µg/L		0.10	2018-06-12	2018-06-13	<0.10	<0.10	<0.10
1,2,4-Trichlorobenzene	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30
1,3-Dichloropropene (Cis + Trans)	µg/L		0.30	2018-06-12	2018-06-13	<0.30	<0.30	<0.30
Xylene Mixture (Total)	µg/L		0.20	2018-06-12	2018-06-13	<0.20	0.46	<0.20
n-Hexane	µg/L		0.20	2018-06-12	2018-06-13	<0.20	<0.20	<0.20
Surrogate	**Unit**	**Acceptable Limits**						
Toluene-d8	% Recovery	50-140		2018-06-12	2018-06-13	86	91	96
4-Bromofluorobenzene	% Recovery	50-140		2018-06-12	2018-06-13	99	113	82

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

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SAMPLED BY:

Volatile Organic Compounds in Water

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Comments:	RDL - Reported Detection Limit; G / S - Guideline / Standard
9311591	Dilution factor=4 The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.
9311607	Dilution factor=4 The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.
9311613	Dilution factor=4 The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.
9311619	Dilution factor=4 The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.
9311629	Dilution factor=2 The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.
9311634	Dilution factor=4 The sample was diluted because it was foamy. The reporting detection limit has been corrected for the dilution factor used.

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CLIENT NAME: GHD LIMITED

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SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-52B		GW-44985-060418-DD-51B		GW-44985-060418-DD-50B
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-04		2018-06-04		2018-06-04
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311541**	**RDL**	**9311553**	**RDL**	**9311554**
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1200	2	1460	2	974
pH	pH Units		NA	2018-06-09	2018-06-09	7.83	NA	7.75	NA	7.73
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	818	20	1070	20	612
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	453	5	463	5	462
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.5	<0.5	0.25	<0.25
Chloride	mg/L		0.50	2018-06-09	2018-06-09	12.6	1.0	23.0	0.50	5.15
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.5	<0.5	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.5	<0.5	0.25	<0.25
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.5	<0.5	0.25	<0.25
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	343	1.0	534	0.50	166
Ammonia as N	mg/L		0.02	2018-06-08	2018-06-08	<0.02	0.02	<0.02	0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-12	2018-06-12	<0.002	0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	117	0.10	150	0.05	148
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	72.0	0.10	96.9	0.05	43.3
Sodium	mg/L		0.10	2018-06-14	2018-06-14	68.8	0.10	96.1	0.05	15.2
Potassium	mg/L		0.10	2018-06-14	2018-06-14	3.01	0.10	3.69	0.05	2.33
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	106	0.10	129	0.05	146
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	67.4	0.10	83.5	0.05	44.3
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	64.3	0.10	81.4	0.05	15.4
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	2.91	0.10	3.26	0.05	2.44
Arsenic	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-08	2018-06-08	0.017	0.002	0.023	0.002	0.022
Boron	mg/L		0.010	2018-06-08	2018-06-08	0.227	0.010	0.384	0.010	0.113
Cadmium	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-08	2018-06-08	<0.010	0.010	<0.010	0.010	0.092
Lead	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-08	2018-06-08	0.006	0.005	<0.005	0.005	<0.005

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

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Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-50A	GW-44985-060418-DD-51A	GW-44985-060418-DD-52A		GW-44985-060418-DD-41S
					SAMPLE TYPE:	Water	Water	Water		Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04		2018-06-04
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311555	9311556	9311557	RDL	9311558
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1440	1240	1590	2	1500
pH	pH Units		NA	2018-06-09	2018-06-09	7.69	7.68	7.81	NA	7.68
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	1090	924	1220	20	1110
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	426	329	505	5	486
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Chloride	mg/L		0.50	2018-06-09	2018-06-09	21.1	14.6	28.0	0.50	38.0
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	555	496	593	0.50	499
Ammonia as N	mg/L		0.02	2018-06-08	2018-06-08	<0.02	<0.02	<0.02	0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-12	2018-06-12	<0.002	<0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	175	149	194	0.10	218
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	94.1	83.3	122	0.10	85.0
Sodium	mg/L		0.10	2018-06-14	2018-06-14	56.4	38.0	58.4	0.10	51.9
Potassium	mg/L		0.10	2018-06-14	2018-06-14	3.09	2.30	1.86	0.10	2.17
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	154	124	169	0.10	185
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	85.7	70.2	105	0.10	73.7
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	49.6	33.5	50.2	0.10	44.2
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	2.88	2.12	1.55	0.10	1.98
Arsenic	mg/L		0.003	2018-06-08	2018-06-08	<0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-08	2018-06-08	0.012	0.045	0.018	0.002	0.025
Boron	mg/L		0.010	2018-06-08	2018-06-08	0.315	0.147	0.223	0.010	0.145
Cadmium	mg/L		0.001	2018-06-08	2018-06-08	<0.001	<0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-08	2018-06-08	<0.010	<0.010	<0.010	0.010	0.058
Lead	mg/L		0.001	2018-06-08	2018-06-08	<0.001	<0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-08	2018-06-08	<0.003	<0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-08	2018-06-08	<0.005	<0.005	<0.005	0.005	<0.005

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Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

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AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-511B		GW-44985-060418-DD-32S		GW-44985-060418-DD-30
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-04		2018-06-04		2018-06-04
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311578**	**RDL**	**9311583**	**RDL**	**9311585**
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1480	2	1240	2	867
pH	pH Units		NA	2018-06-09	2018-06-09	7.87	NA	7.84	NA	7.89
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	1090	20	906	20	500
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	462	5	335	5	396
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	0.25	<0.25
Chloride	mg/L		1.0	2018-06-09	2018-06-09	22.8	0.50	13.8	0.50	5.78
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	0.25	<0.25
Bromide	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	0.25	<0.25
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	523	0.50	457	0.50	141
Ammonia as N	mg/L		0.02	2018-06-08	2018-06-08	<0.02	0.02	<0.02	0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	149	0.10	186	0.05	78.0
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	97.3	0.10	65.8	0.05	54.0
Sodium	mg/L		0.10	2018-06-14	2018-06-14	95.0	0.10	24.9	0.05	36.5
Potassium	mg/L		0.10	2018-06-14	2018-06-14	3.78	0.10	2.25	0.05	1.79
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	126	0.10	156	0.05	82.1
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	81.7	0.10	54.3	0.05	53.3
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	79.9	0.10	21.0	0.05	33.4
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	3.20	0.10	1.89	0.05	2.20
Arsenic	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-08	2018-06-08	0.021	0.002	0.030	0.002	0.033
Boron	mg/L		0.010	2018-06-08	2018-06-08	0.394	0.010	0.213	0.010	0.145
Cadmium	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-08	2018-06-08	<0.010	0.010	<0.010	0.010	0.165
Lead	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	0.003	<0.003

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Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-511B		GW-44985-060418-DD-32S		GW-44985-060418-DD-30
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-04		2018-06-04		2018-06-04
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311578**	**RDL**	**9311583**	**RDL**	**9311585**
Zinc	mg/L		0.005	2018-06-08	2018-06-08	<0.005	0.005	<0.005	0.005	<0.005

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

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Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311587	RDL	9311590	RDL	9311594
					SAMPLE DESCRIPTION:	GW-44985-060418-DD-53S		GW-44985-060418-DD-35S		GW-44985-060418-DD-46I
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-04		2018-06-04		2018-06-04
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1280	2	1410	2	1380
pH	pH Units		NA	2018-06-09	2018-06-09	7.80	NA	7.76	NA	7.77
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	944	20	1090	20	994
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	390	5	338	5	417
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Chloride	mg/L		0.50	2018-06-09	2018-06-09	5.83	0.50	11.7	0.50	44.6
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	481	1.0	628	0.50	435
Ammonia as N	mg/L		0.02	2018-06-08	2018-06-08	<0.02	0.02	<0.02	0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	201	0.10	192	0.10	156
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	73.5	0.10	91.0	0.10	91.8
Sodium	mg/L		0.10	2018-06-14	2018-06-14	23.5	0.10	41.1	0.10	53.1
Potassium	mg/L		0.10	2018-06-14	2018-06-14	1.11	0.10	3.35	0.10	2.04
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	171	0.10	163	0.10	135
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	61.4	0.10	75.6	0.10	78.5
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	20.3	0.10	35.2	0.10	45.9
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	0.95	0.10	2.79	0.10	1.96
Arsenic	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-08	2018-06-08	0.031	0.002	0.028	0.002	0.032
Boron	mg/L		0.010	2018-06-08	2018-06-08	0.147	0.010	0.285	0.010	0.140
Cadmium	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-08	2018-06-08	<0.010	0.010	<0.010	0.010	<0.010
Lead	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-08	2018-06-08	<0.005	0.005	<0.005	0.005	<0.005

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					SAMPLE DESCRIPTION:	GW-44985-060418-DD-46S				GW-44985-060418-DD-32IV	GW-44985-060418-DD-40S
					SAMPLE TYPE:	Water				Water	Water
					DATE SAMPLED:	2018-06-04				2018-06-04	2018-06-04
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311595**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311597**	**9311599**
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1850	2	2018-06-09	2018-06-09	1040	1110
pH	pH Units		NA	2018-06-09	2018-06-09	7.69	NA	2018-06-09	2018-06-09	7.88	7.92
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	1520	20	2018-06-08	2018-06-11	626	750
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	342	5	2018-06-09	2018-06-09	386	415
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25	<0.25
Chloride	mg/L		1.0	2018-06-09	2018-06-09	57.0	0.50	2018-06-09	2018-06-09	24.3	21.2
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25	<0.25
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25	<0.25
Bromide	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25	<0.25
Sulphate	mg/L		2.0	2018-06-09	2018-06-09	956	0.50	2018-06-09	2018-06-09	236	277
Ammonia as N	mg/L		0.02	2018-06-08	2018-06-08	<0.02	0.02	2018-06-08	2018-06-08	<0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	2018-06-13	2018-06-13	<0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	228	0.10	2018-06-14	2018-06-14	95.7	106
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	102	0.10	2018-06-14	2018-06-14	62.6	76.4
Sodium	mg/L		0.10	2018-06-14	2018-06-14	124	0.10	2018-06-14	2018-06-14	63.2	52.0
Potassium	mg/L		0.10	2018-06-14	2018-06-14	8.03	0.10	2018-06-14	2018-06-14	1.81	2.00
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	188	0.10	2018-06-13	2018-06-13	77.0	94.6
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	83.8	0.10	2018-06-13	2018-06-13	51.5	65.9
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	103	0.10	2018-06-13	2018-06-13	55.9	45.0
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	6.97	0.10	2018-06-13	2018-06-13	1.46	1.64
Arsenic	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	2018-06-09	2018-06-09	<0.003	<0.003
Barium	mg/L		0.002	2018-06-08	2018-06-08	0.015	0.002	2018-06-09	2018-06-09	0.021	0.029
Boron	mg/L		0.010	2018-06-08	2018-06-08	2.91	0.010	2018-06-09	2018-06-09	0.171	0.180
Cadmium	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	2018-06-09	2018-06-09	<0.001	<0.001
Iron	mg/L		0.010	2018-06-08	2018-06-08	<0.010	0.010	2018-06-09	2018-06-09	<0.010	<0.010
Lead	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	2018-06-09	2018-06-09	<0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	2018-06-12	2018-06-12	<0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	2018-06-09	2018-06-09	<0.003	<0.003
Zinc	mg/L		0.005	2018-06-08	2018-06-08	<0.005	0.005	2018-06-09	2018-06-09	0.008	<0.005

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					SAMPLE DESCRIPTION:	GW-44985-060518-DD-61I	GW-44985-060518-DD-61S		GW-44985-060518-DD-22	GW-44985-060518-DD-39I
					SAMPLE TYPE:	Water	Water		Water	Water
					DATE SAMPLED:	2018-06-05	2018-06-05		2018-06-05	2018-06-05
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311601**	**9311602**	**RDL**	**9311604**	**9311609**
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	1050	1210	2	1590	1410
pH	pH Units		NA	2018-06-10	2018-06-10	7.63	7.78	NA	7.87	7.87
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	696	780	20	1140	930
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	355	469	5	452	588
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	0.5	<0.5	<0.5
Chloride	mg/L		0.50	2018-06-09	2018-06-09	24.8	22.6	1.0	64.8	20.0
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	0.5	<0.5	<0.5
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	0.5	<0.5	<0.5
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	0.5	<0.5	<0.5
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	280	295	1.0	537	332
Ammonia as N	mg/L		0.02	2018-06-08	2018-06-08	<0.02	<0.02	0.02	<0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	<0.002	0.002	<0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	125	131	0.10	158	112
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	62.0	71.5	0.10	111	119
Sodium	mg/L		0.10	2018-06-14	2018-06-14	35.2	69.0	0.10	90.9	77.5
Potassium	mg/L		0.10	2018-06-14	2018-06-14	1.19	2.59	0.10	2.05	1.57
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	110	115	0.10	140	94.6
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	53.3	61.1	0.10	93.0	101
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	30.2	61.0	0.10	79.7	65.9
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	0.92	2.35	0.10	1.85	1.48
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.053	0.040	0.002	0.018	0.032
Boron	mg/L		0.010	2018-06-09	2018-06-09	0.145	0.302	0.010	0.175	0.163
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	0.001	<0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	<0.010	<0.010	0.010	<0.010	0.160
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	0.001	<0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	<0.005	0.005	<0.005	0.006

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					SAMPLE DESCRIPTION:	GW-44985-060518-DD-39S	GW-44985-060518-DD-21II	GW-44985-060618-DD-48S		
					SAMPLE TYPE:	Water	Water	Water		
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-06		
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311610	9311611	9311621	RDL	Date Prepared
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	1230	1180	1030	2	2018-06-10
pH	pH Units		NA	2018-06-10	2018-06-10	7.80	7.77	7.88	NA	2018-06-10
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	824	832	626	20	2018-06-09
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	467	406	420	5	2018-06-10
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	2018-06-09
Chloride	mg/L		0.50	2018-06-09	2018-06-09	23.9	7.24	23.7	0.50	2018-06-09
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	2018-06-09
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	2018-06-09
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	2018-06-09
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	303	368	206	0.50	2018-06-09
Ammonia as N	mg/L		0.02	2018-06-08	2018-06-08	<0.02	<0.02	<0.02	0.02	2018-06-12
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	<0.002	<0.002	0.002	2018-06-13
Calcium	mg/L		0.10	2018-06-14	2018-06-14	113	182	114	0.05	2018-06-14
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	84.8	61.5	64.9	0.05	2018-06-14
Sodium	mg/L		0.10	2018-06-14	2018-06-14	63.3	23.0	42.3	0.05	2018-06-14
Potassium	mg/L		0.10	2018-06-14	2018-06-14	1.46	1.14	2.44	0.05	2018-06-14
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	100	165	95.7	0.05	2018-06-13
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	75.8	53.8	52.9	0.05	2018-06-13
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	57.2	20.7	35.5	0.05	2018-06-13
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	1.15	0.98	1.99	0.05	2018-06-13
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	<0.003	0.003	2018-06-09
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.029	0.047	0.038	0.002	2018-06-09
Boron	mg/L		0.010	2018-06-09	2018-06-09	0.270	0.090	0.213	0.010	2018-06-09
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	<0.001	0.001	2018-06-09
Iron	mg/L		0.010	2018-06-09	2018-06-09	<0.010	<0.010	<0.010	0.010	2018-06-09
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	<0.001	0.001	2018-06-09
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	<0.0001	<0.0001	0.0001	2018-06-12
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	<0.003	0.003	2018-06-09
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	<0.005	<0.005	0.005	2018-06-09

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SAMPLING SITE:

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					SAMPLE DESCRIPTION:	GW-44985-060618-DD-45S	GW-44985-060618-DD-62S		GW-44985-060618-DD-63S		GW-44985-060618-DD-59S
					SAMPLE TYPE:	Water	Water		Water		Water
					DATE SAMPLED:	2018-06-06	2018-06-06		2018-06-06		2018-06-06
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311628**	**9311630**	**RDL**	**9311631**	**RDL**	**9311637**
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	976	966	2	2320	2	882
pH	pH Units		NA	2018-06-10	2018-06-10	7.80	7.55	NA	7.66	NA	7.84
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	588	640	20	1480	20	528
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	374	335	5	442	5	408
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	1.0	<1.0	0.25	<0.25
Chloride	mg/L		0.50	2018-06-09	2018-06-09	58.9	37.0	2.0	593	0.50	17.7
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	1.0	<1.0	0.25	0.36
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	1.0	<1.0	0.25	<0.25
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	1.0	<1.0	0.25	<0.25
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	134	203	2.0	67.7	0.50	121
Ammonia as N	mg/L		0.02	2018-06-12	2018-06-12	<0.02	<0.02	0.02	<0.02	0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	0.003	<0.002	0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.05	2018-06-14	2018-06-14	115	95.3	0.25	195	0.05	92.8
Magnesium	mg/L		0.05	2018-06-14	2018-06-14	40.4	41.6	0.25	89.9	0.05	51.3
Sodium	mg/L		0.05	2018-06-14	2018-06-14	38.2	56.3	0.25	178	0.05	26.3
Potassium	mg/L		0.05	2018-06-14	2018-06-14	2.12	2.16	0.25	3.44	0.05	2.13
Calcium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	115	94.5	0.25	166	0.05	93.3
Magnesium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	39.5	39.9	0.25	74.5	0.05	52.0
Sodium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	37.9	56.8	0.25	152	0.05	27.3
Potassium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	2.13	2.10	0.25	3.00	0.05	2.23
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.059	0.038	0.002	0.125	0.002	0.033
Boron	mg/L		0.010	2018-06-09	2018-06-09	0.084	0.163	0.010	0.247	0.010	0.113
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	<0.010	<0.010	0.010	<0.010	0.010	<0.010
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	0.003	0.082	0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	<0.005	0.005	<0.005	0.005	<0.005

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AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED | **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: | **SAMPLED BY:**

Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07 | **DATE REPORTED: 2018-07-04**

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

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SAMPLING SITE: **SAMPLED BY:**

Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	SAMPLE DESCRIPTION: GW-44985-060618-DD-43S SAMPLE TYPE: Water DATE SAMPLED: 2018-06-06 9311638	RDL	GW-44985-060618-DD-42S Water 2018-06-06 9311643	RDL	GW-44985-060618-DD-55S Water 2018-06-06 9311644
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	655	2	2880	2	1200
pH	pH Units		NA	2018-06-10	2018-06-10	7.74	NA	7.73	NA	7.80
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	356	20	2970	20	786
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	306	5	353	5	335
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	1.0	<1.0	0.25	<0.25
Chloride	mg/L		0.50	2018-06-09	2018-06-09	13.2	2.0	36.6	0.50	16.8
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	1.0	<1.0	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	1.0	<1.0	0.25	<0.25
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	1.0	<1.0	0.25	<0.25
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	65.1	2.0	1980	0.50	418
Ammonia as N	mg/L		0.02	2018-06-12	2018-06-12	<0.02	0.02	<0.02	0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.05	2018-06-14	2018-06-14	79.5	0.25	472	0.10	139
Magnesium	mg/L		0.05	2018-06-14	2018-06-14	23.9	0.25	227	0.10	66.9
Sodium	mg/L		0.05	2018-06-14	2018-06-14	22.1	0.25	65.7	0.10	55.8
Potassium	mg/L		0.05	2018-06-14	2018-06-14	1.51	0.25	4.49	0.10	2.84
Calcium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	79.1	0.25	430	0.10	119
Magnesium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	23.5	0.25	206	0.10	56.5
Sodium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	22.2	0.25	58.9	0.10	47.1
Potassium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	1.59	0.25	4.44	0.10	2.48
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.034	0.002	0.014	0.002	0.018
Boron	mg/L		0.010	2018-06-09	2018-06-09	0.054	0.010	0.229	0.010	0.214
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	<0.010	0.010	<0.010	0.010	<0.010
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	0.004	0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	0.005	<0.005	0.005	<0.005

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Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060718-DD-FB1		GW-44985-060718-DD-57S		GW-44985-060718-DD-56S	GW-44985-060718-DD-58S
					SAMPLE TYPE:	Water		Water		Water	Water
					DATE SAMPLED:	2018-06-07		2018-06-07		2018-06-07	2018-06-07
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311646**	**RDL**	**9311651**	**RDL**	**9311652**	**9311653**
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	<2	2	1560	2	2100	2970
pH	pH Units		NA	2018-06-10	2018-06-10	5.54	NA	7.76	NA	7.65	7.79
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	<20	20	1140	20	1780	2550
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	<5	5	522	5	346	513
Fluoride	mg/L		0.05	2018-06-09	2018-06-09	<0.05	0.5	<0.5	1.0	<1.0	<1.0
Chloride	mg/L		0.10	2018-06-09	2018-06-09	<0.10	1.0	25.5	2.0	62.1	343
Nitrate as N	mg/L		0.05	2018-06-09	2018-06-09	<0.05	0.5	<0.5	1.0	<1.0	<1.0
Nitrite as N	mg/L		0.05	2018-06-09	2018-06-09	<0.05	0.5	<0.5	1.0	<1.0	<1.0
Bromide	mg/L		0.05	2018-06-09	2018-06-09	<0.05	0.5	<0.5	1.0	<1.0	<1.0
Sulphate	mg/L		0.10	2018-06-09	2018-06-09	<0.10	1.0	514	2.0	1100	1210
Ammonia as N	mg/L		0.02	2018-06-12	2018-06-12	<0.02	0.02	<0.02	0.02	<0.02	<0.02
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Calcium	mg/L		0.05	2018-06-14	2018-06-14	<0.05	0.10	186	0.25	273	319
Magnesium	mg/L		0.05	2018-06-14	2018-06-14	<0.05	0.10	113	0.25	140	258
Sodium	mg/L		0.05	2018-06-14	2018-06-14	<0.05	0.10	51.3	0.25	83.1	121
Potassium	mg/L		0.05	2018-06-14	2018-06-14	<0.05	0.10	3.73	0.25	3.82	5.04
Calcium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	<0.05	0.10	195	0.25	219	275
Magnesium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	<0.05	0.10	109	0.25	113	222
Sodium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	<0.05	0.10	43.3	0.25	68.0	105
Potassium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	<0.05	0.10	3.46	0.25	3.05	4.65
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	<0.002	0.002	0.031	0.002	0.013	0.011
Boron	mg/L		0.010	2018-06-09	2018-06-09	<0.010	0.010	0.139	0.010	0.342	0.260
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	<0.010	0.010	0.759	0.010	<0.010	<0.010
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	0.001	0.001	<0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	0.0001	<0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	0.005	0.003	0.004	0.004
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	0.005	0.008	0.005	<0.005	<0.005

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

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

9311541-9311644 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised Jul 04, 2018.
Revision: This report replaces the Certificate of Analysis issued on Jun 19, 2018 - Values for Bromide & Fluoride are included in this report.
Values reported for "Metals" reflect those of "Dissolved Metals".
Metals - Since samples were field-filtered and were analysed as received, results reported are those of “Dissolved Metals”.

9311646 Revised Jul 04, 2018.
Revision: This report replaces the Certificate of Analysis issued on Jun 19, 2018 - Values for Bromide & Fluoride are included in this report.
Values reported for "Metals" reflect those of "Dissolved Metals".
Metals - Since samples were field-filtered and were analysed as received, results reported are those of “Dissolved Metals”.

9311651-9311653 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised Jul 04, 2018.
Revision: This report replaces the Certificate of Analysis issued on Jun 19, 2018 - Values for Bromide & Fluoride are included in this report.
Values reported for "Metals" reflect those of "Dissolved Metals".
Metals - Since samples were field-filtered and were analysed as received, results reported are those of “Dissolved Metals”.

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Certificate of Analysis

AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-41D	GW-44985-060418-DD-30D	GW-44985-060418-DD-411D		GW-44985-060418-DD-32D
					SAMPLE TYPE:	Water	Water	Water		Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04		2018-06-04
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311560	9311567	9311579	RDL	9311581
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1150	1220	1140	2	1410
pH	pH Units		NA	2018-06-09	2018-06-09	7.68	7.73	7.79	NA	7.70
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	588	598	594	20	718
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	307	265	307	5	261
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Chloride	mg/L		0.50	2018-06-09	2018-06-09	219	270	221	0.50	337
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	<0.25	<0.25	0.25	<0.25
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	<0.50	<0.50	<0.50	0.50	<0.50
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	<0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	16.4	23.1	16.3	0.05	22.7
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	5.90	8.76	5.93	0.05	7.88
Sodium	mg/L		0.10	2018-06-14	2018-06-14	239	239	240	0.05	257
Potassium	mg/L		0.10	2018-06-14	2018-06-14	1.73	2.72	1.78	0.05	2.49
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	14.4	20.4	14.0	0.10	19.1
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	5.09	7.66	5.03	0.10	7.21
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	206	207	208	0.10	254
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	1.70	2.42	1.50	0.10	2.27
Arsenic	mg/L		0.003	2018-06-08	2018-06-08	<0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-08	2018-06-08	0.084	0.327	0.083	0.002	0.106
Boron	mg/L		0.010	2018-06-08	2018-06-08	1.79	1.70	1.85	0.010	1.69
Cadmium	mg/L		0.001	2018-06-08	2018-06-08	<0.001	<0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-08	2018-06-08	0.048	0.277	0.056	0.010	0.815
Lead	mg/L		0.001	2018-06-08	2018-06-08	<0.001	<0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-08	2018-06-08	<0.003	<0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-08	2018-06-08	<0.005	<0.005	<0.005	0.005	<0.005

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060418-DD-53D	RDL	GW-44985-060418-DD-35D	GW-44985-060418-DD-46D	RDL
					SAMPLE TYPE:	Water		Water	Water	
					DATE SAMPLED:	2018-06-04		2018-06-04	2018-06-04	
						9311586		9311588	9311591	
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1600	2	1330	1210	2
pH	pH Units		NA	2018-06-09	2018-06-09	7.78	NA	7.73	7.79	NA
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	816	20	658	620	20
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	303	5	272	333	5
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5
Chloride	mg/L		1.0	2018-06-09	2018-06-09	398	0.50	300	222	1.0
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5
Bromide	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	<1.0	0.50	<0.50	<0.50	1.0
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	<0.002	0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	29.4	0.10	22.9	17.0	0.10
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	10.4	0.10	8.16	5.50	0.10
Sodium	mg/L		0.10	2018-06-14	2018-06-14	315	0.10	265	248	0.10
Potassium	mg/L		0.10	2018-06-14	2018-06-14	2.48	0.10	2.06	1.86	0.10
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	24.6	0.10	18.9	14.7	0.10
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	8.66	0.10	6.75	4.67	0.10
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	269	0.10	225	218	0.10
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	2.19	0.10	1.89	1.59	0.10
Arsenic	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	<0.003	0.003
Barium	mg/L		0.002	2018-06-08	2018-06-08	0.189	0.002	0.128	0.105	0.002
Boron	mg/L		0.010	2018-06-08	2018-06-08	1.79	0.010	1.66	1.82	0.010
Cadmium	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	<0.001	0.001
Iron	mg/L		0.010	2018-06-08	2018-06-08	0.551	0.010	0.553	0.473	0.010
Lead	mg/L		0.001	2018-06-08	2018-06-08	<0.001	0.001	<0.001	<0.001	0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	<0.0001	0.0001
Nickel	mg/L		0.003	2018-06-08	2018-06-08	<0.003	0.003	<0.003	<0.003	0.003
Zinc	mg/L		0.005	2018-06-08	2018-06-08	<0.005	0.005	<0.005	<0.005	0.005

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AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED
SAMPLING SITE:
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-32II				GW-44985-060418-DD-40D
					SAMPLE TYPE:	Water				Water
					DATE SAMPLED:	2018-06-04				2018-06-04
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311596	RDL	Date Prepared	Date Analyzed	9311598
Electrical Conductivity	µS/cm		2	2018-06-09	2018-06-09	1900	2	2018-06-10	2018-06-10	1390
pH	pH Units		NA	2018-06-09	2018-06-09	7.88	NA	2018-06-10	2018-06-10	7.72
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	956	20	2018-06-08	2018-06-11	702
Alkalinity (as CaCO3)	mg/L		5	2018-06-09	2018-06-09	286	5	2018-06-10	2018-06-10	257
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25
Chloride	mg/L		1.0	2018-06-09	2018-06-09	502	0.50	2018-06-09	2018-06-09	330
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25
Bromide	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	2018-06-09	2018-06-09	<0.25
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	<1.0	0.50	2018-06-09	2018-06-09	<0.50
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	2018-06-13	2018-06-13	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	18.5	0.10	2018-06-14	2018-06-14	31.8
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	12.4	0.10	2018-06-14	2018-06-14	11.4
Sodium	mg/L		0.10	2018-06-14	2018-06-14	390	0.10	2018-06-14	2018-06-14	261
Potassium	mg/L		0.10	2018-06-14	2018-06-14	2.86	0.10	2018-06-14	2018-06-14	2.67
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	14.8	0.10	2018-06-13	2018-06-13	25.3
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	10.5	0.10	2018-06-13	2018-06-13	9.45
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	341	0.10	2018-06-13	2018-06-13	222
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	2.42	0.10	2018-06-13	2018-06-13	2.28
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	2018-06-09	2018-06-09	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.250	0.002	2018-06-09	2018-06-09	0.186
Boron	mg/L		0.010	2018-06-09	2018-06-09	2.08	0.010	2018-06-09	2018-06-09	1.47
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	2018-06-09	2018-06-09	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	<0.010	0.010	2018-06-09	2018-06-09	0.935
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	2018-06-09	2018-06-09	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	2018-06-12	2018-06-12	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	2018-06-09	2018-06-09	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	0.005	2018-06-09	2018-06-09	<0.005

Certified By:

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AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**

SAMPLING SITE: **SAMPLED BY:**

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060418-DD-47D	RDL	Date Prepared	GW-44985-060518-DD-61D	RDL	GW-44985-060518-DD-22D
					SAMPLE TYPE:	Water			Water		Water
					DATE SAMPLED:	2018-06-04			2018-06-05		2018-06-05
						9311600			9311603		9311605
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	4590	2	2018-06-10	992	2	4500
pH	pH Units		NA	2018-06-10	2018-06-10	7.99	NA	2018-06-10	7.60	NA	8.08
Total Dissolved Solids	mg/L		20	2018-06-08	2018-06-11	2430	20	2018-06-09	512	20	2440
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	626	5	2018-06-10	259	5	763
Fluoride	mg/L		2.5	2018-06-09	2018-06-09	<2.5	0.25	2018-06-09	<0.25	2.5	<2.5
Chloride	mg/L		5.0	2018-06-09	2018-06-09	1380	0.50	2018-06-09	157	5.0	1220
Nitrate as N	mg/L		2.5	2018-06-09	2018-06-09	<2.5	0.25	2018-06-09	<0.25	2.5	<2.5
Nitrite as N	mg/L		2.5	2018-06-09	2018-06-09	<2.5	0.25	2018-06-09	<0.25	2.5	<2.5
Bromide	mg/L		2.5	2018-06-09	2018-06-09	<2.5	0.25	2018-06-09	<0.25	2.5	<2.5
Sulphate	mg/L		5.0	2018-06-09	2018-06-09	<5.0	0.50	2018-06-09	43.0	5.0	<5.0
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	2018-06-13	<0.002	0.002	<0.002
Calcium	mg/L		0.25	2018-06-14	2018-06-14	73.0	0.10	2018-06-14	23.2	0.25	33.1
Magnesium	mg/L		0.25	2018-06-14	2018-06-14	30.6	0.10	2018-06-14	8.04	0.25	14.7
Sodium	mg/L		0.25	2018-06-14	2018-06-14	976	0.10	2018-06-14	193	0.25	1000
Potassium	mg/L		0.25	2018-06-14	2018-06-14	4.60	0.10	2018-06-14	1.62	0.25	3.32
Calcium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	58.6	0.05	2018-06-13	20.6	0.25	28.5
Magnesium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	25.4	0.05	2018-06-13	6.83	0.25	12.7
Sodium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	820	0.05	2018-06-13	176	0.25	866
Potassium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	4.13	0.05	2018-06-13	1.48	0.25	2.91
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	2018-06-09	0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	1.57	0.002	2018-06-09	0.046	0.002	0.364
Boron	mg/L		0.010	2018-06-09	2018-06-09	2.87	0.010	2018-06-09	1.45	0.010	3.87
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	2018-06-09	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	1.45	0.010	2018-06-09	<0.010	0.010	<0.010
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	2018-06-09	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	2018-06-12	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	2018-06-09	<0.003	0.003	0.004
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	0.005	2018-06-09	<0.005	0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED | **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: | **SAMPLED BY:**

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 | **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060518-DD-60D	RDL	GW-44985-060518-DD-39D	RDL	GW-44985-060518-DD-54D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-05		2018-06-05		2018-06-05
						9311606		9311607		9311612
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	3270	2	1390	2	945
pH	pH Units		NA	2018-06-10	2018-06-10	8.14	NA	7.71	NA	7.78
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	1640	20	734	20	492
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	544	5	343	5	282
Fluoride	mg/L		1.0	2018-06-09	2018-06-09	<1.0	0.5	<0.5	0.25	<0.25
Chloride	mg/L		2.0	2018-06-09	2018-06-09	858	1.0	286	0.50	154
Nitrate as N	mg/L		1.0	2018-06-09	2018-06-09	<1.0	0.5	<0.5	0.25	<0.25
Nitrite as N	mg/L		1.0	2018-06-09	2018-06-09	<1.0	0.5	<0.5	0.25	<0.25
Bromide	mg/L		1.0	2018-06-09	2018-06-09	<1.0	0.5	<0.5	0.25	<0.25
Sulphate	mg/L		2.0	2018-06-09	2018-06-09	<2.0	1.0	<1.0	0.50	<0.50
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.25	2018-06-14	2018-06-14	27.8	0.10	26.5	0.05	16.1
Magnesium	mg/L		0.25	2018-06-14	2018-06-14	10.6	0.10	7.90	0.05	5.53
Sodium	mg/L		0.25	2018-06-14	2018-06-14	660	0.10	272	0.05	175
Potassium	mg/L		0.25	2018-06-14	2018-06-14	2.62	0.10	1.67	0.05	1.75
Calcium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	23.4	0.10	23.0	0.05	15.8
Magnesium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	8.85	0.10	6.95	0.05	5.43
Sodium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	561	0.10	246	0.05	175
Potassium-dissolved	mg/L		0.25	2018-06-13	2018-06-13	2.52	0.10	1.49	0.05	1.75
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.235	0.002	0.137	0.002	0.113
Boron	mg/L		0.010	2018-06-09	2018-06-09	3.09	0.010	1.67	0.010	1.42
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	0.095	0.010	0.284	0.010	0.154
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	0.005	<0.005	0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060518-DD-PW2	RDL	GW-44985-060518-DD-EW2C	GW-44985-060518-DD-EW2B	RDL	GW-44985-060518-DD-EW1C
					SAMPLE TYPE:	Water		Water	Water		Water
					DATE SAMPLED:	2018-06-05		2018-06-05	2018-06-05		2018-06-05
						9311613		9311614	9311615		9311616
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	1560	2	720	734	2	1640
pH	pH Units		NA	2018-06-10	2018-06-10	7.97	NA	7.73	7.80	NA	7.84
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	790	20	358	378	20	906
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	336	5	237	243	5	306
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5	<0.5
Chloride	mg/L		1.0	2018-06-09	2018-06-09	336	0.50	104	105	1.0	348
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5	<0.5
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5	<0.5
Bromide	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.25	<0.25	<0.25	0.5	1.9
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	7.3	0.50	0.81	4.02	1.0	133
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	17.8	0.05	32.4	33.6	0.10	90.2
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	7.80	0.05	14.7	15.1	0.10	52.6
Sodium	mg/L		0.10	2018-06-14	2018-06-14	304	0.05	93.7	93.0	0.10	197
Potassium	mg/L		0.10	2018-06-14	2018-06-14	2.32	0.05	2.47	2.56	0.10	5.21
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	16.0	0.05	32.2	33.6	0.10	76.4
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	7.11	0.05	14.4	14.9	0.10	42.9
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	285	0.05	93.1	93.5	0.10	168
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	2.16	0.05	2.54	2.68	0.10	4.39
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.136	0.002	0.141	0.127	0.002	0.052
Boron	mg/L		0.010	2018-06-09	2018-06-09	2.17	0.010	1.15	1.12	0.010	1.19
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	0.072	0.010	<0.010	<0.010	0.010	0.503
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	0.007	0.005	<0.005	<0.005	0.005	<0.005

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Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

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AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-060518-DD-EW11C	GW-44985-060518-DD-EW1B	GW-44985-060518-DD-PW1	GW-44985-060618-DD-48D	RDL	GW-44985-060618-DD-45D
					SAMPLE TYPE:	Water	Water	Water	Water		Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-05	2018-06-06		2018-06-06
						9311617	9311618	9311619	9311627		9311629
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	1630	1650	1660	1670	2	4280
pH	pH Units		NA	2018-06-10	2018-06-10	7.81	7.83	7.97	7.97	NA	8.30
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	942	940	840	868	20	2470
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	302	302	326	375	5	1030
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5	<0.5	<0.5	<0.5	2.5	<2.5
Chloride	mg/L		1.0	2018-06-09	2018-06-09	348	356	388	371	5.0	947
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	<0.5	<0.5	<0.5	2.5	<2.5
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	<0.5	<0.5	<0.5	2.5	<2.5
Bromide	mg/L		0.5	2018-06-09	2018-06-09	2.0	0.8	<0.5	<0.5	2.5	<2.5
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	133	135	5.3	<1.0	5.0	<5.0
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	<0.002	<0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	89.5	90.3	18.4	27.2	0.25	8.05
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	51.6	51.9	7.69	9.58	0.25	4.63
Sodium	mg/L		0.10	2018-06-14	2018-06-14	194	197	331	343	0.25	1040
Potassium	mg/L		0.10	2018-06-14	2018-06-14	5.16	5.18	2.36	2.78	0.25	2.80
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	76.3	77.3	16.5	22.7	0.25	7.30
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	43.0	44.4	7.03	8.02	0.25	4.21
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	167	171	303	293	0.25	862
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	4.46	4.48	2.14	2.40	0.25	2.16
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	<0.003	<0.003	0.003	0.014
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.054	0.050	0.170	0.185	0.002	0.249
Boron	mg/L		0.010	2018-06-09	2018-06-09	1.18	1.24	1.75	2.05	0.010	2.69
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	0.518	0.661	0.452	0.199	0.010	2.98
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	<0.001	0.004	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	<0.005	0.019	<0.005	0.005	0.031

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

Certified By:

Certificate of Analysis

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AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED
SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060618-DD-59D		GW-44985-060618-DD-43D		GW-44985-060618-DD-49D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-06-06		2018-06-06		2018-06-06
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311634**	**RDL**	**9311640**	**RDL**	**9311641**
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	905	2	1190	2	756
pH	pH Units		NA	2018-06-10	2018-06-10	7.97	NA	7.86	NA	7.80
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	452	20	600	20	384
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	276	5	290	5	268
Fluoride	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Chloride	mg/L		0.50	2018-06-09	2018-06-09	136	0.50	243	0.50	97.6
Nitrate as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Bromide	mg/L		0.25	2018-06-09	2018-06-09	<0.25	0.25	<0.25	0.25	<0.25
Sulphate	mg/L		0.50	2018-06-09	2018-06-09	<0.50	0.50	<0.50	0.50	<0.50
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.05	2018-06-14	2018-06-14	15.3	0.10	28.1	0.05	21.1
Magnesium	mg/L		0.05	2018-06-14	2018-06-14	4.94	0.10	10.1	0.05	5.45
Sodium	mg/L		0.05	2018-06-14	2018-06-14	163	0.10	225	0.05	133
Potassium	mg/L		0.05	2018-06-14	2018-06-14	1.83	0.10	2.03	0.05	1.34
Calcium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	14.8	0.10	23.7	0.05	21.0
Magnesium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	4.96	0.10	8.42	0.05	5.43
Sodium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	167	0.10	189	0.05	134
Potassium-dissolved	mg/L		0.05	2018-06-13	2018-06-13	1.92	0.10	1.78	0.05	1.37
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.103	0.002	0.200	0.002	0.093
Boron	mg/L		0.010	2018-06-09	2018-06-09	1.12	0.010	1.29	0.010	1.07
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	0.360	0.010	0.399	0.010	0.100
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	0.005	<0.005	0.005	<0.005

Certified By:

Results relate only to the items tested and to all the items tested

Certificate of Analysis

AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**

SAMPLING SITE: **SAMPLED BY:**

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060618-DD-55D		GW-44985-060718-DD-FB2	GW-44985-060718-DD-FB3		GW-44985-060718-DD-57D
					SAMPLE TYPE:	Water		Water	Water		Water
					DATE SAMPLED:	2018-06-06		2018-06-07	2018-06-07		2018-06-07
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311645**	**RDL**	**9311648**	**9311649**	**RDL**	**9311650**
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	1800	2	<2	<2	2	1830
pH	pH Units		NA	2018-06-10	2018-06-10	7.84	NA	4.95	4.86	NA	8.15
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	896	20	<20	<20	20	898
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	310	5	<5	<5	5	372
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.05	<0.05	<0.05	0.5	<0.5
Chloride	mg/L		1.0	2018-06-09	2018-06-09	451	0.10	<0.10	<0.10	1.0	418
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.05	<0.05	<0.05	0.5	<0.5
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.05	<0.05	<0.05	0.5	<0.5
Bromide	mg/L		0.5	2018-06-09	2018-06-09	<0.5	0.05	<0.05	<0.05	0.5	<0.5
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	<1.0	0.10	<0.10	<0.10	1.0	<1.0
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	21.3	0.05	<0.05	<0.05	0.10	18.1
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	7.39	0.05	<0.05	<0.05	0.10	6.97
Sodium	mg/L		0.10	2018-06-14	2018-06-14	350	0.05	<0.05	<0.05	0.10	365
Potassium	mg/L		0.10	2018-06-14	2018-06-14	3.55	0.05	<0.05	<0.05	0.10	2.00
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	18.3	0.05	<0.05	<0.05	0.10	17.7
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	6.36	0.05	<0.05	<0.05	0.10	6.96
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	301	0.05	<0.05	<0.05	0.10	360
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	3.05	0.05	<0.05	<0.05	0.10	1.99
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.224	0.002	<0.002	<0.002	0.002	0.109
Boron	mg/L		0.010	2018-06-09	2018-06-09	1.68	0.010	<0.010	<0.010	0.010	1.83
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	0.190	0.010	<0.010	<0.010	0.010	2.08
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001	0.001	<0.001	<0.001	0.001	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.003	<0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005	0.005	<0.005	<0.005	0.005	<0.005

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Certificate of Analysis

AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07

DATE REPORTED: 2018-07-04

					SAMPLE DESCRIPTION:	GW-44985-060718-DD-56D
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2018-06-07
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	**9311654**
Electrical Conductivity	µS/cm		2	2018-06-10	2018-06-10	1500
pH	pH Units		NA	2018-06-10	2018-06-10	7.87
Total Dissolved Solids	mg/L		20	2018-06-09	2018-06-11	738
Alkalinity (as CaCO3)	mg/L		5	2018-06-10	2018-06-10	357
Fluoride	mg/L		0.5	2018-06-09	2018-06-09	<0.5
Chloride	mg/L		1.0	2018-06-09	2018-06-09	315
Nitrate as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5
Nitrite as N	mg/L		0.5	2018-06-09	2018-06-09	<0.5
Bromide	mg/L		0.5	2018-06-09	2018-06-09	<0.5
Sulphate	mg/L		1.0	2018-06-09	2018-06-09	<1.0
Cyanide, Free	mg/L		0.002	2018-06-13	2018-06-13	<0.002
Calcium	mg/L		0.10	2018-06-14	2018-06-14	21.6
Magnesium	mg/L		0.10	2018-06-14	2018-06-14	8.37
Sodium	mg/L		0.10	2018-06-14	2018-06-14	291
Potassium	mg/L		0.10	2018-06-14	2018-06-14	2.46
Calcium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	17.8
Magnesium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	6.95
Sodium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	264
Potassium-dissolved	mg/L		0.10	2018-06-13	2018-06-13	2.12
Arsenic	mg/L		0.003	2018-06-09	2018-06-09	<0.003
Barium	mg/L		0.002	2018-06-09	2018-06-09	0.117
Boron	mg/L		0.010	2018-06-09	2018-06-09	1.85
Cadmium	mg/L		0.001	2018-06-09	2018-06-09	<0.001
Iron	mg/L		0.010	2018-06-09	2018-06-09	1.08
Lead	mg/L		0.001	2018-06-09	2018-06-09	<0.001
Mercury	mg/L		0.0001	2018-06-12	2018-06-12	<0.0001
Nickel	mg/L		0.003	2018-06-09	2018-06-09	<0.003
Zinc	mg/L		0.005	2018-06-09	2018-06-09	<0.005

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CLIENT NAME: GHD LIMITED **ATTENTION TO: Jennifer Balkwill**

SAMPLING SITE: **SAMPLED BY:**

Semi-Annual Groundwater Testing (excl. NH3)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

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

9311560-9311645 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised Jul 04, 2018.
Revision: This report replaces the Certificate of Analysis issued on Jun 19, 2018 - Values for Bromide & Fluoride are included in this report.
Values reported for "Metals" reflect those of "Dissolved Metals".
Metals - Since samples were field-filtered and were analysed as received, results reported are those of “Dissolved Metals”.

9311648-9311649 Revised Jul 04, 2018.
Revision: This report replaces the Certificate of Analysis issued on Jun 19, 2018 - Values for Bromide & Fluoride are included in this report.
Values reported for "Metals" reflect those of "Dissolved Metals".
Metals - Since samples were field-filtered and were analysed as received, results reported are those of “Dissolved Metals”.

9311650-9311654 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised Jul 04, 2018.
Revision: This report replaces the Certificate of Analysis issued on Jun 19, 2018 - Values for Bromide & Fluoride are included in this report.
Values reported for "Metals" reflect those of "Dissolved Metals".
Metals - Since samples were field-filtered and were analysed as received, results reported are those of “Dissolved Metals”.

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Certificate of Analysis

AGAT WORK ORDER: 18T347938

PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED

SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill

SAMPLED BY:

Unfiltered Chromium (Water)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-52B	GW-44985-060418-DD-51B	GW-44985-060418-DD-50B	GW-44985-060418-DD-50A	GW-44985-060418-DD-51A	GW-44985-060418-DD-52A
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311541	9311553	9311554	9311555	9311556	9311557
Chromium	mg/L		0.003	2018-06-08	2018-06-08	0.004	0.007	0.005	0.007	0.004	0.005

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-41S	GW-44985-060418-DD-41D	GW-44985-060418-DD-30D	GW-44985-060418-DD-511B	GW-44985-060418-DD-411D	GW-44985-060418-DD-32D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311558	9311560	9311567	9311578	9311579	9311581
Chromium	mg/L		0.003	2018-06-08	2018-06-08	0.005	0.012	0.013	0.009	0.011	0.011

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-32S	GW-44985-060418-DD-30	GW-44985-060418-DD-53D	GW-44985-060418-DD-53S	GW-44985-060418-DD-35D	GW-44985-060418-DD-35S
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311583	9311585	9311586	9311587	9311588	9311590
Chromium	mg/L		0.003	2018-06-08	2018-06-08	0.006	0.006	0.012	0.006	0.012	0.009

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-46D	GW-44985-060418-DD-46I	GW-44985-060418-DD-46S	GW-44985-060418-DD-32II	GW-44985-060418-DD-32IV	GW-44985-060418-DD-40D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04	2018-06-04
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9311591	9311594	9311595	9311596	9311597	9311598
Chromium	mg/L		0.003	2018-06-08	2018-06-08	0.012	0.008	0.008	0.003	0.004	0.004

Certified By:

Results relate only to the items tested and to all the items tested

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Certificate of Analysis

AGAT WORK ORDER: 18T347938
PROJECT: 0044985-GD-Sarnia

CLIENT NAME: GHD LIMITED | **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: | **SAMPLED BY:**

Unfiltered Chromium (Water)

DATE RECEIVED: 2018-06-07 | **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060418-DD-40S	GW-44985-060418-DD-47D	GW-44985-060518-DD-61I	GW-44985-060518-DD-61S	GW-44985-060518-DD-61D	GW-44985-060518-DD-22
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-04	2018-06-04	2018-06-05	2018-06-05	2018-06-05	2018-06-05
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	9311599	9311600	9311601	9311602	9311603	9311604
Chromium	mg/L		0.003	2018-06-09	2018-06-09	0.004	0.011	0.006	0.008	0.007	0.007

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-22D	GW-44985-060518-DD-60D	GW-44985-060518-DD-39D	GW-44985-060518-DD-39I	GW-44985-060518-DD-39S	GW-44985-060518-DD-21II
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-05	2018-06-05	2018-06-05	2018-06-05
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	9311605	9311606	9311607	9311609	9311610	9311611
Chromium	mg/L		0.003	2018-06-09	2018-06-09	0.011	0.007	0.010	0.008	0.007	0.006

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-54D	GW-44985-060518-DD-PW2	GW-44985-060518-DD-EW2C	GW-44985-060518-DD-EW2B	GW-44985-060518-DD-EW1C	GW-44985-060518-DD-EW11C
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-05	2018-06-05	2018-06-05	2018-06-05
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	9311612	9311613	9311614	9311615	9311616	9311617
Chromium	mg/L		0.003	2018-06-09	2018-06-09	0.006	0.005	0.003	0.003	<0.003	<0.003

					SAMPLE DESCRIPTION:	GW-44985-060518-DD-EW1B	GW-44985-060518-DD-PW1	GW-44985-060618-DD-48S	GW-44985-060618-DD-48D	GW-44985-060618-DD-45S	GW-44985-060618-DD-45D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-05	2018-06-05	2018-06-06	2018-06-06	2018-06-06	2018-06-06
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	9311618	9311619	9311621	9311627	9311628	9311629
Chromium	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.004	0.005	0.004	0.007	0.015

Certified By:

Results relate only to the items tested and to all the items tested

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CLIENT NAME: GHD LIMITED
SAMPLING SITE:
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Unfiltered Chromium (Water)

DATE RECEIVED: 2018-06-07 **DATE REPORTED: 2018-07-04**

					SAMPLE DESCRIPTION:	GW-44985-060618-DD-62S	GW-44985-060618-DD-63S	GW-44985-060618-DD-59D	GW-44985-060618-DD-59S	GW-44985-060618-DD-43S	GW-44985-060618-DD-43D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-06	2018-06-06	2018-06-06	2018-06-06	2018-06-06	2018-06-06
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	9311630	9311631	9311634	9311637	9311638	9311640
Chromium	mg/L		0.003	2018-06-09	2018-06-09	0.007	0.012	0.003	0.005	0.003	0.012

					SAMPLE DESCRIPTION:	GW-44985-060618-DD-49D	GW-44985-060618-DD-42S	GW-44985-060618-DD-55S	GW-44985-060618-DD-55D	GW-44985-060718-DD-FB1	GW-44985-060718-DD-FB2
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-06	2018-06-06	2018-06-06	2018-06-06	2018-06-07	2018-06-07
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	9311641	9311643	9311644	9311645	9311646	9311648
Chromium	mg/L		0.003	2018-06-09	2018-06-09	<0.003	<0.003	0.005	0.004	<0.003	<0.003

					SAMPLE DESCRIPTION:	GW-44985-060718-DD-FB3	GW-44985-060718-DD-57D	GW-44985-060718-DD-57S	GW-44985-060718-DD-56S	GW-44985-060718-DD-58S	GW-44985-060718-DD-56D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-06-07	2018-06-07	2018-06-07	2018-06-07	2018-06-07	2018-06-07
Parameter	**Unit**	**G / S**	**RDL**	**Date Prepared**	**Date Analyzed**	9311649	9311650	9311651	9311652	9311653	9311654
Chromium	mg/L		0.003	2018-06-09	2018-06-09	<0.003	0.008	<0.003	0.004	0.013	0.010

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

Certified By:

AGAT Laboratories

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Quality Assurance

CLIENT NAME: GHD LIMITED | **AGAT WORK ORDER: 18T347938**
PROJECT: 0044985-GD-Sarnia | **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: | **SAMPLED BY:**

Trace Organics Analysis

RPT Date: Jul 04, 2018			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Volatile Organic Compounds in Water															
Dichlorodifluoromethane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	79%	60%	130%	106%	60%	130%	88%	60%	130%
Chloromethane	9311567	9311567	< 0.40	< 0.40	NA	< 0.40	80%	60%	130%	86%	60%	130%	90%	60%	130%
Vinyl Chloride	9311567	9311567	< 0.17	< 0.17	NA	< 0.17	81%	60%	130%	100%	60%	130%	85%	60%	130%
Bromomethane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	87%	60%	130%	74%	60%	130%	71%	60%	130%
Chloroethane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	82%	60%	130%	88%	60%	130%	92%	60%	130%
Trichlorofluoromethane	9311567	9311567	< 0.40	< 0.40	NA	< 0.40	76%	60%	130%	106%	60%	130%	85%	60%	130%
Acetone	9311567	9311567	< 1.0	< 1.0	NA	< 1.0	79%	60%	130%	106%	60%	130%	71%	60%	130%
1,1 Dichloroethylene	9311567	9311567	< 0.30	< 0.30	NA	< 0.30	106%	60%	130%	80%	60%	130%	80%	60%	130%
Methylene Chloride	9311567	9311567	< 0.30	< 0.30	NA	< 0.30	74%	60%	130%	89%	60%	130%	78%	60%	130%
trans- 1,2-dichloroethylene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	82%	60%	130%	94%	60%	130%	96%	60%	130%
Methyl tert-butyl ether	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	116%	60%	130%	108%	60%	130%	112%	60%	130%
1,1-Dichloroethane	9311567	9311567	< 0.30	< 0.30	NA	< 0.30	95%	60%	130%	99%	60%	130%	92%	60%	130%
Methyl Ethyl Ketone	9311567	9311567	< 1.0	< 1.0	NA	< 1.0	84%	60%	130%	72%	60%	130%	86%	60%	130%
cis- 1,2-Dichloroethylene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	80%	60%	130%	85%	60%	130%	89%	60%	130%
Chloroform	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	81%	60%	130%	86%	60%	130%	86%	60%	130%
1,2 - Dichloroethane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	84%	60%	130%	84%	60%	130%	95%	60%	130%
1,1,1-Trichloroethane	9311567	9311567	< 0.30	< 0.30	NA	< 0.30	76%	60%	130%	90%	60%	130%	86%	60%	130%
Carbon Tetrachloride	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	71%	60%	130%	84%	60%	130%	85%	60%	130%
Benzene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	89%	60%	130%	101%	60%	130%	96%	60%	130%
1,2-Dichloropropane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	84%	60%	130%	89%	60%	130%	92%	60%	130%
Trichloroethylene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	87%	60%	130%	81%	60%	130%	81%	60%	130%
Bromodichloromethane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	79%	60%	130%	81%	60%	130%	88%	60%	130%
cis-1,3-Dichloropropene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	81%	60%	130%	90%	60%	130%	88%	60%	130%
Methyl Isobutyl Ketone	9311567	9311567	< 1.0	< 1.0	NA	< 1.0	107%	60%	130%	96%	60%	130%	81%	60%	130%
trans-1,3-Dichloropropene	9311567	9311567	< 0.30	< 0.30	NA	< 0.30	85%	60%	130%	91%	60%	130%	80%	60%	130%
1,1,2-Trichloroethane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	101%	60%	130%	105%	60%	130%	118%	60%	130%
Toluene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	94%	60%	130%	105%	60%	130%	117%	60%	130%
2-Hexanone	9311567	9311567	< 1.0	< 1.0	NA	< 1.0	99%	60%	130%	96%	60%	130%	112%	60%	130%
Dibromochloromethane	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	91%	60%	130%	112%	60%	130%	104%	60%	130%
Ethylene Dibromide	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	95%	60%	130%	97%	60%	130%	110%	60%	130%
Tetrachloroethylene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	89%	60%	130%	110%	60%	130%	110%	60%	130%
1,1,1,2-Tetrachloroethane	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	107%	60%	130%	106%	60%	130%	112%	60%	130%
Chlorobenzene	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	97%	60%	130%	107%	60%	130%	109%	60%	130%
Ethylbenzene	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	91%	60%	130%	109%	60%	130%	106%	60%	130%
m & p-Xylene	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	89%	60%	130%	111%	60%	130%	75%	60%	130%
Bromoform	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	101%	60%	130%	100%	60%	130%	113%	60%	130%
Styrene	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	82%	60%	130%	97%	60%	130%	95%	60%	130%
1,1,2,2-Tetrachloroethane	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	105%	60%	130%	112%	60%	130%	118%	60%	130%
o-Xylene	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	107%	60%	130%	118%	60%	130%	104%	60%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED | **AGAT WORK ORDER: 18T347938**
PROJECT: 0044985-GD-Sarnia | **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: | **SAMPLED BY:**

Trace Organics Analysis (Continued)

RPT Date: Jul 04, 2018			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
1,3-Dichlorobenzene	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	74%	60%	130%	82%	60%	130%	108%	60%	130%
1,4-Dichlorobenzene	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	86%	60%	130%	91%	60%	130%	113%	60%	130%
1,2-Dichlorobenzene	9311567	9311567	< 0.10	< 0.10	NA	< 0.10	83%	60%	130%	83%	60%	130%	111%	60%	130%
1,2,4-Trichlorobenzene	9311567	9311567	< 0.30	< 0.30	NA	< 0.30	80%	60%	130%	75%	60%	130%	109%	60%	130%
1,3-Dichloropropene (Cis + Trans)	9311567	9311567	< 0.30	< 0.30	NA	< 0.30	85%	60%	130%	94%	60%	130%	105%	60%	130%
n-Hexane	9311567	9311567	< 0.20	< 0.20	NA	< 0.20	116%	60%	130%	109%	60%	130%	115%	60%	130%
Volatile Organic Compounds in Water															
Dichlorodifluoromethane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Chloromethane	9311650	9311650	< 0.40	< 0.40	NA	< 0.40	NA	60%	130%	NA	60%	130%	NA	60%	130%
Vinyl Chloride	9311650	9311650	< 0.17	< 0.17	NA	< 0.17	NA	60%	130%	NA	60%	130%	NA	60%	130%
Bromomethane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Chloroethane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Trichlorofluoromethane	9311650	9311650	< 0.40	< 0.40	NA	< 0.40	NA	60%	130%	NA	60%	130%	NA	60%	130%
Acetone	9311650	9311650	< 1.0	< 1.0	NA	< 1.0	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,1 Dichloroethylene	9311650	9311650	< 0.30	< 0.30	NA	< 0.30	NA	60%	130%	NA	60%	130%	NA	60%	130%
Methylene Chloride	9311650	9311650	< 0.30	< 0.30	NA	< 0.30	NA	60%	130%	NA	60%	130%	NA	60%	130%
trans- 1,2-dichloroethylene	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Methyl tert-butyl ether	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,1-Dichloroethane	9311650	9311650	< 0.30	< 0.30	NA	< 0.30	NA	60%	130%	NA	60%	130%	NA	60%	130%
Methyl Ethyl Ketone	9311650	9311650	< 1.0	< 1.0	NA	< 1.0	NA	60%	130%	NA	60%	130%	NA	60%	130%
cis- 1,2-Dichloroethylene	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Chloroform	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,2 - Dichloroethane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,1,1-Trichloroethane	9311650	9311650	< 0.30	< 0.30	NA	< 0.30	NA	60%	130%	NA	60%	130%	NA	60%	130%
Carbon Tetrachloride	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Benzene	9311650	9311650	5.0	6.1	19.8%	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,2-Dichloropropane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Trichloroethylene	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Bromodichloromethane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
cis-1,3-Dichloropropene	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Methyl Isobutyl Ketone	9311650	9311650	< 1.0	< 1.0	NA	< 1.0	NA	60%	130%	NA	60%	130%	NA	60%	130%
trans-1,3-Dichloropropene	9311650	9311650	< 0.30	< 0.30	NA	< 0.30	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,1,2-Trichloroethane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Toluene	9311650	9311650	1.0	1.2	18.2%	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
2-Hexanone	9311650	9311650	< 1.0	< 1.0	NA	< 1.0	NA	60%	130%	NA	60%	130%	NA	60%	130%
Dibromochloromethane	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
Ethylene Dibromide	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
Tetrachloroethylene	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,1,1,2-Tetrachloroethane	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 0044985-GD-Sarnia
SAMPLING SITE:

AGAT WORK ORDER: 18T347938
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Trace Organics Analysis (Continued)

RPT Date: Jul 04, 2018			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Chlorobenzene	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
Ethylbenzene	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
m & p-Xylene	9311650	9311650	0.31	0.28	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%
Bromoform	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
Styrene	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,1,2,2-Tetrachloroethane	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
o-Xylene	9311650	9311650	0.15	0.15	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,3-Dichlorobenzene	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,4-Dichlorobenzene	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,2-Dichlorobenzene	9311650	9311650	< 0.10	< 0.10	NA	< 0.10	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,2,4-Trichlorobenzene	9311650	9311650	< 0.30	< 0.30	NA	< 0.30	NA	60%	130%	NA	60%	130%	NA	60%	130%
1,3-Dichloropropene (Cis + Trans)	9311650	9311650	< 0.30	< 0.30	NA	< 0.30	NA	60%	130%	NA	60%	130%	NA	60%	130%
n-Hexane	9311650	9311650	< 0.20	< 0.20	NA	< 0.20	NA	60%	130%	NA	60%	130%	NA	60%	130%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

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Quality Assurance

CLIENT NAME: GHD LIMITED | **AGAT WORK ORDER: 18T347938**
PROJECT: 0044985-GD-Sarnia | **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: | **SAMPLED BY:**

Water Analysis

RPT Date: Jul 04, 2018			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Semi-Annual Groundwater Testing															
Electrical Conductivity	9311541	9311541	1200	1210	0.8%	< 2	103%	80%	120%	NA			NA		
pH	9311541	9311541	7.83	7.83	0.0%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	9311541	9311541	818	826	1.0%	< 20	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	9311541	9311541	453	460	1.5%	< 5	108%	80%	120%	NA			NA		
Fluoride	9311585	9311585	< 0.25	<0.25	NA	< 0.05	93%	90%	110%	99%	90%	110%	116%	80%	120%
Chloride	9311585	9311585	5.78	5.72	1.0%	< 0.10	102%	90%	110%	104%	90%	110%	109%	80%	120%
Nitrate as N	9311585	9311585	< 0.25	<0.25	NA	< 0.05	98%	90%	110%	107%	90%	110%	109%	80%	120%
Nitrite as N	9311585	9311585	< 0.25	<0.25	NA	< 0.05	NA	90%	110%	91%	90%	110%	119%	80%	120%
Bromide	9311585	9311585	< 0.25	<0.25	NA	< 0.05	105%	90%	110%	95%	90%	110%	95%	80%	120%
Sulphate	9311585	9311585	141	141	0.0%	< 0.10	99%	90%	110%	108%	90%	110%	110%	80%	120%
Ammonia as N	9311554	9311554	< 0.02	< 0.02	NA	< 0.02	104%	90%	110%	106%	90%	110%	86%	80%	120%
Cyanide, Free	9311541	9311541	< 0.002	<0.002	NA	< 0.002	91%	90%	110%	96%	90%	110%	89%	70%	130%
Calcium	9311554	9311554	148	145	2.0%	< 0.05	97%	90%	110%	96%	90%	110%	98%	70%	130%
Magnesium	9311554	9311554	43.3	43.6	0.7%	< 0.05	101%	90%	110%	101%	90%	110%	99%	70%	130%
Sodium	9311554	9311554	15.2	15.4	1.3%	< 0.05	97%	90%	110%	96%	90%	110%	99%	70%	130%
Potassium	9311554	9311554	2.33	2.38	2.1%	< 0.05	97%	90%	110%	97%	90%	110%	100%	70%	130%
Calcium-dissolved	9311554	9311554	146	145	0.7%	< 0.05	96%	90%	110%	100%	90%	110%	98%	70%	130%
Magnesium-dissolved	9311554	9311554	44.3	43.6	1.6%	< 0.05	101%	90%	110%	97%	90%	110%	99%	70%	130%
Sodium-dissolved	9311554	9311554	15.4	15.4	0.0%	< 0.05	96%	90%	110%	96%	90%	110%	99%	70%	130%
Potassium-dissolved	9311554	9311554	2.44	2.38	2.5%	< 0.05	97%	90%	110%	97%	90%	110%	100%	70%	130%
Arsenic	9311541	9311541	< 0.003	<0.003	NA	< 0.003	101%	90%	110%	97%	90%	110%	117%	70%	130%
Barium	9311541	9311541	0.017	0.016	6.1%	< 0.002	102%	90%	110%	101%	90%	110%	95%	70%	130%
Boron	9311541	9311541	0.227	0.231	1.7%	< 0.010	100%	90%	110%	100%	90%	110%	101%	70%	130%
Cadmium	9311541	9311541	< 0.001	<0.001	NA	< 0.001	100%	90%	110%	101%	90%	110%	116%	70%	130%
Iron	9311541	9311541	< 0.010	<0.010	NA	< 0.010	109%	90%	110%	101%	90%	110%	87%	70%	130%
Lead	9311541	9311541	< 0.001	<0.001	NA	< 0.001	101%	90%	110%	102%	90%	110%	96%	70%	130%
Mercury	9311541	9311541	< 0.0001	<0.0001	NA	< 0.0001	102%	90%	110%	102%	90%	110%	104%	80%	120%
Nickel	9311541	9311541	< 0.003	<0.003	NA	< 0.003	106%	90%	110%	103%	90%	110%	96%	70%	130%
Zinc	9311541	9311541	0.006	0.006	NA	< 0.005	101%	90%	110%	105%	90%	110%	110%	70%	130%
Semi-Annual Groundwater Testing															
Electrical Conductivity	9311583	9311583	1240	1220	1.6%	< 2	97%	80%	120%	NA			NA		
pH	9311583	9311583	7.84	7.77	0.9%	NA	99%	90%	110%	NA			NA		
Total Dissolved Solids	9311594	9311594	994	1010	1.6%	< 20	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	9311583	9311583	335	337	0.6%	< 5	104%	80%	120%	NA			NA		
Fluoride	9311615	9311615	< 0.25	< 0.05	NA	< 0.05	102%	90%	110%	99%	90%	110%	113%	80%	120%
Chloride	9311615	9311615	105	105	0.0%	< 0.10	100%	90%	110%	104%	90%	110%	111%	80%	120%
Nitrate as N	9311615	9311615	< 0.25	< 0.05	NA	< 0.05	94%	90%	110%	107%	90%	110%	107%	80%	120%
Nitrite as N	9311615	9311615	< 0.25	< 0.05	NA	< 0.05	NA	90%	110%	91%	90%	110%	115%	80%	120%
Bromide	9311615	9311615	< 0.25	< 0.05	NA	< 0.05	100%	90%	110%	95%	90%	110%	94%	80%	120%

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 0044985-GD-Sarnia
SAMPLING SITE:

AGAT WORK ORDER: 18T347938
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jul 04, 2018			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Sulphate	9311615	9311615	4.02	3.97	1.3%	< 0.10	97%	90%	110%	108%	90%	110%	109%	80%	120%
Ammonia as N	9311590	9311590	< 0.02	<0.02	NA	< 0.02	91%	90%	110%	99%	90%	110%	93%	80%	120%
Cyanide, Free	9311560	9311560	< 0.002	< 0.002	NA	< 0.002	101%	90%	110%	104%	90%	110%	102%	70%	130%
Calcium	9311596	9311596	18.5	18.3	1.1%	< 0.05	98%	90%	110%	99%	90%	110%	102%	70%	130%
Magnesium	9311596	9311596	12.4	12.3	0.8%	< 0.05	98%	90%	110%	99%	90%	110%	102%	70%	130%
Sodium	9311596	9311596	390	385	1.3%	< 0.05	95%	90%	110%	97%	90%	110%	96%	70%	130%
Potassium	9311596	9311596	2.86	2.77	3.2%	< 0.05	94%	90%	110%	96%	90%	110%	100%	70%	130%
Calcium-dissolved	9311585	9311585	82.1	82.3	0.2%	< 0.05	99%	90%	110%	100%	90%	110%	98%	70%	130%
Magnesium-dissolved	9311585	9311585	53.3	53.1	0.4%	< 0.05	96%	90%	110%	97%	90%	110%	98%	70%	130%
Sodium-dissolved	9311585	9311585	33.4	33.6	0.6%	< 0.05	96%	90%	110%	96%	90%	110%	100%	70%	130%
Potassium-dissolved	9311585	9311585	2.20	.20	NA	< 0.05	97%	90%	110%	97%	90%	110%	100%	70%	130%
Arsenic	9311595	9311595	< 0.003	<0.003	NA	< 0.003	100%	90%	110%	98%	90%	110%	105%	70%	130%
Barium	9311595	9311595	0.015	0.016	6.5%	< 0.002	102%	90%	110%	100%	90%	110%	98%	70%	130%
Boron	9311595	9311595	2.91	3.07	5.4%	< 0.010	102%	90%	110%	104%	90%	110%	123%	70%	130%
Cadmium	9311595	9311595	< 0.001	<0.001	NA	< 0.001	99%	90%	110%	100%	90%	110%	100%	70%	130%
Iron	9311595	9311595	< 0.010	<0.010	NA	< 0.010	104%	90%	110%	97%	90%	110%	93%	70%	130%
Lead	9311595	9311595	< 0.001	<0.001	NA	< 0.001	97%	90%	110%	99%	90%	110%	96%	70%	130%
Mercury	9311595	9311595	< 0.0001	<0.0001	NA	< 0.0001	105%	90%	110%	102%	90%	110%	104%	80%	120%
Nickel	9311595	9311595	< 0.003	<0.003	NA	< 0.003	103%	90%	110%	101%	90%	110%	96%	70%	130%
Zinc	9311595	9311595	< 0.005	<0.005	NA	< 0.005	103%	90%	110%	104%	90%	110%	108%	70%	130%
Semi-Annual Groundwater Testing															
Electrical Conductivity	9311606	9311606	3270	3190	2.5%	< 2	101%	80%	120%	NA			NA		
pH	9311606	9311606	8.14	7.98	2.0%	NA	99%	90%	110%	NA			NA		
Total Dissolved Solids	9311601	9311601	696	706	1.4%	< 20	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	9311606	9311606	544	542	0.4%	< 5	109%	80%	120%	NA			NA		
Fluoride	9311638	9311638	< 0.25	< 0.05	NA	< 0.05	102%	90%	110%	99%	90%	110%	114%	80%	120%
Chloride	9311638	9311638	13.2	13.2	0.0%	< 0.10	100%	90%	110%	104%	90%	110%	112%	80%	120%
Nitrate as N	9311638	9311638	< 0.25	< 0.05	NA	< 0.05	94%	90%	110%	107%	90%	110%	108%	80%	120%
Nitrite as N	9311638	9311638	< 0.25	< 0.05	NA	< 0.05	NA	90%	110%	91%	90%	110%	119%	80%	120%
Bromide	9311638	9311638	< 0.25	< 0.05	NA	< 0.05	100%	90%	110%	95%	90%	110%	92%	80%	120%
Sulphate	9311638	9311638	65.1	65.2	0.2%	< 0.10	97%	90%	110%	108%	90%	110%	111%	80%	120%
Ammonia as N	9311595	9311595	< 0.02	< 0.02	NA	< 0.02	104%	90%	110%	102%	90%	110%	91%	80%	120%
Cyanide, Free	9311601	9311601	< 0.002	< 0.002	NA	< 0.002	103%	90%	110%	103%	90%	110%	101%	70%	130%
Calcium	9311630	9311630	95.3	95.3	0.0%	< 0.05	99%	90%	110%	98%	90%	110%	102%	70%	130%
Magnesium	9311630	9311630	41.6	41.6	0.0%	< 0.05	100%	90%	110%	98%	90%	110%	100%	70%	130%
Sodium	9311630	9311630	56.3	56.3	0.0%	< 0.05	97%	90%	110%	94%	90%	110%	100%	70%	130%
Potassium	9311630	9311630	2.16	2.14	0.9%	< 0.05	96%	90%	110%	95%	90%	110%	99%	70%	130%
Calcium-dissolved	9311612	9311612	15.8	15.9	0.6%	< 0.05	100%	90%	110%	100%	90%	110%	99%	70%	130%
Magnesium-dissolved	9311612	9311612	5.43	5.52	1.6%	< 0.05	97%	90%	110%	98%	90%	110%	99%	70%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 0044985-GD-Sarnia
SAMPLING SITE:

AGAT WORK ORDER: 18T347938
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jul 04, 2018			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Sodium-dissolved	9311612	9311612	175	176	0.6%	< 0.05	96%	90%	110%	96%	90%	110%	102%	70%	130%
Potassium-dissolved	9311612	9311612	1.75	1.75	0.0%	< 0.05	96%	90%	110%	96%	90%	110%	100%	70%	130%
Arsenic	9311616	9311616	< 0.003	< 0.003	NA	< 0.003	95%	90%	110%	92%	90%	110%	101%	70%	130%
Barium	9311616	9311616	0.052	0.050	3.9%	< 0.002	100%	90%	110%	101%	90%	110%	95%	70%	130%
Boron	9311616	9311616	1.19	1.23	3.3%	< 0.010	103%	90%	110%	100%	90%	110%	108%	70%	130%
Cadmium	9311616	9311616	< 0.001	< 0.001	NA	< 0.001	98%	90%	110%	99%	90%	110%	97%	70%	130%
Iron	9311616	9311616	0.503	0.542	7.5%	< 0.010	97%	90%	110%	93%	90%	110%	91%	70%	130%
Lead	9311616	9311616	< 0.001	< 0.001	NA	< 0.001	98%	90%	110%	99%	90%	110%	93%	70%	130%
Mercury	9311616	9311616	< 0.0001	< 0.0001	NA	< 0.0001	98%	90%	110%	98%	90%	110%	92%	80%	120%
Nickel	9311616	9311616	< 0.003	< 0.003	NA	< 0.003	101%	90%	110%	100%	90%	110%	93%	70%	130%
Zinc	9311616	9311616	< 0.005	< 0.005	NA	< 0.005	99%	90%	110%	103%	90%	110%	98%	70%	130%
Semi-Annual Groundwater Testing															
Electrical Conductivity	9311634	9311634	905	889	1.8%	< 2	102%	80%	120%	NA			NA		
pH	9311634	9311634	7.97	7.90	0.9%	NA	99%	90%	110%	NA			NA		
Total Dissolved Solids	9311627	9311627	868	848	2.3%	< 20	98%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	9311634	9311634	276	275	0.4%	< 5	106%	80%	120%	NA			NA		
Fluoride	9311654	9311654	< 0.5	< 0.05	NA	< 0.05	103%	90%	110%	99%	90%	110%	106%	80%	120%
Chloride	9311654	9311654	315	312	1.0%	< 0.10	100%	90%	110%	104%	90%	110%	98%	80%	120%
Nitrate as N	9311654	9311654	< 0.5	< 0.05	NA	< 0.05	95%	90%	110%	107%	90%	110%	108%	80%	120%
Nitrite as N	9311654	9311654	< 0.5	< 0.05	NA	< 0.05	NA	90%	110%	91%	90%	110%	95%	80%	120%
Bromide	9311654	9311654	< 0.5	< 0.05	NA	< 0.05	100%	90%	110%	95%	90%	110%	87%	80%	120%
Sulphate	9311654	9311654	< 1.0	< 0.10	NA	< 0.10	98%	90%	110%	108%	90%	110%	106%	80%	120%
Cyanide, Free	9311628	9311628	0.003	< 0.002	NA	< 0.002	103%	90%	110%	104%	90%	110%	84%	70%	130%
Calcium	9311654	9311654	21.6	18.8	13.9%	< 0.05	100%	90%	110%	98%	90%	110%	102%	70%	130%
Magnesium	9311654	9311654	8.37	7.20	15.0%	< 0.05	100%	90%	110%	99%	90%	110%	101%	70%	130%
Sodium	9311654	9311654	291	256	12.8%	< 0.05	96%	90%	110%	96%	90%	110%	99%	70%	130%
Potassium	9311654	9311654	2.46	2.18	12.1%	< 0.05	96%	90%	110%	96%	90%	110%	99%	70%	130%
Calcium-dissolved	9311634	9311634	14.8	15.0	1.3%	< 0.05	99%	90%	110%	99%	90%	110%	99%	70%	130%
Magnesium-dissolved	9311634	9311634	4.96	5.03	1.4%	< 0.05	97%	90%	110%	97%	90%	110%	97%	70%	130%
Sodium-dissolved	9311634	9311634	167	167	0.0%	< 0.05	95%	90%	110%	95%	90%	110%	97%	70%	130%
Potassium-dissolved	9311634	9311634	1.92	1.91	0.5%	< 0.05	95%	90%	110%	95%	90%	110%	96%	70%	130%
Arsenic	9311649	9311649	< 0.003	<0.003	NA	< 0.003	99%	90%	110%	96%	90%	110%	111%	70%	130%
Barium	9311649	9311649	< 0.002	<0.002	NA	< 0.002	101%	90%	110%	104%	90%	110%	101%	70%	130%
Boron	9311649	9311649	< 0.010	<0.010	NA	< 0.010	95%	90%	110%	101%	90%	110%	NA	70%	130%
Cadmium	9311649	9311649	< 0.001	<0.001	NA	< 0.001	100%	90%	110%	99%	90%	110%	119%	70%	130%
Iron	9311649	9311649	< 0.010	<0.010	NA	< 0.010	98%	90%	110%	104%	90%	110%	107%	70%	130%
Lead	9311649	9311649	< 0.001	<0.001	NA	< 0.001	97%	90%	110%	100%	90%	110%	99%	70%	130%
Mercury	9311649	9311649	< 0.0001	< 0.0001	NA	< 0.0001	104%	90%	110%	100%	90%	110%	92%	80%	120%
Nickel	9311649	9311649	< 0.003	<0.003	NA	< 0.003	107%	90%	110%	103%	90%	110%	105%	70%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 0044985-GD-Sarnia
SAMPLING SITE:

AGAT WORK ORDER: 18T347938
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jul 04, 2018			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
Zinc	9311649	9311649	< 0.005	<0.005	NA	< 0.005	103%	90%	110%	105%	90%	110%	115%	70%	130%
Unfiltered Chromium (Water)															
Chromium	9311541	9311541	0.004	0.005	NA	< 0.003	100%	90%	110%	100%	90%	110%	101%	70%	130%
Unfiltered Chromium (Water)															
Chromium	9311595	9311595	0.008	0.008	NA	< 0.003	100%	90%	110%	98%	90%	110%	100%	70%	130%
Unfiltered Chromium (Water)															
Chromium	9311616	9311616	< 0.003	< 0.003	NA	< 0.003	106%	90%	110%	90%	90%	110%	109%	70%	130%
Unfiltered Chromium (Water)															
Chromium	9311649	9311649	< 0.003	< 0.003	NA	< 0.003	109%	90%	110%	102%	90%	110%	110%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the Reporting Limit (RL), the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By:

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Method Summary

CLIENT NAME: GHD LIMITED **AGAT WORK ORDER: 18T347938**
PROJECT: 0044985-GD-Sarnia **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Dichlorodifluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Vinyl Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromomethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichlorofluoromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Acetone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1 Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans- 1,2-dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl tert-butyl ether	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1-Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Ethyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chloroform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2 - Dichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Carbon Tetrachloride	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Benzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichloropropane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromodichloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
cis-1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Methyl Isobutyl Ketone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2-Trichloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
2-Hexanone	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Dibromochloromethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylene Dibromide	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,1,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Chlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Bromoform	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Styrene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
o-Xylene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,2,4-Trichlorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
1,3-Dichloropropene (Cis + Trans)	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Xylene Mixture (Total)	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
n-Hexane	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
Toluene-d8	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91-5001	EPA SW-846 5030 & 8260	(P&T)GC/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: GHD LIMITED **AGAT WORK ORDER: 18T347938**
PROJECT: 0044985-GD-Sarnia **ATTENTION TO: Jennifer Balkwill**
SAMPLING SITE: **SAMPLED BY:**

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Cyanide, Free	INOR-93-6052	MOE CN-3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Calcium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

AGAT Laboratories

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

CHAIN OF CUSTODY RECORD

L BLK

LABORATORY USE ONLY			
Arrival Condition:	✓ Good	Poor (complete "Notes")	
Arrival Temperature:	8.7	8.7	8.7
AGAT Job Number:	6.3	6.9	5.7
Notes:	18T347938		

Client Information

Company: GHD Ltd.
Contact: Jennifer Balkwill/Dan Daum
Address: 651 Colby Drive, Waterloo Ontario N2V 1C2
Phone: 519-884-0510 Fax: 519-725-1394
PO#: 73507870-1
Client Project #: 44985
AGAT Quotation #:

Report Information

1. Name: Jennifer Balkwill
   Email: jennifer.balkwill@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

- [ ] Single sample per page
- [ ] 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
- [ ] 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium				
GW-44985-05_18-52B	06/18	0600	water	7		X	X	X	X	X	X	X	X	X		X	X				
GW-44985-05_18-[illegible]B		0620	water	7							X										
GW-44985-05_18-50B		0720	water	7							X										
GW-44985-05_18-50A		0730	water	7							X										
GW-44985-05_18-[illegible]A		0800	water	7							X										
GW-44985-05_18-[illegible]A		0830	water	7							X										
GW-44985-05_18-[illegible]S		0900	water	7							X										
GW-44985-05_18-[illegible]D		0920	water	8											X						
GW-44985-05_18-50D		1000	water	8											X						
GW-44985-05_18-[illegible]B		0630	water	7							X										
GW-44985-05_18-[illegible]B		0930	water	8											X						
TOTAL # OF CONTAINERS				0																	

* 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
[signature]	6/7/18 [illegible]	[signature]	6/7/18
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
	6/7/18 2:30		

Special Instructions Ag metals + Hg field filtered

Page 1 of 1

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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: 8.7 6.3 | 8.7 6.9 | 8.7 6.3
AGAT Job Number:
Notes:

Client Information

Company:	GHD Ltd.
Contact:	Jennifer Balkwill/Dan Daum
Address:	651 Colby Drive, Waterloo Ontario N2V 1C2
Phone:	519-884-0510
Fax:	519-725-1394
PO#:	73507870-1
Client Project #:	44985
AGAT Quotation #:	

Report Information

1. Name: Jennifer Balkwill
   Email: jennifer.balkwill@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

- ☐ Single sample per page
- ☐ 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
- ☐ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium			
GW-44985-05__18-[illegible]	6/4/18	1030	water	9		X	X	X	X	X		X	X	X	X	X	X			
GW-44985-05__18-325		1100	water	7							X									
GW-44985-05__18-320		1130	water	7							X									
GW-44985-05__18-330		1200	water	9											X					
GW-44985-05__18-335		1230	water	7							X									
GW-44985-05__18-350		1300	water	9											X					
GW-44985-05__18-355		1330	water	7							X									
GW-44985-05__18-360		1400	water	9											X					
GW-44985-05__18-[illegible]		1430	water	7							X									
GW-44985-05__18-365		1500	water	7							X									
GW-44985-05__18-[illegible]		1530	water	9											X					
			TOTAL # OF CONTAINERS	0																

* 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
Dan Daum	6/7/18 [illegible]		6/7/18 10:00
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time
	6/7/18	2:30	

Special Instructions

Page 2 of 2

① BLK

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: 8.7 8.7 8.7

AGAT Job Number: 6.3 6.9 6.3

Notes:

Client Information

Company: GHD Ltd.

Contact: Jennifer Balkwill/Dan Daum

Address: 651 Colby Drive, Waterloo Ontario

N2V 1C2

Phone: 519-884-0510 Fax: 519-725-1394

PO#: 73507870-1

Client Project #: 44985

AGAT Quotation #:

Report Information

1. Name: Jennifer Balkwill
   Email: jennifer.balkwill@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

[ ] Single sample per page

[ ] 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

[ ] 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium				
GW-44985-05_18-3IV	6/4/18	1600	water	7		X	X	X	X	X	X	X	X	X		X	X				
GW-44985-05_18-40D		1630	water	9											X						
GW-44985-05_18-40S		1700	water	7							X										
GW-44985-05_18-[illegible]D		1730	water	9											X						
GW-44985-05_18-61I	6/5/18	0700	water	4							X										
GW-44985-05_18-61S		0730	water	7							X										
GW-44985-05_18-61D		0800	water	9											X						
GW-44985-05_18-22		0830	water	7							X										
GW-44985-05_18-22D		0900	water	9											X						
GW-44985-05_18-60D		0930	water	9											X						
GW-44985-05_18-39D		1600	water	9											X						
TOTAL # OF CONTAINERS				0																	

* 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
DAN DAUM	6/7/18		6/7/18	10:00
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	
	6/7/18	2:30		

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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: 8-7 8-7 8-7

AGAT Job Number: 6-5 6-9 6-5

Notes:

Client Information

Company: GHD Ltd.

Contact: Jennifer Balkwill/Dan Daum

Address: 651 Colby Drive, Waterloo Ontario

N2V 1C2

Phone: 519-884-0510 Fax: 519-725-1394

PO#: 73507870-1

Client Project #: 44985

AGAT Quotation #:

Report Information

1. Name: Jennifer Balkwill
   Email: jennifer.balkwill@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

[ ] Single sample per page

[ ] 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
[ ] 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium			
GW-44985-05__18-34T	6/5/18	1030	water	7		X	X	X	X	X	X	X	X	X		X	X			
GW-44985-05__18-395	↓	1100	water	↓		↓	↓	↓	↓	X	X	↓	↓	↓		↓	↓			
GW-44985-05__18-21II	↓	1130	water	↓		↓	↓	↓	↓	X	X	↓	↓	↓		↓	↓			
GW-44985-05__18-5D	↓	1200	water	9		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
GW-44985-05__18-PW2	↓	1230	water	↓		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
GW-44985-05__18-EW2C	↓	1300	water	↓		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
GW-44985-05__18-EW2B	↓	1330	water	↓		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
GW-44985-05__18-EW1C	↓	1400	water	↓		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
GW-44985-05__18-EW11C	↓	1400	water	↓		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
GW-44985-05__18-EW1B	↓	1430	water	↓		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
GW-44985-05__18-PW1	↓	1500	water	↓		↓	↓	↓	↓	↓		↓	↓	↓	X	↓	↓			
TOTAL # OF CONTAINERS				0	* 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
Dan Daum	6/7/18		6/7/18	10:02
Sample Relinquished By (print name & sign)	**Date/Time**	**Samples Received By (print name and sign)**	**Date/Time**	
	6/7/18	2:33		

Page 4 of 7

(L) RCK

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: 8.7 / 8.7 / 8.7   6.3 / 6.7 / 6.3

AGAT Job Number:

Notes:

Client Information

Company: GHD Ltd.
Contact: Jennifer Balkwill/Dan Daum
Address: 651 Colby Drive, Waterloo Ontario
N2V 1C2
Phone: 519-884-0510 Fax: 519-725-1394
PO#: 73507870-1
Client Project #: 44985
AGAT Quotation #:

Report Information

1. Name: Jennifer Balkwill
   Email: jennifer.balkwill@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

- [ ] Single sample per page
- [ ] 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
- [ ] 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium
GW-44985-05_485	6/6/18	700	water	7		X	X	X	X	X	X	X	X	X		X	X
GW-44985-05_480		730	water	5											X		
GW-44985-05_455		830	water	7							X						
GW-44985-05_440		900	water	5											X		
GW-44985-05_425		1000	water	7							X						
GW-44985-05_435		1030	water	7							X						
GW-44985-05_490		1100	water	9											X		
GW-44985-05_495		1130	water	7							X						
GW-44985-05_475		1230	water	7							X						
GW-44985-05_450		1300	water	9											X		
GW-44985-05_470		1400	water	9											X		
			TOTAL # OF CONTAINERS	0													

* 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
D. Daum	6/7/18		6/7/18
Sample Relinquished By (print name & sign)	**Date/Time**	**Samples Received By (print name and sign)**	**Date/Time**
	6/7/18	2:50	

Special Instructions

10:00

Page 1 of 7

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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:	8-7 8-7 8-7
AGAT Job Number:	6-3 6-9 6-3
Notes:	

Client Information

Company:	GHD Ltd.
Contact:	Jennifer Balkwill/Dan Daum
Address:	651 Colby Drive, Waterloo Ontario
	N2V 1C2
Phone:	519-884-0510 Fax: 519-725-1394
PO#:	73507870-1
Client Project #:	44985
AGAT Quotation #:	

Report Information

1. Name: Jennifer Balkwill
   Email: jennifer.balkwill@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

- ☐ Single sample per page
- ☐ 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
- ☐ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium				
GW-44985-05_18- 425	6/6/18	1430	water	7		X	X	X	X	X	X	X	X	X		X	X				
GW-44985-05_18- 555		1530	water	7							X										
GW-44985-05_18- 550		1600	water	9											X						
GW-44985-05_18- 781	6/7/18	0700	water	7							X										
GW-44985-05_18- 782		0700	water	9											X						
GW-44985-05_18- 783		0700	water	9											X						
GW-44985-05_18- 570		0800	water	9											X						
GW-44985-05_18- 575		0900	water	7							X										
GW-44985-05_18- 565		1000	water	7							X										
GW-44985-05_18- 585		1100	water	7							X										
GW-44985-05_18- 720		1200	water	9																	
			TOTAL # OF CONTAINERS	0	* 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
Dan Daum	6/7/18 6:00		6/7/18	10:00
Sample Relinquished By (print name & sign)	**Date/Time**	**Samples Received By (print name and sign)**	**Date/Time**	
	6/7/18 2:35			Page 6 of 7

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AGAT Laboratories

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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: 8.7 8.7 8.7

AGAT Job Number: 6.7 6.9 6.7

Notes:

Client Information

Company: GHD Ltd.

Contact: Jennifer Balkwill/Dan Daum

Address: 651 Colby Drive, Waterloo Ontario

N2V 1C2

Phone: 519-884-0510 Fax: 519-725-1394

PO#: 73507870-1

Client Project #: 44985

AGAT Quotation #:

Report Information

1. Name: Jennifer Balkwill
   Email: jennifer.balkwill@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

[ ] Single sample per page

[ ] 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 [ ] 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium				
GW-44985-05__18- TRIP BLANK →			water	3											X						
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
GW-44985-05__18-			water																		
			TOTAL # OF CONTAINERS	3																	

* 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
Dan Daum	6/7/18		6/7/18	10:00
Sample Relinquished By (print name & sign)	**Date/Time**	**Samples Received By (print name and sign)**	**Date/Time**	
	6/7/18	2:30		

Page 4 of 4

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

CLIENT NAME: GHD LIMITED
455 Phillip St
WATERLOO, ON N2V1C2
(519) 884-0510

ATTENTION TO: Jennifer Balkwill

PROJECT: 44985 (PO#73507870-1)

AGAT WORK ORDER: 18T413071

WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Supervisor

DATE REPORTED: Jan 21, 2019

PAGES (INCLUDING COVER): 50

VERSION*: 2

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

*NOTES

VERSION 2:Revised report issued January 21, 2019.

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Ammonia (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-43S	GW-44985-111918-DD-42S	GW-44985-111918-DD-55S	GW-44985-111918-DD-57S	GW-44985-111918-DD-58S	GW-44985-111918-DD-56S
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-19	2018-11-19	2018-11-19	2018-11-19	2018-11-19	2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733203	9733206	9733207	9733209	9733211	9733212
Ammonia as N	mg/L		0.02	2018-11-26	2018-11-26	<0.02	<0.02	<0.02	1.02	<0.02	<0.02

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-59S	GW-44985-111918-DD-32IV	GW-44985-111918-DD-46S	GW-44985-111918-DD-46I	GW-44985-111918-DD-40S	GW-44985-111918-DD-21II
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-19	2018-11-19	2018-11-19	2018-11-19	2018-11-19	2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733214	9733216	9733218	9733219	9733220	9733223
Ammonia as N	mg/L		0.02	2018-11-26	2018-11-26	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-DUP1	GW-44985-111918-DD-22	GW-44985-112018-DD-61S	GW-44985-112018-DD-61I	GW-44985-112018-DD-DUP2	GW-44985-112018-DD-39I
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-19	2018-11-19	2018-11-20	2018-11-20	2018-11-20	2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733224	9733225	9733226	9733227	9733229	9733233
Ammonia as N	mg/L		0.02	2018-11-26	2018-11-26	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

					SAMPLE DESCRIPTION:	GW-44985-112018-DD-39S	GW-44985-112018-DD-63S	GW-44985-112018-DD-45S	GW-44985-112018-DD-62S	GW-44985-112018-DD-48S	GW-44985-112018-DD-52B
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733234	9733235	9733238	9733239	9733241	9733242
Ammonia as N	mg/L		0.02	2018-11-26	2018-11-26	<0.02	<0.02	<0.02	0.40	<0.02	<0.02

Certified By: Amanjot Bhela

CHARTERED AMANJOT BHELA CHEMIST
ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Ammonia (Water)

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112018-DD-52A	GW-44985-112018-DD-51B	GW-44985-112018-DD-51A	GW-44985-112018-DD-50B	GW-44985-112018-DD-50A	GW-44985-112118-DD-35S
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-21
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733243	9733244	9733245	9733246	9733247	9733248
Ammonia as N	mg/L		0.02	2018-11-26	2018-11-26	<0.02	<0.02	<0.02	<0.02	0.48	<0.02

					SAMPLE DESCRIPTION:	GW-44985-112118-DD-53S	GW-44985-112118-DD-32S	GW-44985-112118-DD-30	GW-44985-112118-DD-41S	GW-44985-112218-DD-FB1	GW-44985-112218-DD-FB2
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-21	2018-11-21	2018-11-21	2018-11-21	2018-11-22	2018-11-22
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733251	9733253	9733256	9733258	9733266	9733267
Ammonia as N	mg/L		0.02	2018-11-26	2018-11-26	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Amanjot Bhela

CHARTERED AMANJOT BHELA CHEMIST — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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

CLIENT NAME: GHD LIMITED
SAMPLING SITE:
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-43S		GW-44985-111918-DD-43D		GW-44985-111918-DD-49D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-19		2018-11-19		2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733203	RDL	9733204	RDL	9733205
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.038	0.002	0.167	0.002	0.082
Boron	mg/L		0.010	2018-11-27	2018-11-27	0.052	0.010	1.40	0.010	1.25
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	<0.001	0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.003	0.003	0.009	0.003	0.006
Iron	mg/L		0.010	2018-11-27	2018-11-27	<0.010	0.010	0.512	0.010	0.030
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	0.001	0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	0.005	<0.005	0.005	<0.005
Calcium-dissolved	mg/L		0.05	2018-11-28	2018-11-28	83.2	0.25	22.4	0.05	19.6
Magnesium-dissolved	mg/L		0.05	2018-11-28	2018-11-28	23.4	0.25	8.59	0.05	5.48
Sodium-dissolved	mg/L		0.05	2018-11-28	2018-11-28	26.6	0.25	191	0.05	144
Potassium-dissolved	mg/L		0.05	2018-11-28	2018-11-28	1.58	0.25	1.54	0.05	1.34

Certified By: Amanjot Bhela

CHARTERED AMANJOT BHELA CHEMIST — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18T413071

PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-111918-DD-42S	GW-44985-111918-DD-55S	GW-44985-111918-DD-55D	GW-44985-111918-DD-57S	GW-44985-111918-DD-57D	GW-44985-111918-DD-58S
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-19	2018-11-19	2018-11-19	2018-11-19	2018-11-19	2018-11-19
						9733206	9733207	9733208	9733209	9733210	9733211
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.017	0.014	0.193	0.032	0.101	0.011
Boron	mg/L		0.010	2018-11-27	2018-11-27	0.175	0.203	1.79	0.140	2.17	0.319
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.004	0.003	0.016	0.007	0.017	0.012
Iron	mg/L		0.010	2018-11-27	2018-11-27	<0.010	0.016	0.331	<0.010	2.23	<0.010
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	0.002	<0.001	0.001	0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	0.005	<0.003	<0.003	<0.003	<0.003	0.005
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	331	120	18.4	130	18.4	261
Magnesium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	154	58.3	6.14	76.1	7.13	211
Sodium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	54.8	44.0	294	57.2	349	107
Potassium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	3.25	2.69	2.81	2.64	1.71	5.01

Certified By: Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

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

Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-56S	GW-44985-111918-DD-56D		GW-44985-111918-DD-59S		GW-44985-111918-DD-59D
					SAMPLE TYPE:	Water	Water		Water		Water
					DATE SAMPLED:	2018-11-19	2018-11-19		2018-11-19		2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733212	9733213	RDL	9733214	RDL	9733215
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	<0.003	<0.003	0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.012	0.120	0.002	0.037	0.002	0.093
Boron	mg/L		0.010	2018-11-27	2018-11-27	0.403	2.11	0.010	0.144	0.010	1.26
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.006	0.011	0.003	0.005	0.003	0.008
Iron	mg/L		0.010	2018-11-27	2018-11-27	0.023	0.983	0.010	<0.010	0.010	0.438
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	0.001	<0.001	0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	0.004	<0.003	0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	<0.005	0.005	<0.005	0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	232	20.6	0.10	84.7	0.05	14.5
Magnesium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	116	7.47	0.10	45.1	0.05	4.83
Sodium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	74.5	247	0.10	21.6	0.05	157
Potassium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	3.40	1.89	0.10	2.00	0.05	1.74

Certified By: Amanjot Bhela

CHARTERED AMANJOT BHELA CHEMIST — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-32IV		GW-44985-111918-DD-46D	GW-44985-111918-DD-46S	GW-44985-111918-DD-46I	GW-44985-111918-DD-40S
					SAMPLE TYPE:	Water		Water	Water	Water	Water
					DATE SAMPLED:	2018-11-19		2018-11-19	2018-11-19	2018-11-19	2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733216	RDL	9733217	9733218	9733219	9733220
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.019	0.002	0.088	0.019	0.031	0.026
Boron	mg/L		0.010	2018-11-27	2018-11-27	0.079	0.010	1.81	2.93	0.150	0.209
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.004	0.003	0.011	0.005	0.005	0.005
Iron	mg/L		0.010	2018-11-27	2018-11-27	<0.010	0.010	0.423	<0.010	0.372	<0.010
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	<0.003	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	0.005	0.007	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.10	2018-11-28	2018-11-28	68.8	0.25	13.3	178	128	97.7
Magnesium-dissolved	mg/L		0.10	2018-11-28	2018-11-28	36.3	0.25	4.61	80.4	75.3	70.0
Sodium-dissolved	mg/L		0.10	2018-11-28	2018-11-28	30.1	0.25	201	78.5	41.9	44.1
Potassium-dissolved	mg/L		0.10	2018-11-28	2018-11-28	0.68	0.25	1.57	8.07	1.50	2.01

Certified By: Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

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

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-40D		GW-44985-111918-DD-47D		
					SAMPLE TYPE:	Water		Water		
					DATE SAMPLED:	2018-11-19		2018-11-19		
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733221	RDL	9733222	RDL	Date Prepared
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	0.004	0.003	2018-11-27
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.190	0.002	1.47	0.002	2018-11-27
Boron	mg/L		0.010	2018-11-27	2018-11-27	1.76	0.010	3.01	0.010	2018-11-27
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	<0.001	0.001	2018-11-27
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.011	0.003	0.026	0.003	2018-11-27
Iron	mg/L		0.010	2018-11-27	2018-11-27	1.35	0.010	1.78	0.010	2018-11-27
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	0.001	0.001	2018-11-27
Nickel	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	<0.003	0.003	2018-11-27
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	0.005	<0.005	0.005	2018-11-27
Calcium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	26.0	0.5	51.0	0.25	2018-11-29
Magnesium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	9.91	0.5	23.6	0.25	2018-11-29
Sodium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	223	0.5	776	0.25	2018-11-29
Potassium-dissolved	mg/L		0.25	2018-11-28	2018-11-28	2.11	0.5	3.2	0.25	2018-11-29

Certified By: Amanjot Bhela

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

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					SAMPLE DESCRIPTION:	GW-44985-111918-DD-21II	GW-44985-111918-DD-DUP1	GW-44985-111918-DD-22	GW-44985-112018-DD-61S	GW-44985-112018-DD-61I
					SAMPLE TYPE:	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-19	2018-11-19	2018-11-19	2018-11-20	2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733223	9733224	9733225	9733226	9733227
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.040	0.040	0.018	0.035	0.046
Boron	mg/L		0.010	2018-11-27	2018-11-27	0.102	0.099	0.215	0.331	0.132
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.003	<0.003	0.005	0.004	<0.003
Iron	mg/L		0.010	2018-11-27	2018-11-27	<0.010	<0.010	<0.010	<0.010	<0.010
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	<0.003	<0.003	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	<0.005	0.010	<0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	148	137	132	108	101
Magnesium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	46.9	43.3	91.1	55.8	48.4
Sodium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	17.2	15.7	72.8	55.5	27.3
Potassium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	0.51	0.67	1.82	1.78	0.73

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AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
SAMPLING SITE:
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-112018-DD-61D	RDL	GW-44985-112018-DD-DUP2	RDL	GW-44985-112018-DD-22D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-20		2018-11-20		2018-11-20
						9733228		9733229		9733230
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	0.003	0.003	<0.003	0.003	0.006
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.047	0.002	0.044	0.002	0.353
Boron	mg/L		0.010	2018-11-27	2018-11-27	1.59	0.010	0.148	0.010	4.42
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	<0.001	0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.008	0.003	0.003	0.003	0.019
Iron	mg/L		0.010	2018-11-27	2018-11-27	0.055	0.010	<0.010	0.010	0.054
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	<0.001	0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	<0.003	0.003	0.004
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	0.005	0.006	0.005	0.010
Calcium-dissolved	mg/L		0.10	2018-11-29	2018-11-29	18.0	0.25	98.8	0.5	30.1
Magnesium-dissolved	mg/L		0.10	2018-11-29	2018-11-29	6.39	0.25	47.5	0.5	12.7
Sodium-dissolved	mg/L		0.10	2018-11-29	2018-11-29	168	0.25	26.4	0.5	872
Potassium-dissolved	mg/L		0.10	2018-11-29	2018-11-29	1.30	0.25	0.62	0.5	2.3

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112018-DD-60D	GW-44985-112018-DD-39D	GW-44985-112018-DD-39I	GW-44985-112018-DD-39S	GW-44985-112018-DD-63S	GW-44985-112018-DD-54D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733231	9733232	9733233	9733234	9733235	9733236
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	0.004	<0.003	0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.213	0.118	0.027	0.026	0.117	0.103
Boron	mg/L		0.010	2018-11-27	2018-11-27	3.13	1.76	0.160	0.259	0.283	1.52
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.015	0.011	<0.003	<0.003	0.016	0.008
Iron	mg/L		0.010	2018-11-27	2018-11-27	0.247	0.371	0.794	<0.010	<0.010	0.234
Lead	mg/L		0.001	2018-11-27	2018-11-27	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	0.006	<0.003	<0.003	<0.003	0.084	<0.003
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	21.1	21.8	83.7	89.2	146	14.4
Magnesium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	8.00	6.20	93.4	66.4	67.2	4.77
Sodium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	498	220	59.7	49.6	138	150
Potassium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	1.76	1.39	1.03	1.04	2.90	1.24

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CLIENT NAME: GHD LIMITED
SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112018-DD-45D		GW-44985-112018-DD-45S		GW-44985-112018-DD-62S	GW-44985-112018-DD-48D
					SAMPLE TYPE:	Water		Water		Water	Water
					DATE SAMPLED:	2018-11-20		2018-11-20		2018-11-20	2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733237	RDL	9733238	RDL	9733239	9733240
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	0.016	0.003	<0.003	0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.130	0.002	0.056	0.002	0.037	0.168
Boron	mg/L		0.010	2018-11-27	2018-11-27	2.56	0.010	0.074	0.010	0.186	1.98
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.034	0.003	0.007	0.003	0.005	0.011
Iron	mg/L		0.010	2018-11-27	2018-11-27	<0.010	0.010	<0.010	0.010	<0.010	0.521
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	0.001	<0.001	0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	<0.003	0.003	<0.003	0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	0.005	<0.005	0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	5.43	0.10	94.3	0.25	79.6	20.9
Magnesium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	3.31	0.10	31.6	0.25	34.4	7.45
Sodium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	705	0.10	28.0	0.25	48.3	260
Potassium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	1.42	0.10	1.50	0.25	1.95	1.90

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ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO CHARTERED AMANJOT BHELA CHEMIST

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Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112018-DD-48S	GW-44985-112018-DD-52B	GW-44985-112018-DD-52A	GW-44985-112018-DD-51B	GW-44985-112018-DD-51A	GW-44985-112018-DD-50B
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733241	9733242	9733243	9733244	9733245	9733246
Arsenic	mg/L		0.003	2018-11-27	2018-11-27	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-27	2018-11-27	0.035	0.015	0.017	0.022	0.044	0.018
Boron	mg/L		0.010	2018-11-27	2018-11-27	0.229	0.264	0.258	0.381	0.184	0.119
Cadmium	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-27	2018-11-27	0.006	0.004	<0.003	<0.003	<0.003	<0.003
Iron	mg/L		0.010	2018-11-27	2018-11-27	<0.010	<0.010	<0.010	0.044	<0.010	0.361
Lead	mg/L		0.001	2018-11-27	2018-11-27	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-27	2018-11-27	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-11-27	2018-11-27	<0.005	0.005	<0.005	0.006	<0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	89.4	91.9	165	115	120	130
Magnesium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	50.0	58.1	100	72.2	65.0	37.5
Sodium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	32.9	57.2	45.5	72.3	32.2	11.3
Potassium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	1.80	2.34	1.44	2.89	2.01	2.37

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Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112018-DD-50A	GW-44985-112118-DD-35S	GW-44985-112118-DD-35D	GW-44985-112118-DD-DUP3	GW-44985-112118-DD-53S	GW-44985-112118-DD-53D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-20	2018-11-21	2018-11-21	2018-11-21	2018-11-21	2018-11-21
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733247	9733248	9733249	9733250	9733251	9733252
Arsenic	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-28	2018-11-28	0.012	0.025	0.113	0.116	0.032	0.171
Boron	mg/L		0.010	2018-11-28	2018-11-28	0.350	0.260	1.55	1.53	0.153	1.56
Cadmium	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	0.006	0.005	<0.003	0.006
Iron	mg/L		0.010	2018-11-28	2018-11-28	<0.010	<0.010	0.663	0.660	<0.010	0.557
Lead	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-11-28	2018-11-28	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	149	146	19.1	19.3	161	23.1
Magnesium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	78.4	66.0	6.43	6.38	58.6	8.22
Sodium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	43.4	28.7	208	207	17.1	249
Potassium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	2.39	2.31	1.57	1.29	0.95	1.74

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112118-DD-32S	GW-44985-112118-DD-32D	GW-44985-112118-DD-30D		GW-44985-112118-DD-30
					SAMPLE TYPE:	Water	Water	Water		Water
					DATE SAMPLED:	2018-11-21	2018-11-21	2018-11-21		2018-11-21
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733253	9733254	9733255	RDL	9733256
Arsenic	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-11-28	2018-11-28	0.026	0.133	0.294	0.002	0.028
Boron	mg/L		0.010	2018-11-28	2018-11-28	0.187	1.32	1.44	0.010	0.103
Cadmium	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001	0.001	<0.001
Chromium	mg/L		0.003	2018-11-28	2018-11-28	<0.003	0.004	0.005	0.003	<0.003
Iron	mg/L		0.010	2018-11-28	2018-11-28	<0.010	0.591	0.397	0.010	<0.010
Lead	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001	0.001	0.013
Nickel	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-11-28	2018-11-28	<0.005	<0.005	<0.005	0.005	0.098
Calcium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	151	19.9	18.9	0.05	74.0
Magnesium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	54.1	6.93	6.89	0.05	49.4
Sodium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	20.2	217	182	0.05	35.7
Potassium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	1.49	1.94	1.97	0.05	1.57

Certified By: Amanjot Bhela

CHARTERED AMANJOT BHELA CHEMIST — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 18T413071

PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112118-DD-41D	GW-44985-112118-DD-41S	GW-44985-112118-DD-PW2	GW-44985-112118-DD-DUP4		GW-44985-112118-DD-EW2C
					SAMPLE TYPE:	Water	Water	Water	Water		Water
					DATE SAMPLED:	2018-11-21	2018-11-21	2018-11-21	2018-11-21		2018-11-21
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733257	9733258	9733259	9733260	RDL	9733261
Arsenic	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003	<0.003	0.003	<0.003
Barium	mg/L		0.002	2018-11-28	2018-11-28	0.075	0.027	0.122	0.125	0.002	0.128
Boron	mg/L		0.010	2018-11-28	2018-11-28	1.59	0.144	2.08	2.05	0.010	1.10
Cadmium	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Chromium	mg/L		0.003	2018-11-28	2018-11-28	0.005	0.003	0.005	0.005	0.003	<0.003
Iron	mg/L		0.010	2018-11-28	2018-11-28	0.171	<0.010	0.139	0.127	0.010	0.012
Lead	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
Nickel	mg/L		0.003	2018-11-28	2018-11-28	<0.003	0.004	<0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	2018-11-28	2018-11-28	<0.005	0.005	<0.005	<0.005	0.005	<0.005
Calcium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	13.0	179	14.6	14.0	0.05	30.2
Magnesium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	4.55	65.5	6.81	6.40	0.05	13.9
Sodium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	181	41.0	270	258	0.05	87.9
Potassium-dissolved	mg/L		0.25	2018-11-29	2018-11-29	1.29	1.39	1.84	1.83	0.05	2.22

Certified By: Amanjot Bhela

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CLIENT NAME: GHD LIMITED
SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112218-DD-EW2B		GW-44985-112218-DD-EW1C	GW-44985-112218-DD-EW1B	GW-44985-112218-DD-PW1
					SAMPLE TYPE:	Water		Water	Water	Water
					DATE SAMPLED:	2018-11-22		2018-11-22	2018-11-22	2018-11-22
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733262	RDL	9733263	9733264	9733265
Arsenic	mg/L		0.003	2018-11-28	2018-11-28	<0.003	0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-28	2018-11-28	0.112	0.002	0.043	0.044	0.084
Boron	mg/L		0.010	2018-11-28	2018-11-28	1.07	0.010	1.10	1.12	1.29
Cadmium	mg/L		0.001	2018-11-28	2018-11-28	<0.001	0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-28	2018-11-28	0.003	0.003	0.004	<0.003	0.003
Iron	mg/L		0.010	2018-11-28	2018-11-28	0.036	0.010	0.512	0.644	0.265
Lead	mg/L		0.001	2018-11-28	2018-11-28	<0.001	0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-28	2018-11-28	<0.003	0.003	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-11-28	2018-11-28	<0.005	0.005	<0.005	<0.005	0.006
Calcium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	31.7	0.25	69.1	70.5	10.8
Magnesium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	14.2	0.25	41.0	40.6	4.17
Sodium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	89.1	0.25	156	157	243
Potassium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	2.27	0.25	3.98	4.08	1.88

Amanjot Bhela

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AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 18T413071

PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Dissolved Metals (Water)

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112218-DD-FB1	GW-44985-112218-DD-FB2	GW-44985-112218-DD-FB3
					SAMPLE TYPE:	Water	Water	Water
					DATE SAMPLED:	2018-11-22	2018-11-22	2018-11-22
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733266	9733267	9733268
Arsenic	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003
Barium	mg/L		0.002	2018-11-28	2018-11-28	<0.002	<0.002	<0.002
Boron	mg/L		0.010	2018-11-28	2018-11-28	<0.010	<0.010	<0.010
Cadmium	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003
Iron	mg/L		0.010	2018-11-28	2018-11-28	<0.010	<0.010	<0.010
Lead	mg/L		0.001	2018-11-28	2018-11-28	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	2018-11-28	2018-11-28	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	2018-11-28	2018-11-28	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	<0.05	<0.05	<0.05
Magnesium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	<0.05	<0.05	<0.05
Sodium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	0.07	<0.05	<0.05
Potassium-dissolved	mg/L		0.05	2018-11-29	2018-11-29	<0.05	<0.05	<0.05

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

9733203-9733268 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised: Jan 16, 2019
Revision: This report replaces the Certificate of Analysis issued on Nov 30, 2018.It has been revised to include the comment regarding the SampID of the Matrix Spike.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Amanjot Bhela

CHARTERED CHEMIST AMANJOT BHELA ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-43S		GW-44985-111918-DD-43D		GW-44985-111918-DD-49D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-19		2018-11-19		2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733203	RDL	9733204	RDL	9733205
Electrical Conductivity	µS/cm		2	2018-11-26	2018-11-26	718	2	1220	2	756
pH	pH Units		NA	2018-11-26	2018-11-26	7.97	NA	8.13	NA	7.95
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	390	20	592	20	378
Alkalinity (as CaCO3)	mg/L		5	2018-11-26	2018-11-26	308	5	271	5	256
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.10	2018-11-26	2018-11-26	0.16	0.25	0.62	0.10	1.09
Chloride	mg/L		0.20	2018-11-26	2018-11-26	12.0	0.50	223	0.20	89.0
Nitrate as N	mg/L		0.10	2018-11-26	2018-11-26	<0.10	0.25	<0.25	0.10	<0.10
Nitrite as N	mg/L		0.10	2018-11-26	2018-11-26	<0.10	0.25	<0.25	0.10	<0.10
Bromide	mg/L		0.10	2018-11-26	2018-11-26	<0.10	0.25	<0.25	0.10	0.57
Sulphate	mg/L		0.20	2018-11-26	2018-11-26	66.8	0.50	<0.50	0.20	<0.20
Calcium	mg/L		0.05	2018-11-28	2018-11-28	83.7	0.25	24.4	0.05	19.9
Magnesium	mg/L		0.05	2018-11-28	2018-11-28	23.1	0.25	9.10	0.05	5.20
Sodium	mg/L		0.05	2018-11-28	2018-11-28	27.1	0.25	207	0.05	129
Potassium	mg/L		0.05	2018-11-28	2018-11-28	1.71	0.25	1.69	0.05	1.28

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-42S		GW-44985-111918-DD-55S		
					SAMPLE TYPE:	Water		Water		
					DATE SAMPLED:	2018-11-19		2018-11-19		
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733206	RDL	9733207	RDL	Date Prepared
Electrical Conductivity	µS/cm		2	2018-11-26	2018-11-26	2950	2	1300	2	2018-11-27
pH	pH Units		NA	2018-11-26	2018-11-26	7.78	NA	7.90	NA	2018-11-27
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	2500	20	856	20	2018-11-26
Alkalinity (as CaCO3)	mg/L		5	2018-11-26	2018-11-26	354	5	325	5	2018-11-27
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	2018-11-27
Fluoride	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	0.40	0.5	2018-11-26
Chloride	mg/L		2.0	2018-11-26	2018-11-26	37.1	0.50	14.3	1.0	2018-11-26
Nitrate as N	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	<0.25	0.5	2018-11-26
Nitrite as N	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	<0.25	0.5	2018-11-26
Bromide	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	<0.25	0.5	2018-11-26
Sulphate	mg/L		2.0	2018-11-26	2018-11-26	1660	0.50	444	1.0	2018-11-26
Calcium	mg/L		0.25	2018-11-28	2018-11-28	405	0.25	136	0.25	2018-11-28
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	189	0.25	62.3	0.25	2018-11-28
Sodium	mg/L		0.25	2018-11-28	2018-11-28	64.4	0.25	48.2	0.25	2018-11-28
Potassium	mg/L		0.25	2018-11-28	2018-11-28	4.23	0.25	2.93	0.25	2018-11-28

Certified By: Amanjot Bhela

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Certificate of Analysis

AGAT Laboratories

AGAT WORK ORDER: 18T413071

PROJECT: 44985 (PO#73507870-1)

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CLIENT NAME: GHD LIMITED

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733208	RDL	9733209	RDL	9733210
					SAMPLE DESCRIPTION:	GW-44985-111918-DD-55D		GW-44985-111918-DD-57S		GW-44985-111918-DD-57D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-19		2018-11-19		2018-11-19
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1790	2	1580	2	1900
pH	pH Units		NA	2018-11-27	2018-11-27	8.26	NA	7.98	NA	8.02
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	890	20	1010	20	966
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	292	5	550	5	371
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.5	2018-11-26	2018-11-26	<0.5	0.25	0.52	0.5	<0.5
Chloride	mg/L		1.0	2018-11-26	2018-11-26	412	0.50	19.1	1.0	398
Nitrate as N	mg/L		0.5	2018-11-26	2018-11-26	<0.5	0.25	<0.25	0.5	<0.5
Nitrite as N	mg/L		0.5	2018-11-26	2018-11-26	<0.5	0.25	<0.25	0.5	<0.5
Bromide	mg/L		0.5	2018-11-26	2018-11-26	<0.5	0.25	<0.25	0.5	<0.5
Sulphate	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.50	427	1.0	<1.0
Calcium	mg/L		0.25	2018-11-28	2018-11-28	20.2	0.25	164	0.25	18.3
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	7.14	0.25	94.5	0.25	6.69
Sodium	mg/L		0.25	2018-11-28	2018-11-28	338	0.25	64.0	0.25	351
Potassium	mg/L		0.25	2018-11-28	2018-11-28	3.15	0.25	3.50	0.25	1.81

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Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
SAMPLING SITE:

ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23

DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-111918-DD-58S				GW-44985-111918-DD-56S
					SAMPLE TYPE:	Water				Water
					DATE SAMPLED:	2018-11-19				2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733211	RDL	Date Prepared	Date Analyzed	9733212
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	3200	2	2018-11-27	2018-11-27	2250
pH	pH Units		NA	2018-11-27	2018-11-27	7.90	NA	2018-11-27	2018-11-27	7.87
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	2450	20	2018-11-26	2018-11-27	1790
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	481	5	2018-11-27	2018-11-27	347
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	2018-11-27	2018-11-27	<0.002
Fluoride	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.5	2018-11-26	2018-11-26	<0.5
Chloride	mg/L		2.0	2018-11-26	2018-11-26	283	1.0	2018-11-26	2018-11-26	67.3
Nitrate as N	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.5	2018-11-26	2018-11-26	<0.5
Nitrite as N	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.5	2018-11-26	2018-11-26	<0.5
Bromide	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.5	2018-11-26	2018-11-26	<0.5
Sulphate	mg/L		2.0	2018-11-26	2018-11-26	1190	2.0	2018-11-27	2018-11-27	1060
Calcium	mg/L		0.25	2018-11-28	2018-11-28	287	0.25	2018-11-28	2018-11-28	261
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	224	0.25	2018-11-28	2018-11-28	129
Sodium	mg/L		0.25	2018-11-28	2018-11-28	117	0.25	2018-11-28	2018-11-28	80.2
Potassium	mg/L		0.25	2018-11-28	2018-11-28	5.37	0.25	2018-11-28	2018-11-28	3.75

Certified By: Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

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CLIENT NAME: GHD LIMITED
SAMPLING SITE:
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

						GW-44985-		GW-44985-		GW-44985-
					SAMPLE DESCRIPTION:	111918-DD-56D		111918-DD-59S		111918-DD-59D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-19		2018-11-19		2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733213	RDL	9733214	RDL	9733215
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1500	2	915	2	876
pH	pH Units		NA	2018-11-27	2018-11-27	8.13	NA	7.99	NA	8.01
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	754	20	514	20	436
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	345	5	390	5	270
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-26	2018-11-26	0.69	0.25	0.60	0.25	1.01
Chloride	mg/L		0.50	2018-11-26	2018-11-26	301	0.50	16.5	0.50	122
Nitrate as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	0.32	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.25	<0.25
Bromide	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.25	<0.25
Sulphate	mg/L		0.50	2018-11-26	2018-11-26	<0.50	0.50	108	0.50	<0.50
Calcium	mg/L		0.25	2018-11-28	2018-11-28	21.2	0.10	94.0	0.05	14.5
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	7.77	0.10	50.3	0.05	4.86
Sodium	mg/L		0.25	2018-11-28	2018-11-28	273	0.10	25.0	0.05	158
Potassium	mg/L		0.25	2018-11-28	2018-11-28	2.43	0.10	2.25	0.05	1.79

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AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
SAMPLING SITE:
ATTENTION TO: Jennifer Balkwill
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					SAMPLE DESCRIPTION:	GW-44985-111918-DD-32IV		GW-44985-111918-DD-46D		GW-44985-111918-DD-46S
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-19		2018-11-19		2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733216	RDL	9733217	RDL	9733218
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	936	2	1210	2	1930
pH	pH Units		NA	2018-11-27	2018-11-27	8.03	NA	7.98	NA	7.90
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	522	20	630	20	1450
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	379	5	320	5	354
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	0.79	0.5	<0.5
Chloride	mg/L		0.50	2018-11-26	2018-11-26	18.2	0.50	205	1.0	25.6
Nitrate as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.5	<0.5
Nitrite as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.5	<0.5
Bromide	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.5	<0.5
Sulphate	mg/L		0.50	2018-11-26	2018-11-26	133	0.50	<0.50	1.0	820
Calcium	mg/L		0.10	2018-11-28	2018-11-28	82.9	0.25	17.0	0.25	208
Magnesium	mg/L		0.10	2018-11-28	2018-11-28	45.9	0.25	5.03	0.25	90.6
Sodium	mg/L		0.10	2018-11-28	2018-11-28	42.6	0.25	235	0.25	95.9
Potassium	mg/L		0.10	2018-11-28	2018-11-28	0.92	0.25	1.76	0.25	8.65

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					SAMPLE DESCRIPTION:	GW-44985-111918-DD-46I	GW-44985-111918-DD-40S	GW-44985-111918-DD-40D		GW-44985-111918-DD-47D
					SAMPLE TYPE:	Water	Water	Water		Water
					DATE SAMPLED:	2018-11-19	2018-11-19	2018-11-19		2018-11-19
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733219	9733220	9733221	RDL	9733222
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1460	1300	1440	2	5000
pH	pH Units		NA	2018-11-27	2018-11-27	7.92	8.13	7.96	NA	8.23
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	960	874	716	20	2570
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	406	415	254	5	623
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	<0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.66	0.67	2.5	<2.5
Chloride	mg/L		0.50	2018-11-26	2018-11-26	40.1	19.7	309	5.0	1260
Nitrate as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	<0.25	<0.25	2.5	<2.5
Nitrite as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	<0.25	<0.25	2.5	<2.5
Bromide	mg/L		0.25	2018-11-26	2018-11-26	<0.25	<0.25	<0.25	2.5	<2.5
Sulphate	mg/L		0.50	2018-11-26	2018-11-26	429	348	<0.50	5.0	<5.0
Calcium	mg/L		0.25	2018-11-28	2018-11-28	145	111	27.7	0.5	63.2
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	83.6	79.5	10.2	0.5	27.0
Sodium	mg/L		0.25	2018-11-28	2018-11-28	48.8	50.9	240	0.5	933
Potassium	mg/L		0.25	2018-11-28	2018-11-28	1.68	2.20	2.06	0.5	4.3

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					SAMPLE DESCRIPTION:	GW-44985-111918-DD-21II	GW-44985-111918-DD-DUP1		GW-44985-111918-DD-22		GW-44985-112018-DD-61S
					SAMPLE TYPE:	Water	Water		Water		Water
					DATE SAMPLED:	2018-11-19	2018-11-19		2018-11-19		2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733223	9733224	RDL	9733225	RDL	9733226
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1220	1220	2	1800	2	1260
pH	pH Units		NA	2018-11-27	2018-11-27	8.04	7.92	NA	7.96	NA	7.96
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	812	760	20	1220	20	766
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	494	495	5	487	5	455
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-26	2018-11-26	<0.25	<0.25	0.5	<0.5	0.25	0.44
Chloride	mg/L		0.50	2018-11-26	2018-11-26	5.34	5.24	1.0	58.6	0.50	18.8
Nitrate as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	<0.25	0.5	<0.5	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	<0.25	0.5	<0.5	0.25	<0.25
Bromide	mg/L		0.25	2018-11-26	2018-11-26	<0.25	<0.25	0.5	<0.5	0.25	<0.25
Sulphate	mg/L		0.50	2018-11-26	2018-11-26	257	249	1.0	585	0.50	262
Calcium	mg/L		0.25	2018-11-28	2018-11-28	175	175	0.25	156	0.25	118
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	53.0	52.3	0.25	104	0.25	62.7
Sodium	mg/L		0.25	2018-11-28	2018-11-28	19.1	19.4	0.25	84.7	0.25	63.0
Potassium	mg/L		0.25	2018-11-28	2018-11-28	0.86	0.92	0.25	2.03	0.25	2.15

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PROJECT: 44985 (PO#73507870-1)

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					SAMPLE DESCRIPTION:	GW-44985-112018-DD-61I		GW-44985-112018-DD-61D		GW-44985-112018-DD-DUP2
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-20		2018-11-20		2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733227	RDL	9733228	RDL	9733229
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1070	2	1020	2	1060
pH	pH Units		NA	2018-11-27	2018-11-27	7.91	NA	7.94	NA	7.99
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	658	20	502	20	654
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	347	5	247	5	340
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	0.77	0.25	<0.25
Chloride	mg/L		0.50	2018-11-26	2018-11-26	22.0	0.50	143	0.50	22.2
Nitrate as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.25	<0.25
Bromide	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.25	<0.25	0.25	<0.25
Sulphate	mg/L		0.50	2018-11-26	2018-11-26	243	0.50	38.8	0.50	246
Calcium	mg/L		0.25	2018-11-28	2018-11-28	112	0.10	20.7	0.25	114
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	54.1	0.10	6.99	0.25	55.6
Sodium	mg/L		0.25	2018-11-28	2018-11-28	28.4	0.10	173	0.25	28.5
Potassium	mg/L		0.25	2018-11-28	2018-11-28	0.88	0.10	1.42	0.25	0.89

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Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733230	RDL	9733231	RDL	9733232	9733233
					SAMPLE DESCRIPTION:	GW-44985-112018-DD-22D		GW-44985-112018-DD-60D		GW-44985-112018-DD-39D	GW-44985-112018-DD-39I
					SAMPLE TYPE:	Water		Water		Water	Water
					DATE SAMPLED:	2018-11-20		2018-11-20		2018-11-20	2018-11-20
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	4770	2	3100	2	1370	1480
pH	pH Units		NA	2018-11-27	2018-11-27	8.28	NA	8.07	NA	7.89	8.00
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	2510	20	1560	20	702	914
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	746	5	494	5	325	565
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Fluoride	mg/L		2.5	2018-11-26	2018-11-26	<2.5	1.0	<1.0	0.25	0.90	0.58
Chloride	mg/L		5.0	2018-11-26	2018-11-26	1110	2.0	728	0.50	242	17.0
Nitrate as N	mg/L		2.5	2018-11-26	2018-11-26	<2.5	1.0	<1.0	0.25	<0.25	<0.25
Nitrite as N	mg/L		2.5	2018-11-26	2018-11-26	<2.5	1.0	<1.0	0.25	<0.25	<0.25
Bromide	mg/L		2.5	2018-11-26	2018-11-26	<2.5	1.0	<1.0	0.25	<0.25	<0.25
Sulphate	mg/L		5.0	2018-11-26	2018-11-26	<5.0	2.0	3.6	0.50	<0.50	324
Calcium	mg/L		0.5	2018-11-28	2018-11-28	33.8	0.25	24.9	0.25	23.6	103
Magnesium	mg/L		0.5	2018-11-28	2018-11-28	13.9	0.25	9.61	0.25	6.78	107
Sodium	mg/L		0.5	2018-11-28	2018-11-28	954	0.25	602	0.25	245	68.9
Potassium	mg/L		0.5	2018-11-28	2018-11-28	3.0	0.25	2.44	0.25	1.35	1.45

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					SAMPLE DESCRIPTION:	GW-44985-112018-DD-39S		GW-44985-112018-DD-63S		GW-44985-112018-DD-54D
					SAMPLE TYPE:	Water		Water		Water
					DATE SAMPLED:	2018-11-20		2018-11-20		2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733234	RDL	9733235	RDL	9733236
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1270	2	2360	2	951
pH	pH Units		NA	2018-11-27	2018-11-27	7.96	NA	7.91	NA	8.06
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	788	20	1380	20	472
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	433	5	417	5	270
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-26	2018-11-26	0.44	0.5	<0.5	0.25	0.95
Chloride	mg/L		0.50	2018-11-26	2018-11-26	20.1	1.0	553	0.50	140
Nitrate as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.5	<0.5	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.5	<0.5	0.25	<0.25
Bromide	mg/L		0.25	2018-11-26	2018-11-26	<0.25	0.5	2.2	0.25	<0.25
Sulphate	mg/L		0.50	2018-11-26	2018-11-26	280	1.0	72.0	0.50	<0.50
Calcium	mg/L		0.25	2018-11-28	2018-11-28	101	0.25	172	0.25	16.6
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	74.0	0.25	76.9	0.25	5.39
Sodium	mg/L		0.25	2018-11-28	2018-11-28	58.7	0.25	162	0.25	170
Potassium	mg/L		0.25	2018-11-28	2018-11-28	1.34	0.25	3.17	0.25	1.60

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					SAMPLE DESCRIPTION:	GW-44985-112018-DD-45D				GW-44985-112018-DD-45S
					SAMPLE TYPE:	Water				Water
					DATE SAMPLED:	2018-11-20				2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733237	RDL	Date Prepared	Date Analyzed	9733238
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	3500	2	2018-11-27	2018-11-27	924
pH	pH Units		NA	2018-11-27	2018-11-27	8.36	NA	2018-11-27	2018-11-27	7.83
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	1850	20	2018-11-26	2018-11-27	508
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	899	5	2018-11-27	2018-11-27	403
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	0.002	2018-11-27	2018-11-27	<0.002
Fluoride	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	2018-11-27	2018-11-27	<0.25
Chloride	mg/L		2.0	2018-11-26	2018-11-26	634	0.50	2018-11-27	2018-11-27	30.2
Nitrate as N	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	2018-11-27	2018-11-27	<0.25
Nitrite as N	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	2018-11-27	2018-11-27	<0.25
Bromide	mg/L		1.0	2018-11-26	2018-11-26	<1.0	0.25	2018-11-27	2018-11-27	<0.25
Sulphate	mg/L		2.0	2018-11-26	2018-11-26	<2.0	0.50	2018-11-27	2018-11-27	66.6
Calcium	mg/L		0.25	2018-11-28	2018-11-28	7.12	0.10	2018-11-28	2018-11-28	104
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	3.63	0.10	2018-11-28	2018-11-28	33.5
Sodium	mg/L		0.25	2018-11-28	2018-11-28	727	0.10	2018-11-28	2018-11-28	30.5
Potassium	mg/L		0.25	2018-11-28	2018-11-28	1.75	0.10	2018-11-28	2018-11-28	1.74

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Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

					SAMPLE DESCRIPTION:	GW-44985-112018-DD-62S	GW-44985-112018-DD-48D	GW-44985-112018-DD-48S	GW-44985-112018-DD-52B	GW-44985-112018-DD-52A	GW-44985-112018-DD-51B
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20	2018-11-20
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733239	9733240	9733241	9733242	9733243	9733244
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1020	1690	1040	1260	1760	1570
pH	pH Units		NA	2018-11-27	2018-11-27	7.94	8.18	8.04	8.14	8.02	8.00
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	606	850	596	762	1200	1060
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	328	366	399	435	552	436
Cyanide, Free	mg/L		0.002	2018-11-27	2018-11-27	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Fluoride	mg/L		0.25	2018-11-27	2018-11-27	0.43	0.98	0.51	0.69	<0.25	0.62
Chloride	mg/L		0.50	2018-11-27	2018-11-27	32.5	325	21.5	9.46	21.5	18.1
Nitrate as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nitrite as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bromide	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L		0.50	2018-11-27	2018-11-27	184	<0.50	167	295	499	464
Calcium	mg/L		0.25	2018-11-28	2018-11-28	93.5	24.2	103	108	185	133
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	39.2	8.65	55.0	68.1	111	85.4
Sodium	mg/L		0.25	2018-11-28	2018-11-28	56.2	311	36.1	66.2	48.6	85.1
Potassium	mg/L		0.25	2018-11-28	2018-11-28	2.42	2.11	2.33	2.94	1.58	3.38

Certified By: Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO CHARTERED AMANJOT BHELA CHEMIST

Certificate of Analysis

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PROJECT: 44985 (PO#73507870-1)

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					SAMPLE DESCRIPTION:	GW-44985-112018-DD-51A	GW-44985-112018-DD-50B		GW-44985-112018-DD-50A		GW-44985-112118-DD-35S
					SAMPLE TYPE:	Water	Water		Water		Water
					DATE SAMPLED:	2018-11-20	2018-11-20		2018-11-20		2018-11-21
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733245	9733246	RDL	9733247	RDL	9733248
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1280	1000	2	1610	2	1420
pH	pH Units		NA	2018-11-27	2018-11-27	7.94	7.92	NA	7.88	NA	7.91
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	866	604	20	1140	20	1010
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	313	472	5	412	5	332
Cyanide, Free	mg/L		0.002	2018-11-28	2018-11-28	<0.002	<0.002	0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-27	2018-11-27	0.44	<0.25	0.50	<0.50	0.25	<0.25
Chloride	mg/L		0.50	2018-11-27	2018-11-27	10.9	5.11	1.00	15.9	0.50	7.83
Nitrate as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	0.50	<0.50	0.25	<0.25
Nitrite as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	0.50	<0.50	0.25	<0.25
Bromide	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	0.50	<0.50	0.25	<0.25
Sulphate	mg/L		0.50	2018-11-27	2018-11-27	420	106	2.0	561	1.0	536
Calcium	mg/L		0.25	2018-11-28	2018-11-28	130	147	0.25	173	0.25	168
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	71.6	37.8	0.25	89.2	0.25	73.9
Sodium	mg/L		0.25	2018-11-28	2018-11-28	35.5	10.6	0.25	50.4	0.25	32.4
Potassium	mg/L		0.25	2018-11-28	2018-11-28	2.41	2.51	0.25	2.99	0.25	3.25

Certified By: Amanjot Bhela

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ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23

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					SAMPLE DESCRIPTION:	GW-44985-112118-DD-35D	GW-44985-112118-DD-DUP3	GW-44985-112118-DD-53S	GW-44985-112118-DD-53D	GW-44985-112118-DD-32S	GW-44985-112118-DD-32D
					SAMPLE TYPE:	Water	Water	Water	Water	Water	Water
					DATE SAMPLED:	2018-11-21	2018-11-21	2018-11-21	2018-11-21	2018-11-21	2018-11-21
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733249	9733250	9733251	9733252	9733253	9733254
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1480	1520	1340	1660	1280	1420
pH	pH Units		NA	2018-11-27	2018-11-27	8.07	8.12	8.02	8.03	8.00	7.99
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	738	690	932	774	878	682
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	274	288	405	291	355	244
Cyanide, Free	mg/L		0.002	2018-11-28	2018-11-28	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Fluoride	mg/L		0.25	2018-11-27	2018-11-27	0.73	0.67	<0.25	0.84	<0.25	0.87
Chloride	mg/L		0.50	2018-11-27	2018-11-27	299	327	4.10	340	9.23	294
Nitrate as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nitrite as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bromide	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L		0.50	2018-11-27	2018-11-27	<0.50	<0.50	402	<0.50	393	<0.50
Calcium	mg/L		0.25	2018-11-28	2018-11-28	20.7	20.5	181	25.4	171	21.4
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	7.39	7.58	62.9	9.25	60.6	7.80
Sodium	mg/L		0.25	2018-11-28	2018-11-28	258	283	18.7	284	22.8	242
Potassium	mg/L		0.25	2018-11-28	2018-11-28	1.84	1.86	0.77	2.21	2.14	2.15

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Inorganic Chemistry - Ground Water Samples

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					SAMPLE DESCRIPTION:	GW-44985-112118-DD-30D		GW-44985-112118-DD-30		
					SAMPLE TYPE:	Water		Water		
					DATE SAMPLED:	2018-11-21		2018-11-21		
Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733255	RDL	9733256	RDL	Date Prepared
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1250	2	880	2	2018-11-27
pH	pH Units		NA	2018-11-27	2018-11-27	8.10	NA	8.14	NA	2018-11-27
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	606	20	502	20	2018-11-26
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	258	5	386	5	2018-11-27
Cyanide, Free	mg/L		0.002	2018-11-28	2018-11-28	<0.002	0.002	<0.002	0.002	2018-11-29
Fluoride	mg/L		0.25	2018-11-27	2018-11-27	0.79	0.25	0.62	0.25	2018-11-27
Chloride	mg/L		0.50	2018-11-27	2018-11-27	240	0.50	4.42	0.50	2018-11-27
Nitrate as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	0.25	<0.25	0.25	2018-11-27
Nitrite as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	0.25	<0.25	0.25	2018-11-27
Bromide	mg/L		0.25	2018-11-27	2018-11-27	<0.25	0.25	<0.25	0.25	2018-11-27
Sulphate	mg/L		0.50	2018-11-27	2018-11-27	<0.50	0.50	117	0.50	2018-11-27
Calcium	mg/L		0.25	2018-11-28	2018-11-28	20.9	0.05	76.0	0.25	2018-11-28
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	7.83	0.05	49.3	0.25	2018-11-28
Sodium	mg/L		0.25	2018-11-28	2018-11-28	213	0.05	35.5	0.25	2018-11-28
Potassium	mg/L		0.25	2018-11-28	2018-11-28	2.47	0.05	1.63	0.25	2018-11-28

Certified By: Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
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DATE RECEIVED: 2018-11-23
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Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-112118-DD-41D	GW-44985-112118-DD-41S	GW-44985-112118-DD-PW2	GW-44985-112118-DD-DUP4	RDL	GW-44985-112118-DD-EW2C
					SAMPLE TYPE:	Water	Water	Water	Water		Water
					DATE SAMPLED:	2018-11-21	2018-11-21	2018-11-21	2018-11-21		2018-11-21
						9733257	9733258	9733259	9733260		9733261
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	1170	1640	1570	1580	2	731
pH	pH Units		NA	2018-11-27	2018-11-27	8.08	7.99	8.12	8.17	NA	8.14
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	574	1090	760	780	20	358
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	293	506	330	326	5	228
Cyanide, Free	mg/L		0.002	2018-11-29	2018-11-29	<0.002	<0.002	<0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.25	2018-11-27	2018-11-27	0.76	<0.25	0.54	0.55	0.10	0.98
Chloride	mg/L		0.50	2018-11-27	2018-11-27	197	32.9	296	297	0.20	94.2
Nitrate as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	0.10	<0.10
Nitrite as N	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	0.10	<0.10
Bromide	mg/L		0.25	2018-11-27	2018-11-27	<0.25	<0.25	<0.25	<0.25	0.10	0.94
Sulphate	mg/L		0.50	2018-11-27	2018-11-27	<0.50	434	3.76	3.61	0.20	0.82
Calcium	mg/L		0.25	2018-11-28	2018-11-28	15.8	207	15.9	15.8	0.05	31.4
Magnesium	mg/L		0.25	2018-11-28	2018-11-28	5.43	75.7	7.24	7.18	0.05	14.1
Sodium	mg/L		0.25	2018-11-28	2018-11-28	215	46.6	287	287	0.05	89.7
Potassium	mg/L		0.25	2018-11-28	2018-11-28	1.45	1.76	1.94	1.88	0.05	2.33

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Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	GW-44985-112218-DD-EW2B	RDL	GW-44985-112218-DD-EW1C	GW-44985-112218-DD-EW1B	GW-44985-112218-DD-PW1
					SAMPLE TYPE:	Water		Water	Water	Water
					DATE SAMPLED:	2018-11-22		2018-11-22	2018-11-22	2018-11-22
						9733262		9733263	9733264	9733265
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	746	2	1720	1740	1490
pH	pH Units		NA	2018-11-27	2018-11-27	8.09	NA	8.08	8.07	8.25
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	370	20	912	910	746
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	232	5	298	286	330
Cyanide, Free	mg/L		0.002	2018-11-29	2018-11-29	<0.002	0.002	<0.002	<0.002	<0.002
Fluoride	mg/L		0.10	2018-11-27	2018-11-27	1.02	0.25	0.79	0.91	0.39
Chloride	mg/L		0.20	2018-11-27	2018-11-27	95.0	0.50	303	312	267
Nitrate as N	mg/L		0.10	2018-11-27	2018-11-27	<0.10	0.25	<0.25	<0.25	<0.25
Nitrite as N	mg/L		0.10	2018-11-27	2018-11-27	<0.10	0.25	<0.25	<0.25	<0.25
Bromide	mg/L		0.10	2018-11-27	2018-11-27	1.03	0.25	2.67	2.93	<0.25
Sulphate	mg/L		0.20	2018-11-27	2018-11-27	3.74	0.50	116	125	6.60
Calcium	mg/L		0.05	2018-11-28	2018-11-28	33.2	0.25	80.3	83.1	13.4
Magnesium	mg/L		0.05	2018-11-28	2018-11-28	14.5	0.25	46.2	47.1	4.98
Sodium	mg/L		0.05	2018-11-28	2018-11-28	91.1	0.25	174	179	279
Potassium	mg/L		0.05	2018-11-28	2018-11-28	2.44	0.25	4.69	4.80	2.51

Certified By: Amanjot Bhela

CHARTERED CHEMIST AMANJOT BHELA — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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Certificate of Analysis

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)

CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
SAMPLING SITE:
SAMPLED BY:

Inorganic Chemistry - Ground Water Samples

DATE RECEIVED: 2018-11-23
DATE REPORTED: 2019-01-21

Parameter	Unit	G / S	RDL	Date Prepared	Date Analyzed	9733266	9733267	9733268
					SAMPLE DESCRIPTION:	GW-44985-112218-DD-FB1	GW-44985-112218-DD-FB2	GW-44985-112218-DD-FB3
					SAMPLE TYPE:	Water	Water	Water
					DATE SAMPLED:	2018-11-22	2018-11-22	2018-11-22
Electrical Conductivity	µS/cm		2	2018-11-27	2018-11-27	<2	<2	<2
pH	pH Units		NA	2018-11-27	2018-11-27	5.57	5.07	4.99
Total Dissolved Solids	mg/L		20	2018-11-26	2018-11-27	<20	<20	<20
Alkalinity (as CaCO3)	mg/L		5	2018-11-27	2018-11-27	<5	<5	<5
Cyanide, Free	mg/L		0.002	2018-11-29	2018-11-29	<0.002	<0.002	<0.002
Fluoride	mg/L		0.05	2018-11-27	2018-11-27	<0.05	<0.05	<0.05
Chloride	mg/L		0.10	2018-11-27	2018-11-27	<0.10	<0.10	<0.10
Nitrate as N	mg/L		0.05	2018-11-27	2018-11-27	<0.05	<0.05	<0.05
Nitrite as N	mg/L		0.05	2018-11-27	2018-11-27	<0.05	<0.05	<0.05
Bromide	mg/L		0.05	2018-11-27	2018-11-27	<0.05	<0.05	<0.05
Sulphate	mg/L		0.10	2018-11-27	2018-11-27	<0.10	<0.10	<0.10
Calcium	mg/L		0.05	2018-11-28	2018-11-28	0.09	<0.05	<0.05
Magnesium	mg/L		0.05	2018-11-28	2018-11-28	<0.05	<0.05	<0.05
Sodium	mg/L		0.05	2018-11-28	2018-11-28	0.08	<0.05	<0.05
Potassium	mg/L		0.05	2018-11-28	2018-11-28	<0.05	<0.05	<0.05

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

9733203-9733204 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

9733205 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences. Value reported for Sodium was confirmed by re-analysis.

9733206-9733265 Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Amanjot Bhela

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 44985 (PO#73507870-1)
SAMPLING SITE:

AGAT WORK ORDER: 18T413071
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Water Analysis

RPT Date: Jan 21, 2019

PARAMETER	Batch	Sample Id	DUPLICATE Dup #1	DUPLICATE Dup #2	DUPLICATE RPD	Method Blank	REFERENCE MATERIAL Measured Value	REFERENCE MATERIAL Acceptable Limits Lower	REFERENCE MATERIAL Acceptable Limits Upper	METHOD BLANK SPIKE Recovery	METHOD BLANK SPIKE Acceptable Limits Lower	METHOD BLANK SPIKE Acceptable Limits Upper	MATRIX SPIKE Recovery	MATRIX SPIKE Acceptable Limits Lower	MATRIX SPIKE Acceptable Limits Upper
Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733203	9733203	718	723	0.7%	< 2	95%	80%	120%						
pH	9733203	9733203	7.97	7.90	0.9%	NA	99%	90%	110%						
Total Dissolved Solids	9733203	9733203	390	406	4.0%	< 20	100%	80%	120%						
Alkalinity (as CaCO3)	9733203	9733203	308	309	0.3%	< 5	108%	80%	120%						
Cyanide, Free	9733203	9733203	< 0.002	<0.002	NA	< 0.002	103%	90%	110%	99%	90%	110%	90%	70%	130%
Fluoride	9733208	9733208	< 0.5	<0.5	NA	< 0.05	105%	90%	110%	96%	90%	110%	103%	80%	120%
Chloride	9733208	9733208	412	431	4.5%	< 0.10	94%	90%	110%	100%	90%	110%	94%	80%	120%
Nitrate as N	9733208	9733208	< 0.5	<0.5	NA	< 0.05	97%	90%	110%	104%	90%	110%	107%	80%	120%
Nitrite as N	9733208	9733208	< 0.5	<0.5	NA	< 0.05	NA	90%	110%	100%	90%	110%	95%	80%	120%
Bromide	9733208	9733208	< 0.5	<0.5	NA	< 0.05	107%	90%	110%	103%	90%	110%	93%	80%	120%
Sulphate	9733208	9733208	< 1.0	<1.0	NA	< 0.10	96%	90%	110%	101%	90%	110%	106%	80%	120%
Calcium	9733203	9733203	83.7	83.9	0.2%	< 0.05	96%	90%	110%	100%	90%	110%	94%	70%	130%
Magnesium	9733203	9733203	23.1	23.5	1.7%	< 0.05	95%	90%	110%	97%	90%	110%	96%	70%	130%
Sodium	9733203	9733203	27.1	27.2	0.4%	< 0.05	96%	90%	110%	97%	90%	110%	97%	70%	130%
Potassium	9733203	9733203	1.71	1.70	0.6%	< 0.05	98%	90%	110%	96%	90%	110%	97%	70%	130%
Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733204	9733204	1220	1220	0.0%	< 2	109%	80%	120%						
pH	9733204	9733204	8.13	8.03	1.2%	NA	99%	90%	110%						
Total Dissolved Solids	9733222	9733222	2570	2640	2.5%	< 20	100%	80%	120%						
Alkalinity (as CaCO3)	9733204	9733204	271	272	0.4%	< 5	101%	80%	120%						
Cyanide, Free	9733223	9733223	< 0.002	< 0.002	NA	< 0.002	95%	90%	110%	99%	90%	110%	93%	70%	130%
Fluoride	9733225	9733225	< 0.5	<0.5	NA	< 0.05	105%	90%	110%	96%	90%	110%	111%	80%	120%
Chloride	9733225	9733225	58.6	52.9	10.2%	< 0.10	94%	90%	110%	100%	90%	110%	103%	80%	120%
Nitrate as N	9733225	9733225	< 0.5	<0.5	NA	< 0.05	97%	90%	110%	104%	90%	110%	106%	80%	120%
Nitrite as N	9733225	9733225	< 0.5	<0.5	NA	< 0.05	NA	90%	110%	100%	90%	110%	101%	80%	120%
Bromide	9733225	9733225	< 0.5	<0.5	NA	< 0.05	107%	90%	110%	103%	90%	110%	106%	80%	120%
Sulphate	9733225	9733225	585	514	12.9%	< 0.10	96%	90%	110%	101%	90%	110%	104%	80%	120%
Calcium	9733228	9733228	20.7	21.0	1.4%	< 0.05	99%	90%	110%	100%	90%	110%	94%	70%	130%
Magnesium	9733228	9733228	6.99	7.14	2.1%	< 0.05	97%	90%	110%	97%	90%	110%	96%	70%	130%
Sodium	9733228	9733228	173	176	1.7%	< 0.05	97%	90%	110%	97%	90%	110%	97%	70%	130%
Potassium	9733228	9733228	1.42	1.39	2.1%	< 0.05	96%	90%	110%	96%	90%	110%	97%	70%	130%
Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733223	9733223	1220	1230	0.8%	< 2	94%	80%	120%						
pH	9733223	9733223	8.04	7.96	1.0%	NA	99%	90%	110%						
Total Dissolved Solids	9733241	9733241	596	620	3.9%	< 20	102%	80%	120%						
Alkalinity (as CaCO3)	9733223	9733223	494	493	0.2%	< 5	100%	80%	120%						
Cyanide, Free	9733243	9733243	< 0.002	< 0.002	NA	< 0.002	101%	90%	110%	105%	90%	110%	95%	70%	130%
Fluoride	9733246	9733246	< 0.25	<0.25	NA	< 0.05	105%	90%	110%	100%	90%	110%	101%	80%	120%
Chloride	9733246	9733246	5.11	5.44	6.3%	< 0.10	94%	90%	110%	102%	90%	110%	99%	80%	120%

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 44985 (PO#73507870-1)
SAMPLING SITE:

AGAT WORK ORDER: 18T413071
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jan 21, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Nitrate as N	9733246	9733246	< 0.25	<0.25	NA	< 0.05	97%	90%	110%	107%	90%	110%	106%	80%	120%
Nitrite as N	9733246	9733246	< 0.25	<0.25	NA	< 0.05	NA	90%	110%	98%	90%	110%	93%	80%	120%
Bromide	9733246	9733246	< 0.25	<0.25	NA	< 0.05	107%	90%	110%	104%	90%	110%	92%	80%	120%
Sulphate	9733246	9733246	106	107	0.9%	< 0.10	96%	90%	110%	104%	90%	110%	108%	80%	120%
Calcium	9733256	9733256	76.0	75.4	0.8%	< 0.05	100%	90%	110%	100%	90%	110%	95%	70%	130%
Magnesium	9733256	9733256	49.3	49.0	0.6%	< 0.05	97%	90%	110%	97%	90%	110%	97%	70%	130%
Sodium	9733256	9733256	35.5	35.8	0.8%	< 0.05	97%	90%	110%	96%	90%	110%	97%	70%	130%
Potassium	9733256	9733256	1.63	1.62	0.6%	< 0.05	95%	90%	110%	95%	90%	110%	96%	70%	130%
Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733242	9733242	1260	1270	0.8%	< 2	92%	80%	120%						
pH	9733242	9733242	8.14	8.05	1.1%	NA	100%	90%	110%						
Total Dissolved Solids	9733260	9733260	780	770	1.3%	< 20	102%	80%	120%						
Alkalinity (as CaCO3)	9733242	9733242	435	438	0.7%	< 5	102%	80%	120%						
Cyanide, Free	9733257	9733257	< 0.002	< 0.002	NA	< 0.002	101%	90%	110%	100%	90%	110%	100%	70%	130%
Fluoride	9733257	9733257	0.76	0.76	0.0%	< 0.05	105%	90%	110%	96%	90%	110%	96%	80%	120%
Chloride	9733257	9733257	197	197	0.0%	< 0.10	91%	90%	110%	100%	90%	110%	100%	80%	120%
Nitrate as N	9733257	9733257	< 0.25	<0.25	NA	< 0.05	93%	90%	110%	104%	90%	110%	106%	80%	120%
Nitrite as N	9733257	9733257	< 0.25	<0.25	NA	< 0.05	NA	90%	110%	100%	90%	110%	103%	80%	120%
Bromide	9733257	9733257	< 0.25	<0.25	NA	< 0.05	105%	90%	110%	103%	90%	110%	108%	80%	120%
Sulphate	9733257	9733257	< 0.50	<0.50	NA	< 0.10	94%	90%	110%	101%	90%	110%	105%	80%	120%
Calcium	9733262	9733262	33.2	33.1	0.3%	< 0.05	100%	90%	110%	96%	90%	110%	94%	70%	130%
Magnesium	9733262	9733262	14.5	14.6	0.7%	< 0.05	97%	90%	110%	96%	90%	110%	97%	70%	130%
Sodium	9733262	9733262	91.1	90.6	0.6%	< 0.05	97%	90%	110%	95%	90%	110%	96%	70%	130%
Potassium	9733262	9733262	2.44	2.47	1.2%	< 0.05	95%	90%	110%	97%	90%	110%	96%	70%	130%
Ammonia (Water)															
Ammonia as N	9733203	9733203	< 0.02	<0.02	NA	< 0.02	96%	90%	110%	107%	90%	110%	98%	80%	120%
Ammonia (Water)															
Ammonia as N	9733219	9733219	< 0.02	<0.02	NA	< 0.02	106%	90%	110%	92%	90%	110%	97%	80%	120%
Ammonia (Water)															
Ammonia as N	9733246	9733246	< 0.02	<0.02	NA	< 0.02	100%	90%	110%	92%	90%	110%	96%	80%	120%
Dissolved Metals (Water)															
Arsenic	9733203	9733203	< 0.003	<0.003	NA	< 0.003	103%	90%	110%	103%	90%	110%	108%	70%	130%
Barium	9733203	9733203	0.038	0.038	0.0%	< 0.002	103%	90%	110%	102%	90%	110%	101%	70%	130%
Boron	9733203	9733203	0.052	0.052	0.0%	< 0.010	102%	90%	110%	103%	90%	110%	104%	70%	130%
Cadmium	9733203	9733203	< 0.001	<0.001	NA	< 0.001	101%	90%	110%	104%	90%	110%	103%	70%	130%
Chromium	9733203	9733203	0.003	0.003	NA	< 0.003	102%	90%	110%	100%	90%	110%	104%	70%	130%
Iron	9733203	9733203	< 0.010	<0.010	NA	< 0.010	98%	90%	110%	100%	90%	110%	93%	70%	130%
Lead	9733203	9733203	< 0.001	<0.001	NA	< 0.001	95%	90%	110%	101%	90%	110%	94%	70%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 44985 (PO#73507870-1)
SAMPLING SITE:

AGAT WORK ORDER: 18T413071
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jan 21, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper
Nickel	9733203	9733203	< 0.003	<0.003	NA	< 0.003	107%	90%	110%	105%	90%	110%	100%	70%	130%
Zinc	9733203	9733203	< 0.005	<0.005	NA	< 0.005	98%	90%	110%	97%	90%	110%	96%	70%	130%
Calcium-dissolved	9733215	9733215	14.5	14.5	0.0%	< 0.05	97%	90%	110%	98%	90%	110%	99%	70%	130%
Magnesium-dissolved	9733215	9733215	4.83	4.93	2.0%	< 0.05	96%	90%	110%	98%	90%	110%	102%	70%	130%
Sodium-dissolved	9733215	9733215	157	158	0.6%	< 0.05	95%	90%	110%	95%	90%	110%	99%	70%	130%
Potassium-dissolved	9733215	9733215	1.74	1.76	1.1%	< 0.05	97%	90%	110%	97%	90%	110%	99%	70%	130%

Comments: PI note - Sample used for Matrix spike was GW-44985-111918-DD-43D (9733024).

Dissolved Metals (Water)

PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Lower	Upper	Recovery	Lower	Upper	Recovery	Lower	Upper
Arsenic	9733223	9733223	<0.003	<0.003	NA	< 0.003	103%	90%	110%	105%	90%	110%	119%	70%	130%
Barium	9733223	9733223	0.040	0.041	3.1%	< 0.002	99%	90%	110%	100%	90%	110%	96%	70%	130%
Boron	9733223	9733223	0.102	0.101	1.6%	< 0.010	110%	90%	110%	109%	90%	110%	112%	70%	130%
Cadmium	9733223	9733223	<0.001	<0.001	NA	< 0.001	103%	90%	110%	109%	90%	110%	129%	70%	130%
Chromium	9733223	9733223	0.003	<0.003	NA	< 0.003	101%	90%	110%	103%	90%	110%	105%	70%	130%
Iron	9733223	9733223	<0.010	<0.010	NA	< 0.010	109%	90%	110%	112%	90%	110%	98%	70%	130%
Lead	9733223	9733223	<0.001	<0.001	NA	< 0.001	99%	90%	110%	104%	90%	110%	94%	70%	130%
Nickel	9733223	9733223	<0.003	<0.003	NA	< 0.003	104%	90%	110%	109%	90%	110%	102%	70%	130%
Zinc	9733223	9733223	<0.005	<0.005	NA	< 0.005	100%	90%	110%	101%	90%	110%	101%	70%	130%
Calcium-dissolved	9733243	9733243	165	157	5.1%	< 0.05	95%	90%	110%	95%	90%	110%	89%	70%	130%
Magnesium-dissolved	9733243	9733243	100	95.4	5.2%	< 0.05	95%	90%	110%	95%	90%	110%	92%	70%	130%
Sodium-dissolved	9733243	9733243	45.5	43.2	5.2%	< 0.05	96%	90%	110%	96%	90%	110%	91%	70%	130%
Potassium-dissolved	9733243	9733243	1.44	1.32	8.8%	< 0.05	94%	90%	110%	94%	90%	110%	88%	70%	130%

Comments: PI note - Sample used for Matrix spike was GW-44985-111918-DD-DUP1 (9733224).

Dissolved Metals (Water)

PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Lower	Upper	Recovery	Lower	Upper	Recovery	Lower	Upper
Arsenic	9733243	9733243	<0.003	<0.003	NA	< 0.003	101%	90%	110%	101%	90%	110%	108%	70%	130%
Barium	9733243	9733243	0.017	0.016	2.4%	< 0.002	102%	90%	110%	100%	90%	110%	96%	70%	130%
Boron	9733243	9733243	0.258	0.258	0.0%	< 0.010	99%	90%	110%	103%	90%	110%	93%	70%	130%
Cadmium	9733243	9733243	<0.001	<0.001	NA	< 0.001	101%	90%	110%	103%	90%	110%	119%	70%	130%
Chromium	9733243	9733243	<0.003	<0.003	NA	< 0.003	101%	90%	110%	104%	90%		103%	70%	130%
Iron	9733243	9733243	<0.010	<0.010	NA	< 0.010	97%	90%	110%	104%	90%	110%	100%	70%	130%
Lead	9733243	9733243	<0.001	<0.001	NA	< 0.001	95%	90%	110%	100%	90%	110%	95%	70%	130%
Nickel	9733243	9733243	<0.003	<0.003	NA	< 0.003	102%	90%	110%	106%	90%	110%	98%	70%	130%
Zinc	9733243	9733243	<0.005	<0.005	NA	< 0.005	96%	90%	110%	100%	90%	110%	104%	70%	130%
Calcium-dissolved	9733263	9733263	69.1	66.7	3.6%	< 0.05	96%	90%	110%	95%	90%	110%	88%	70%	130%
Magnesium-dissolved	9733263	9733263	41.0	39.0	4.9%	< 0.05	97%	90%	110%	96%	90%	110%	91%	70%	130%
Sodium-dissolved	9733263	9733263	156	151	3.3%	< 0.05	96%	90%	110%	96%	90%	110%	90%	70%	130%
Potassium-dissolved	9733263	9733263	3.98	3.78	5.3%	< 0.05	95%	90%	110%	94%	90%	110%	88%	70%	130%

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Quality Assurance

CLIENT NAME: GHD LIMITED
PROJECT: 44985 (PO#73507870-1)
SAMPLING SITE:

AGAT WORK ORDER: 18T413071
ATTENTION TO: Jennifer Balkwill
SAMPLED BY:

Water Analysis (Continued)

RPT Date: Jan 21, 2019			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper	Recovery	Acceptable Limits Lower	Acceptable Limits Upper

Comments: Pl note - Sample used for Matrix spike was GW-44985-112018-DD-51B (9733244).

Dissolved Metals (Water)															
Arsenic	9733263	9733263	<0.003	<0.003	NA	< 0.003	102%	90%	110%	99%	90%	110%	106%	70%	130%
Barium	9733263	9733263	0.043	0.044	1.5%	< 0.002	102%	90%	110%	102%	90%	110%	93%	70%	130%
Boron	9733263	9733263	1.10	1.14	2.7%	< 0.010	100%	90%	110%	95%	90%	110%	104%	70%	130%
Cadmium	9733263	9733263	<0.001	<0.001	NA	< 0.001	99%	90%	110%	102%	90%	110%	100%	70%	130%
Chromium	9733263	9733263	0.004	0.003	NA	< 0.003	101%	90%	110%	101%	90%	110%	101%	70%	130%
Iron	9733263	9733263	0.512	0.520	1.4%	< 0.010	97%	90%	110%	98%	90%	110%	100%	70%	130%
Lead	9733263	9733263	<0.001	0.004	NA	< 0.001	97%	90%	110%	97%	90%	110%	92%	70%	130%
Nickel	9733263	9733263	<0.003	<0.003	NA	< 0.003	103%	90%	110%	101%	90%	110%	100%	70%	130%
Zinc	9733263	9733263	<0.005	<0.005	NA	< 0.005	98%	90%	110%	97%	90%	110%	101%	70%	130%
Calcium-dissolved	9733223	9733223	148	145	2.0%	< 0.05	94%	90%	110%	96%	90%	110%	88%	70%	130%
Magnesium-dissolved	9733223	9733223	46.9	45.1	3.9%	< 0.05	95%	90%	110%	95%	90%	110%	89%	70%	130%
Sodium-dissolved	9733223	9733223	17.2	16.6	3.6%	< 0.05	96%	90%	110%	96%	90%	110%	88%	70%	130%
Potassium-dissolved	9733223	9733223	0.51	0.49	4.0%	< 0.05	96%	90%	110%	99%	90%	110%	87%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the Reporting Limit (RL), the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.
Pl note - Sample used for Matrix spike was GW-44985-112218-DD-EW1B (9733264).

Certified By: Amanjot Bhela

CHARTERED AMANJOT BHELA CHEMIST — ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO

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QA Violation

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 18T413071

PROJECT: 44985 (PO#73507870-1)

ATTENTION TO: Jennifer Balkwill

RPT Date: Jan 21, 2019			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Sample Description	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
				Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Metals (Water)											
Iron	9733223	GW-44985-111918-DD-43D	109%	90%	110%	112%	90%	110%	98%	70%	130%

Comments: PI note - Sample used for Matrix spike was GW-44985-111918-DD-DUP1 (9733224).

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Method Summary

CLIENT NAME: GHD LIMITED

AGAT WORK ORDER: 18T413071

PROJECT: 44985 (PO#73507870-1)

ATTENTION TO: Jennifer Balkwill

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Calcium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium-dissolved	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Cyanide, Free	INOR-93-6052	MOE CN-3015 & SM 4500 CN- I	TECHNICON AUTO ANALYZER
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES

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: 18 18T413071

AGAT Job Number:

Notes:

Client Information

Company:	GHD Ltd.
Contact:	Laura Ermeta
Address:	651 Colby Drive, Waterloo Ontario
	N2V 1C2
Phone:	519-884-0510 Fax: 519-725-1394
PO#:	73507870-1
Client Project #:	44985
AGAT Quotation #:	

Report Information

1. Name: Laura Ermeta
   Email: Laura.Ermeta@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

☐ Single sample per page
☐ Multiple samples per page
☐ Results by Fax

Turnaround Time (TAT)*

(Please "x" the applicable box below)

Regular TAT:

☒ 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 ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium	Alcias Nosanic		
GW-44985-11 18-BS	11/14/18		water	5				X			X	X	X					X		
GW-44985-11 18-RD	↓	↓	water	4				↓				↓	↓					↓		
GW-44985-11 18-RD	↓	↓	water	4				↓				↓	↓					↓		
GW-44985-11 18-RS	↓	↓	water	5				↓			X	↓	↓					↓		
GW-44985-11 18-SS	↓	↓	water	5				↓			X	↓	↓					↓		
GW-44985-11 18-SD	↓	↓	water	4				↓				↓	↓					↓		
GW-44985-11 18-SS	↓	↓	water	5				↓			X	↓	↓					↓		
GW-44985-11 18-SD	↓	↓	water	4				↓				↓	↓					↓		
GW-44985-11 18-SS	↓	↓	water	5				↓			X	↓	↓					↓		
GW-44985-11 18-SS	↓	↓	water	5				↓			X	↓	↓					↓		
GW-44985-11 18-SD	↓	↓	water	4				↓				↓	↓					↓		

TOTAL # OF CONTAINERS 50

* 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
Dan Alum	11/15/18		
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time

Special Instructions Cations Field Filtered For All GW

Page 1 of 6

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:

AGAT Job Number:

Notes:

Client Information

Company: GHD Ltd.

Contact: Laura Ermeta

Address: 651 Colby Drive, Waterloo Ontario

N2V 1C2

Phone: 519-884-0510 Fax: 519-725-1394

PO#: 73507870-1

Client Project #: 44985

AGAT Quotation #:

Report Information

1. Name: Laura Ermeta
   Email: Laura.Ermeta@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

☐ Single sample per page

☐ 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 ☐ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium	Vanadium
GW-44985-11_~~18-~~595	1/11918		water	5				X			X	X	X					X
GW-44985-11_~~18-~~591			water	4														
GW-44985-11_~~18-~~32 IV			water	5							X							
GW-44985-11_~~18-~~[illegible]			water	4														
GW-44985-11_~~18-~~[illegible]			water	5							X							
GW-44985-11_~~18-~~[illegible]			water	5							X							
GW-44985-11_~~18-~~[illegible]			water	5							X							
GW-44985-11_~~18-~~[illegible]			water	4														
GW-44985-11_~~18-~~[illegible]			water	4														
GW-44985-11_~~18-~~21 II			water	5							X							
GW-44985-11_~~18-~~DUP1			water	5							X							
TOTAL # OF CONTAINERS				51														

* 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
[signature]	11/9/18		
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time

Special Instructions

Page 2 of 6

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:
AGAT Job Number:
Notes:

Client Information

Company: GHD Ltd.
Contact: Laura Ermeta
Address: 651 Colby Drive, Waterloo Ontario
N2V 1C2
Phone: 519-884-0510 Fax: 519-725-1394
PO#: 73507870-1
Client Project #: 44985
AGAT Quotation #:

Report Information

1. Name: Laura Ermeta
Email: Laura.Ermeta@ghd.com
2. Name:
Email:
3. Name:
Email:
4. Name:
Email:

Report Format

(Please "x" those that apply)
☐ Single sample per page
☐ 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 ☐ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium	Various [illegible]		
GW-44985-11__18-22	11/19/18		water	5				X			X	X	X					X		
GW-44985-11__18-615	11/20/18		water	5				X			X	X	X					X		
GW-44985-11__18-617			water	5				X			X	X	X					X		
GW-44985-11__18-[illegible]			water	4				X				X	X					X		
GW-44985-11__18-DUP2			water	5				X			X	X	X					X		
GW-44985-11__18-[illegible]			water	4				X				X	X					X		
GW-44985-11__18-[illegible]			water	4				X				X	X					X		
GW-44985-11__18-[illegible]			water	4				X				X	X					X		
GW-44985-11__18-[illegible]			water	5				X			X	X	X					X		
GW-44985-11__18-95			water	5				X			X	X	X					X		
GW-44985-11__18-633			water	5				X			X	X	X					X		

TOTAL # OF CONTAINERS [illegible]

* 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
[illegible signature]	11/23/18		

Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time

Special Instructions

Page 3 of 6

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:

AGAT Job Number:

Notes:

Client Information

Company: GHD Ltd.

Contact: Laura Ermeta

Address: 651 Colby Drive, Waterloo Ontario

N2V 1C2

Phone: 519-884-0510 Fax: 519-725-1394

PO#: 73507870-1

Client Project #: 44985

AGAT Quotation #:

Report Information

1. Name: Laura Ermeta

Email: Laura.Ermeta@ghd.com

2. Name:

Email:

3. Name:

Email:

4. Name:

Email:

Report Format

(Please "x" those that apply)

☐ Single sample per page

☐ Multiple samples per page

☐ Results by Fax

Turnaround Time (TAT)*

(Please "x" the applicable box below)

Regular TAT:

☒ 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 ☐ Other (indicate)

Is this a drinking water sample (potable water intended for human consumption)? ☐ Yes ☒ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium	Metals/Inorganics		
GW-44985-11_18-5D	11/20/18		water	4				X				X	X					X		
GW-44985-11_18-5D			water	4																
GW-44985-11_18-5S			water	5							X									
GW-44985-11_18-2S			water	5							X									
GW-44985-11_18-8D			water	5																
GW-44985-11_18-4S			water	5							X									
GW-44985-11_18-1B			water	5							X									
GW-44985-11_18-4A			water	5							X									
GW-44985-11_18-3B			water	5							X									
GW-44985-11_18-3A			water	5							X									
GW-44985-11_18-6B			water	5							X									

TOTAL # OF CONTAINERS 52

* 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
Dave Ame	11/23/18		
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time

Special Instructions

Page 4 of 6

Page 48 of 50

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:

AGAT Job Number:

Notes:

Client Information

Company: GHD Ltd.

Contact: Laura Ermeta

Address: 651 Colby Drive, Waterloo Ontario

N2V 1C2

Phone: 519-884-0510 Fax: 519-725-1394

PO#: 73507870-1

Client Project #: 44985

AGAT Quotation #:

Report Information

1. Name: Laura Ermeta

Email: Laura.Ermeta@ghd.com

2. Name:

Email:

3. Name:

Email:

4. Name:

Email:

Report Format

(Please "x" those that apply)

☐ Single sample per page

☐ 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 ☐ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium	[illegible]		
GW-44985-11__18-[illegible]	1/20/18		water	5				X			X	X	X					X		
GW-44985-11__18-[illegible]	1/21/18		water	5							X									
GW-44985-11__18-[illegible]			water	4																
GW-44985-11__18-[illegible]			water	4																
GW-44985-11__18-[illegible]			water	5							X									
GW-44985-11__18-[illegible]			water	4																
GW-44985-11__18-[illegible]			water	5							X									
GW-44985-11__18-[illegible]			water	4																
GW-44985-11__18-[illegible]			water	4																
GW-44985-11__18-[illegible]			water	5							X									
GW-44985-11__18-[illegible]			water	4																
TOTAL # OF CONTAINERS				49																

* 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
[illegible signature]	1/23/18		
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time

Special Instructions

Page 5 of 6

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

AGAT Laboratories

CHAIN OF CUSTODY RECORD

LABORATORY USE ONLY

Arrival Condition: ☐ Good ☐ Poor (complete "Notes")

Arrival Temperature:

AGAT Job Number:

Notes:

Client Information

Company:	GHD Ltd.
Contact:	Laura Ermeta
Address:	651 Colby Drive, Waterloo Ontario
	N2V 1C2
Phone:	519-884-0510 Fax: 519-725-1394
PO#:	73507870-1
Client Project #:	44985
AGAT Quotation #:	

Report Information

1. Name: Laura Ermeta
   Email: Laura.Ermeta@ghd.com
2. Name:
   Email:
3. Name:
   Email:
4. Name:
   Email:

Report Format

(Please "x" those that apply)

☐ Single sample per page
☐ 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 ☐ 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	pH	Conductivity	TDS	Alkalinity	Anions	Ammonia	Cyanide	Cations	Mercury	VOCs	Dissolved Metals	Total Chromium	Various Metals		
GW-44985-4/5 BH...	1/23/18		water	5				X			X	X	X					X		
GW-44985-1/18-22			water	4				X				X	X					X		
GW-44985-11_18-24			water	4				X				X	X					X		
GW-44985-11_18-EW-2C			water	4				X				X	X					X		
GW-44985-11_18-EW-2B	1/22/18		water	4				X				X	X					X		
GW-44985-11_18-EW-1C			water	4				X				X	X					X		
GW-44985-11_18-EW-1B			water	4				X				X	X					X		
GW-44985-11_18-			water	4				X				X	X					X		
GW-44985-11_18-FB1			water	5				X			X	X	X					X		
GW-44985-11_18-FB2			water	5				X			X	X	X					X		
GW-44985-11_18-FB3			water	4				X				X	X					X		

TOTAL # OF CONTAINERS: 47

* 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
Dani Dam	1/23/18			
Sample Relinquished By (print name & sign)	Date/Time	Samples Received By (print name and sign)	Date/Time	Page 6 of 6

AGAT Laboratories

Sample Temperature Log

Client: GHD

COC# or Work Order #:

# of Coolers: 8

# of Submissions:

Arrival Temperatures - Branch/Driver			
Cooler #1:	1.0	1.1	1.2
Cooler #2:	-0.9	1.1	-0.7
Cooler #3:	-0.2	-0.1	0.7
Cooler #4:	1.1	3.2	0.1
Cooler #5:	1.0	-0.9	-0.7
Cooler #6:	2.1	-0.6	0.4
Cooler #7:	0.9	0.1	-0.1
Cooler #8	0.7	-0.5	-0.2
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By: [signature]

Date (yyyy/mm/dd): 2018/11/23 Time: 1:30 AM / PM

Arrival Temperatures - Laboratory			
Cooler #1:	0.9	0.9	0.9
Cooler #2:	0.6	0.9	0.5
Cooler #3:	-0.1	-0.4	-0.5
Cooler #4:	-0.9	-1.1	-0.9
Cooler #5:	-0.7	-0.7	0.5
Cooler #6:	-0.1	-0.1	0.1
Cooler #7:	-0.8	0.9	-0.7
Cooler #8	-0.1	-0.3	-0.9
Cooler #9:			
Cooler #10:			

IR Gun ID:

Taken By: [signature]

Date (yyyy/mm/dd): 2018/11/23 Time: 7:00 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)

Document ID: SR-78-9511.003
Date Issued: 2017-2-23

Page:______ of ______

CERTIFICATE OF ANALYSIS

AGAT WORK ORDER: 18T413071
PROJECT: 44985 (PO#73507870-1)
CLIENT NAME: GHD LIMITED
ATTENTION TO: Jennifer Balkwill
DATE RECEIVED: Nov 23, 2018
DATE SAMPLED: Nov 19, 2018
DATE REPORTED: Jan 21, 2019

PACKAGE INFORMATION:

Work Sheet Name	Sample Ty	Guideline / Standard	Package Name
X01	Water		Ammonia (Water)
X02	Water		Dissolved Metals (Water)
X03	Water		Inorganic Chemistry - Ground Water Samples

Ammonia (Water)

Sample Description				**GW-44985-111918-DD-43S**	**GW-44985-111918-DD-42S**	**GW-44985-111918-DD-55S**	**GW-44985-111918-DD-57S**	**GW-44985-111918-DD-58S**	**GW-44985-111918-DD-56S**	**GW-44985-111918-DD-59S**	**GW-44985-111918-DD-32IV**	**GW-44985-111918-DD-46S**
Date Sampled				**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9733203**	**9733206**	**9733207**	**9733209**	**9733211**	**9733212**	**9733214**	**9733216**	**9733218**
Ammonia as N	mg/L		0.02	<0.02	<0.02	<0.02	1.02	<0.02	<0.02	<0.02	<0.02	<0.02

Sample Description				**GW-44985-111918-DD-46I**	**GW-44985-111918-DD-40S**	**GW-44985-111918-DD-21II**	**GW-44985-111918-DD-DUP1**	**GW-44985-111918-DD-22**	**GW-44985-112018-DD-61S**	**GW-44985-112018-DD-61I**	**GW-44985-112018-DD-DUP2**	**GW-44985-112018-DD-39I**
Date Sampled				**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9733219**	**9733220**	**9733223**	**9733224**	**9733225**	**9733226**	**9733227**	**9733229**	**9733233**
Ammonia as N	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Comments:
Analysis performed at AGAT Toronto

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

Ammonia (Water)

Sample Description				**GW-44985-112018-DD-39S**	**GW-44985-112018-DD-63S**	**GW-44985-112018-DD-45S**	**GW-44985-112018-DD-62S**	**GW-44985-112018-DD-48S**	**GW-44985-112018-DD-52B**	**GW-44985-112018-DD-52A**	**GW-44985-112018-DD-51B**	**GW-44985-112018-DD-51A**	**GW-44985-112018-DD-50B**	**GW-44985-112018-DD-50A**	**GW-44985-112118-DD-35S**	**GW-44985-112118-DD-53S**	**GW-44985-112118-DD-32S**	**GW-44985-112118-DD-30**	**GW-44985-112118-DD-41S**	**GW-44985-112218-DD-FB1**	**GW-44985-112218-DD-FB2**
Date Sampled				**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/21/2018**	**11/21/2018**	**11/21/2018**	**11/21/2018**	**11/21/2018**	**11/22/2018**	**11/22/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9733234**	**9733235**	**9733238**	**9733239**	**9733241**	**9733242**	**9733243**	**9733244**	**9733245**	**9733246**	**9733247**	**9733248**	**9733251**	**9733253**	**9733256**	**9733258**	**9733266**	**9733267**
Ammonia as N	mg/L		0.02	<0.02	<0.02	<0.02	0.40	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.48	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Comments:
Analysis performed at AGAT Toronto

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

Dissolved Metals (Water)

Sample Description				GW-44985-111918-DD-43S		GW-44985-111918-DD-43D		GW-44985-111918-DD-49D		GW-44985-111918-DD-42S	GW-44985-111918-DD-55S	GW-44985-111918-DD-55D	GW-44985-111918-DD-57S	GW-44985-111918-DD-57D	GW-44985-111918-DD-58S	GW-44985-111918-DD-56S	GW-44985-111918-DD-56D	
Date Sampled				**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	
Parameter	**Unit**	**G / S**	**RDL**	**9733203**	**RDL**	**9733204**	**RDL**	**9733205**	**RDL**	**9733206**	**9733207**	**9733208**	**9733209**	**9733210**	**9733211**	**9733212**	**9733213**	**RDL**
Arsenic	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003
Barium	mg/L		0.002	0.038	0.002	0.167	0.002	0.082	0.002	0.017	0.014	0.193	0.032	0.101	0.011	0.012	0.120	0.002
Boron	mg/L		0.010	0.052	0.010	1.40	0.010	1.25	0.010	0.175	0.203	1.79	0.140	2.17	0.319	0.403	2.11	0.010
Cadmium	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
Chromium	mg/L		0.003	0.003	0.003	0.009	0.003	0.006	0.003	0.004	0.003	0.016	0.007	0.017	0.012	0.006	0.011	0.003
Iron	mg/L		0.010	<0.010	0.010	0.512	0.010	0.030	0.010	<0.010	0.016	0.331	<0.010	2.23	<0.010	0.023	0.983	0.010
Lead	mg/L		0.001	<0.001	0.001	0.001	0.001	<0.001	0.001	<0.001	<0.001	0.002	<0.001	0.001	0.001	<0.001	0.001	0.001
Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	0.005	<0.003	<0.003	<0.003	<0.003	0.005	0.004	<0.003	0.003
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
Calcium-dissolved	mg/L		0.05	83.2	0.25	22.4	0.05	19.6	0.25	331	120	18.4	130	18.4	261	232	20.6	0.10
Magnesium-dissolved	mg/L		0.05	23.4	0.25	8.59	0.05	5.48	0.25	154	58.3	6.14	76.1	7.13	211	116	7.47	0.10
Sodium-dissolved	mg/L		0.05	26.6	0.25	191	0.05	144	0.25	54.8	44.0	294	57.2	349	107	74.5	247	0.10
Potassium-dissolved	mg/L		0.05	1.58	0.25	1.54	0.05	1.34	0.25	3.25	2.69	2.81	2.64	1.71	5.01	3.40	1.89	0.10

Comments:
9733203-9733268

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised: Jan 16, 2019
Revision: This report replaces the Certificate of Analysis issued on Nov 30, 2018.It has been revised to include the comment regarding the SampID of the Matrix Spike.

Dissolved Metals (Water)

Sample Description				GW-44985-111918-DD-59S		GW-44985-111918-DD-59D		GW-44985-111918-DD-32IV		GW-44985-111918-DD-46D	GW-44985-111918-DD-46S	GW-44985-111918-DD-46I	GW-44985-111918-DD-40S	GW-44985-111918-DD-40D		GW-44985-111918-DD-47D		GW-44985-111918-DD-21II
Date Sampled				**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**	**11/19/2018**		**11/19/2018**		**11/19/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9733214**	**RDL**	**9733215**	**RDL**	**9733216**	**RDL**	**9733217**	**9733218**	**9733219**	**9733220**	**9733221**	**RDL**	**9733222**	**RDL**	**9733223**
Arsenic	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.004	0.003	<0.003
Barium	mg/L		0.002	0.037	0.002	0.093	0.002	0.019	0.002	0.088	0.019	0.031	0.026	0.190	0.002	1.47	0.002	0.040
Boron	mg/L		0.010	0.144	0.010	1.26	0.010	0.079	0.010	1.81	2.93	0.150	0.209	1.76	0.010	3.01	0.010	0.102
Cadmium	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001
Chromium	mg/L		0.003	0.005	0.003	0.008	0.003	0.004	0.003	0.011	0.005	0.005	0.005	0.011	0.003	0.026	0.003	0.003
Iron	mg/L		0.010	<0.010	0.010	0.438	0.010	<0.010	0.010	0.423	<0.010	0.372	<0.010	1.35	0.010	1.78	0.010	<0.010
Lead	mg/L		0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	0.001	<0.001
Nickel	mg/L		0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003
Zinc	mg/L		0.005	<0.005	0.005	<0.005	0.005	<0.005	0.005	0.007	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005
Calcium-dissolved	mg/L		0.05	84.7	0.05	14.5	0.10	68.8	0.25	13.3	178	128	97.7	26.0	0.5	51.0	0.25	148
Magnesium-dissolved	mg/L		0.05	45.1	0.05	4.83	0.10	36.3	0.25	4.61	80.4	75.3	70.0	9.91	0.5	23.6	0.25	46.9
Sodium-dissolved	mg/L		0.05	21.6	0.05	157	0.10	30.1	0.25	201	78.5	41.9	44.1	223	0.5	776	0.25	17.2
Potassium-dissolved	mg/L		0.05	2.00	0.05	1.74	0.10	0.68	0.25	1.57	8.07	1.50	2.01	2.11	0.5	3.2	0.25	0.51

Comments:

9733203-9733268

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised: Jan 16, 2019
Revision: This report replaces the Certificate of Analysis issued on Nov 30, 2018.It has been revised to include the comment regarding the SampID of the Matrix Spike.

Dissolved Metals (Water)

Sample Description				**GW-44985-111918-DD-DUP1**	**GW-44985-111918-DD-22**	**GW-44985-112018-DD-61S**	**GW-44985-112018-DD-61I**		**GW-44985-112018-DD-61D**		**GW-44985-112018-DD-DUP2**		**GW-44985-112018-DD-22D**		**GW-44985-112018-DD-60D**	**GW-44985-112018-DD-39D**	**GW-44985-112018-DD-39I**	**GW-44985-112018-DD-39S**
Date Sampled				**11/19/2018**	**11/19/2018**	**11/20/2018**	**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9733224**	**9733225**	**9733226**	**9733227**	**RDL**	**9733228**	**RDL**	**9733229**	**RDL**	**9733230**	**RDL**	**9733231**	**9733232**	**9733233**	**9733234**
Arsenic	mg/L		0.003	<0.003	<0.003	<0.003	<0.003	0.003	0.003	0.003	<0.003	0.003	0.006	0.003	0.004	<0.003	0.003	<0.003
Barium	mg/L		0.002	0.040	0.018	0.035	0.046	0.002	0.047	0.002	0.044	0.002	0.353	0.002	0.213	0.118	0.027	0.026
Boron	mg/L		0.010	0.099	0.215	0.331	0.132	0.010	1.59	0.010	0.148	0.010	4.42	0.010	3.13	1.76	0.160	0.259
Cadmium	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	<0.003	0.005	0.004	<0.003	0.003	0.008	0.003	0.003	0.003	0.019	0.003	0.015	0.011	<0.003	<0.003
Iron	mg/L		0.010	<0.010	<0.010	<0.010	<0.010	0.010	0.055	0.010	<0.010	0.010	0.054	0.010	0.247	0.371	0.794	<0.010
Lead	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	0.003	0.004	0.003	0.006	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	<0.005	0.010	<0.005	<0.005	0.005	<0.005	0.005	0.006	0.005	0.010	0.005	<0.005	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.05	137	132	108	101	0.10	18.0	0.25	98.8	0.5	30.1	0.25	21.1	21.8	83.7	89.2
Magnesium-dissolved	mg/L		0.05	43.3	91.1	55.8	48.4	0.10	6.39	0.25	47.5	0.5	12.7	0.25	8.00	6.20	93.4	66.4
Sodium-dissolved	mg/L		0.05	15.7	72.8	55.5	27.3	0.10	168	0.25	26.4	0.5	872	0.25	498	220	59.7	49.6
Potassium-dissolved	mg/L		0.05	0.67	1.82	1.78	0.73	0.10	1.30	0.25	0.62	0.5	2.3	0.25	1.76	1.39	1.03	1.04

Comments:

9733203-9733268

Analysis performed at AGAT Toronto

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Revised: Jan 16, 2019
Revision: This report replaces the Certificate of Analysis issued on Nov 30, 2018.It has been revised to include the comment regarding the SampID of the Matrix Spike.

Dissolved Metals (Water)

Sample Description				GW-44985-112018-DD-63S	GW-44985-112018-DD-54D	GW-44985-112018-DD-45D		GW-44985-112018-DD-45S		GW-44985-112018-DD-62S	GW-44985-112018-DD-48D	GW-44985-112018-DD-48S	GW-44985-112018-DD-52B	GW-44985-112018-DD-52A	GW-44985-112018-DD-51B	GW-44985-112018-DD-51A	GW-44985-112018-DD-50B	GW-44985-112018-DD-50A
Date Sampled				11/20/2018	11/20/2018	11/20/2018		11/20/2018		11/20/2018	11/20/2018	11/20/2018	11/20/2018	11/20/2018	11/20/2018	11/20/2018	11/20/2018	11/20/2018
Parameter	**Unit**	**G / S**	**RDL**	**9733235**	**9733236**	**9733237**	**RDL**	**9733238**	**RDL**	**9733239**	**9733240**	**9733241**	**9733242**	**9733243**	**9733244**	**9733245**	**9733246**	**9733247**
Arsenic	mg/L		0.003	<0.003	<0.003	0.016	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	0.117	0.103	0.130	0.002	0.056	0.002	0.037	0.168	0.035	0.015	0.017	0.022	0.044	0.018	0.012
Boron	mg/L		0.010	0.283	1.52	2.56	0.010	0.074	0.010	0.186	1.98	0.229	0.264	0.258	0.381	0.184	0.119	0.350
Cadmium	mg/L		0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	0.016	0.008	0.034	0.003	0.007	0.003	0.005	0.011	0.006	0.004	<0.003	<0.003	<0.003	<0.003	<0.003
Iron	mg/L		0.010	<0.010	0.234	<0.010	0.010	<0.010	0.010	<0.010	0.521	<0.010	<0.010	<0.010	0.044	<0.010	0.361	<0.010
Lead	mg/L		0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	0.084	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.006	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.05	146	14.4	5.43	0.10	94.3	0.25	79.6	20.9	89.4	91.9	165	115	120	130	149
Magnesium-dissolved	mg/L		0.05	67.2	4.77	3.31	0.10	31.6	0.25	34.4	7.45	50.0	58.1	100	72.2	65.0	37.5	78.4
Sodium-dissolved	mg/L		0.05	138	150	705	0.10	28.0	0.25	48.3	260	32.9	57.2	45.5	72.3	32.2	11.3	43.4
Potassium-dissolved	mg/L		0.05	2.90	1.24	1.42	0.10	1.50	0.25	1.95	1.90	1.80	2.34	1.44	2.89	2.01	2.37	2.39

Comments:

9733203-9733268

Analysis performed at AGAT Toronto

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Revised: Jan 16, 2019
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Dissolved Metals (Water)

Sample Description				GW-44985-112118-DD-35S	GW-44985-112118-DD-35D	GW-44985-112118-DD-DUP3	GW-44985-112118-DD-53S	GW-44985-112118-DD-53D	GW-44985-112118-DD-32S	GW-44985-112118-DD-32D	GW-44985-112118-DD-30D		GW-44985-112118-DD-30		GW-44985-112118-DD-41D	GW-44985-112118-DD-41S	GW-44985-112118-DD-PW2	GW-44985-112118-DD-DUP4
Date Sampled				11/21/2018	11/21/2018	11/21/2018	11/21/2018	11/21/2018	11/21/2018	11/21/2018	11/21/2018		11/21/2018		11/21/2018	11/21/2018	11/21/2018	11/21/2018
Parameter	**Unit**	**G / S**	**RDL**	**9733248**	**9733249**	**9733250**	**9733251**	**9733252**	**9733253**	**9733254**	**9733255**	**RDL**	**9733256**	**RDL**	**9733257**	**9733258**	**9733259**	**9733260**
Arsenic	mg/L		0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	0.025	0.113	0.116	0.032	0.171	0.026	0.133	0.294	0.002	0.028	0.002	0.075	0.027	0.122	0.125
Boron	mg/L		0.010	0.260	1.55	1.53	0.153	1.56	0.187	1.32	1.44	0.010	0.103	0.010	1.59	0.144	2.08	2.05
Cadmium	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	<0.003	0.006	0.005	<0.003	0.006	<0.003	0.004	0.005	0.003	<0.003	0.003	0.005	0.003	0.005	0.005
Iron	mg/L		0.010	<0.010	0.663	0.660	<0.010	0.557	<0.010	0.591	0.397	0.010	<0.010	0.010	0.171	<0.010	0.139	0.127
Lead	mg/L		0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.013	0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.003	<0.003	0.003	<0.003	0.004	<0.003	<0.003
Zinc	mg/L		0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.098	0.005	<0.005	0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.05	146	19.1	19.3	161	23.1	151	19.9	18.9	0.05	74.0	0.25	13.0	179	14.6	14.0
Magnesium-dissolved	mg/L		0.05	66.0	6.43	6.38	58.6	8.22	54.1	6.93	6.89	0.05	49.4	0.25	4.55	65.5	6.81	6.40
Sodium-dissolved	mg/L		0.05	28.7	208	207	17.1	249	20.2	217	182	0.05	35.7	0.25	181	41.0	270	258
Potassium-dissolved	mg/L		0.05	2.31	1.57	1.29	0.95	1.74	1.49	1.94	1.97	0.05	1.57	0.25	1.29	1.39	1.84	1.83

Comments:
9733203-9733268

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised: Jan 16, 2019
Revision: This report replaces the Certificate of Analysis issued on Nov 30, 2018.It has been revised to include the comment regarding the SampID of the Matrix Spike.

Dissolved Metals (Water)

Sample Description					**GW-44985-112118-DD-EW2C**	**GW-44985-112218-DD-EW2B**		**GW-44985-112218-DD-EW1C**	**GW-44985-112218-DD-EW1B**	**GW-44985-112218-DD-PW1**		**GW-44985-112218-DD-FB1**	**GW-44985-112218-DD-FB2**	**GW-44985-112218-DD-FB3**
Date Sampled					**11/21/2018**	**11/22/2018**		**11/22/2018**	**11/22/2018**	**11/22/2018**		**11/22/2018**	**11/22/2018**	**11/22/2018**
Parameter	**Unit**	**G / S**	**RDL**	**RDL**	**9733261**	**9733262**	**RDL**	**9733263**	**9733264**	**9733265**	**RDL**	**9733266**	**9733267**	**9733268**
Arsenic	mg/L		0.003	0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Barium	mg/L		0.002	0.002	0.128	0.112	0.002	0.043	0.044	0.084	0.002	<0.002	<0.002	<0.002
Boron	mg/L		0.010	0.010	1.10	1.07	0.010	1.10	1.12	1.29	0.010	<0.010	<0.010	<0.010
Cadmium	mg/L		0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Chromium	mg/L		0.003	0.003	<0.003	0.003	0.003	0.004	<0.003	0.003	0.003	<0.003	<0.003	<0.003
Iron	mg/L		0.010	0.010	0.012	0.036	0.010	0.512	0.644	0.265	0.010	<0.010	<0.010	<0.010
Lead	mg/L		0.001	0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001
Nickel	mg/L		0.003	0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003	0.003	<0.003	<0.003	<0.003
Zinc	mg/L		0.005	0.005	<0.005	<0.005	0.005	<0.005	<0.005	0.006	0.005	<0.005	<0.005	<0.005
Calcium-dissolved	mg/L		0.05	0.05	30.2	31.7	0.25	69.1	70.5	10.8	0.05	<0.05	<0.05	<0.05
Magnesium-dissolved	mg/L		0.05	0.05	13.9	14.2	0.25	41.0	40.6	4.17	0.05	<0.05	<0.05	<0.05
Sodium-dissolved	mg/L		0.05	0.05	87.9	89.1	0.25	156	157	243	0.05	0.07	<0.05	<0.05
Potassium-dissolved	mg/L		0.05	0.05	2.22	2.27	0.25	3.98	4.08	1.88	0.05	<0.05	<0.05	<0.05

Comments:

9733203-9733268

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.
Revised: Jan 16, 2019
Revision: This report replaces the Certificate of Analysis issued on Nov 30, 2018.It has been revised to include the comment regarding the SampID of the Matrix Spike.

Inorganic Chemistry - Ground Water Samples

Sample Description				GW-44985-111918-DD-43S		GW-44985-111918-DD-43D		GW-44985-111918-DD-49D		GW-44985-111918-DD-42S		GW-44985-111918-DD-55S		GW-44985-111918-DD-55D		GW-44985-111918-DD-57S	
Date Sampled				**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**	
Parameter	**Unit**	**G / S**	**RDL**	**9733203**	**RDL**	**9733204**	**RDL**	**9733205**	**RDL**	**9733206**	**RDL**	**9733207**	**RDL**	**9733208**	**RDL**	**9733209**	**RDL**
Electrical Conductivity	µS/cm		2	718	2	1220	2	756	2	2950	2	1300	2	1790	2	1580	2
pH	pH Units		NA	7.97	NA	8.13	NA	7.95	NA	7.78	NA	7.90	NA	8.26	NA	7.98	NA
Total Dissolved Solids	mg/L		20	390	20	592	20	378	20	2500	20	856	20	890	20	1010	20
Alkalinity (as CaCO3)	mg/L		5	308	5	271	5	256	5	354	5	325	5	292	5	550	5
Cyanide, Free	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002
Fluoride	mg/L		0.10	0.16	0.25	0.62	0.10	1.09	1.0	<1.0	0.25	0.40	0.5	<0.5	0.25	0.52	0.5
Chloride	mg/L		0.20	12.0	0.50	223	0.20	89.0	2.0	37.1	0.50	14.3	1.0	412	0.50	19.1	1.0
Nitrate as N	mg/L		0.10	<0.10	0.25	<0.25	0.10	<0.10	1.0	<1.0	0.25	<0.25	0.5	<0.5	0.25	<0.25	0.5
Nitrite as N	mg/L		0.10	<0.10	0.25	<0.25	0.10	<0.10	1.0	<1.0	0.25	<0.25	0.5	<0.5	0.25	<0.25	0.5
Bromide	mg/L		0.10	<0.10	0.25	<0.25	0.10	0.57	1.0	<1.0	0.25	<0.25	0.5	<0.5	0.25	<0.25	0.5
Sulphate	mg/L		0.20	66.8	0.50	<0.50	0.20	<0.20	2.0	1660	0.50	444	1.0	<1.0	0.50	427	1.0
Calcium	mg/L		0.05	83.7	0.25	24.4	0.05	19.9	0.25	405	0.25	136	0.25	20.2	0.25	164	0.25
Magnesium	mg/L		0.05	23.1	0.25	9.10	0.05	5.20	0.25	189	0.25	62.3	0.25	7.14	0.25	94.5	0.25
Sodium	mg/L		0.05	27.1	0.25	207	0.05	129	0.25	64.4	0.25	48.2	0.25	338	0.25	64.0	0.25
Potassium	mg/L		0.05	1.71	0.25	1.69	0.05	1.28	0.25	4.23	0.25	2.93	0.25	3.15	0.25	3.50	0.25

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Inorganic Chemistry - Ground Water Samples

Sample Description				GW-44985-111918-DD-57D		GW-44985-111918-DD-58S		GW-44985-111918-DD-56S		GW-44985-111918-DD-56D		GW-44985-111918-DD-59S		GW-44985-111918-DD-59D		GW-44985-111918-DD-32IV	
Date Sampled				**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**		**11/19/2018**	
Parameter	**Unit**	**G / S**	**RDL**	**9733210**	**RDL**	**9733211**	**RDL**	**9733212**	**RDL**	**9733213**	**RDL**	**9733214**	**RDL**	**9733215**	**RDL**	**9733216**	**RDL**
Electrical Conductivity	µS/cm		2	1900	2	3200	2	2250	2	1500	2	915	2	876	2	936	2
pH	pH Units		NA	8.02	NA	7.90	NA	7.87	NA	8.13	NA	7.99	NA	8.01	NA	8.03	NA
Total Dissolved Solids	mg/L		20	966	20	2450	20	1790	20	754	20	514	20	436	20	522	20
Alkalinity (as CaCO3)	mg/L		5	371	5	481	5	347	5	345	5	390	5	270	5	379	5
Cyanide, Free	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002
Fluoride	mg/L		0.10	<0.5	1.0	<1.0	0.5	<0.5	0.25	0.69	0.25	0.60	0.25	1.01	0.25	<0.25	0.25
Chloride	mg/L		0.20	398	2.0	283	1.0	67.3	0.50	301	0.50	16.5	0.50	122	0.50	18.2	0.50
Nitrate as N	mg/L		0.10	<0.5	1.0	<1.0	0.5	<0.5	0.25	<0.25	0.25	0.32	0.25	<0.25	0.25	<0.25	0.25
Nitrite as N	mg/L		0.10	<0.5	1.0	<1.0	0.5	<0.5	0.25	<0.25	0.25	<0.25	0.25	<0.25	0.25	<0.25	0.25
Bromide	mg/L		0.10	<0.5	1.0	<1.0	0.5	<0.5	0.25	<0.25	0.25	<0.25	0.25	<0.25	0.25	<0.25	0.25
Sulphate	mg/L		0.20	<1.0	2.0	1190	2.0	1060	0.50	<0.50	0.50	108	0.50	<0.50	0.50	133	0.50
Calcium	mg/L		0.05	18.3	0.25	287	0.25	261	0.25	21.2	0.10	94.0	0.05	14.5	0.10	82.9	0.25
Magnesium	mg/L		0.05	6.69	0.25	224	0.25	129	0.25	7.77	0.10	50.3	0.05	4.86	0.10	45.9	0.25
Sodium	mg/L		0.05	351	0.25	117	0.25	80.2	0.25	273	0.10	25.0	0.05	158	0.10	42.6	0.25
Potassium	mg/L		0.05	1.81	0.25	5.37	0.25	3.75	0.25	2.43	0.10	2.25	0.05	1.79	0.10	0.92	0.25

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Inorganic Chemistry - Ground Water Samples

Sample Description				**GW-44985-111918-DD-46D**		**GW-44985-111918-DD-46S**		**GW-44985-111918-DD-46I**	**GW-44985-111918-DD-40S**	**GW-44985-111918-DD-40D**		**GW-44985-111918-DD-47D**		**GW-44985-111918-DD-21II**	**GW-44985-111918-DD-DUP1**		**GW-44985-111918-DD-22**
Date Sampled				**11/19/2018**		**11/19/2018**		**11/19/2018**	**11/19/2018**	**11/19/2018**		**11/19/2018**		**11/19/2018**	**11/19/2018**		**11/19/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9733217**	**RDL**	**9733218**	**RDL**	**9733219**	**9733220**	**9733221**	**RDL**	**9733222**	**RDL**	**9733223**	**9733224**	**RDL**	**9733225**
Electrical Conductivity	µS/cm		2	1210	2	1930	2	1460	1300	1440	2	5000	2	1220	1220	2	1800
pH	pH Units		NA	7.98	NA	7.90	NA	7.92	8.13	7.96	NA	8.23	NA	8.04	7.92	NA	7.96
Total Dissolved Solids	mg/L		20	630	20	1450	20	960	874	716	20	2570	20	812	760	20	1220
Alkalinity (as CaCO3)	mg/L		5	320	5	354	5	406	415	254	5	623	5	494	495	5	487
Cyanide, Free	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.10	0.79	0.5	<0.5	0.25	<0.25	0.66	0.67	2.5	<2.5	0.25	<0.25	<0.25	0.5	<0.5
Chloride	mg/L		0.20	205	1.0	25.6	0.50	40.1	19.7	309	5.0	1260	0.50	5.34	5.24	1.0	58.6
Nitrate as N	mg/L		0.10	<0.25	0.5	<0.5	0.25	<0.25	<0.25	<0.25	2.5	<2.5	0.25	<0.25	<0.25	0.5	<0.5
Nitrite as N	mg/L		0.10	<0.25	0.5	<0.5	0.25	<0.25	<0.25	<0.25	2.5	<2.5	0.25	<0.25	<0.25	0.5	<0.5
Bromide	mg/L		0.10	<0.25	0.5	<0.5	0.25	<0.25	<0.25	<0.25	2.5	<2.5	0.25	<0.25	<0.25	0.5	<0.5
Sulphate	mg/L		0.20	<0.50	1.0	820	0.50	429	348	<0.50	5.0	<5.0	0.50	257	249	1.0	585
Calcium	mg/L		0.05	17.0	0.25	208	0.25	145	111	27.7	0.5	63.2	0.25	175	175	0.25	156
Magnesium	mg/L		0.05	5.03	0.25	90.6	0.25	83.6	79.5	10.2	0.5	27.0	0.25	53.0	52.3	0.25	104
Sodium	mg/L		0.05	235	0.25	95.9	0.25	48.8	50.9	240	0.5	933	0.25	19.1	19.4	0.25	84.7
Potassium	mg/L		0.05	1.76	0.25	8.65	0.25	1.68	2.20	2.06	0.5	4.3	0.25	0.86	0.92	0.25	2.03

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Inorganic Chemistry - Ground Water Samples

Sample Description					**GW-44985-112018-DD-61S**	**GW-44985-112018-DD-61I**		**GW-44985-112018-DD-61D**		**GW-44985-112018-DD-DUP2**		**GW-44985-112018-DD-22D**		**GW-44985-112018-DD-60D**		**GW-44985-112018-DD-39D**	**GW-44985-112018-DD-39I**
Date Sampled					**11/20/2018**	**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**	**11/20/2018**
Parameter	**Unit**	**G / S**	**RDL**	**RDL**	**9733226**	**9733227**	**RDL**	**9733228**	**RDL**	**9733229**	**RDL**	**9733230**	**RDL**	**9733231**	**RDL**	**9733232**	**9733233**
Electrical Conductivity	µS/cm		2	2	1260	1070	2	1020	2	1060	2	4770	2	3100	2	1370	1480
pH	pH Units		NA	NA	7.96	7.91	NA	7.94	NA	7.99	NA	8.28	NA	8.07	NA	7.89	8.00
Total Dissolved Solids	mg/L		20	20	766	658	20	502	20	654	20	2510	20	1560	20	702	914
Alkalinity (as CaCO3)	mg/L		5	5	455	347	5	247	5	340	5	746	5	494	5	325	565
Cyanide, Free	mg/L		0.002	0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002
Fluoride	mg/L		0.10	0.25	0.44	<0.25	0.25	0.77	0.25	<0.25	2.5	<2.5	1.0	<1.0	0.25	0.90	0.58
Chloride	mg/L		0.20	0.50	18.8	22.0	0.50	143	0.50	22.2	5.0	1110	2.0	728	0.50	242	17.0
Nitrate as N	mg/L		0.10	0.25	<0.25	<0.25	0.25	<0.25	0.25	<0.25	2.5	<2.5	1.0	<1.0	0.25	<0.25	<0.25
Nitrite as N	mg/L		0.10	0.25	<0.25	<0.25	0.25	<0.25	0.25	<0.25	2.5	<2.5	1.0	<1.0	0.25	<0.25	<0.25
Bromide	mg/L		0.10	0.25	<0.25	<0.25	0.25	<0.25	0.25	<0.25	2.5	<2.5	1.0	<1.0	0.25	<0.25	<0.25
Sulphate	mg/L		0.20	0.50	262	243	0.50	38.8	0.50	246	5.0	<5.0	2.0	3.6	0.50	<0.50	324
Calcium	mg/L		0.05	0.25	118	112	0.10	20.7	0.25	114	0.5	33.8	0.25	24.9	0.25	23.6	103
Magnesium	mg/L		0.05	0.25	62.7	54.1	0.10	6.99	0.25	55.6	0.5	13.9	0.25	9.61	0.25	6.78	107
Sodium	mg/L		0.05	0.25	63.0	28.4	0.10	173	0.25	28.5	0.5	954	0.25	602	0.25	245	68.9
Potassium	mg/L		0.05	0.25	2.15	0.88	0.10	1.42	0.25	0.89	0.5	3.0	0.25	2.44	0.25	1.35	1.45

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Inorganic Chemistry - Ground Water Samples

Sample Description				**GW-44985-112018-DD-39S**		**GW-44985-112018-DD-63S**		**GW-44985-112018-DD-54D**		**GW-44985-112018-DD-45D**		**GW-44985-112018-DD-45S**		**GW-44985-112018-DD-62S**	**GW-44985-112018-DD-48D**	**GW-44985-112018-DD-48S**	**GW-44985-112018-DD-52B**
Date Sampled				**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**		**11/20/2018**	**11/20/2018**	**11/20/2018**	**11/20/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9733234**	**RDL**	**9733235**	**RDL**	**9733236**	**RDL**	**9733237**	**RDL**	**9733238**	**RDL**	**9733239**	**9733240**	**9733241**	**9733242**
Electrical Conductivity	µS/cm		2	1270	2	2360	2	951	2	3500	2	924	2	1020	1690	1040	1260
pH	pH Units		NA	7.96	NA	7.91	NA	8.06	NA	8.36	NA	7.83	NA	7.94	8.18	8.04	8.14
Total Dissolved Solids	mg/L		20	788	20	1380	20	472	20	1850	20	508	20	606	850	596	762
Alkalinity (as CaCO3)	mg/L		5	433	5	417	5	270	5	899	5	403	5	328	366	399	435
Cyanide, Free	mg/L		0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002
Fluoride	mg/L		0.10	0.44	0.5	<0.5	0.25	0.95	1.0	<1.0	0.25	<0.25	0.25	0.43	0.98	0.51	0.69
Chloride	mg/L		0.20	20.1	1.0	553	0.50	140	2.0	634	0.50	30.2	0.50	32.5	325	21.5	9.46
Nitrate as N	mg/L		0.10	<0.25	0.5	<0.5	0.25	<0.25	1.0	<1.0	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25
Nitrite as N	mg/L		0.10	<0.25	0.5	<0.5	0.25	<0.25	1.0	<1.0	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25
Bromide	mg/L		0.10	<0.25	0.5	2.2	0.25	<0.25	1.0	<1.0	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L		0.20	280	1.0	72.0	0.50	<0.50	2.0	<2.0	0.50	66.6	0.50	184	<0.50	167	295
Calcium	mg/L		0.05	101	0.25	172	0.25	16.6	0.25	7.12	0.10	104	0.25	93.5	24.2	103	108
Magnesium	mg/L		0.05	74.0	0.25	76.9	0.25	5.39	0.25	3.63	0.10	33.5	0.25	39.2	8.65	55.0	68.1
Sodium	mg/L		0.05	58.7	0.25	162	0.25	170	0.25	727	0.10	30.5	0.25	56.2	311	36.1	66.2
Potassium	mg/L		0.05	1.34	0.25	3.17	0.25	1.60	0.25	1.75	0.10	1.74	0.25	2.42	2.11	2.33	2.94

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Inorganic Chemistry - Ground Water Samples

Sample Description				GW-44985-112018-DD-52A	GW-44985-112018-DD-51B	GW-44985-112018-DD-51A	GW-44985-112018-DD-50B		GW-44985-112018-DD-50A		GW-44985-112118-DD-35S		GW-44985-112118-DD-35D	GW-44985-112118-DD-DUP3	GW-44985-112118-DD-53S	GW-44985-112118-DD-53D	GW-44985-112118-DD-32S
Date Sampled				11/20/2018	11/20/2018	11/20/2018	11/20/2018		11/20/2018		11/21/2018		11/21/2018	11/21/2018	11/21/2018	11/21/2018	11/21/2018
Parameter	**Unit**	**G / S**	**RDL**	**9733243**	**9733244**	**9733245**	**9733246**	**RDL**	**9733247**	**RDL**	**9733248**	**RDL**	**9733249**	**9733250**	**9733251**	**9733252**	**9733253**
Electrical Conductivity	µS/cm		2	1760	1570	1280	1000	2	1610	2	1420	2	1480	1520	1340	1660	1280
pH	pH Units		NA	8.02	8.00	7.94	7.92	NA	7.88	NA	7.91	NA	8.07	8.12	8.02	8.03	8.00
Total Dissolved Solids	mg/L		20	1200	1060	866	604	20	1140	20	1010	20	738	690	932	774	878
Alkalinity (as CaCO3)	mg/L		5	552	436	313	472	5	412	5	332	5	274	288	405	291	355
Cyanide, Free	mg/L		0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Fluoride	mg/L		0.10	<0.25	0.62	0.44	<0.25	0.50	<0.50	0.25	<0.25	0.25	0.73	0.67	<0.25	0.84	<0.25
Chloride	mg/L		0.20	21.5	18.1	10.9	5.11	1.00	15.9	0.50	7.83	0.50	299	327	4.10	340	9.23
Nitrate as N	mg/L		0.10	<0.25	<0.25	<0.25	<0.25	0.50	<0.50	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nitrite as N	mg/L		0.10	<0.25	<0.25	<0.25	<0.25	0.50	<0.50	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Bromide	mg/L		0.10	<0.25	<0.25	<0.25	<0.25	0.50	<0.50	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Sulphate	mg/L		0.20	499	464	420	106	2.0	561	1.0	536	0.50	<0.50	<0.50	402	<0.50	393
Calcium	mg/L		0.05	185	133	130	147	0.25	173	0.25	168	0.25	20.7	20.5	181	25.4	171
Magnesium	mg/L		0.05	111	85.4	71.6	37.8	0.25	89.2	0.25	73.9	0.25	7.39	7.58	62.9	9.25	60.6
Sodium	mg/L		0.05	48.6	85.1	35.5	10.6	0.25	50.4	0.25	32.4	0.25	258	283	18.7	284	22.8
Potassium	mg/L		0.05	1.58	3.38	2.41	2.51	0.25	2.99	0.25	3.25	0.25	1.84	1.86	0.77	2.21	2.14

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Inorganic Chemistry - Ground Water Samples

Sample Description				GW-44985-112118-DD-32D	GW-44985-112118-DD-30D		GW-44985-112118-DD-30		GW-44985-112118-DD-41D	GW-44985-112118-DD-41S	GW-44985-112118-DD-PW2	GW-44985-112118-DD-DUP4		GW-44985-112118-DD-EW2C	GW-44985-112218-DD-EW2B		GW-44985-112218-DD-EW1C
Date Sampled				11/21/2018	11/21/2018		11/21/2018		11/21/2018	11/21/2018	11/21/2018	11/21/2018		11/21/2018	11/22/2018		11/22/2018
Parameter	**Unit**	**G / S**	**RDL**	**9733254**	**9733255**	**RDL**	**9733256**	**RDL**	**9733257**	**9733258**	**9733259**	**9733260**	**RDL**	**9733261**	**9733262**	**RDL**	**9733263**
Electrical Conductivity	µS/cm		2	1420	1250	2	880	2	1170	1640	1570	1580	2	731	746	2	1720
pH	pH Units		NA	7.99	8.10	NA	8.14	NA	8.08	7.99	8.12	8.17	NA	8.14	8.09	NA	8.08
Total Dissolved Solids	mg/L		20	682	606	20	502	20	574	1090	760	780	20	358	370	20	912
Alkalinity (as CaCO3)	mg/L		5	244	258	5	386	5	293	506	330	326	5	228	232	5	298
Cyanide, Free	mg/L		0.002	<0.002	<0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.002	<0.002
Fluoride	mg/L		0.10	0.87	0.79	0.25	0.62	0.25	0.76	<0.25	0.54	0.55	0.10	0.98	1.02	0.25	0.79
Chloride	mg/L		0.20	294	240	0.50	4.42	0.50	197	32.9	296	297	0.20	94.2	95.0	0.50	303
Nitrate as N	mg/L		0.10	<0.25	<0.25	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	0.10	<0.10	<0.10	0.25	<0.25
Nitrite as N	mg/L		0.10	<0.25	<0.25	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	0.10	<0.10	<0.10	0.25	<0.25
Bromide	mg/L		0.10	<0.25	<0.25	0.25	<0.25	0.25	<0.25	<0.25	<0.25	<0.25	0.10	0.94	1.03	0.25	2.67
Sulphate	mg/L		0.20	<0.50	<0.50	0.50	117	0.50	<0.50	434	3.76	3.61	0.20	0.82	3.74	0.50	116
Calcium	mg/L		0.05	21.4	20.9	0.05	76.0	0.25	15.8	207	15.9	15.8	0.05	31.4	33.2	0.25	80.3
Magnesium	mg/L		0.05	7.80	7.83	0.05	49.3	0.25	5.43	75.7	7.24	7.18	0.05	14.1	14.5	0.25	46.2
Sodium	mg/L		0.05	242	213	0.05	35.5	0.25	215	46.6	287	287	0.05	89.7	91.1	0.25	174
Potassium	mg/L		0.05	2.15	2.47	0.05	1.63	0.25	1.45	1.76	1.94	1.88	0.05	2.33	2.44	0.25	4.69

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Inorganic Chemistry - Ground Water Samples

Sample Description Date Sampled Parameter	Unit	G / S	RDL	GW-44985-112218-DD-EW1B 11/22/2018 9733264	GW-44985-112218-DD-PW1 11/22/2018 9733265	RDL	GW-44985-112218-DD-FB1 11/22/2018 9733266	GW-44985-112218-DD-FB2 11/22/2018 9733267	GW-44985-112218-DD-FB3 11/22/2018 9733268
Electrical Conductivity	µS/cm		2	1740	1490	2	<2	<2	<2
pH	pH Units		NA	8.07	8.25	NA	5.57	5.07	4.99
Total Dissolved Solids	mg/L		20	910	746	20	<20	<20	<20
Alkalinity (as CaCO3)	mg/L		5	286	330	5	<5	<5	<5
Cyanide, Free	mg/L		0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002
Fluoride	mg/L		0.10	0.91	0.39	0.05	<0.05	<0.05	<0.05
Chloride	mg/L		0.20	312	267	0.10	<0.10	<0.10	<0.10
Nitrate as N	mg/L		0.10	<0.25	<0.25	0.05	<0.05	<0.05	<0.05
Nitrite as N	mg/L		0.10	<0.25	<0.25	0.05	<0.05	<0.05	<0.05
Bromide	mg/L		0.10	2.93	<0.25	0.05	<0.05	<0.05	<0.05
Sulphate	mg/L		0.20	125	6.60	0.10	<0.10	<0.10	<0.10
Calcium	mg/L		0.05	83.1	13.4	0.05	0.09	<0.05	<0.05
Magnesium	mg/L		0.05	47.1	4.98	0.05	<0.05	<0.05	<0.05
Sodium	mg/L		0.05	179	279	0.05	0.08	<0.05	<0.05
Potassium	mg/L		0.05	4.80	2.51	0.05	<0.05	<0.05	<0.05

Comments:

9733203-9733204

9733205

9733206-9733265

Analysis performed at AGAT Toronto

RDL - Reported Detection Limit; G / S - Guideline / Standard
Elevated RDLs indicate the degree of sample dilutions prior to analysis in order to keep the analytes within the calibration range of the instruments and to reduce matrix interferences.

Value reported for Sodium was confirmed by re-analysis.

Parameter	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Reference Material	Lower	Upper	Method Blank Spike	Lower	Upper	Matrix Spike	Lower	Upper
Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733203	9733203	718	723	0.7%	< 2	95%	80%	120%						
pH	9733203	9733203	7.97	7.90	0.9%	NA	99%	90%	110%						
Total Dissolved Solids	9733203	9733203	390	406	4.0%	< 20	100%	80%	120%						
Alkalinity (as CaCO3)	9733203	9733203	308	309	0.3%	< 5	108%	80%	120%						
Cyanide, Free	9733203	9733203	< 0.002	<0.002	NA	< 0.002	103%	90%	110%	99%	90%	110%	90%	70%	130%
Fluoride	9733208	9733208	< 0.5	<0.5	NA	< 0.05	105%	90%	110%	96%	90%	110%	103%	80%	120%
Chloride	9733208	9733208	412	431	4.5%	< 0.10	94%	90%	110%	100%	90%	110%	94%	80%	120%
Nitrate as N	9733208	9733208	< 0.5	<0.5	NA	< 0.05	97%	90%	110%	104%	90%	110%	107%	80%	120%
Nitrite as N	9733208	9733208	< 0.5	<0.5	NA	< 0.05	NA	90%	110%	100%	90%	110%	95%	80%	120%
Bromide	9733208	9733208	< 0.5	<0.5	NA	< 0.05	107%	90%	110%	103%	90%	110%	93%	80%	120%
Sulphate	9733208	9733208	< 1.0	<1.0	NA	< 0.10	96%	90%	110%	101%	90%	110%	106%	80%	120%
Calcium	9733203	9733203	83.7	83.9	0.2%	< 0.05	96%	90%	110%	100%	90%	110%	94%	70%	130%
Magnesium	9733203	9733203	23.1	23.5	1.7%	< 0.05	95%	90%	110%	97%	90%	110%	96%	70%	130%
Sodium	9733203	9733203	27.1	27.2	0.4%	< 0.05	96%	90%	110%	97%	90%	110%	97%	70%	130%
Potassium	9733203	9733203	1.71	1.70	0.6%	< 0.05	98%	90%	110%	96%	90%	110%	97%	70%	130%
Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733204	9733204	1220	1220	0.0%	< 2	109%	80%	120%						
pH	9733204	9733204	8.13	8.03	1.2%	NA	99%	90%	110%						
Total Dissolved Solids	9733222	9733222	2570	2640	2.5%	< 20	100%	80%	120%						
Alkalinity (as CaCO3)	9733204	9733204	271	272	0.4%	< 5	101%	80%	120%						
Cyanide, Free	9733223	9733223	< 0.002	< 0.002	NA	< 0.002	95%	90%	110%	99%	90%	110%	93%	70%	130%
Fluoride	9733225	9733225	< 0.5	<0.5	NA	< 0.05	105%	90%	110%	96%	90%	110%	111%	80%	120%
Chloride	9733225	9733225	58.6	52.9	10.2%	< 0.10	94%	90%	110%	100%	90%	110%	103%	80%	120%
Nitrate as N	9733225	9733225	< 0.5	<0.5	NA	< 0.05	97%	90%	110%	104%	90%	110%	106%	80%	120%
Nitrite as N	9733225	9733225	< 0.5	<0.5	NA	< 0.05	NA	90%	110%	100%	90%	110%	101%	80%	120%
Bromide	9733225	9733225	< 0.5	<0.5	NA	< 0.05	107%	90%	110%	103%	90%	110%	106%	80%	120%
Sulphate	9733225	9733225	585	514	12.9%	< 0.10	96%	90%	110%	101%	90%	110%	104%	80%	120%
Calcium	9733228	9733228	20.7	21.0	1.4%	< 0.05	99%	90%	110%	100%	90%	110%	94%	70%	130%
Magnesium	9733228	9733228	6.99	7.14	2.1%	< 0.05	97%	90%	110%	97%	90%	110%	96%	70%	130%
Sodium	9733228	9733228	173	176	1.7%	< 0.05	97%	90%	110%	97%	90%	110%	97%	70%	130%
Potassium	9733228	9733228	1.42	1.39	2.1%	< 0.05	96%	90%	110%	96%	90%	110%	97%	70%	130%
Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733223	9733223	1220	1230	0.8%	< 2	94%	80%	120%						
pH	9733223	9733223	8.04	7.96	1.0%	NA	99%	90%	110%						
Total Dissolved Solids	9733241	9733241	596	620	3.9%	< 20	102%	80%	120%						
Alkalinity (as CaCO3)	9733223	9733223	494	493	0.2%	< 5	100%	80%	120%						
Cyanide, Free	9733243	9733243	< 0.002	< 0.002	NA	< 0.002	101%	90%	110%	105%	90%	110%	95%	70%	130%
Fluoride	9733246	9733246	< 0.25	<0.25	NA	< 0.05	105%	90%	110%	100%	90%	110%	101%	80%	120%
Chloride	9733246	9733246	5.11	5.44	6.3%	< 0.10	94%	90%	110%	102%	90%	110%	99%	80%	120%
Nitrate as N	9733246	9733246	< 0.25	<0.25	NA	< 0.05	97%	90%	110%	107%	90%	110%	106%	80%	120%
Nitrite as N	9733246	9733246	< 0.25	<0.25	NA	< 0.05	NA	90%	110%	98%	90%	110%	93%	80%	120%
Bromide	9733246	9733246	< 0.25	<0.25	NA	< 0.05	107%	90%	110%	104%	90%	110%	92%	80%	120%
Sulphate	9733246	9733246	106	107	0.9%	< 0.10	96%	90%	110%	104%	90%	110%	108%	80%	120%
Calcium	9733256	9733256	76.0	75.4	0.8%	< 0.05	100%	90%	110%	100%	90%	110%	95%	70%	130%
Magnesium	9733256	9733256	49.3	49.0	0.6%	< 0.05	97%	90%	110%	97%	90%	110%	97%	70%	130%
Sodium	9733256	9733256	35.5	35.8	0.8%	< 0.05	97%	90%	110%	96%	90%	110%	97%	70%	130%
Potassium	9733256	9733256	1.63	1.62	0.6%	< 0.05	95%	90%	110%	95%	90%	110%	96%	70%	130%

Inorganic Chemistry - Ground Water Samples															
Electrical Conductivity	9733242	9733242	1260	1270	0.8%	< 2	92%	80%	120%						
pH	9733242	9733242	8.14	8.05	1.1%	NA	100%	90%	110%						
Total Dissolved Solids	9733260	9733260	780	770	1.3%	< 20	102%	80%	120%						
Alkalinity (as CaCO3)	9733242	9733242	435	438	0.7%	< 5	102%	80%	120%						
Cyanide, Free	9733257	9733257	< 0.002	< 0.002	NA	< 0.002	101%	90%	110%	100%	90%	110%	100%	70%	130%
Fluoride	9733257	9733257	0.76	0.76	0.0%	< 0.05	105%	90%	110%	96%	90%	110%	96%	80%	120%
Chloride	9733257	9733257	197	197	0.0%	< 0.10	91%	90%	110%	100%	90%	110%	100%	80%	120%
Nitrate as N	9733257	9733257	< 0.25	<0.25	NA	< 0.05	93%	90%	110%	104%	90%	110%	106%	80%	120%
Nitrite as N	9733257	9733257	< 0.25	<0.25	NA	< 0.05	NA	90%	110%	100%	90%	110%	103%	80%	120%
Bromide	9733257	9733257	< 0.25	<0.25	NA	< 0.05	105%	90%	110%	103%	90%	110%	108%	80%	120%
Sulphate	9733257	9733257	< 0.50	<0.50	NA	< 0.10	94%	90%	110%	101%	90%	110%	105%	80%	120%
Calcium	9733262	9733262	33.2	33.1	0.3%	< 0.05	100%	90%	110%	96%	90%	110%	94%	70%	130%
Magnesium	9733262	9733262	14.5	14.6	0.7%	< 0.05	97%	90%	110%	96%	90%	110%	97%	70%	130%
Sodium	9733262	9733262	91.1	90.6	0.6%	< 0.05	97%	90%	110%	95%	90%	110%	96%	70%	130%
Potassium	9733262	9733262	2.44	2.47	1.2%	< 0.05	95%	90%	110%	97%	90%	110%	96%	70%	130%
Ammonia (Water)															
Ammonia as N	9733203	9733203	< 0.02	<0.02	NA	< 0.02	96%	90%	110%	107%	90%	110%	98%	80%	120%
Ammonia (Water)															
Ammonia as N	9733219	9733219	< 0.02	<0.02	NA	< 0.02	106%	90%	110%	92%	90%	110%	97%	80%	120%
Ammonia (Water)															
Ammonia as N	9733246	9733246	< 0.02	<0.02	NA	< 0.02	100%	90%	110%	92%	90%	110%	96%	80%	120%
Dissolved Metals (Water)															
Arsenic	9733203	9733203	< 0.003	<0.003	NA	< 0.003	103%	90%	110%	103%	90%	110%	108%	70%	130%
Barium	9733203	9733203	0.038	0.038	0.0%	< 0.002	103%	90%	110%	102%	90%	110%	101%	70%	130%
Boron	9733203	9733203	0.052	0.052	0.0%	< 0.010	102%	90%	110%	103%	90%	110%	104%	70%	130%
Cadmium	9733203	9733203	< 0.001	<0.001	NA	< 0.001	101%	90%	110%	104%	90%	110%	103%	70%	130%
Chromium	9733203	9733203	0.003	0.003	NA	< 0.003	102%	90%	110%	100%	90%	110%	104%	70%	130%
Iron	9733203	9733203	< 0.010	<0.010	NA	< 0.010	98%	90%	110%	100%	90%	110%	93%	70%	130%
Lead	9733203	9733203	< 0.001	<0.001	NA	< 0.001	95%	90%	110%	101%	90%	110%	94%	70%	130%
Nickel	9733203	9733203	< 0.003	<0.003	NA	< 0.003	107%	90%	110%	105%	90%	110%	100%	70%	130%
Zinc	9733203	9733203	< 0.005	<0.005	NA	< 0.005	98%	90%	110%	97%	90%	110%	96%	70%	130%
Calcium-dissolved	9733215	9733215	14.5	14.5	0.0%	< 0.05	97%	90%	110%	98%	90%	110%	99%	70%	130%
Magnesium-dissolved	9733215	9733215	4.83	4.93	2.0%	< 0.05	96%	90%	110%	98%	90%	110%	102%	70%	130%
Sodium-dissolved	9733215	9733215	157	158	0.6%	< 0.05	95%	90%	110%	95%	90%	110%	99%	70%	130%
Potassium-dissolved	9733215	9733215	1.74	1.76	1.1%	< 0.05	97%	90%	110%	97%	90%	110%	99%	70%	130%
Comments:	Pl note - Sample used for Matrix spike was GW-44985-111918-DD-43D (9733024).														
Dissolved Metals (Water)															
Arsenic	9733223	9733223	<0.003	<0.003	NA	< 0.003	103%	90%	110%	105%	90%	110%	119%	70%	130%
Barium	9733223	9733223	0.040	0.041	3.1%	< 0.002	99%	90%	110%	100%	90%	110%	96%	70%	130%
Boron	9733223	9733223	0.102	0.101	1.6%	< 0.010	110%	90%	110%	109%	90%	110%	112%	70%	130%
Cadmium	9733223	9733223	<0.001	<0.001	NA	< 0.001	103%	90%	110%	109%	90%	110%	129%	70%	130%
Chromium	9733223	9733223	0.003	<0.003	NA	< 0.003	101%	90%	110%	103%	90%	110%	105%	70%	130%
Iron	9733223	9733223	<0.010	<0.010	NA	< 0.010	109%	90%	110%	112%	90%	110%	98%	70%	130%
Lead	9733223	9733223	<0.001	<0.001	NA	< 0.001	99%	90%	110%	104%	90%	110%	94%	70%	130%
Nickel	9733223	9733223	<0.003	<0.003	NA	< 0.003	104%	90%	110%	109%	90%	110%	102%	70%	130%
Zinc	9733223	9733223	<0.005	<0.005	NA	< 0.005	100%	90%	110%	101%	90%	110%	101%	70%	130%
Calcium-dissolved	9733243	9733243	165	157	5.1%	< 0.05	95%	90%	110%	95%	90%	110%	89%	70%	130%
Magnesium-dissolved	9733243	9733243	100	95.4	5.2%	< 0.05	95%	90%	110%	95%	90%	110%	92%	70%	130%
Sodium-dissolved	9733243	9733243	45.5	43.2	5.2%	< 0.05	96%	90%	110%	96%	90%	110%	91%	70%	130%
Potassium-dissolved	9733243	9733243	1.44	1.32	8.8%	< 0.05	94%	90%	110%	94%	90%	110%	88%	70%	130%
Comments:	Pl note - Sample used for Matrix spike was GW-44985-111918-DD-DUP1 (9733224).														

Dissolved Metals (Water)

Arsenic	9733243	9733243	<0.003	<0.003	NA	< 0.003	101%	90%	110%	101%	90%	110%	108%	70%	130%
Barium	9733243	9733243	0.017	0.016	2.4%	< 0.002	102%	90%	110%	100%	90%	110%	96%	70%	130%
Boron	9733243	9733243	0.258	0.258	0.0%	< 0.010	99%	90%	110%	103%	90%	110%	93%	70%	130%
Cadmium	9733243	9733243	<0.001	<0.001	NA	< 0.001	101%	90%	110%	103%	90%	110%	119%	70%	130%
Chromium	9733243	9733243	<0.003	<0.003	NA	< 0.003	101%	90%	110%	104%	90%		103%	70%	130%
Iron	9733243	9733243	<0.010	<0.010	NA	< 0.010	97%	90%	110%	104%	90%	110%	100%	70%	130%
Lead	9733243	9733243	<0.001	<0.001	NA	< 0.001	95%	90%	110%	100%	90%	110%	95%	70%	130%
Nickel	9733243	9733243	<0.003	<0.003	NA	< 0.003	102%	90%	110%	106%	90%	110%	98%	70%	130%
Zinc	9733243	9733243	<0.005	<0.005	NA	< 0.005	96%	90%	110%	100%	90%	110%	104%	70%	130%
Calcium-dissolved	9733263	9733263	69.1	66.7	3.6%	< 0.05	96%	90%	110%	95%	90%	110%	88%	70%	130%
Magnesium-dissolved	9733263	9733263	41.0	39.0	4.9%	< 0.05	97%	90%	110%	96%	90%	110%	91%	70%	130%
Sodium-dissolved	9733263	9733263	156	151	3.3%	< 0.05	96%	90%	110%	96%	90%	110%	90%	70%	130%
Potassium-dissolved	9733263	9733263	3.98	3.78	5.3%	< 0.05	95%	90%	110%	94%	90%	110%	88%	70%	130%

Comments: Pl note - Sample used for Matrix spike was GW-44985-112018-DD-51B (9733244).

Dissolved Metals (Water)

Arsenic	9733263	9733263	<0.003	<0.003	NA	< 0.003	102%	90%	110%	99%	90%	110%	106%	70%	130%
Barium	9733263	9733263	0.043	0.044	1.5%	< 0.002	102%	90%	110%	102%	90%	110%	93%	70%	130%
Boron	9733263	9733263	1.10	1.14	2.7%	< 0.010	100%	90%	110%	95%	90%	110%	104%	70%	130%
Cadmium	9733263	9733263	<0.001	<0.001	NA	< 0.001	99%	90%	110%	102%	90%	110%	100%	70%	130%
Chromium	9733263	9733263	0.004	0.003	NA	< 0.003	101%	90%	110%	101%	90%	110%	101%	70%	130%
Iron	9733263	9733263	0.512	0.520	1.4%	< 0.010	97%	90%	110%	98%	90%	110%	100%	70%	130%
Lead	9733263	9733263	<0.001	0.004	NA	< 0.001	97%	90%	110%	97%	90%	110%	92%	70%	130%
Nickel	9733263	9733263	<0.003	<0.003	NA	< 0.003	103%	90%	110%	101%	90%	110%	100%	70%	130%
Zinc	9733263	9733263	<0.005	<0.005	NA	< 0.005	98%	90%	110%	97%	90%	110%	101%	70%	130%
Calcium-dissolved	9733223	9733223	148	145	2.0%	< 0.05	94%	90%	110%	96%	90%	110%	88%	70%	130%
Magnesium-dissolved	9733223	9733223	46.9	45.1	3.9%	< 0.05	95%	90%	110%	95%	90%	110%	89%	70%	130%
Sodium-dissolved	9733223	9733223	17.2	16.6	3.6%	< 0.05	96%	90%	110%	96%	90%	110%	88%	70%	130%
Potassium-dissolved	9733223	9733223	0.51	0.49	4.0%	< 0.05	96%	90%	110%	99%	90%	110%	87%	70%	130%

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