2020 Annual Report, Buckhorn Waste Transfer Station

Environmental Compliance Approval No. A341301

March 5, 2021

Prepared for:
The Corporation of the Municipality of Trent Lakes

Cambium Reference: 10520-006

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Executive Summary

The Buckhorn Waste Transfer Station is a natural attenuation landfill and waste transfer station that operates under Environmental Compliance Approval No. A341301. The site is at 37 Dump Road, 3 km southeast of the community of Buckhorn. The site consists of an approved fill area of 1.8 ha within a total licensed area of 6.43 ha. The site ceased landfilling in 2008 and now operates as a waste transfer station.

Groundwater flow determined by water level measurements continued to be south in the shallow and deep aquifers during the monitoring events.

Immediate down-gradient monitors were impacted by a weak leachate signature. Impacts at monitors DP1, DP2-R, and DP4-R may have been attributable to the site, in part; however, some elevated parameter concentrations were also attributed to the organic environment in the provincially significant wetland (i.e., peat, saturated soils, etc.) and bedrock/soil geochemistry. Elevated parameter concentrations at monitors OW19-1 and OW19-2 were attributed to non-site related sources.

Future monitoring is required for the newly installed perimeter wells. The initial assessment indicated that road salt impacts were evident at all perimeter wells and naturally elevated concentrations related to saturated organic soils were also at wells BH16-1, BH16-4S, and BH16-4D.

Surface water drainage is toward the south and southwest of the waste mound and site, through overland flow during times of increased precipitation. All surface water from the site eventually drains into a bay of Lower Buckhorn Lake. Immediately south of the site is the Lower Buckhorn Complex which is an identified provincially significant wetland with portions of the wetland in the designated Contaminant Attenuation Zone.

Review of the surface water quality data from 2020 indicated the presence of site related impacts at surface water sampling stations SW1 and SW3; however, where leachate indicator parameters were elevated, the concentrations generally met the Provincial Water Quality Objectives. All remaining surface water locations were either un-impacted or exhibited elevated parameter concentrations attributed to road salt impacts and/or natural sources.

Based on this assessment, the site was not adversely impacting the down-gradient/downstream Lower Buckhorn Lake provincially significant wetland.

A Ministry Site Inspection was conducted in March 2020. The Township submitted an Action Plan to address the Ministry's concerns. Of note the Municipal Hazardous or Special Waste Depot was identified to be in the wrong location. The Township has submitted an ECA amendment to reflect the current site layout.

A total of 502.76 tonnes of waste and 364.30 tonnes of divertible materials were accepted at the site in 2020. In addition to these tonnages the Site received, 180 tonnes of brush, 722 tires, and 60,275 alcohol containers.

The site was operated in compliance with the Environmental Compliance Approval in 2020.

Recommendations have been provided regarding the future operation of the Buckhorn waste disposal site and work to be completed in 2021.

Respectfully submitted,

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1.0 Introduction

The Corporation of the Municipality of Trent Lakes (Municipality) retained Cambium Inc. (Cambium) to complete the 2020 annual monitoring program for the Buckhorn waste transfer station (Site). The Site operates under Ministry of the Environment, Conservation and Parks (Ministry) Environmental Compliance Approval (ECA) No. A341301, most recently amended October 2, 2017 (Appendix A).

To aid in the understanding of the history and development of the Site, the following information is included digitally in the report package:

- Environmental Compliance Approval Application, with Design and Operations Report, Maps and other supporting documentation to amend ECA, dated May 10, 2016
- Historical water quality (WSP, 2017)
- *Municipality of Trent Lakes – Transfer Station Safety, Emergency and Spills Procedures* (MTL, 2020a)
- *Municipality of Trent Lakes – Transfer Station Standard Operating Procedures* (MTL, 2020b)

1.1 Site Location

The Site is on Lot 11, Concession 6, geographic Harvey Township, Municipality of Trent Lakes, County of Peterborough. The municipal address for the Site is 37 Dump Road, which is 3 km southeast of the community of Buckhorn. The Universal Transverse Mercator (UTM) coordinates for the site entrance are Zone 17T, 712862 m east, 4938573 m north.

1.2 Site Description

The Site operated as a natural attenuation landfill for the disposal of domestic, commercial, and non-hazardous solid industrial waste from 1971 until landfilling was ceased in December 2008. The Site began operations as a transfer station in January 2009.

The County of Peterborough (County) operates a Municipal Hazardous and Special Waste (MHSW) depot at the Site. The MHSW depot is open seasonally and is operated under ECA No. A710166 (Appendix A). Details of the MHSW depot operations and waste quantities will be reported in a separate document prepared by the County.

Site details are in Embedded Table 1. A Local Topography Plan, a Monitoring Well Locations plan, and a Transfer Station Plan are included as Figure 2, Figure 3, and Figure 4, respectively.

Embedded Table 1 Site Details

Total Site Area	6.43 ha
Total Contaminant Attenuation Zone (CAZ)	10.85 ha
Approved Area of Refuse Placement	1.8 ha
Total Capacity, not including Final Cover	61,400 m³

The CAZ is distinguished from the licenced site property and is divided in four discrete zones (Figure 3):

- CAZ-1: Immediately west of Site
- CAZ-2: Southwest of Site (Diagonal to Site)
- CAZ-3: Immediately south of Site
- CAZ-4: South of CAZ 2, South of Country Rd. 36

1.3 Scope of Work

The scope of the 2020 work program was based on the results of the 2019 monitoring program (Cambium, 2020), requirements outlined in Condition 17, 80, and 81 of the ECA, and included:

- Groundwater elevation monitoring
- Surface water and groundwater sampling and analysis
- Evaluation of groundwater quality against the Ontario Drinking Water Quality Standards (ODWQS) and Reasonable Use Concept (RUC) values developed in accordance with Ministry Guideline B-7

- Evaluation of surface water quality against the PWQO
- Site inspection
- Preparation of this annual report

In addition to the above, this report discusses the following correspondence received from the Ministry in 2020 (Appendix B):

- Technical Support Section comments received from Ministry Surface Water Specialist, Dana Cruickshank, dated July 15, 2020 following review of the *2019 Annual Report* (Cambium, 2020)
- Technical Support Section comments received from Ministry Hydrogeologist, Thomas Guo, dated July 15, 2020 following review of the *2019 Annual Report* (Cambium, 2020)
- Non-Hazardous Waste Transfer Processing Inspection Report completed by Gary Muloin, March 2020

This report presents the results of the 2020 work program, provides an assessment of the current landfill impact of the Site on the surrounding groundwater and surface water environments, and a summary of the operational activities at the Site. Cambium has provided recommendations for the 2021 monitoring program and site operations based on the 2020 results and assessment.

2.0 Methodology

The 2020 work program was completed to maintain compliance with the ECA and Ministry requirements. As such, the environmental monitoring work program was completed consistent with *Guidance Manual for Landfill Sites Receiving Municipal Waste* (MOEE, 1993) and *Monitoring and Reporting for Waste Disposal Sites, Groundwater and Surface Water, Technical Guidance Document* (MOE, 2010).

Field tasks were completed following Cambium's Standard Operating Procedures developed from recognized standard procedures such as those listed above and *Guidance on Sampling and Analytical Methods for use at Contaminated Sites in Ontario* (MOEE, 1996). A health and safety program was developed for site-specific conditions and all Cambium personnel working on the project were familiarized and required to follow the identified protocol.

Surface water and groundwater samples were stored in coolers with freezer packs and maintained at less than 10°C during transport to Caduceon Environmental Laboratories (Caduceon) in Kingston, Ontario. Caduceon is accredited by the Canadian Association for Laboratory Accreditation Inc. for specific environmental tests listed in the scope of accreditation. Groundwater and surface water samples were submitted for analysis of the parameters outlined in Table 1.

2.1 Groundwater Monitoring Program

The following tasks were completed as part of the 2020 groundwater monitoring program:

- Prior to sampling, water levels were measured at each monitoring well using an electronic water level tape.
- The purge volume was calculated on-site during each monitoring event using the measured water level, well depth, and the borehole diameter. Each groundwater monitoring well to be sampled was purged of approximately three well bore volumes. For wells with low recovery, at least one saturated borehole volume was purged prior to sampling. Purged water was disposed on-site, down-gradient of each respective well.

- Samples were collected using dedicated polyethylene tubing equipped with inertial-lift foot valves.
- Groundwater samples for metals and dissolved organic carbon (DOC) analysis were field filtered.
- Field measurements were recorded for pH, conductivity, temperature, dissolved oxygen (DO), and oxygen reduction potential (ORP).

Groundwater samples were collected on April 27 and November 11 from the on-site monitoring wells listed below.

- OW9
- OW12-1
- OW12-2
- OW16
- OW17-1
- OW17-3
- OW19-1
- OW19-2
- DP1
- DP2-R
- DP3
- DP4-R
- BH16-1
- BH16-2
- BH16-3S
- BH16-3D
- BH16-4S
- BH16-4D

Monitoring wells included in the groundwater monitoring program are shown on Figure 2. The UTM coordinates for the monitoring locations are in Table 2. Groundwater results are discussed in Section 4.2. Field data sheets are in Appendix C. Laboratory Certificates of Analysis are in Appendix D. Photographs of each monitoring location are in Appendix E.

Blind duplicate groundwater samples were collected from OW16 and BH16-4S in the spring and OW16 and BH16-2 in the autumn as part of the Quality Assurance/Quality Control (QA/QC) program. As these field duplicates equate to about 10% of the total samples collected, this is an adequate QA/QC program for groundwater. In addition to these samples, the laboratory completes internal QA/QC. The results of the QA/QC program are presented in Section 4.1.

2.2 Residential Well Monitoring Program

Residential well sampling was not completed in 2020 from the following residential wells identified in the monitoring program (Table 1) due to COVID-19:

- PW1
- PW2
- PW3

Well locations are on Figure 3. Results from the residential well sampling are discussed in Section 4.2.10. Field data sheets are in Appendix C and laboratory Certificates of Analysis as provided by Caduceon are in Appendix D.

2.3 Surface Water Monitoring Program

The following tasks were completed as part of the 2020 surface water monitoring program:

- Surface water samples were collected by immersing the sample container into the water body.
- When sample bottles were prefilled with preservatives, a clean bottle was used to collect and decant the water directly into the sample bottle.
- Surface water samples for mercury (0.45 µm) analysis were filtered by the laboratory.
- Field measurements including pH, conductivity, temperature, DO, and ORP were recorded at each sample location.
- Where possible, depth, width, and flow velocity measurements were collected at each surface water location.

Surface waster samples were collected on April 22 and November 10 from the surface water sample stations listed below, with the following exceptions:

- SW2 was dry in April and November
- SW3 had insufficient volume to allow sample collection in November

Surface water sampling locations are shown on Figure 2. The UTM coordinates for the monitoring locations are in Embedded Table 2. Surface water results are discussed in

Section 4.3. Field data sheets are in Appendix C. Laboratory Certificates of Analysis provided by Caduceon are in Appendix D. Photographs of each surface water sample location are in Appendix E.

- SW1
- SW2
- SW3
- SW4
- SW5
- SW6
- SW7
- SW8
- SW9
- SW10
- SW11

Blind duplicate surface water samples were collected from station SW10 in April and SW1 in November as part of the QA/QC program. As these field duplicates equate to about 10% of the total samples obtained, this is an adequate QA/QC program for surface water. The results of the QA/QC program are presented in Section 4.1.

2.4 Landfill Gas Monitoring Program

Landfill gas (LFG) monitoring was implemented at the Site to assess compliance with Section 4.10 of *Landfill Standards, A Guideline on the Regulatory and Approval Requirements for New and Expanding Landfilling Sites* (MOEE, 1998), which states the concentration of methane gas in the subsurface may not exceed 2.5% by volume at the property boundary.

Landfill gas monitoring is conducted during the spring and autumn monitoring program. Landfill gas measurements were recorded at all groundwater monitors included in the 2020 monitoring program on April 27 and November 11, with the following exceptions:

- DP4-R was flooded in April and November and readings were not taken
- OW19-1 and OW19-2 were flooded in April and readings were not taken

2.5 Site Review and Operations Overview

Site operations were observed during site visits completed in April, and November 2020. During these visits, the items listed below were inspected on accessed areas of the Site and observations noted in the field file. In January 2021, the Township provided additional 2020 site operations information. Site inspection results are presented in Section 5.0.

- Final cover condition
- Litter control
- Condition and layout of recycling bins
- Status of monitoring well security
- Condition and layout of access roads, access gates

3.0 Geological and Hydrogeological Context

3.1 Topography and Drainage

The Site is in the Kawartha Lakes tertiary watershed and the Miller Creek and Deer Bay quaternary watershed. The flow in the area generally collects from the northeast areas of Peterborough County and drains southwest through Trent Lakes and into Lower Buckhorn Lake (LBL). Locally, drainage from the Site collects in adjacent low-lying wet areas then migrates southwest via natural depressions, channels, and roadside ditches, until discharging to the LBL Wetland Complex. The water then flows through SW6 and into a bay of LBL.

Surface waters surrounding the Site are characterized as ponded (unevaluated) wetland environments. Directly south of the Site and in the adjacent CAZ is the LBL Complex which is an identified Provincially Significant Wetland (PSW). Surface water is generally directed toward the south-southwest eventually draining into LBL.

There are currently 11 surface water locations on and around the Site, as described below (Figure 2).

- SW11 is at the northern edge of the limit of existing waste and has had water quality representative of background or non-landfill impacted conditions based on its location upstream and up-gradient of the waste mound.
- CAZ-1 is monitored by two surface water stations: SW1 and SW3. SW1 is between the southwestern corner of the licensed site boundary and the eastern limit of CAZ-1. It is adjacent the access road to Rigbe Quarry. SW1 is in an unevaluated wetland and is the closest downstream and down-gradient monitoring location to the waste footprint. Station SW3 is at the southwest corner of CAZ-1, adjacent DP1, south of Fire Route 22. The sample is collected in an intermittent stream which drains southwest into an unevaluated wetland.
- SW9 and SW10 are north of Country Road 36, west of CAZ-2 and Dump Road, and down-gradient and downstream of the waste disposal site. Both locations are in a portion of the LBL Complex PSW. Surface water location SW10 is adjacent to County Road 36 and

sampled from a culvert which connects the north and south side of the LBL Complex. Surface water monitoring station SW9 is on the opposite side of the wetland (north).

- The area directly south of the site property (CAZ-3) is monitored by three surface water stations: SW2, SW4 and SW5. SW2 is closest to the waste mound, just south of Fire Route 23, and is sampled from a culvert passing under the fire route. SW4 and SW5 are north of Country Road 36, along the south-western edge of CAZ-3, east of Dump Road, and within the PSW.
- SW7 is at the eastern edge of CAZ-4, south of County Road 36, west of Fire Route 21, and in an unevaluated wetland.
- SW6 and SW8 are both south of County Road 36, west of the CAZ and Site. SW6 is at the outlet of a permanent stream which connects two areas of the LBL Complex PSW. SW8 is on a permanent stream which discharges from the Kawartha Highlands Provincial Park and its series of tributary lakes. Both locations are greater than 500 m southwest from the waste mound.

The geospatial coordinates (NAD 83) for the surface water monitoring stations are in Embedded Table 2. Flow and discharge rates measured during the monitoring events are in Appendix C.

Embedded Table 2 Coordinates of Surface Water Stations

Surface Water Station	Northing	Easting
SW1	712777	4938604
SW2	712951	4938547
SW3	712636	4938496
SW4	712846	4938445
SW5	712877	4938392
SW6	712453	4938265
SW7	712890	4938297
SW8	711908	4938221
SW9	712618	4938393
SW10	712610	4938350
SW11	712975	4938722

Notes: 1. Zone 17.

3.1.1 Precipitation Data

A review of the 2020 precipitation data for Peterborough County (Government of Canada, 2020) in comparison to the average precipitation data for 1981 to 2010 for Peterborough (Government of Canada, 2015) indicated that, similar to 2019, the annual precipitation was notably less than normal. January and August received more precipitation than normal, while the remaining months received less. The precipitation in April and November was about 40% lower than normal. The monthly precipitation, as well as the amount of precipitation during and in the three days prior to the sampling events is summarized in Embedded Table 3. Refer to Appendix C for field sheets and climate data.

Embedded Table 3 Historical and 2020 Precipitation Data

Sampling Date	Average Monthly Precipitation (mm) (1981 – 2010)	2020 Precipitation (mm)	Precipitation During and Prior to Sampling (mm)
April 22	68.6	41.1	5.0
April 27			0.0
November 10	86.4	55	0.0
November 11			

3.2 Hydrogeology

The hydrogeology of the Site has previously been characterized by WSP (2017). The following is a reiteration of that characterization with additional observations and interpretations made by Cambium. Available borehole logs and geological cross sections are included in Appendix F.

Stratigraphy composition and thicknesses vary across the Site, but is generally reported to be combinations of peat, sand and gravel, sandy silt to silty sand glacial till, overlaying granitic bedrock. Local groundwater flows through both the overburden and to a lesser extent, the bedrock. There are currently two aquifers identified at the Site. A shallow aquifer comprising overburdening soils and fractured portions of the upper bedrock and a deeper aquifer in the lower extents of the bedrock (less fractured, more competent, greater lithostatic pressure).

Peat deposits have been identified within the low-lying marsh/wetland areas to the southwest and southeast of the waste mound. The peat unit is dark brown in colour, saturated, and

contains some sand, gravel, and woody fragments. The thickness of the peat unit varies in depth across the Site, most notably extending to depths of 1.5 m below ground surface (bgs) in historical borehole BH13.

Historical borehole logs indicate the upper overburden soil of areas not identified as wetlands/lowlands, consist mainly of sand and gravel. The thickness of this unit varies from 0.9 m to 2.9 m identified in boreholes BH14 and BH12, respectively. Grain size distribution analyses of samples from this unit indicated the material consists of fine to medium-grained sand with minor amounts of silt and clay, to a gravelly sand with boulders.

The lower overburden unit is generally composed of sandy silt to silty sand glacial till ranging in thickness from 0.8 m to 2.4 m (BH9 and BH13). A significant number of boulders and cobbles were also identified in this unit.

The underlying bedrock formation and basement rock is identified as a biotite gneiss with local granitic intrusions both belonging to the regionally extensive Grenville Province (WSP, 2017). The mineral assemblage of metapelites in the biotite zone contains: chlorite, biotite, epidote, actinolite, plagioclase, and alkali feldspars. Given the extensive metamorphism and intrusions associated with Grenville Supergroup, hydrothermal alteration minerals such as tourmaline and sulphides, particularly pyrite may also be present. Several elements monitored as leachate indicator parameters are present in these minerals such as magnesium, iron, potassium, sodium, calcium, and boron.

Outcrops of the bedrock formation are ‘ridge-like’ features to the northwest and southeast perimeter of the Site. The area between these ‘ridges’ at the center of the Site forms a natural depression in the bedrock surface which accumulates water, organic matter, and fine sediments creating the wetland to the southwest area of the Site. Geological cross sections generated by WSP (2017) demonstrate the undulating nature of the bedrock surface underlying the overburden at the Site.

Shallow groundwater flow generally occurs in the upper sand unit. An increased abundance of fine sediments such as silt and clay within the lower till unit causes the hydraulic conductivity to decrease with depth in the overburdening soils. Hazen permeability was calculated by WSP

(2017) for the lower till unit with values ranging from $6x10^{-5}$ m/s to $6x10^{-7}$ m/s, averaging $2x10^{-5}$ m/s.

WSP (2017) installed six monitors along County Road 36 in 2016 to better quantify the background shallow groundwater chemistry as part of the Ministry Guideline B-7 RUC (MOEE, 1994a) assessment. Three monitors (BH16-1, BH16-3D, and BH16 4D) were installed in the deeper, fractured bedrock with depths ranging from 11 to 18 mbgs. The remaining three monitors (BH16-2, BH16-3S, and BH16-4S) were installed in the fractured, shallow granitic (gneissic) bedrock to depths ranging from 5 to 7 mbgs.

Drive-points DP2 and DP4, destroyed in 2010, were replaced by WSP in 2016 and identified as DP2-R and DP4-R.

The current monitoring program consists of eight monitoring wells installed in the deep bedrock and 12 monitors completed in the shallow overburden/fractured upper bedrock.

- Shallow Aquifer – Overburden and fractured bedrock
  - Overburden: OW9, OW12-2, OW14-2, OW17-3, OW19-2, DP1, DP2-R, DP3, DP4-R
  - Shallow fractured bedrock: BH16-2, BH16-3S, and BH16-4S
- Deep Aquifer – Deep Bedrock
  - OW12-1, OW14-1, OW16, OW17-1, OW19-1, BH16-1, BH16-3D, and BH16-4D

A description of monitors used to evaluate each groundwater area is described below:

- OW17-1 installed in the deep aquifer and OW17-3 installed in the shallow aquifer, up-gradient of the waste disposal site are representative of background water quality.
- Leachate wells include nested wells OW12 and OW14 installed within the existing limit of waste and OW9 and OW16 installed between the existing limit of waste and the southern limit of the property.
- CAZ-1 is the area directly west of the property boundary and waste footprint. The zone is on the west side of Rigbe's Quarry Access Road and is monitored by deep well BH16-1

and shallow well DP1. BH16-1 is on the western limit of CAZ-1 just north of Fire Route 22. DP1 is at the southwest corner of the zone, south of Fire Route 22.

- CAZ-2 is diagonally southwest of the licensed site boundary. CAZ-2 is monitored by shallow wells DP2-R, BH16-4S, and deep well BH16-4D. Monitors BH16-4S and BH16 4D are in the northwest corner of the intersection of Dump Road and County Road 36. DP2-R is a replacement for DP2 and is in the PSW, 93 m south of drive-point DP1, beyond the eastern edge of CAZ-2.
- CAZ-3, immediately south of the licenced site and down-gradient of the waste footprint, is monitored by shallow wells DP3, DP4-R, BH16-2, and BH16-3S, and deep well BH16-3D. BH16-2 and DP4-R are in the southwest corner of CAZ-3, north of County Road 36. DP4-R is within the LBL Complex (PSW). DP3 is in the centre of CAZ-3, just south of Fire Route 23. Nested wells BH16-3S/D are north of County Road 36 in the southeast corner of CAZ-3.
- The farthest monitors down-gradient from the waste mound are OW19-1 and OW19-2, south of Country Road 36, east of Fire Route 21, and in the area identified as CAZ-4. The monitoring wells are in an unevaluated wetland that drains into the LBL Complex (PSW).

3.2.1 Well Records

A Ministry water well search was completed for a 500 m radius of the Site (Cambium, 2019). The identified water wells within the Site and/or CAZ boundaries on Figure 2 are the newly installed BH16 series monitors along County Road 36. No other well records were identified within 500 m of the waste mound.

There were two wells identified 600 m and 700 m south and down-gradient of the waste mound. Both wells were installed to 50 mbgs in the deeper extents of the granitic bedrock. These wells were interpreted to be hydraulically separate from the Site. Furthermore, given the depth to a suitable water supply aquifer, no adverse impacts from the Site are expected.

Regardless of the above, three residential wells were identified to be included in monitoring program as discussed in Section 2.2. Residential well PW1 is on Fire Route 22 and is 425 m

cross-gradient from the existing limit of waste. Residential well PW2 is down-gradient of the Site along Country Road 36. Well PW3 is on Fire Route 21 and is the farthest down-gradient residential well in the monitoring program. The home at PW2 burned down in 2018. During the November 2019 sampling event, Cambium noted a new home was being constructed.

Ministry water well records indicated that the depth of residential well PW3 (Water Well Record: 5118487) is 122 m (Appendix F). Well records could not be obtained for residential wells PW1 or PW2.

3.2.2 Groundwater Flow Direction

To determine the current groundwater elevation, water table gradient, and groundwater flow direction, water level measurements were collected in the spring and autumn. The water level data were used to calculate the groundwater elevations summarized in Table 2 and shown on Figure 5 and Figure 6. The general direction of groundwater flow continues to be southwest. Embedded Table 4 provides a summary of the gradients measured.

Embedded Table 4 Summary of 2020 Horizontal Hydraulic Gradients

Unit	April	November
Shallow	0.039 m/m southwest	0.040 m/m southwest
Deep	Waste mound: 0.078 m/m west-southwest CAZ: 0.020 m/m southwest	Waste mound: 0.064 m/m west-southwest CAZ: 0.021 m/m/ southwest

3.2.3 Vertical Gradients

As there are nested/clustered wells on-site, vertical gradients were calculated between the lower till aquifer and the upper outwash sands and upper till aquifer (Table 3). Calculated vertical gradients were generally consistent with historical gradients in 2020.

Although some well nests showed variability in gradients over time, typically, upward gradients have been calculated between the shallow and deep monitors in the area of OW14 and OW12. These wells are closer to the waste mound. Conversely, negligible gradients have been present at the nested/clustered wells OW17 north of the waste mound and down-gradient well nest OW19 confirming connectivity between the aquifers in this area.

3.2.4 Conceptual Site Model

The Site is underlain by a combination of peat, silty sands, and sands and gravels overlaying granitic bedrock. Shallow groundwater surrounding the waste mound discharges to surface near the landfill as evidenced by vertical upward gradients. Farther down-gradient of the waste mound, relatively low vertical and horizontal hydraulic gradients are present.

It was inferred there was a significant flow along the contact between the upper aquifer and the relatively impermeable bedrock. Vertical gradients and the impermeable nature of the bedrock will restrict the downward migration of impacted groundwater at the Site. As such, the primary receptor of impacted groundwater is surface water when groundwater discharges to surface in the wetlands on and adjacent the Site.

4.0 Results and Discussion

Water quality results from the monitoring program are used to assess the existence, extent, and degree of impacts to the groundwater and surface water environments related to waste disposal site activities at the Site.

To ensure appropriate actions are in place to respond to degradation in surface water or groundwater quality beyond an acceptable level, site-specific trigger levels and contingency measures aid in the assessment of impacts from leachate contamination and help to prevent adverse impacts to the environments surrounding the waste disposal site.

This section presents the results of the 2020 monitoring program.

4.1 Quality Assurance/Quality Control

Results from the analyses completed on the blind duplicate QA/QC samples were evaluated. Parameter concentrations were considered significantly different if the relative percent difference (RPD) between the duplicate and the parent samples was greater than 30% when at least one result was greater than five times the reported detection limit (RDL).

The duplicate groundwater and surface water analyses were compared to the originals. Overall, the duplicate samples correlated well with the parent samples and met the data quality objective of 30%. Exceptions noted included:

- Copper, iron, and total Kjeldahl nitrogen (TKN) at BH16-4S in April
- Total phosphorus at SW1 in November

Considering the low variation between the parent and duplicate samples, the groundwater and surface water results were interpreted with confidence.

4.2 Groundwater Quality

Groundwater analysis data for 2011 to 2020 are in Table 4, Table 5, and Table 6. Data from 2003 to 2010 is included digitally in the report package.

To assess water quality impacts related to landfill site operations, the analytical results for groundwater samples collected on-site were compared to background water quality and historical data, and site compliance was assessed using the ODWQS (MOE, 2006) and RUC (MOEE, 1994a).

4.2.1 Background Groundwater Quality

When evaluating the impact, a waste disposal site has on groundwater resources, a reference point or value must be established to assist in determining the magnitude of the impact. The quality of the groundwater that is not impacted by the waste disposal site operation (background water quality) should be used for comparison purposes. Groundwater samples collected from monitoring wells OW17-1 (deep) and OW17-3 (shallow), both up-gradient of the waste mound, represent background groundwater quality at the Site.

Water quality at deep monitoring well OW17-1 has historically been characterized as having low concentrations of chloride, iron, ammonia, and manganese. Water quality at the shallow monitor OW17-3 has typically had some parameters with slightly elevated concentrations in comparison to adjacent bedrock monitor OW17-1 including conductivity, hardness, barium, calcium, and phosphorus. Conversely, concentrations of sulphate, boron, and magnesium have been less at well OW17-3 than OW17-1. Water quality data has fluctuated seasonally at monitor OW17-3.

Overall, the data from 2020 indicated stable parameter concentrations and the water quality at these locations remained representative of background groundwater quality.

4.2.2 Leachate Characteristics

Leachate indicator parameters (LIPs) were identified for the Site by comparing the immediate down-gradient shallow monitors OW9, OW12-2, and OW14-2 and the deep monitors OW12-1, OW14-1, and OW16 to the background monitors OW17-1 and OW17-3. Where parameters were persistently greater than the background water quality these parameters were considered to be LIPs for the Site.

Embedded Table 5 Leachate Indicator Parameter

Alkalinity	Conductivity	Barium	Manganese	Magnesium	Iron
Ammonia	Chloride	DOC	Hardness	Potassium	Chemical oxygen demand (COD)
Boron	Calcium	Total dissolved solids (TDS)	Total Phosphorus	Sodium	

The following was noted about the water quality in immediate down-gradient monitoring wells in 2020:

- OW9: Some LIP concentrations continued to be elevated compared to historical ranges including conductivity, chloride, and sodium, in April. Parameters including calcium, magnesium, barium, and COD which were elevated in April 2019 were reported within typical ranges in 2020.
- OW12-1: Some LIPs remained low in respect to their historical ranges, consistent with 2018 and 2019, including alkalinity, conductivity, ammonia, TDS, DOC, and chloride.
- OW12-2 and OW14-1: Concentrations were within typical ranges and no trends were identified.
- OW14-2: Concentrations of boron, biological oxygen demand (BOD), and ammonia have been elevated compared to historical values since 2017.
- OW16: Parameters were within historical concentrations ranges and were subject to seasonal fluctuations.

Overall, the water quality at the immediate down-gradient monitors remained consistent with historical results and was stable. In previous annual reports Cambium recommended that OW9 and OW16 be maintained to monitor leachate quality at the Site and OW12-1, OW12-2, OW14-1, and OW14-2 be decommissioned (Cambium, 2020). Ministry comments received in 2020 supported this recommendation (Appendix B).

4.2.3 Groundwater Quality West of Waste Footprint (CAZ-1)

Many parameter concentrations have decreased at BH16-1 since installation including conductivity, alkalinity, chloride, and sulphate. With the exception of elevated chloride in April,

concentrations of all parameters in 2020 were similar to background OW17-1 suggesting this well is not impacted by leachate. Where elevated concentrations were previously noted, these were attributed to the disturbance during drilling. Further monitoring is recommended.

Historically, DP1 has reported elevated concentrations for all LIPs except for ammonia and total phosphorus in comparison to background water quality. Due to the location of this monitor, elevated concentrations of DOC, iron, and manganese were attributed at least in part to naturally elevated concentrations typical in organic soils in Ontario (Bendell-Young, 2003). Despite seasonal variations, groundwater quality at monitor DP1 remained stable in 2020.

4.2.4 Groundwater Quality Southwest of Waste Footprint (CAZ-2)

Parameters associated with road salt applications (e.g., conductivity, TDS, chloride, hardness, and sodium) and/or naturally occurring organic conditions (e.g., manganese) have been elevated at BH16-4S and BH16-4D relative to background concentrations. Both monitors also had elevated concentrations of LIPs such as barium and potassium indicating a weak leachate signature in the shallow and deep aquifers at this location. Elevated concentrations attributed to increased road salt impacts at BH16-4S were noted in 2020 including conductivity, TDS, chloride, hardness, calcium, and sodium. Concentrations at BH16-4D remained generally stable in 2020 with the exception of an increasing trend for barium.

Although barium is associated with leachate at the Site, elevated metals concentrations may be related to salt use and/or be naturally elevated in organic soils. The presence of salts can influence the chemistry of the soil in which it infiltrates and can increase the solubility of metals and base cations (calcium, magnesium, potassium) (Health Canada, 2001). Given the increased road salt impacts at BH16-4S corresponding with the increased barium concentration, this suggests correlation between barium and road salt impacts opposed to leachate impacts.

DP2-R was installed in 2016. Concentrations of LIPs TDS, DOC, hardness, barium, iron, and manganese have been elevated compared to background. Initial evaluation indicated similar water quality to historical monitor DP2, exhibiting a weak leachate signature. Concentrations remained typical in 2020. Further monitoring is recommended.

4.2.5 Groundwater Quality South of Waste Footprint (CAZ-3)

Historically, some LIPS (barium, chloride, iron, manganese, sodium, TDS, DOC, conductivity) have been elevated at BH16-3D in comparison to the deep background well OW17-1. In 2020, most parameters at BH16-3D exhibited declining or stable trends including iron, manganese, sodium, TDS, DOC. Parameter concentrations have been slightly increasing for calcium and a spike in barium occurred in November.

Historically, most LIPs at DP3 have been elevated in comparison to the shallow background well OW17-3. This monitor has been impacted by a weak leachate signature and road salt impacts from Fire Route 23. Concentrations have also fluctuated seasonally, significantly in many cases. Despite the weak leachate signature, the water quality at drive point DP3 has been better than that of monitors OW14-2 and OW9, up-gradient between the drive-point and refuse area. This confirmed natural attenuation was occurring at the Site. Concentrations at DP3 were generally consistent with historical results in 2020.

DP4-R has been impacted by road de-icing activities, the overlying organic environment, and has had a weak leachate signature similar to that of DP3. Since installation, the following parameter concentrations have been increasing: conductivity, hardness, chloride, barium, calcium, iron, lead, manganese, sodium, TDS, and zinc. Conversely, DOC concentrations have decreased. Continued monitoring is recommended to understand the seasonal and annual variations at this monitor, as well as define the source of the impacts.

The water quality at monitor BH16-2 exhibited increasing trends in parameters associated with road salt including calcium, chloride, sodium, hardness, and TDS after declining throughout 2016 and 2017 (since installation). In contrast, the water quality at monitor BH16-3S shows high variability with concentrations in 2020 decreasing from peaks reported in 2019 for conductivity, chloride, barium, calcium, and sodium. Although these monitors were exhibiting a weak leachate signature similar to the one at up gradient DP3, due to the proximity of these monitors to County Road 36, it is not unexpected that the initial water quality analysis indicated these monitors were being impacted by road salt activities. Further monitoring is required to better characterize the water quality at these locations.

4.2.6 Groundwater Quality South of County Rd 36 (CAZ-4)

Water quality at OW19-1 and OW19-2 exhibited elevated concentrations of DOC, barium, iron, and manganese, which were not unexpected as the monitors are in a wetland area. Additionally, elevated concentrations of chloride, sodium, and TDS have indicated minor road salt impacts. Water quality at these monitors is not impacted by the Site. Concentrations at both wells in 2020 were consistent with historical results.

4.2.7 Groundwater VOC Monitoring

Volatile organic compound (VOC) analysis was completed during the spring sampling event at the monitoring wells listed in Table 1. Consistent with historical results, benzene and 1,4-dichlorobenzene were detected at OW16 and OW12-2, respectively. All other VOC parameter concentrations were less than RDLs. Refer to Table 6 for a summary of VOC results.

4.2.8 Summary of Groundwater Quality

Overall, monitoring wells in contaminant attenuation zones CAZ-2 and CAZ-3, directly down-gradient of the waste footprint were impacted by a weak leachate signature. The elevated LIP concentrations were less than those from leachate monitors up-gradient indicating that natural attenuation was occurring at the Site.

Impacts at monitors DP1, DP2-R, DP4-R, and BH16-4S/D may be attributed in part to the Site; however, some elevated parameter concentrations were also attributed to the organic environment in the PSW (i.e., peat, saturated soils, etc.).

Monitoring wells proximal to roadways, especially County Road 36, exhibited elevated concentrations of parameters such as chloride, sodium, and TDS, attributed to road de-icing activities. This includes monitoring wells such as BH16-4S, BH16-4D, BH16-2, BH16-3S, and BH16-3D. DP3 and DP4-R have also exhibited road salt impacts.

Monitors OW19-1 and OW19-2 are installed south of County Road 36 in rich organic environments (i.e., organic soil, wetland). Elevated concentrations of DOC, iron, and

manganese were attributed to the organic soils. No impacts from the Site were evident at these locations. Similarly, no impacts from the Site were evident at BH16-1.

Given that the BH16 series wells were installed in 2016, there is limited data available for water quality evaluation especially as some of these wells continue to stabilize.

4.2.9 Groundwater Compliance Assessment

The Ministry's RUC (MOEE, 1994a) applies to operating waste disposal sites and sites closed post-1986. As the Site closed in 2001, the RUC applies to the Site.

Based on the existing hydrogeological model of the Site, shallow leachate impacted groundwater discharges to the surface water systems on and down-gradient of the Site. As dictated by the RUC, where groundwater provides baseflow to a surface water feature, this is the recognized reasonable use of the groundwater. Therefore, management approaches should be focused on the receiving surface water feature. As such, compliance with Ministry policies for the protection of the environment should be focused to the surface water systems; refer to Section 4.3.

With possible baseflow discharging off-site (to the CAZ), there is also potential for impacted groundwater to flow west and south from the waste mound and leave the Site prior to discharging to surface. To ensure appropriate actions are in place to respond to any potential degradation in groundwater quality beyond an acceptable level, site-specific trigger levels have been developed for the Site. These are the RUC values developed in accordance with Ministry Guideline B-7 (MOEE, 1994a). The Ministry Guideline B-7 states that, in accordance with the appropriate criteria for particular uses, a change in quality of the groundwater on an adjacent property will be accepted only as follows (Ministry Procedure B-7-1):

> *The quality cannot be degraded by an amount in excess of 50% of the difference between background and the Ontario Drinking Water Standards (ODWQS) for non-health related parameters and in excess of 25% of the difference between background and the ODWQS for health-related parameters. Background is considered to be the quality of the groundwater prior to any man-made contamination.*

The maximum concentration of a particular contaminant that is considered acceptable in the groundwater beneath an adjacent property is calculated in accordance with the following relationship:

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

Where:
- C_m = maximum concentration accepted
- C_b = background concentration
- C_r = maximum concentration permitted in accordance with the ODWQS
- x = a constant that reduces the contamination to a level that is considered by the Ministry to have a negligible effect on water use.
  i.e. 0.5 for non-health related parameters
  0.25 for health-related parameters.

The RUC values were calculated using the median value of the background concentration (C_b) from a minimum of the previous five sampling events as required by Ministry Eastern Region Technical Support Section. Where background concentrations were less than the laboratory RDL, the RDL was used as the background concentration. Where the background concentrations exceeded ODWQS, the C_b value was set as the RUC value. The calculated C_m values for the Site were set as the RUC values.

The RUC values were calculated for all of the LIPs identified for the Site, as defined in Embedded Table 5, that have an ODWQS. The RUC assessment included monitoring wells along the perimeter of the CAZ and included: OW19-1, OW19-2, DP1, DP2-R, BH16-1, BH16-2, BH16-3S, BH16-3D, BH16-4S, and BH16-4D, as well as background wells OW17-1 and OW17-3 for reference. The RUC exceedances are in Table 4 and Table 5, and summarized in Embedded Table 6.

Embedded Table 6 Groundwater RUC Exceedances

Shallow Monitor	RUC Exceedance
OW17-3 (Background)	None
DP1	TDS, DOC, iron, manganese
DP2-R	TDS, hardness, barium, iron, manganese
BH16-2	TDS, chloride, hardness, sodium
BH16-3S	TDS, chloride, barium, sodium, DOC
BH16-4S	TDS, chloride, hardness, manganese, sodium
OW19-2	DOC, barium, iron, manganese
Deep Monitor	
OW17-1 (Background)	None
BH16-1	Manganese
BH16-3D	TDS, barium
BH16-4D	TDS, chloride, hardness, barium, iron, manganese
OW19-1	DOC, barium, iron, manganese, TDS

The exceedances noted above were not indicative of site related impacts. As discussed in Sections 3.2 and 4.2, exceedances were attributed to the proximity of monitors to roads and to naturally occurring conditions at the Site. The farthest down-gradient wells (OW19-1 and OW19-2) were not interpreted to be impacted by the Site and elevated concentrations were attributed to naturally occurring conditions (i.e., DOC, barium, iron, and manganese).

As additional data becomes available, a source characterization assessment is recommended (e.g., statistical analysis, Piper diagrams), to attempt to discern between leachate impacts and other sources of elevated concentrations.

Based on the assessment in 2020, the Site complied with the intent of Guideline B-7 (MOEE, 1994a). As the Site met the RUC in 2020, no additional actions or reporting under Condition 81 of the ECA were required.

4.2.10 Residential Water Quality

Residential wells included in the annual monitoring program are PW1, PW2, and PW3 Figure 3. Historically, two samples were collected at residential well PW3: one treated sample and one untreated sample. Only raw samples have been collected since 2017. No residential

wells were sampled during the 2020 monitoring program due to COVID-19. Residential well water quality results from 2011 to 2019 are in Table 7.

Historically, PW1 exhibited ODWQS exceedances for iron, manganese, and DOC (seasonally) and had trace concentrations for various metals. Exceedances of the ODWQS have been rare at PW2 and historically only DOC exceeded the criteria. The water quality at residential well PW3 has exhibited intermittently elevated concentrations of TDS, DOC, chloride, manganese, and sodium, and persistently elevated iron concentrations often exceeding the ODWQS.

In 2019, VOC analysis was completed on residential wells PW1 and PW3 (raw) during the spring sampling event. All VOC parameter concentrations were less than RDL (Table 6).

Elevated concentrations during the 2019 monitoring events were not attributed to the Site, but rather naturally elevated concentrations in the area. Given the distance of the residential wells from the Site and the depth to a suitable water supply aquifer, no adverse impacts from the Site are expected.

4.3 Surface Water Quality

The 2011 to 2020 surface water quality data are in Table 8. Data between 2003 and 2010 is included digitally in the report package. The surface water data have been compared with background water quality and historical data, and compliance was assessed using the PWQO (MOEE, 1994b).

4.3.1 Background Surface Water Quality

Water quality at SW11 has historically exhibited elevated concentrations of alkalinity, TDS, conductivity, COD, hardness, and total phosphorous. Water quality at SW11 was consistent with historical results in 2020. Total phosphorus and DO (low) did not meet the PWQO in November.

4.3.2 Surface Water Quality West of Waste Footprint (CAZ-1)

SW1 and SW3 have historically exhibited elevated concentrations for many LIPs including conductivity, TDS, chloride, ammonia, boron, and iron, compared to SW11. Concentrations at

both locations have been stable overtime. Consistent with historical results, boron exceeded the PWQO in the spring 2020 and DO (low) and unionized ammonia did not meet the PWQO in April at SW1. Boron exceeded the PWQO at SW3 in April.

4.3.3 Surface Water Quality Southwest of Waste Footprint (CAZ-2)

Due to the proximity of SW9 and SW10 to County Road 36, road de-icing activities have impacted these locations, evidenced by elevated concentrations of chloride and TDS. Elevated concentrations of iron have been attributed to the saturated organic soils.

Historically, water quality at SW9 and SW10 have been similar, with the exception of elevated conductivity, TDS, and hardness at station SW9. Regardless, with the exception of TDS, chloride, iron, and conductivity, average concentrations at SW9 and SW10 have been of similar or better quality than background SW11. Elevated concentrations have been attributed to the saturated organic soils, impacts from road de-icing activities on the County Road, and some influence from mineralogical composition of the overburden soils. Overall, site related impacts have not been identified at these locations.

Minor seasonal fluctuations were observed within a stable range for SW9 and SW10 in 2020. Boron and iron concentrations at both SW9 and SW10 have decreased since 2018. Consistent with historical results, SW9 exceeded the PWQO for phosphorus in November. No other PWQO exceedances were noted at these stations.

4.3.4 Surface Water Quality South of Waste Footprint (CAZ-3)

SW2 was not sampled in 2020 (Section 2.3). Water quality at SW2 has been similar to that SW11, with the exception of slightly elevated chloride, iron, and COD attributed to natural conditions and road salting. SW2 showed stable to decreasing concentration trends, with no PWQO exceedances in 2019. This location has not been impacted by the Site.

Water quality at SW4 and SW5 has been characterized as having minor impacts from road de-icing activities and elevated iron attributed to organic rich soils. In 2020 water quality at SW4 was consistent with historical results, including total phosphorus and DO (low) not meeting the PWQO in November. Water quality at SW5 remained stable with no PWQO

exceedances or increasing concentration trends in 2020. Iron concentrations at SW5 have decreased since 2018. These locations have not been impacted by the Site.

4.3.5 Surface Water Quality South of County Road 36 (CAZ-4)

SW7 is characterized by elevated concentrations of COD, chloride, ammonia, TKN, iron, and total phosphorus compared to SW11. Given SW7 is adjacent to Fire Route 21 and in a wetland, the elevated parameters were not unexpected or attributed to leachate impacts.

Several parameters were elevated in 2020 compared to historical results including barium, cadmium, copper, iron, lead, phosphorus, zinc, hardness, TDS, and TKN. The PWQO for cadmium, copper, iron, total phosphorus, lead, zinc, and DO (low) were not met at SW7 during one or more sampling events in 2020. Many of these parameters are not leachate indicators and are reported at concentrations which exceed those reported in the leachate wells. Field notes indicated SW7 sample in April was brown, opaque, and swampy. It is inferred that the variations were due to sediment in the sample and the difficulty sampling the shallow ponded surface water location.

Overall, the water quality at this location is considered representative of the natural wetland environment and is not impacted by the Site.

4.3.6 Surface Water Quality Off-site

The water quality at SW6 and SW8 have been similar to stations SW4, SW5, and SW7, and in many cases better than SW11. Similar to station SW7, elevated iron concentrations and minor road salt impacts have been at these locations. In November, water quality exceeded the PWQO for phosphorus at SW6 and SW8. Iron and DO (low) also did not meet the PWQO at SW8 in November.

4.3.7 Summary of Surface Water Quality

All down-gradient and downstream surface water stations are in low lying, generally ponded areas, underlain by saturated organic soils; therefore, elevated concentrations of ammonia, TKN, total phosphorus, iron, manganese, and other trace metals were not unexpected

(Bendell-Young, 2003). Many locations were also impacted by road de-icing activities given their proximity to roadways/driveways.

Given that monitoring station SW11 is immediately adjacent the waste mound, the water quality at this location has historically been scrutinized as to whether it represents background water quality at the Site. In 2019,a review of average concentrations at all stations indicated parameter concentrations at station SW11 were generally consistent with the down-gradient/downstream concentrations that were not impacted by the Site (e.g., SW4, SW5, SW6, SW8, SW7, SW9, and SW10) (Cambium, 2019).

SW1 is immediately adjacent the waste site; therefore, impacts at this location were expected. At station SW3, the only parameter concentrations that have persistently exceeded the PWQO have been iron and total phosphorus, which were attributed to natural wetland environments and not impacts from the Site. No other surface water locations were adversely impacted by the Site.

Based on the above, the Site was not interpreted to be impacting the surface water systems much beyond the immediate waste footprint and no adverse impacts to the down-gradient/downstream LBL Complex PSW were expected.

In July 2020, comments received from the Ministry supported Cambium's assessment of surface water quality surrounding the Site and recommendation to reduce the number of surface water monitoring locations Appendix B.

4.4 Landfill Gas

LFG, specifically methane and carbon dioxide, is derived from the decomposition of organic wastes. Production of LFG from landfilled wastes normally reaches a maximum rate approximately two years after placement and may continue at this rate for many years. The biological decomposition process results in the generation of LFG until some period, likely decades, after the landfilling of that waste ceases.

LFG was monitored at the on-site groundwater wells in April and November 2020. Methane was observed at 0.19% methane by volume at OW14-2 and concentrations less than 0.05%

methane by volume at all other locations. Landfill gas concentrations show a decreasing trend at OW14-2 over the past 3 years. Landfill gas monitoring results are provided in Table 9.

4.5 Adequacy of Monitoring Program

The existing monitoring program is reviewed annually to determine if it sufficiently monitors impacts at the Site. Following an assessment of the monitoring program in 2017 and 2018, recommendations were made to amend the groundwater and surface water monitoring programs at the Site (Cambium, 2018) (Cambium, 2019). In 2020, the Ministry Technical Support Section provided responses to both surface water and groundwater recommendations (Appendix B). Their responses are summarized below.

- The Ministry agrees that OW12-1, OW12-2, OW14-1, and OW14-2 should be removed from the water quality monitoring program and should continue to be maintained for water elevation readings and that the frequency of VOC monitoring should be reduced to every five years.
- The Ministry agrees with the recommendation to remove SW8, SW2, SW4, and SW5 from the monitoring program.

The Municipality submitted an ECA amendment application to the Ministry on October 28, 2020 to formally recognize these changes. The application was received; however, no approval has been received as of the date of this report. The existing monitoring program will continue as approved until an amended ECA for the Site is received.

No further recommendations were made following the 2020 assessment.

5.0 Site Operations

This section presents a summary of 2020 operations at the Site. The requirements of ECA Condition 82, related to the Transfer Station operation are addressed as follows:

- a monthly balance of waste received and transferred from the Transfer Station (Table 10)
- a summary of any rejected wastes (Section 5.6)
- a summary of any incidents (Section 5.5)
- a summary of complaints received (Section 5.5)
- any changes to the Site Operations and Maintenance Manual and/or the Transfer Station Safety and Emergency Response (Contingency) Plans since the last annual report (Section 5.9)
- any changes to the Design and Operations Report that have been approved by the Director since the last Annual Report (Section 5.9)
- a statement as to compliance with all conditions of the ECA, a description of any operational changes and/or Transfer Station improvements undertaken and all other operational issues (Sections 5.9 and 5.10)
- any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site and during the facility inspections and any mitigative actions taken (Section 5.4)

Furthermore, this section discusses the findings of the Non-Hazardous Waste Transfer Processing Report completed on March 4, 2020 by Senior Environmental Office Gary Muloin. The Municipality submitted an Action Plan to the Ministry on September 8, 2020 in response to the inspection report (Appendix B).

5.1 Site Access and Security

The Site was well screened by surrounding forest and thick vegetation. Site access was controlled from Dump Road by a chain linked fence which was in good repair in 2020. Access

is only permitted during operational hours and with the presence of a site attendant and an access card (provided to all tax paying residents of the Municipality).

Signage was posted at the gate, which lists the ECA number, hours of operation, emergency contact information, acceptable wastes, site rules, and a bear advisory.

The hours of operation in 2020 were:

Summer (May 1 to September 30)

Wednesday, Thursday, Saturday ..... 8:00 AM to 4:30 PM

Sunday and Holiday Monday ..... 12:00 PM to 8:00 PM

Winter (October 1 to April 30)

Wednesday, Saturday ..... 8:00 AM to 4:30 PM

Sunday and Holiday Monday ..... 12:00 PM to 5:00 PM

5.2 Site Operation

All transfer operations were conducted under the supervision and direction of the site attendant, employed by the Municipality. The site attendant was responsible for ensuring that the safe and orderly operation and maintenance of the Site complied with the requirements of the ECA and the Environmental Protection Act and its Regulations as administered by the Ministry. The site attendant's responsibilities included, but were not limited to the following:

- controlling admission of authorized vehicles with acceptable wastes
- ensuring proper daily litter control
- controlling collection and haulage of materials by a licensed hauler
- maintaining daily records of all operations which are available for inspection by the Ministry

As part of the daily operation of the Site and outlined in the Standard Operating Procedures (MTL, 2020b), the site attendant used the following forms on each operating day, as applicable:

- TS-1 Daily Inspection Form

- TS-2 Issues and Deficiencies Forms
- TS-3 Daily Incoming Waste Form
- TS-4 Tipping Fee Form
- TS-5 Tire Form
- TS-6 Reuse Centre Form
- TS-7 Unaccepted Refused Waste & Entry Form
- TS-8 Complaint Form
- TS-9 Daily Record of Waste Removed Form

5.3 Training

Training was limited due to the COVID-19 pandemic in 2020. A site attendant meeting was held on October 1, 2020 to complete a WHMIS refresher, discuss policies on wearing face masks in the workplace, and how to sanitize tools and equipment. Furthermore, an Action Item listed in the Ministry inspection required that annual training be completed on the ECA and the *Transfer Station, Safety, Emergency, and Spills Procedures* (MTL, 2020a) for all transfer station employees as per ECA Condition 67(b) and (j). Training was completed in conjunction with the October 1 meeting. Employees signed an “Acknowledgement and Understanding” form to acknowledge the training.

In 2019, semi-annual meetings were held with site attendants and municipal staff that operate and/or are responsible for transfer station operations. The following items are covered by these meetings:

- site operating responsibilities
- receiving and recording procedures
- storage, handling, sorting and shipping procedures
- equipment inspection, operation and maintenance procedures

- housekeeping and nuisance control procedures
- site inspection procedures
- occupational health and safety concerns (related to waste)
- complaint response procedures
- procedures to be followed in the event of a spill, fire medical or other emergency
- as required by Condition 67 (b) of the ECA, a review of the ECA

In addition to the semi-annual training/meeting, the following training was provided to site attendants in 2019:

- Paintball Gun Training (for bear deterrence)
- Fire Extinguisher Awareness Training
- Lifting Loads Safely

A record is kept of all staff who attend the meetings and/or training.

5.4 Site Inspections

The following section discusses observations made by Cambium and the Township in 2020.

Daily site inspections of on-site equipment and facilities were completed by the site attendant, as per Conditions 49, 50, and 71 of the ECA. Records of these inspections are kept on-site.

There were no environmental and/or operational problems that were negatively impacting the environment observed by Cambium or the Municipality during site inspections in 2020.

5.4.1 Litter Control

As noted by Cambium staff, the Site was in good condition. Minimal evidence of blown litter was observed during the site visits completed in 2020.

The intent of good housekeeping practices is to protect on-site worker health and safety, and the surrounding environment from nuisance effects. Nuisance effects are minimized by

adopting good housekeeping measures as part of the Site operations. Regular housekeeping is essential to control such nuisances as:

- Blowing and loose litter
- Odour
- Rodents and insects
- Scavenging birds

5.4.2 Access Road

The access road has sufficient width at the entrance and within the Site to allow unimpeded winter travel and access for emergency and snow removal equipment. The Site access roads was well maintained and graded (as needed) and were reported to be regularly cleared of snow with a sand mixture applied as needed by the Municipality during the winter months.

5.4.3 Final Cover Integrity

The waste mound was adequately covered and there was minimal evidence of erosion observed from the areas accessed during visits in 2020. Furthermore, the waste mound was well vegetated, which is an effective erosion control measure. No seeps were identified during any site visits conducted by Cambium staff in 2020.

5.5 Complaints and Incidents

According to the Municipality, complaints were received from residents in regards to the site rules.

Minor incidents were reported based on inappropriate behavior of the residents caused by the site rules. Several incidents of trespassing were reported where items were stolen from the Site. In the event that the incident was major in nature (e.g., illegal dumping, large quantities stolen from Site) then the Ontario Provincial Police were notified.

During a windstorm in November, the alcohol collection bin was lifted from its staging area and almost struck an employee. As reported by the Municipality, the appropriate paper work was completed and corrective actions were taken.

A record of all complaints and incidents are kept on file at the municipal office.

5.6 Waste Refusals

The Municipality has a Clear Bag Policy. Any garbage bag that had any visible blue box materials, MHSW, or more than 20% divertible items (i.e., blue box recyclables, clothing, organics, waste electrical electronic equipment (WEEE)), is not accepted at the Site. The site attendant is required to fill out the "TS-7 Unaccepted Refused Waste and Entry" form as detailed in the Municipal document *Transfer Station Standard Operating Procedures* (MTL, 2020b). The Municipality keeps these forms on file. As noted by the Municipality, there is an increase in waste refusals during the summer months.

5.7 Monitoring Well Security

As part of the 2020 groundwater monitoring program, every monitoring well listed in Table 1 was inspected for compliance with Reg. 903. A new lock was installed on monitoring well BH16-2 in 2020. Following the installation of a new lock all monitors complied with Reg. 903. Refer to Appendix E for photographs of the monitoring wells.

5.8 Materials Summary

The following waste types are accepted at the Site; refer to Figure 4 for the collection locations of each material.

- Household Waste
- Construction and Demolition Materials (C&D)
- Bulky Items
- Blue Box Recyclables
- MHSW (County)
- Limited MHSW
- Leaf and Yard Waste
- Source Separated Organics
- Scrap Metal
- Tires
- WEEE
- CFC Appliances

The Township reported that only household waste and blue box recyclables were accepted at the Site from March 17 to June. This was a precaution caused by the Covid-19 pandemic. Restrictions were slowly lifted and additional waste types were once again accepted at the Site.

In 2020, Waste By-Law B2020-031 was established to maintain and regulate the disposal of waste and divertible materials at all transfer stations owned by the Municipality. Minor housekeeping issues were addressed and fees were removed. Fees are now detailed in the Fees and Charges By-Law.

As noted in Section 1.2, the County operated MHSW depot is open seasonally, under ECA No. A710166. Details of the MHSW depot operations and detailed waste quantities are reported under separate cover by the County.

Condition 36 of the Site ECA defines the limited quantities and types of MHSW that can be accepted at the Site during the remainder of the year as follows:

- a maximum of 50 vehicular batteries
- a maximum of 20 compressed gas tanks at a weight of greater than one pound each and/or 30 tanks weighing less than or equal to one pound
- a maximum of one 250 L drum of lithium, dry cell and/or rechargeable batteries
- a maximum of one 250 L capacity container for the bulk collection of empty motor oil containers
- a maximum of 50 units of fluorescent light bulbs

In 2019, the Municipality finished relocating the MHSW depot to the west of the exit gate. To accommodate the relocation, the WEEE storage bin was relocated to the former location of the MHSW depot and the bottle drive collection bin was relocated to the southwest corner of the fibre collection area (Cambium, 2020). Refer to Figure 4 for the existing transfer station plan.

In 2020, the Ministry identified the relocation of the MHSW depot as a contravention of the Site ECA (Appendix B). As a result, the Township submitted an ECA amendment application to

request the flexibility to revise the site layout with District Office approval opposed to Director approval and the requirement for an ECA amendment. The application was received; however, no approval has been received as of the date of this report.

5.8.1 Site Usage

Site usage, as documented by the Municipality, is summarized in Embedded Table 7. Waste collected is transferred to the Peterborough Waste Management Facility. Refer to Table 10 for a monthly summary of materials accepted and transferred at the Site.

Embedded Table 7 Summary of Site Usage

	2020	2019	2018	2017
Vehicles – Private	35,912	34,148	31,570	35,089
Bags of Garbage	49,708	41,370	37,280	39,476
Waste – Tonnes[1]	502.76	422.11	437.84	493.4
C&D Materials[2,3] - Tonnes	73.4	99.32	117.54	-

Notes:

1. *85 bins transferred to the Peterborough Waste Management Facility.*
2. *C&D materials tonnages unreported in 2017.*
3. *C&D material tonnage provided by Waste Connections.*

5.8.2 Site Diversion

Embedded Table 8 provides a summary of the materials diverted from the Site in 2020, as reported by the Municipality and the County of Peterborough. Additionally, 180.9 tonnes of brush and lumber were accepted at the Site in 2020 which was chipped and used as cover for rehabilitation on Municipal properties. The Township began tracking incoming recyclable material quantities on May 1, 2020 to meet the requirements detailed in ECA Condition 73 and as required by the Ministry inspection (Appendix B).

Embedded Table 8 Summary of Diverted Materials

Material	Tonnes
Blue Box	
Plastic Containers	119.9
Fibres	65.75
Cardboard	53.24
Scrap Metal and White Goods	52.17
Single Source Organics	47.85
Textiles	2.95
WEEE	22.26
Empty Oil/Anti-freeze Containers	0.18
TOTAL	**364.30**
Material	**Unit**
Alcohol Containers	60,275
Tires	722

5.8.3 Municipal Wide Diversion

In 2020, the County did not operate the Buckhorn MHSW depot due to COVID-19. As noted in Section 5.8, in addition to the seasonally operated County MHSW Depot, the Site is approved to accept limited MHSW (Condition 36), as are various transfer stations in the Municipality including the Bobcaygeon, Cavendish, and Crystal Lake sites. Embedded Table 9 provides a summary of the limited MHSW accepted at these sites 2020. In 2020, car batteries and fluorescent tubes were only accepted at the Bobcaygeon, Cavendish and Crystal Lake sites, not at the Buckhorn Transfer Station.

In 2020, the annual Environmental Day hosted by the County was cancelled due to the COVID-19 pandemic. Typically, this annual event would allow residents to dispose of the following items: polystyrene, media and car seats, hard cover books, and mattresses.

Embedded Table 9 Summary of Limited MHSW Collected - Municipality

MHSW	Municipal Wide (Tonnes)
Batteries	0.81
Florescent Tubes	0.16
Car Batteries	1.20
TOTAL	**2.17**

5.9 Site Documentation Reviews and Updates

The following documents are maintained by the Municipality, reviewed annually, and updated as required. Copies of each of these documents are included with this report digitally.

- Current Design and Operations Plan (Condition 54 of ECA), consisting of:
    - Environmental Compliance Approval application, dated May 10, 2016, and includes the Design & Operations Report and supporting documentation (Item 5 of Schedule A)
    - Correspondence dated May 10, 2016 re: description of proposed changes sought under the application to amend ECA No. A341301 including the Existing Site Conditions and Figure 2- Proposed Site Layout, dated May and April 2016, respectively (Item 6 of Schedule A)
    - email correspondence from Cambium, with updated Figure 2 - Proposed Site Layout, dated September 8, 2017 (Item 7 of Schedule A)
- *Municipality of Trent Lakes – Transfer Station Standard Operating Procedures* (MTL, 2020b)
- *Municipality of Trent Lakes – Transfer Station Safety, Emergency and Spills Procedures* (MTL, 2020a)

Specifically,

- No changes were made to the Design and Operations Plan in 2020.

- The Standard Operating Procedures were reviewed and updated on October 1, 2020. Minor changes were made to identify the staging area for ashes, changes to the haulers for textiles and blue box recyclables, and the handling of loose waste.
- The Emergency and Spills Procedure was reviewed on November 26, 2020. As a result of the Ministry site inspection the following changes were made: clarification stating that all fires must be reported to the Ministry, contact information for the Spills Action Centre, and an “Acknowledgement and Understanding” sign off page was added. Furthermore, Municipal contact information was updated.

No changes were made to the transfer station, facility, or equipment in 2020.

5.10 Compliance with Ministry Approval

An application was submitted by the Township on July 29, 2020 to amend the ECA to reflect the new location of the MHSW depot as well as approved changes to monitoring program. No approval has been granted for this amendment as of the date of this report.

6.0 Conclusions and Recommendations

Based on the 2020 monitoring program, Cambium offers the following conclusions regarding the Buckhorn waste transfer station.

- Results of the groundwater elevation monitoring indicated the shallow and deep aquifers continued to flow to the southwest, consistent with historical results. All nested wells exhibit upward to neutral vertical hydraulic gradients.
- Given the presence of a PSW immediately adjacent the Site (persistently wet and ponded area) and upward vertical gradients, it is expected that at least a portion of the shallow aquifer discharges to surface within the CAZ at the Site.
- Leachate is characterized at the down-gradient shallow monitors OW9, OW12-2, and OW14-2 and the deep monitors OW12-1, OW14-1, and OW16.
- Site related impacts have been at immediate down-gradient groundwater drive-point piezometer DP3. Impacts at DP1, DP2-R, and DP4-R may be attributable to the Site, in part; however, some elevated parameter concentrations were also attributed to both the organic environment in the PSW (i.e., peat, saturated soils, etc.) and the geochemistry of the bedrock and overburden.
- Elevated concentrations at monitors OW19-1 and OW19-2 were naturally elevated and not attributed to the Site.
- Given the limited data available for the remaining down-gradient wells (i.e., the BH16 series perimeter wells), a conclusive assessment could not be completed. The initial assessment indicated road salt impacts were evident at all wells and naturally elevated concentrations related to saturated organic soils were at wells BH16-1, BH16-4S, and BH16-4D.
- Review of groundwater quality data indicated the Site complied with the intent of Ministry Guideline B-7 (MOEE, 1994a)
- The results of the surface water monitoring program indicated that site-related impacts were occurring at stations SW1 and SW3. Although impacts were at these locations, most

parameters complied with the PWQO. All remaining surface water locations were either un-impacted or exhibited elevated parameter concentrations attributed to road salt impacts and/or natural sources. Based on this assessment, the Site was not interpreted to be adversely impacting the down-gradient/downstream LBL PSW.

- Municipal and County records indicated 502.76 tonnes of waste, 47.85 tonnes of organics, 73.4 tonnes of construction and demolition wastes, 238.89 tonnes of containers, fibres, and cardboard, and 77.56 tonnes of various other materials were accepted and transferred off-site. Not included in these tonnages were, 180 tonnes of brush, 722 tires, and 60,275 alcohol containers.
- The Municipality operated the Site in compliance with the ECA with the exception of a minor non-compliance issue including relocation of the MHSW and some daily record keeping requirements. An action plan was submitted by the Township to address these issues.

Based on the 2020 monitoring program, the following recommendations are provided:

- The groundwater and surface water monitoring program should be continued in 2020 in accordance with appended Table 1 until written approval from the Director is received for the recommended reductions.
- Annual reporting should continue in accordance with Conditions 80 and 82 of the ECA.

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Glossary of Terms

Active Face/Area
The portion of the landfill facility where waste is currently being deposited, spread and/or, compacted prior to the placement of cover material.

Adverse Environmental Impact
Any direct or indirect undesirable effect on the environment resulting from an emission or discharge that is caused or likely to be caused by human activity.

Annual Report
Report documenting the results of water quality, environmental quality, and operations monitoring for the year, or for a period as prescribed in the Certificate of Approval.

Approved Design and Operations Plan
The design of a landfill site and its facilities which have been submitted along with the application documents for which formal Ministry approval has been issued through the Certificate of Approval.

Approved Site or Facility
A landfill site/facility for which there is an existing and current Certificate of Approval.

Aquifer
A geologic unit (soil or rock) that contains sufficient saturated permeable material to yield measurable quantities of water to wells and springs.

Attenuation
Natural process through which the concentrations of landfill generated contaminants are reduced to safe levels.

Borehole
A hole drilled for soil sampling purposes.

Buffer Area
An area of land situated within the peripheral area surrounding an active filling area, but limited in extent to the property boundary, assigned to provide space for remedial measures, contaminant control measures, and for the reduction or elimination of adverse environmental impact caused by migrating contaminants.

Certificate of Approval
The license or permit issued by the Ministry for the operation of a landfill site. Issued to the owner of the site with conditions of compliance stated therein.

Contaminant
A compound, element, or physical parameter, usually resulting from human activity, or found at elevated concentrations that have or may have a harmful effect on public health or the environment.

Contaminant Migration Path
Route by which a contaminant will move from the site into adjacent properties or the natural environment. Usually a route that offers the least resistance to movement.

Contamination Attenuation Zone
The zone beneath the surface, located beyond the landfill site boundary, where contaminants will be naturally attenuated to predetermined levels. Also, see Reasonable Use Policy.

Contingency Plan
A documented plan detailing a co-ordinated course of action to be followed to control and remediate occurrences such as a fire, explosion, or release of contaminants in an uncontrolled manner that could threaten the environment and public health.

Cover Material
Material approved by the Ministry that is used to cover compacted solid waste. Usually, a soil with suitable characteristics for specific end-use.

Site Development Plan and Operations Report
Development and Operations Plan or Report is a document detailing the planned sequence of activities through the landfill site's active life, the control systems, site facilities and monitoring systems that are necessary. This document is required for obtaining a Certificate of Approval.

Design Capacity
The maximum amount of waste that is planned to be disposed of at a landfill site.

Detection Limit
Concentration under which a parameter cannot be quantitatively measured.

EAA or EA Act
Environmental Assessment Act, Revised Statutes of Ontario, 1990. One of the primary acts of legislation intended to protect, conserve, and wisely manage Ontario's environment through regulating planning and development.

Environmental Compliance Approval
The license or permit issued by the Ministry for the operation of a landfill site. Issued to the owner of the site with conditions of compliance stated therein.

EPA
Environmental Protection Act, Revised Status of Ontario, 1990. EPA is another of the primary pieces of Provincial legislation governing the protection of the natural environment of the Province.

Evapotranspiration
The evaporation of all water from soil, snow, ice, vegetation and other surfaces, including the water absorbed by plants, that is released to the atmosphere as vapour.

Fill Area
The area of a landfill site designed and designated for the disposal of waste.

Final Cover
Soil material or soil in combination with synthetic membranes, overlain by vegetation in a planned landscape, placed over a waste cell that has reached the end of its active life.

Groundwater
Subsurface water that occurs beneath the water table in soils and rocks that are fully saturated.

Hydraulic Conductivity
The rate of flow of water through a cross-section under a specific hydraulic gradient. It is a property of the geologic formation and the fluid, in hydrogeologic applications where the fluid is water (Units of m/day or cm/s).

Hydraulic Gradient
The head drop per unit distance in the direction of flow, the driving force for groundwater flow.

Hydrogeology
The study of subsurface waters and related geologic aspects of surface waters.

Impermeable Fill
Soil material that is placed as filling material that is sufficiently cohesive and fine grained to impede and restrict the flow of water through it.

In situ Testing
Testing done on-site, in the field, of material or naturally occurring substances in their original state.

Landfill Gas
Combustible gas (primarily methane and carbon dioxide) generated by the decomposition of organic waste materials.

Landfill Site
A parcel of land where solid waste is disposed of in or on land for the purposes of waste management.

Leachate
Water or other liquid that has been contaminated by dissolved or suspended particles due to contact with solid waste.

Leachate Breakout
Location where leachate comes to the ground surfaces; a seep or spring.

Limit of Filling
The outermost limit at which waste has been disposed of, or approved or proposed for disposal at a landfill.

Ministry
Ontario Ministry of the Environment, Conservation and Parks.

Monitoring
Regular or spontaneous procedures used to methodically inspect and collect data on the performance of a landfill site relating to environmental quality (i.e., air, leachate, gas, ground or surface water, unsaturated soils, etc.).

Monitoring Well
The constructed unit of casing (riser and screen) installed in a borehole.

Multi-Level Monitoring Well
More than one monitoring well installed at a given test well location.

Native Soil
Soil material occurring naturally in the ground at a location.

Natural Attenuation
Where contaminants are reduced to acceptable concentration levels by natural mechanisms (dilution, absorption onto the soil matrix, etc.), biological action, and chemical interaction.

Occupational Health and Safety Act
The primary act of legislation enacted by Ontario Ministry of Labour to regulate and control the safety in the workplace; also, Occupational Health and Safety Act, Revised Statutes of Ontario, 1990.

Odour Control
Minimizing or eliminating the nuisance and undesirable impact of objectionable or unpleasant odours arising from waste disposal operations.

Open Burning
Burning any matter whereby the resultant combustion products are emitted directly to the atmosphere without passing through an adequate stack, duct, or chimney.

Operations Plan
A document detailing the waste disposal operations in a planned, and if necessary, a staged manner, that ensure compliance with regulatory provisions concerning the operations of a landfill site.

Operator (Site Operator)/Attendant
The individual or organization who, through ownership or under contract, manages and operates a landfill site for the purpose of waste disposal.

Owner
A person, persons, organization, or municipal authority who own a landfill facility or part of a landfill facility, and in whose name the Certificate of Approval for the site is issued.

Percolation
The movement of infiltrating water through soil.

Permeability
Often used interchangeable with hydraulic conductivity, but not strictly correct. Permeability is a property of the porous media only. Dependent upon media properties that affect flow, diameter, sphericity, roundness, and packing of the grains.

Piezometer
A well that intersects a confined aquifer.

Provisional Certificate of Approval (Provisional C of A)
Same as Certificate of Approval.

Reasonable Use Policy
A policy developed by the Ministry to stipulate limits to the level of groundwater quality impairment that may be permitted to occur at site property boundaries, to allow the reasonable use of adjacent properties or land without adversely affecting public health and the environment.

Recharge Zone
An area where precipitation or surface run-off infiltrates into the ground and then, through natural percolation enters an aquifer.

Recycling
Sorting, collecting or processing waste materials that can be used as a substitute for the raw materials in a process or activity for the production of (the same or other) goods. For example, the "Blue Box" system, in-plant scrap handling, or raw material recovery systems. Recycling is also the marketing of products made from recycled or recycled materials.

Reduction (of waste or component of 3Rs program)
Those actions, practices, or processes that result in the production or generation of less waste.

Remedial Action
Corrective action taken to clean-up or remedy a spill, an uncontrolled discharge of a contaminant, or a breach in a facility or its operations, in order to minimize the consequent threat to public health and the environment.

Representative Sample
A small portion of soil, water, etc. which can be subjected to testing and analysis, that is expected to yield results that will reliably represent the identical characteristics of the source of the material or of a larger body of material.

Reuse (component of 3Rs program)
The use of an item again in its original form, for a similar purpose as originally intended, or to fulfil a different function.

Run-off
The part of precipitation (rainwater, snowmelt) that flows overland and does not infiltrate the surface material (soil or rock).

Saturated Zone
The zone of a subsurface soil where all voids are filled with water.

Sedimentation
The deposition of fine grained soil in an undesirable location, caused by the scouring, erosion and transportation of earth materials by surface run-off.

Sensitive Land Use
A land use where humans or the natural environment may experience an adverse environmental impact.

Settlement
The subsidence of the top surface and underlying waste of a landfill or waste cell as a result of densification under its own weight.

Site Capacity
The maximum amount of waste that is planned to be disposed (design capacity) or that has been disposed of at a landfill site.

Site Closure
The planned and approved cessation or termination of landfilling activities at a landfill site upon reaching its site capacity.

Site Life
The period from its inception through active period of waste disposal, to the time when a landfill site reaches its' site capacity, when it ceases to receive any further waste, including and up to closure.

Solid Waste
Any waste matter that cannot be characterized by its physical properties as a liquid waste product.

Solid Waste Disposal Site or Facility
A site or facility such as a landfill site where solid waste is disposed of.

Source Separation
The separation of various wastes at their point of generation for the purposes of recycling or further processing.

Standpipe
A monitoring well that intersects the water table aquifer.

Storm water
Run-off that occurs as a direct result of a storm event or thaw.

Storm water Detention
Control of storm water by the construction of impoundments of structures for the purpose of regulating storm water flows during high intensity rainfall events that would otherwise transport excessive amounts of sediment, cause soil erosion or cause flooding.

Stratigraphy
The geologic sub-structuring, usually layered with different distribution, deposition and age.

Surface Run-off (Drainage)
See Run-off.

Surface Water
Water that occurs at the earth's surface (ponds, streams, rivers, lakes, oceans).

Sub-Soil
Soil horizons below the topsoil.

Test hole
A hole drilled for soil sampling purposes.

Topsoil
The uppermost layer of the soil containing appreciable organic materials in mineral soils. Adequate fertility to support plant growth.

Unsaturated Zone
The zone (also vadose zone) in a porous sub-soil, where the voids are not completely water-filled, but contain some air-filled voids. Limited above by the land surface and below by the water table.

Vector
A disease carrier and transmitter; usually an insect or rodent.

VOC
Volatile organic compounds are those compounds that will readily volatilize (convert from liquid to gas phase) at conditions normally found in the environment.

Waste
Ashes, garbage, refuse, domestic waste, industrial waste, or municipal refuse and other used products as are designated or interpreted by the provisions of the Environmental Protection Act.

Waste Disposal Site (Facility)
Any land or land covered by water upon, into, in or through which, or building or structure in which, waste is deposited or processed and any machinery or equipment or operation required for the treatment or disposal of waste.

Waste Management System
All facilities, equipment and operations for the complete management of waste, including the collection, handling, transportation, storage, processing and disposal thereof, and may include one or more waste disposal sites.

Water Table
The water level attained in a monitoring well, which screens the surficial unconfined aquifer.

Water Balance
Amounts of water to various components in a system so that water entering the system equals the amount of water contained within and discharged out of a system.

Water Level
The level of water in a well.

Well Casing
The pipe that is used to construct a well.

Well Screen
A filtering device used to keep sediment from entering a well.

Wetlands
Areas where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrolytic vegetation, and which have soils indicative of wet conditions.

Abbreviations

RFP	Request For Proposal	**ha**	hectare
Ministry	Ontario Ministry of the Environment, Conservation and Parks	**tonne**	metric ton
MNRF	Ontario Ministry of Natural Resources and Forestry	**t**	metric tonne
ECA	Environmental Compliance Approval	**µS**	microSiemens
EPA	Environmental Protection Act	**ODWQS**	Ontario Drinking Water Quality Standards
EAA	Environmental Assessment Act	**PC of A**	Provisional Certificate of Approval
MW	monitoring well	**PWQO**	Provincial Water Quality Objectives
masl	metres above sea level	**TOC**	Total Organic Carbon
pg	picogram	**VOC**	Volatile Organic Compound
ng	nanogram	**BTU**	British Thermal Unit
µg	microgram	**°C**	temperature in degrees Celsius
g	gram	**N/A**	not available
kg	kilogram	**%**	percent
L	Litre	**cfm**	cubic feet per minute
mg/L	milligrams per litre	**ppmdv**	part per million by dry volume
mm	millimetre	**ppmv**	part per million by volume
m	metre	**ppm**	part per million
km	kilometre	**min**	minimum
m^3	cubic metre	**max**	maximum
m^2	square metre		

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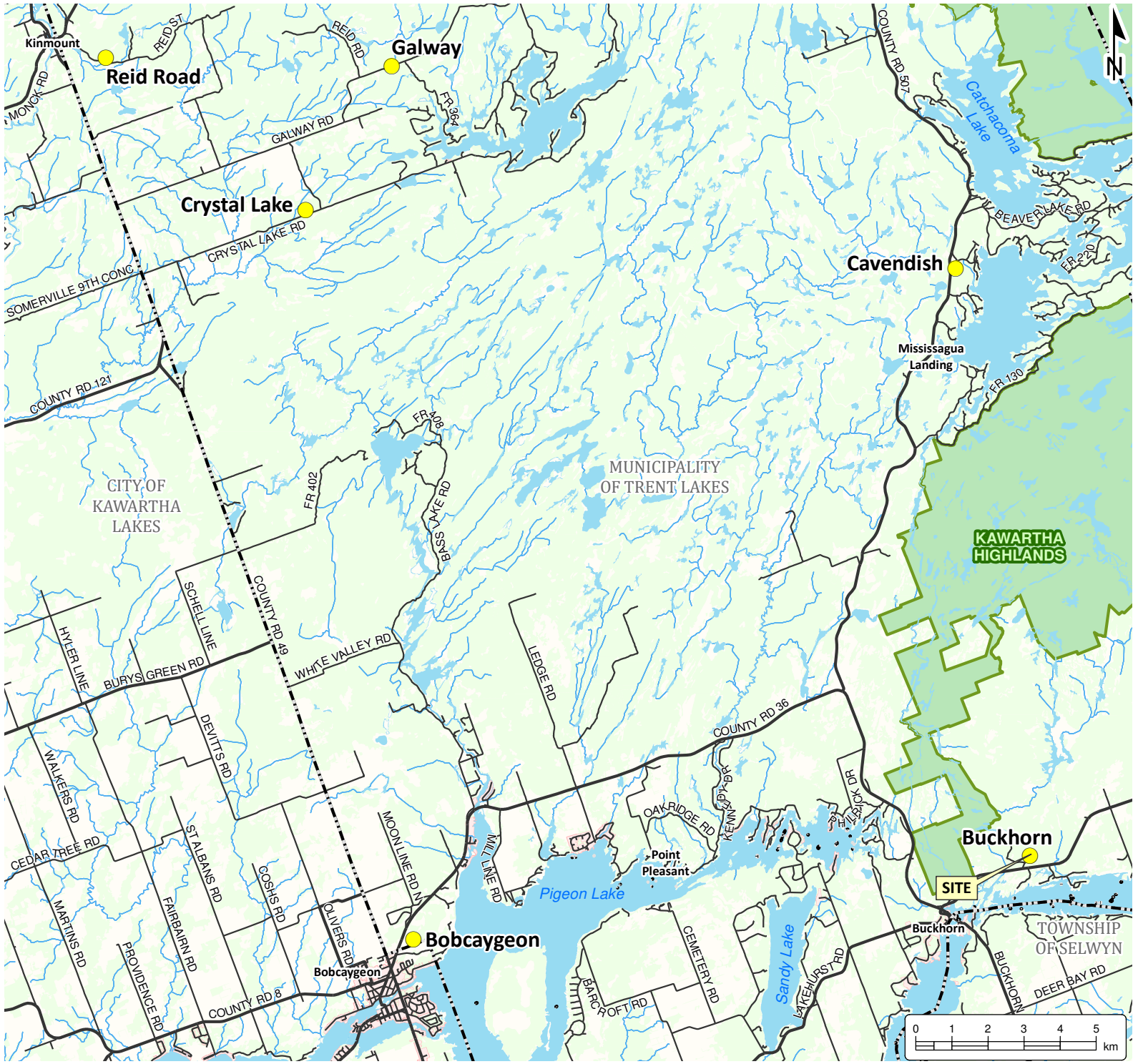
Appended Figures

Figures



BUCKHORN WASTE TRANSFER STATION

37 DUMP ROAD
Buckhorn, Ontario
Municipality of Trent Lakes

LEGEND

- Trent Lakes Waste Disposal Sites
- Major Road
- Minor Road
- Watercourse
- Water Area
- Provincial Park
- Wooded Area
- Built Up Area
- Lower Tier Municipality

Notes:
- Base mapping features are © Queen's Printer of Ontario, 2019 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
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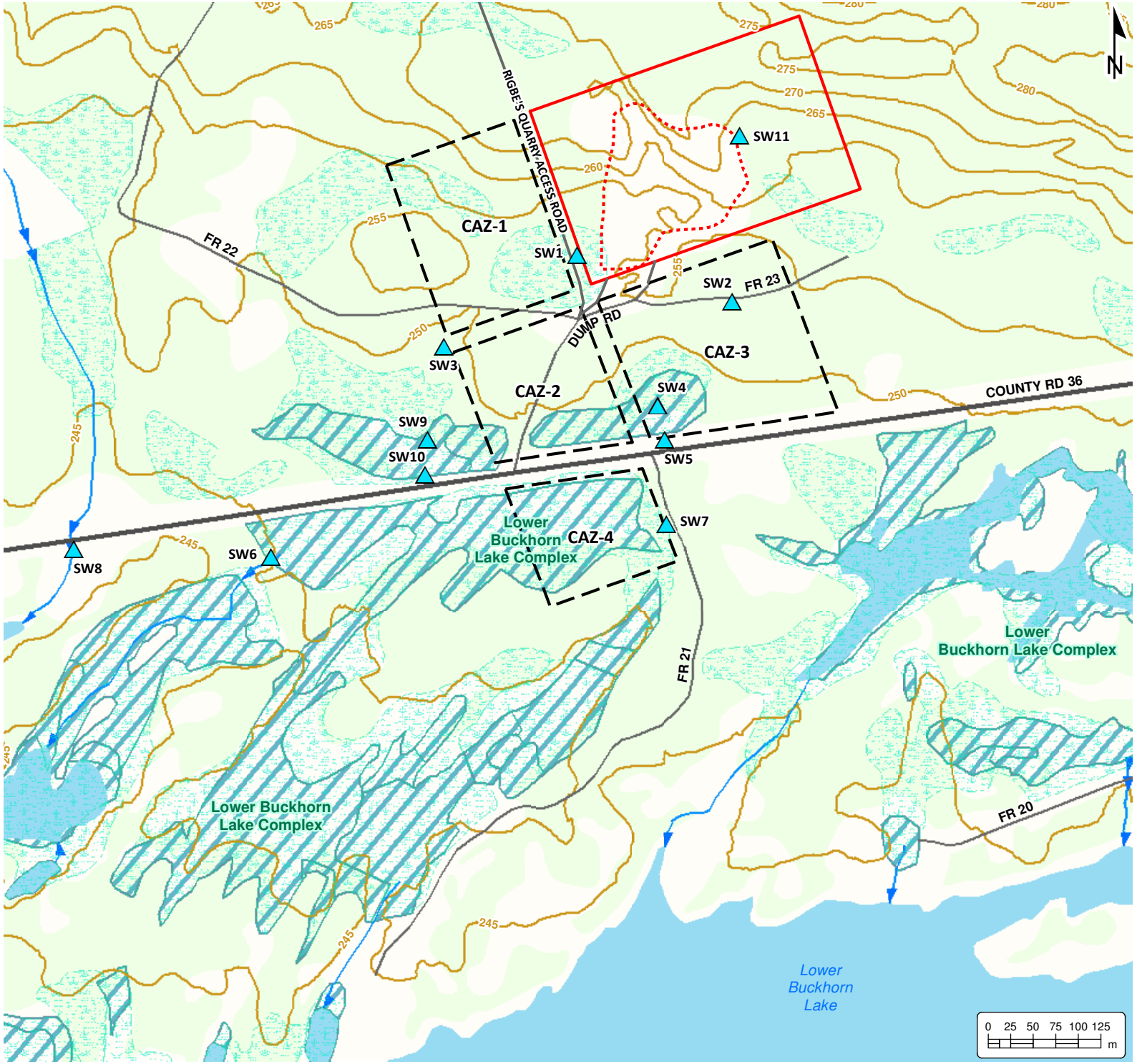
REGIONAL LOCATION PLAN

Project No.:	10520-006	Date:	March 2021
		Rev.:	
Scale:	1:150,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	TLC	Checked by:	SNR
Figure:	1		

O:\GIS\MXDs\10500-10999\10520-006 MTL - Buckhorn Landfill\AMP 2020\2021-02-05 FIG 1 - Regional Location Plan.mxd



BUCKHORN WASTE TRANSFER STATION

37 DUMP ROAD
Buckhorn, Ontario
Municipality of Trent Lakes

LEGEND

- Surface Water Location
- Major Road
- Minor Road
- Watercourse, Permanent
- Contour 5m Interval (Major)
- Contour 5m Interval (Minor)
- Limit of Existing Waste (1.8 ha.)
- Contaminant Attentuation Zone (10.85 ha.)
- Property Boundary (6.43 ha.)
- Unevaluated Wetlands
- Provincially Significant Wetlands
- Water Area
- Wooded Area

Notes:
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- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
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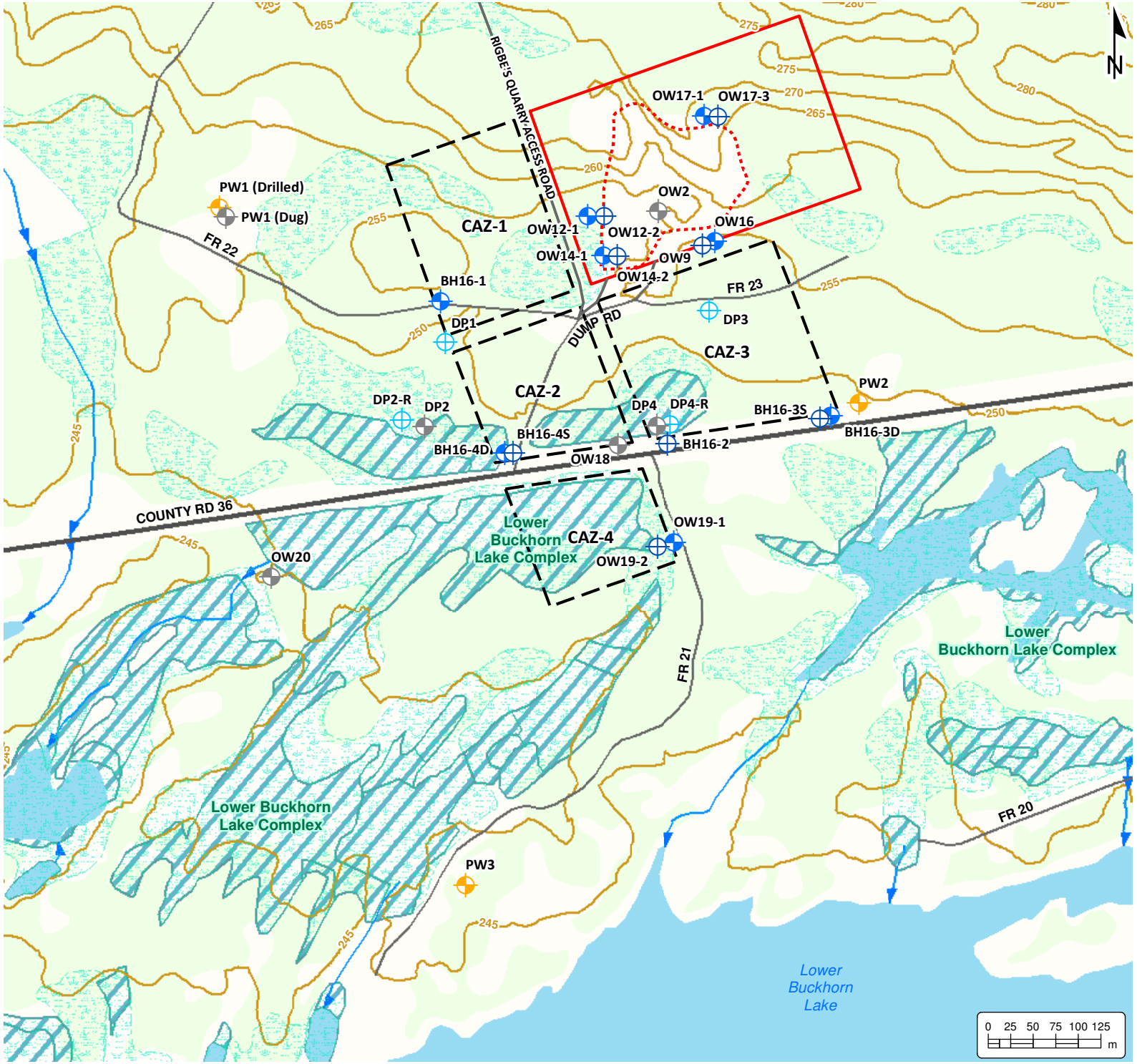
LOCAL TOPOGRAPHY PLAN

Project No.:	10520-006	Date:	March 2021
		Rev.:	
Scale:	1:6,000	Projection:	NAD 1983 UTM Zone 17N
Created by:	TLC	Checked by:	SNR
Figure:	2		

O:\GIS\MXDs\10500-10999\10520-006 MTL - Buckhorn Landfill\AMP 20220221-02-05 FIG 2 - Local Topography Plan.mxd



BUCKHORN WASTE TRANSFER STATION

37 DUMP ROAD
Buckhorn, Ontario
Municipality of Trent Lakes

LEGEND

- Deep Monitoring Well Location
- Shallow Monitoring Well Location
- Shallow Drive Point Location
- Residential Well Location
- Historic Monitoring Location
- Major Road
- Minor Road
- Watercourse, Permanent
- Contour 5m Interval (Major)
- Contour 5m Interval (Minor)
- Limit of Existing Waste (1.8 ha.)
- Contaminant Attentuation Zone (10.85 ha.)
- Property Boundary (6.43 ha.)
- Unevaluated Wetlands
- Provincially Significant Wetlands
- Water Area
- Wooded Area

Notes:
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- Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
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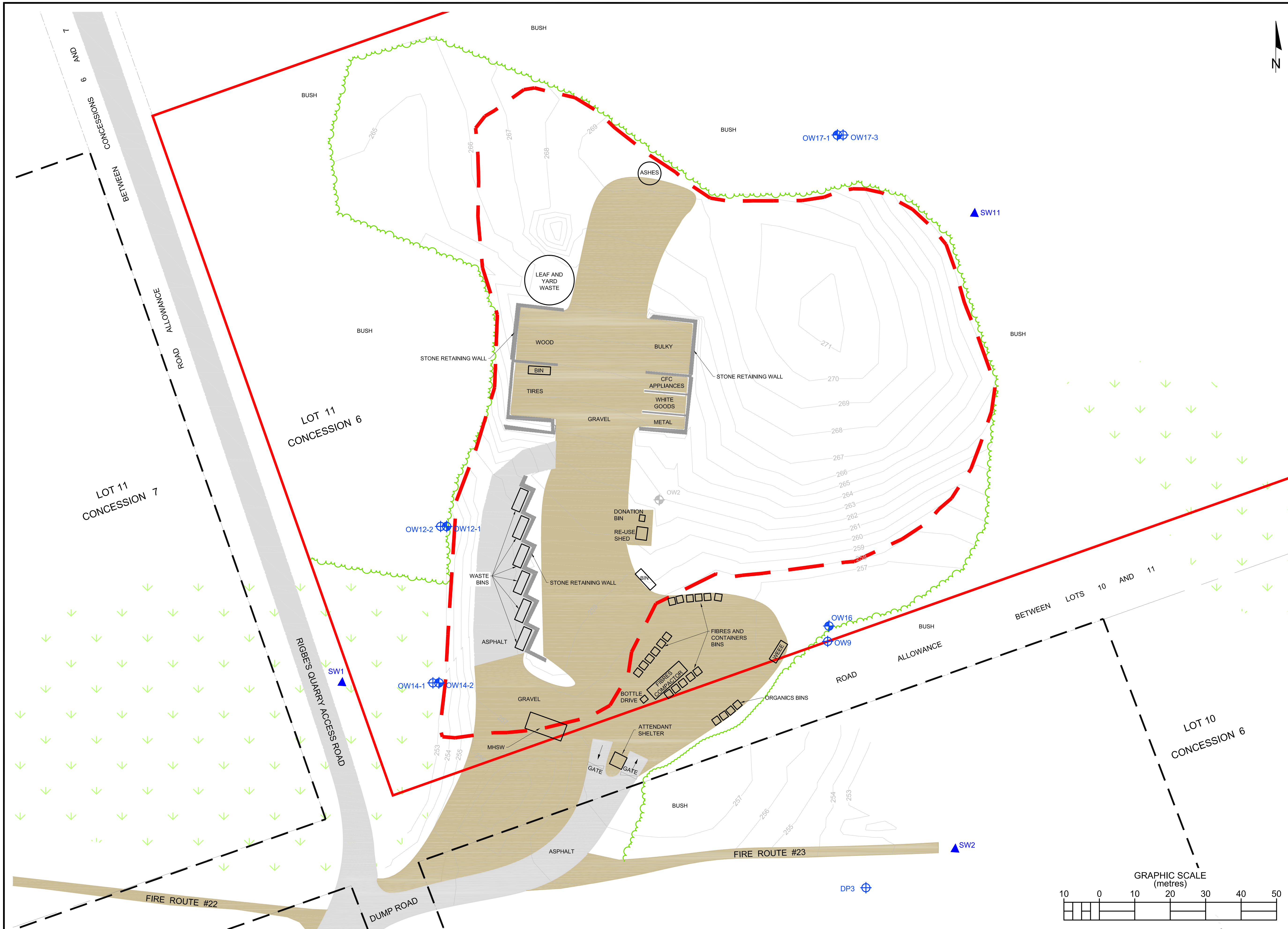
MONITORING WELL LOCATIONS

Project No.: 10520-006		Date: March 2021 Rev.:	
Scale: 1:6,000		Projection: NAD 1983 UTM Zone 17N	
Created by: TLC	Checked by: SNR	Figure:	3

O:\GIS\MXDs\10500-10999\10520-006 MTL - Buckhorn Landfill\AMP 2020\2021-02-05 FIG 3 - Monitoring Well Locations.mxd



BUCKHORN WASTE TRANSFER STATION

37 DUMP ROAD
Buckhorn, Ontario, Ontario
Municipality of Trent Lakes

LEGEND

- Surface Water Sample Location
- Shallow Monitoring Well Location
- Deep Monitoring Well Location
- Topographic Contour Line
- Property Boundary (6.43 ha)
- Existing Limit of Waste (1.8 ha) (Approximate from 2013 AMR)
- Contaminant Attenuation Zone
- Gate
- Gravel Road
- Asphalt Road
- Tree Line (Approximate)
- Wetland

Notes:
1. Base mapping features adapted from a site plan prepared by Coe Fisher Cameron Land Surveyors dated January 21, 2015.
2. Waste disposal site features are approximate and are adapted from a site plan prepared by WSP dated March 2014.
2. Wetland features are © Queen's Printer of Ontario, 2015 (this does not constitute an endorsement by the Ministry of Natural Resources or the Ontario Government).
3. Distances on this plan are in metres and can be converted to feet by dividing by 0.3048.
4. Projection: NAD 1983 UTM Zone 17T.

Benchmarks:
5. ORP A is an SIB located at the SW property corner. Northing: 4938565.8 Easting: 712799.9 Elevation: 252.49
6. ORP B is an SIB located at the SE property corner (Not shown on this plan). Northing: 4938671.3 Easting: 713097.8 Elevation: 259.51
7. Elevations shown hereon are geodetic and are referred to Geodetic Surveys Canada Benchmark #0011971u206, being a tablet in the top of a concrete dam on the Bobcaygeon River in the Village of Bobcaygeon, 0.34m from the south end of the dam, having an elevation of 249.20m (cgvd28-1978).

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TRANSFER STATION PLAN

Project No.: 10520-006		Date: March 2021	Rev.:
Horizontal Scale: 1:1,000		Projection: UTM Zone 17N	
Drawn By: TLC	Checked By: SNR	Figure: 4	

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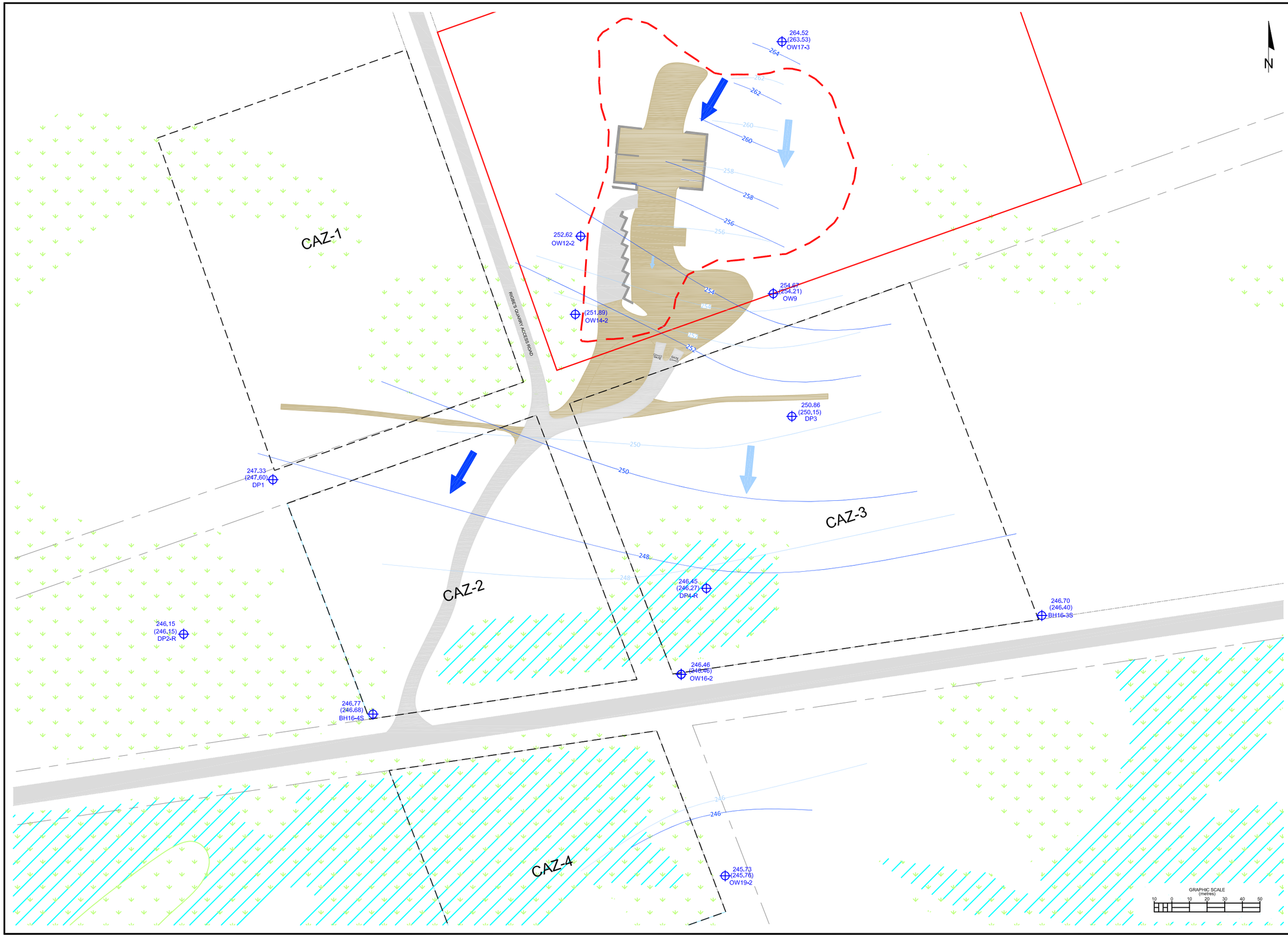
BUCKHORN
WASTE TRANSFER STATION

37 DUMP ROAD
Buckhorn, Ontario, Ontario
Municipality of Trent Lakes



LEGEND

- Shallow Monitoring Well Location
- 254.59 (253.93) Shallow Groundwater Elevation April 27, 2020 (November 11, 2020)
- Topographic Contour Line
- Property Boundary (6.43 ha)
- Existing Limit of Waste (1.8 ha) (Approximate from 2013 AMR)
- Contaminant Attenuation Zone
- Shallow Groundwater Contour April 27, 2020
- Shallow Groundwater Contour November 11, 2020
- Gate
- Gravel Road
- Asphalt Road
- Wetland
- Provincially Significant Wetland
- Shallow Groundwater Flow Direction April 27, 2020
- Shallow Groundwater Flow Direction November 11, 2020

GRAPHIC SCALE (metres)
10 0 10 20 30 40 50

Notes:
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4. Projection: NAD 1983 UTM Zone 17T.

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6. ORP B is an SIB located at the SE property corner (Not shown on this plan). Northing: 4938671.3 Easting: 713097.8 Elevation: 259.51
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SHALLOW GROUNDWATER CONFIGURATION

Project No.: 10520-006	Date: March 2021	
	Rev.:	
Horizontal Scale: 1:2,000	Projection: UTM Zone 17N	
Drawn By: TLC	Checked By: SNR	Figure: 5

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BUCKHORN
WASTE TRANSFER STATION

37 DUMP ROAD
Buckhorn, Ontario, Ontario
Municipality of Trent Lakes

N

264.38
(263.34)
OW17-1

252.65
OW12-1

254.81
(254.30)
OW18

(252.62)
OW14-1

252.71
(251.59)
BH16-1

247.11
(247.08)
BH16-4D

246.33
(246.41)
BH16-3D

245.72
(245.76)
OW19-1

CAZ-1
CAZ-2
CAZ-3
CAZ-4

RIDEAU QUARRY ACCESS ROAD

264
262
260
258
256
254
252
250
248
246

GRAPHIC SCALE
(metres)
10 0 10 20 30 40 50

LEGEND

- Deep Monitoring Well Location
- 264.30 (263.24) Deep Groundwater Elevation April 27, 2020 (November 11, 2020)
- Topographic Contour Line
- Property Boundary (6.43 ha)
- Existing Limit of Waste (1.8 ha) (Approximate from 2013 AMR)
- Contaminant Attenuation Zone
- Deep Groundwater Contour April 27, 2020
- Deep Groundwater Contour November 11, 2020
- Gate
- Gravel Road
- Asphalt Road
- Wetland
- Provincially Significant Wetland
- Deep Groundwater Flow Direction April 27, 2020
- Deep Groundwater Flow Direction November 11, 2020

Notes:
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DEEP GROUNDWATER CONFIGURATION

Project No.: 10520-006		Date: March 2021 Rev.:
Horizontal Scale: 1:2,000		Projection: UTM Zone 17N
Drawn By: TLC	Checked By: SNR	Figure: 6

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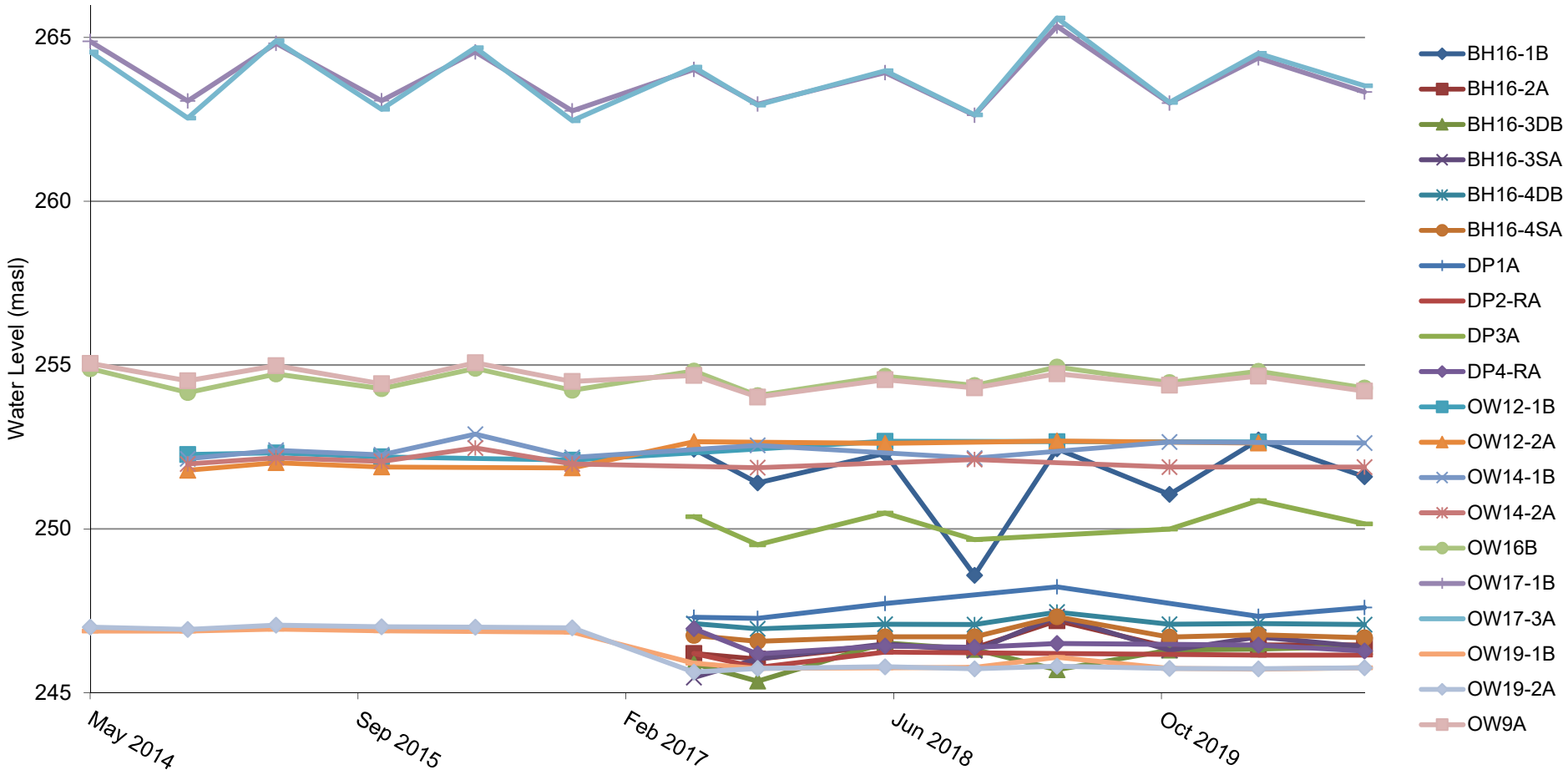

Groundwater Elevations

2020 Annual Report, Buckhorn Waste Transfer Station
37 Dump Road, Buckhorn
The Corporation of the Municipality of Trent Lakes

Figure:	**7**
Date:	Mar-21
Project Manger:	Stephanie Reeder
Project No.:	10520-006

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Appended Tables

Table Notes

RDL - reported detection limit for the current year

RUC - Reasonable Use Criteria

CWQG - Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2011)

ODWQS - Ontario Drinking Water Quality Standards, O.Reg. 169/03

PWQO - Water Management, Policies, Guidelines, Provincial Water Quality Objectives (MOEE, 1994b)

PWQO for beryllium, cadmium, copper, and lead depend on hardness

PWQO for aluminum depends on pH and background concentration

NV - No Value

"-" Parameter not analyzed or measured

Unionized ammonia calculated using total ammonia and field data for pH and conductivity. Where field pH values were not available, lab pH was used.

Table 1 - Environmental Monitoring Program

Location	Task	Frequency	Parameters
GROUNDWATER			
OW9, OW12-1, OW12-2, OW16, OW17-1, OW17-3, OW19-1, OW19-2, DP1, DP2-R, DP3, DP4-R, BH16-1, BH16-2, BH16-3S, BH16-3D, BH16-4S, BH16-4D PW1, PW2, PW3 (Raw) 2 QA/QC Duplicates	• Measure groundwater levels • Groundwater sampling • Field Measurements (pH, temperature, conductivity, dissolved oxygen, ORP)	Once (Spring)	Alkalinity, Ammonia, Arsenic, Barium, Boron, Cadmium, Calcium, Chloride, Chromium, Conductivity, COD, DOC, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nitrate, Nitrite, TKN, pH, Phenols, Phosphorus by ICP, Potassium, Sodium, TDS, Sulphate, Zinc, Hardness Benzene, 1,4- Dichlorobenzene, Dichloromethane, Toluene, Vinyl Chloride
OW9, OW14-1, OW14-2, OW16, OW17-1, OW17-3, OW19-1, OW19-2, DP1, DP2-R, DP3, DP4-R, BH16-1, BH16-2, BH16-3S, BH16-3D, BH16-4S, BH16-4D PW1, PW2, PW3 (Raw) 2 QA/QC Duplicates	• Measure groundwater levels • Groundwater sampling Field Measurements (pH, temperature, conductivity, dissolved oxygen, ORP)	Once (Autumn)	Alkalinity, Ammonia, Barium, Boron, Calcium, Chloride, Conductivity, Iron, Magnesium, Nitrate, pH, Sodium, TDS, Sulphate, COD, DOC, Hardness
OW12-2 (Spring) OW14-2 (Autumn)		Twice (Spring and Autumn)	BOD, TSS
All existing monitors	• Measure combustible gas % by volume methane • Groundwater Elevations	Twice (Spring and Autumn)	% methane by volume
SURFACE WATER			
SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8, SW9, SW10, SW11 1 QA/QC Duplicate	• Surface water sampling • Flow estimates • Field measurements (pH, temperature, conductivity, dissolved oxygen and ORP)	Once (Spring)	Alkalinity, Ammonia, Arsenic, Barium, Boron, Cadmium, Chloride, Chromium, Conductivity, Copper, Iron, Lead, dissolved Mercury, Nitrate, Nitrite, TKN, pH, Total Phosphorous, TSS, TDS, Sulphate, Zinc, BOD, COD, Phenols, Hardness
SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8, SW9, SW10, SW11 1 QA/QC Duplicate	• Surface water sampling • Flow estimates • Field measurements (pH, temperature, conductivity, dissolved oxygen and ORP)	Once (Autumn)	Alkalinity, Ammonia, Chloride, Conductivity, Iron, Nitrate, Nitrite, TKN, pH, Total Phosphorous, TSS, TDS, Sulphate, BOD, COD, Phenols, Hardness

**Dissolved mercury to be filtered with a 0.45 micron lab filter for all surface water samples (Spring event only)*

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Table 2 - Groundwater Elevation Data

Monitor	OW9	OW12-1	OW12-2	OW14-1	OW14-2	OW16	OW17-1	OW17-3	OW19-1	OW19-2	DP1	DP2-R	DP3	DP4-R	BH16-1	*BH16-2*	*BH16-3S*	*BH16-3D*	*BH16-4S*	BH16-4D
Northing Easting [2]	712924 4938608	712814 4938642	712815 4938642	712813, 4938597	712814, 4938598	712924 4938613	712916 4938752	712916 4938761	712888 4938277	712888 4938277	712639 4938504	712588 4938416	712530 4938535	712882 4938401	712631 4938549	*712882 4938390*	*713052 4938415*	*713053 4938416*	*712907 4938279*	712706 4938279
Original Ground Elevation (masl)	256.11	252.35	252.63	252.72	252.72	256.41	269.10	269.10	245.53	245.53	247.55	246.12	251.03	245.31	254.21	246.96	247.15	247.18	247.85	247.84
Stick Up (m)	0.77	0.32	0.50	Flush	0.44	0.55	0.73	0.50	0.38	0.52	0.93	0.77	1.15	1.97	0.68	0.79	0.92	0.91	0.74	0.72
Depth (m)	4.47	6.49	2.61	6.28	2.50	7.97	15.56	8.07	6.93	2.25	2.66	2.40	3.59	2.98	12.86	5.87	5.86	10.80	7.60	11.12
Measuring Point (masl)	256.91	252.67	252.69	253.06	252.66	257.02	269.59	269.43	246.28	246.15	248.57	246.97	252.21	247.27	254.94	247.85	248.11	248.20	248.72	248.61
08-May-14	255.05	-	-	-	-	254.89	264.88	264.56	246.88	247.00	-	-	-	-	-	-	-	-	-	-
06-Nov-14	254.52	252.27	251.79	252.14	251.98	254.16	263.06	262.54	246.88	246.93	-	-	-	-	-	-	-	-	-	-
20-Apr-15	254.98	252.32	252.02	252.40	252.17	254.73	264.82	264.90	246.94	247.06	-	-	-	-	-	-	-	-	-	-
03-Nov-15	254.43	252.20	251.89	252.26	252.06	254.28	263.07	262.81	246.89	247.01	-	-	-	-	-	-	-	-	-	-
26-Apr-16	255.07	-	-	252.89	252.47	254.90	264.56	264.69	246.87	247.00	-	-	-	-	-	-	-	-	-	-
24-Oct-16	254.50	252.10	251.86	252.18	251.98	254.23	262.76	262.46	246.85	246.98	-	-	-	-	-	-	-	-	-	-
8-Jun-17	254.69	-	252.66	-	-	254.82	264.03	264.10	245.90	245.63	247.30	246.20	250.37	246.95	252.43	246.20	245.46	245.89	246.75	247.11
5-Oct-17	254.03	-	-	252.55	251.87	254.07	262.97	262.94	245.74	245.74	247.27	245.77	249.51	246.18	251.40	246.03	246.03	245.35	246.57	246.95
31-May-18	254.56	252.67	252.61	-	-	254.66	263.93	263.99	245.76	245.79	247.72	246.24	250.48	246.42	252.30	246.43	246.48	246.52	246.71	247.09
14-Nov-18	254.31	-	-	252.16	252.12	254.38	262.63	262.64	245.77	245.73	-	-	249.67	246.38	248.58	246.37	246.28	246.32	246.71	247.08
17-Apr-19	254.74	252.66	252.68	-	-	254.94	265.35	265.60	246.08	245.81	248.23	-	-	246.50	252.44	247.20	247.32	245.70	247.32	247.46
13-Nov-19	254.39	-	-	252.65	251.89	254.47	263.00	263.02	245.74	245.74	-	-	249.99	-	251.05	246.39	246.29	246.30	246.70	247.09
27-Apr-20	254.67	252.65	252.62	-	-	254.81	264.38	264.52	245.72	245.73	247.33	246.15	250.86	246.45	252.71	246.46	246.70	246.33	246.77	247.11
11-Nov-20	254.21	-	-	252.62	251.89	254.30	263.34	263.53	245.76	245.76	247.60	246.15	250.15	246.27	251.59	246.46	246.40	246.41	246.68	247.08

Notes:

Elevations are geodetic.
Zone 17, accurate to +/- 5.0 metres
Shaded cells indicate Bedrock Monitors
Light grey shaded cells with italic text indicate shallow fractured bedrock monitors.

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Table 3 - Monitor Well Information and Vertical Gradients

Monitor Well	Screen Length (m)	Bottom of Screen Elevation (m) [3]	Top of Screen Elevation (m) [3]	Unit Screened	Difference in Elevation of Bottom of Screen	Vertical Gradients Shallow-Deep: +downwards -upwards													
						08-May-14	06-Nov-14	20-Apr-15	03-Nov-15	26-Apr-16	24-Oct-16	08-Jun-17	05-Oct-17	31-May-18	14-Nov-18	17-Apr-19	13-Nov-19	27-Apr-20	11-Nov-20
OW12-1	3.05	246.18	249.23	Bedrock	-3.90	-	-	-	-	-	-0.062	-	-	-0.016	-	0.004	-	-0.008	-
OW12-2	1.50	250.08	251.58	Sandy Silt															
OW14-1	3.05	246.78	249.83	Bedrock	-3.38	-	-0.047	-0.068	-0.059	-0.124	-0.059	-	-0.202	-	-0.013	-	-0.226	-	-0.217
OW14-2	1.50	250.16	251.66	Silty Sand															
OW17-1	3.05	254.30	257.35	Bedrock	-7.49	-0.043	-0.069	0.011	-0.035	0.017	-0.040	0.009	-0.004	0.008	0.001	0.033	0.003	0.019	0.025
OW17-3	3.05	261.79	264.84	Sandy Silt															
OW19-1	3.05	239.22	242.27	Bedrock	-5.95	0.020	0.008	0.020	0.020	0.022	0.022	-0.046	0.000	0.005	-0.007	-0.046	0.000	0.002	0.000
OW19-2	1.50	245.17	246.67	Peat															

Notes:

1. Screen length assumed for all monitors.
2. mbgs means metres below ground surface.
3. Elevations are geodetic.
4. Shaded cells are monitoring wells installed in the bedrock.

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-2 2016-10-24	BH16-2 2017-06-08	BH16-2 2017-10-05	BH16-2 2018-05-31	BH16-2 2018-11-14	BH16-2 2019-04-18	BH16-2 2019-11-13	BH16-2 2020-04-27	BH16-2 2020-11-11
Metals													
Arsenic (Filtered)	µg/L	0.1		25	-	0.79	-	0.5	-	0.2	-	0.2	-
Barium (Filtered)	µg/L	1	***385***	1000	349	199	179	176	157	195	243	274	240
Boron (Filtered)	µg/L	5	***2505***	5000	133	184	194	186	183	182	179	173	169
Calcium (Filtered)	µg/L	20			152,000	132,000	116,000	121,000	125,000	164,000	187,000	217,000	187,000
Cadmium (Filtered)	µg/L	0.015		5	-	0.047	-	0.015	-	0.025	-	<0.015	-
Chloride	µg/L	500	***125685***	250000	***606,000***	***134,000***	122,000	***145,000***	***169,000***	***265,000***	***381,000***	***459,000***	***348,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	-	1	-	<1	-	0.3	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	-	0.4	-	2	-	<2	-	1.3	-
Iron (Filtered)	µg/L	5	***155***	300	119	80	138	13	8	21	<5	8	57
Lead (Filtered)	µg/L	0.02		10	-	0.3	-	0.1	-	0.02	-	<0.04	-
Manganese (Filtered)	µg/L	1	***26***	50	-	***818***	-	***269***	-	12	-	2	-
Magnesium (Filtered)	µg/L	20			16,800	21,000	19,900	20,000	21,100	26,200	28,200	33,800	28,400
Mercury (Filtered)	µg/L	0.02		1	-	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				-	210	-	90	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	10	-	<100	-
Potassium (Filtered)	µg/L	100			13,400	4500	-	3600	-	3600	-	4500	-
Sodium (Filtered)	µg/L	200	***100850***	200000	***268,000***	65,900	49,600	53,100	50,600	60,900	85,200	***116,000***	92,300
Zinc (Filtered)	µg/L	5		5000	-	<5	-	<5	-	<5	-	<5	-
Inorganics													
Alkalinity (as CaCO3)	mg/L	5	***379***	500	308	268	260	251	251	249	245	258	246
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	***449***	***418***	372	385	***399***	***518***	***583***	***681***	***584***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***1360***	***638***	***574***	***525***	***596***	***755***	***842***	***1040***	***874***
Solids - Total Suspended (TSS)	mg/L	3			7290	-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			<5	98	25	22	30	12	15	27	11
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***8.1***	1.8	2.4	***4.8***	1.4	1.8	1.4	1.3	0.3
Oxygen Demand - Biological (BOD)	mg/L	3			-	-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			-	<0.001	-	<0.001	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	61.2	40	37	50	44	44	44	39	40
Ammonia	mg/L	0.01			0.03	0.01	<0.01	0.02	0.02	0.02	0.02	0.01	0.12
Nitrate (as N)	mg/L	0.05		10	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.16	0.06
Nitrite (as N)	mg/L	0.05		1	<0.5	<0.05	-	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-	0.3	-	0.2	-	0.3	-	0.2	-
Conductivity (lab)	µS/cm	1			2270	1160	1040	984	1110	1390	1540	1900	1600
pH (Lab)	-			6.5-8.5	8.13	8.09	8.18	8.16	7.83	8.01	7.94	7.84	7.95
Field													
DO (Field)	mg/L				8.9	7.42	8.69	5.3	5.61	8.04	7.05	7.43	9.45
Redox Potential (Field)	mV				-	-62	12	35	112	108	72	53	152
Temp (Field)	°C				12.2	15.6	14.4	12.1	8.3	6	7.6	10.2	10.5
Conductivity (field)	µS/cm				214	1090	910	980	1040	1300	1320	1530	1532
pH (Field)	-			6.5-8.5	7.1	7.48	7.93	7.46	7.3	7.71	6.94	7.73	7.55

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-3S 2016-10-24	BH16-3S 2017-06-08	BH16-3S 2017-10-05	BH16-3S 2018-05-31	BH16-3S 2018-11-14	BH16-3S 2019-04-18	BH16-3S 2019-11-13	BH16-3S 2020-04-27	BH16-3S 2020-11-11
Metals													
Arsenic (Filtered)	µg/L	0.1		25	-	1.33	-	0.3	-	0.2	-	0.2	-
Barium (Filtered)	µg/L	1	***385***	1000	***500***	***617***	***659***	***1320***	***1080***	***3080***	***1410***	***978***	***624***
Boron (Filtered)	µg/L	5	***2505***	5000	61	32	49	25	44	25	32	22	33
Calcium (Filtered)	µg/L	20			106,000	87,100	77,200	139,000	115,000	284,000	145,000	110,000	64,000
Cadmium (Filtered)	µg/L	0.015		5	-	0.04	-	0.035	-	0.035	-	<0.015	-
Chloride	µg/L	500	***125685***	250000	***195,000***	116,000	77,100	***251,000***	***278,000***	***1,110,000***	***469,000***	***276,000***	113,000
Chromium (III+VI) (Filtered)	µg/L	1		50	-	1	-	2	-	0.6	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	-	0.7	-	1.3	-	<2	-	4	-
Iron (Filtered)	µg/L	5	***155***	300	39	118	***298***	23	6	19	24	7	11
Lead (Filtered)	µg/L	0.02		10	-	0.21	-	<0.02	-	0.04	-	0.07	-
Manganese (Filtered)	µg/L	1	***26***	50	-	***1460***	-	***721***	-	***563***	-	1	-
Magnesium (Filtered)	µg/L	20			5200	3390	2840	5200	4020	9030	4530	3680	2030
Mercury (Filtered)	µg/L	0.02		1	-	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				-	280	-	230	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	20	-	<100	-
Potassium (Filtered)	µg/L	100			7350	3300	-	2700	-	3800	-	2200	-
Sodium (Filtered)	µg/L	200	***100850***	200000	85,400	92,900	96,000	***123,000***	***158,000***	***383,000***	***204,000***	***147,000***	***144,000***
Zinc (Filtered)	µg/L	5		5000	-	<5	-	<5	-	<5	-	<5	-
Inorganics													
Alkalinity (as CaCO3)	mg/L	5	***379***	500	230	203	269	220	221	163	187	161	241
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	286	232	205	369	304	***747***	381	290	168
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***672***	***498***	***450***	***693***	***772***	***2100***	***934***	***680***	***464***
Solids - Total Suspended (TSS)	mg/L	3			970	-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			<5	61	35	20	22	24	45	14	59
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***6.7***	***4.2***	***6.5***	***4***	***3.4***	1.3	2.4	2	***3.5***
Oxygen Demand - Biological (BOD)	mg/L	3			<5	-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			-	<0.001	-	<0.001	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	27.4	25	11	17	28	39	30	24	19
Ammonia	mg/L	0.01			<0.02	0.07	0.08	0.07	0.02	0.06	0.03	0.02	0.05
Nitrate (as N)	mg/L	0.05		10	<0.25	<0.05	0.06	0.13	0.38	0.13	0.06	0.2	0.11
Nitrite (as N)	mg/L	0.05		1	<0.25	<0.05	-	<0.05	-	0.57	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-	0.5	-	0.5	-	0.6	-	0.3	-
Conductivity (lab)	µS/cm	1			1000	906	819	1280	1420	3740	1700	125	878
pH (Lab)	-			6.5-8.5	7.86	7.97	8.15	7.96	7.88	7.45	7.63	7.5	7.81
Field													
DO (Field)	mg/L				6.5	9.12	9.39	7.68	10.92	5.75	7.91	6.12	7.71
Redox Potential (Field)	mV				-	-53	53	80	128	134	80	65	194
Temp (Field)	°C				11.9	17.9	15.2	12.9	7.9	7	9.7	7.5	11.6
Conductivity (field)	µS/cm				102	900	820	1030	1210	870	1480	1200	1029
pH (Field)	-			6.5-8.5	8	7.55	7.34	7.16	7.57	7.52	6.64	7.74	7.17

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-4S 2016-10-24	BH16-4S 2017-06-08	BH16-4S 2017-10-05	BH16-4S 2018-05-31	BH16-4S 2018-11-14	BH16-4S 2019-04-18	BH16-4S 2019-11-13	BH16-4S 2020-04-27	BH16-4S 2020-11-11
Metals													
Arsenic (Filtered)	µg/L	0.1		25	-	<0.7	-	<0.1	-	<0.1	-	<0.1	-
Barium (Filtered)	µg/L	1	***385***	1000	366	217	332	252	346	371	***419***	312	380
Boron (Filtered)	µg/L	5	***2505***	5000	99	53	76	41	94	43	86	46	86
Calcium (Filtered)	µg/L	20			172,000	117,000	159,000	127,000	173,000	227,000	217,000	161,000	202,000
Cadmium (Filtered)	µg/L	0.015		5	-	-	-	<0.015	-	<0.015	-	<0.015	-
Chloride	µg/L	500	***125685***	250000	***426,000***	***191,000***	***286,000***	***253,000***	***332,000***	***523,000***	***452,000***	***374,000***	***401,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	-	1	-	<1	-	3.7	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	-	0.6	-	0.6	-	<2	-	2.2	-
Iron (Filtered)	µg/L	5	***155***	300	28	<5	<5	7	10	32	<5	5	6
Lead (Filtered)	µg/L	0.02		10	-	0.28	-	<0.02	-	<0.02	-	0.04	-
Manganese (Filtered)	µg/L	1	***26***	50	-	***753***	-	***76***	-	***228***	-	***112***	-
Magnesium (Filtered)	µg/L	20			9710	6390	8720	6260	9160	9310	10,800	7530	9970
Mercury (Filtered)	µg/L	0.02		1	-	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				-	750	-	3840	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	10	-	<100	-
Potassium (Filtered)	µg/L	100			5390	2600	-	2300	-	2500	-	3300	-
Sodium (Filtered)	µg/L	200	***100850***	200000	***195,000***	***141,000***	***188,000***	***141,000***	***197,000***	***192,000***	***205,000***	***190,000***	***211,000***
Zinc (Filtered)	µg/L	5		5000	-	<5	-	<5	-	<5	-	<5	-
Inorganics													
Alkalinity (as CaCO3)	mg/L	5	***379***	500	379	276	353	274	***382***	265	342	264	357
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	***469***	319	***433***	343	***470***	***606***	***587***	***433***	***546***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***1180***	***703***	***966***	***732***	***1000***	***1230***	***1110***	***894***	***1070***
Solids - Total Suspended (TSS)	mg/L	3			6370	-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			<5	143	112	86	34	41	22	43	11
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***3.8***	2.2	2	2.5	2.5	1.7	1.4	1.6	0.4
Oxygen Demand - Biological (BOD)	mg/L	3			<5	-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			-	<0.001	-	<0.001	-	0.012	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	28	13	17	15	21	18	22	16	24
Ammonia	mg/L	0.01			0.02	0.02	<0.01	0.02	0.08	0.05	0.04	0.03	0.04
Nitrate (as N)	mg/L	0.05		10	<0.5	0.07	0.06	<0.05	<0.05	0.07	<0.05	0.12	0.06
Nitrite (as N)	mg/L	0.05		1	<0.5	<0.05	-	<0.05	-	0.09	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-	0.3	-	2.3	-	1	-	1	-
Conductivity (lab)	µS/cm	1			1920	1280	1760	1350	1820	2220	2010	1630	1940
pH (Lab)	-			6.5-8.5	7.86	7.7	7.75	7.74	7.54	7.19	7.43	7.52	7.42
Field													
DO (Field)	mg/L				3.4	1.05	1.27	2.61	2.37	2.81	1.62	6.88	4.67
Redox Potential (Field)	mV				-	90	159	122	150	154	185	66	214
Temp (Field)	°C				13.5	9.1	13	9.7	11	5	11.2	7.4	12.8
Conductivity (field)	µS/cm				1658	1350	1690	1400	1530	220	1720	1690	1617
pH (Field)	-			6.5-8.5	7.4	6.7	6.93	6.97	6.68	6.74	6.33	7.23	7.05

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP1 2012-05-01	DP1 2012-11-01	DP1 2013-06-06	DP1 2014-05-08	DP1 2014-11-06	DP1 2015-04-17	DP1 2015-11-02	DP1 2016-04-26	DP1 2016-10-24	DP1 2017-06-08	DP1 2017-10-05	DP1 2018-05-31	DP1 2019-04-18
Metals																	
Arsenic (Filtered)	µg/L	0.1		25	<3	-	<3	<3	-	7	-	<3	-	1.58	-	0.3	0.2
Barium (Filtered)	µg/L	1	***385***	1000	376	-	258	265	190	287	221	221	196	199	212	214	226
Boron (Filtered)	µg/L	5	***2505***	5000	347	-	288	323	380	225	362	260	418	237	434	266	215
Calcium (Filtered)	µg/L	20			-	-	148,000	84,900	117,000	115,000	106,000	86,000	77,900	101,000	101,000	95,500	119,000
Cadmium (Filtered)	µg/L	0.015		5	10	-	<1	<1	-	<1	-	<1	-	0.016	-	<0.015	<0.015
Chloride	µg/L	500	***125685***	250000	107,000	***133,000***	113,000	59,500	118,000	107,000	104,000	65,700	***126,000***	73,700	72,500	69,500	74,200
Chromium (III+VI) (Filtered)	µg/L	1		50	63	-	<3	<3	-	<3	-	<3	-	9	-	<1	<0.2
Copper (Filtered)	µg/L	0.1		1000	20	-	<2	<2	-	<2	-	<2	-	0.4	-	1.6	<2
Iron (Filtered)	µg/L	5	***155***	300	***29,900***	***5200***	***16,100***	***20,900***	***6890***	***4360***	***34,000***	***30,700***	***42,400***	***24,100***	***9150***	***29,300***	***13,900***
Lead (Filtered)	µg/L	0.02		10	288	-	<2	<2	-	3	-	<2	-	0.3	-	0.09	<0.02
Manganese (Filtered)	µg/L	1	***26***	50	-	-	***158***	***209***	-	***264***	-	***316***	-	***305***	-	***287***	***282***
Magnesium (Filtered)	µg/L	20			-	-	23,000	14,100	18,400	17,800	17,100	13,600	13,700	16,100	16,600	15,200	18,300
Mercury (Filtered)	µg/L	0.02		1	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.02	-	<0.02	<0.02
Phosphorus total (P2O5)	µg/L				240	80	70	50	-	<50	-	<50	-	80	-	20	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-	-	<10
Potassium (Filtered)	µg/L	100			-	-	3640	2960	-	3060	-	2520	2860	2700	-	2900	2900
Sodium (Filtered)	µg/L	200	***100850***	200000	-	-	71,700	48,500	71,000	54,600	70,600	45,800	58,800	55,900	71,000	45,300	41,100
Zinc (Filtered)	µg/L	5		5000	64,900	-	736	341	-	658	-	776	-	411	-	184	358
Inorganics																	
Alkalinity (as CaCO3)	mg/L	5	***379***	500	347	340	377	256	347	352	339	292	229	318	372	322	331
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	375	***399***	***464***	270	368	360	335	271	251	319	321	301	373
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***542***	***614***	***446***	***424***	***566***	***466***	***504***	***396***	***558***	***497***	***526***	***425***	***470***
Solids - Total Suspended (TSS)	mg/L	3			106	286	174	279	156	123	198	135	212	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			88	26	36	21	7	16	19	10	16	65	27	59	29
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	-	-	***23.5***	***3.6***	***5.6***	***6.9***	***6.5***	***4.5***	***6.5***	***4.9***	***7.8***	***10.2***	***4.3***
Oxygen Demand - Biological (BOD)	mg/L	3			<5	<5	9	<5	<5	<5	<5	<5	<5	-	-	-	-
Phenols (4AAP)	mg/L	0.002			0.042	0.005	0.006	0.005	-	<0.001	-	<0.001	-	<0.001	-	<0.001	<0.002
Sulphate (Filtered)	mg/L	1		500	8.76	27.6	9	9.5	6.89	4.4	3.51	8.2	4.22	11	2	8	5
Ammonia	mg/L	0.01			0.29	1.23	0.05	0.15	<0.02	0.2	<0.02	0.09	0.02	0.06	0.02	0.05	0.05
Nitrate (as N)	mg/L	0.05		10	<0.05	0.68	0.25	<0.25	<0.25	0.29	<0.25	0.32	<0.25	<0.05	<0.05	<0.05	0.24
Nitrite (as N)	mg/L	0.05		1	<0.05	<0.05	<0.1	<0.25	-	<0.25	-	<0.25	<0.25	<0.05	-	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.98	2.16	0.97	0.5	-	0.44	-	<0.1	-	0.7	-	0.5	0.4
Conductivity (lab)	µS/cm	1			917	1030	988	718	1000	1000	942	721	802	903	957	808	887
pH (Lab)	-			6.5-8.5	7.95	8.39	8.2	8.17	8.04	7.93	8.07	8.05	7.5	7.8	7.96	8.02	7.75
Field																	
DO (Field)	mg/L				-	-	-	-	-	-	-	6.7	5.1	8.65	6.49	9.75	8.66
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-8	109	25	140
Temp (Field)	°C				-	-	-	-	-	-	-	6.9	10.4	14.5	13.9	14.3	9
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	743	780	920	990	810	910
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	7	7.7	7.25	7.37	7.18	7.3

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP1 2020-04-27	DP1 2020-11-11
Metals						
Arsenic (Filtered)	µg/L	0.1		25	0.1	-
Barium (Filtered)	µg/L	1	***385***	1000	237	253
Boron (Filtered)	µg/L	5	***2505***	5000	209	380
Calcium (Filtered)	µg/L	20			109,000	116,000
Cadmium (Filtered)	µg/L	0.015		5	<0.015	-
Chloride	µg/L	500	***125685***	250000	79,400	96,200
Chromium (III+VI) (Filtered)	µg/L	1		50	<1	-
Copper (Filtered)	µg/L	0.1		1000	0.9	-
Iron (Filtered)	µg/L	5	***155***	300	***11,800***	***3950***
Lead (Filtered)	µg/L	0.02		10	0.03	-
Manganese (Filtered)	µg/L	1	***26***	50	***323***	-
Magnesium (Filtered)	µg/L	20			17,000	15,900
Mercury (Filtered)	µg/L	0.02		1	<0.02	-
Phosphorus total (P2O5)	µg/L				-	-
Phosphorus (Filtered)	µg/L	100			<100	-
Potassium (Filtered)	µg/L	100			2900	-
Sodium (Filtered)	µg/L	200	***100850***	200000	49,600	69,300
Zinc (Filtered)	µg/L	5		5000	643	-
Inorganics						
Alkalinity (as CaCO3)	mg/L	5	***379***	500	295	307
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	342	355
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***435***	***483***
Solids - Total Suspended (TSS)	mg/L	3			-	-
Oxygen Demand - Chemical (COD)	mg/L	5			24	19
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***4.2***	1.9
Oxygen Demand - Biological (BOD)	mg/L	3			-	-
Phenols (4AAP)	mg/L	0.002			<0.002	-
Sulphate (Filtered)	mg/L	1		500	7	3
Ammonia	mg/L	0.01			0.06	0.04
Nitrate (as N)	mg/L	0.05		10	0.33	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.3	-
Conductivity (lab)	µS/cm	1			826	911
pH (Lab)	-			6.5-8.5	7.69	7.82
Field						
DO (Field)	mg/L				7.12	7.7
Redox Potential (Field)	mV				6	125
Temp (Field)	°C				7.2	11.7
Conductivity (field)	µS/cm				840	962
pH (Field)	-			6.5-8.5	7.38	7.34

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP2-R 2017-06-08	DP2-R 2017-10-05	DP2-R 2018-05-31	DP2-R 2019-04-18	DP2-R 2020-04-27	DP2-R 2020-11-11
Metals										
Arsenic (Filtered)	µg/L	0.1		25	1.43	-	1.6	0.6	0.9	-
Barium (Filtered)	µg/L	1	***385***	1000	***534***	***510***	***621***	***498***	***494***	***577***
Boron (Filtered)	µg/L	5	***2505***	5000	208	252	229	127	180	206
Calcium (Filtered)	µg/L	20			130,000	116,000	135,000	137,000	129,000	148,000
Cadmium (Filtered)	µg/L	0.015		5	<0.014	-	<0.015	<0.015	<0.015	-
Chloride	µg/L	500	***125685***	250000	90,700	93,600	111,000	110,000	106,000	109,000
Chromium (III+VI) (Filtered)	µg/L	1		50	5	-	<1	<0.2	<1	-
Copper (Filtered)	µg/L	0.1		1000	0.5	-	2	<2	0.3	-
Iron (Filtered)	µg/L	5	***155***	300	***2060***	***491***	***606***	***1010***	***818***	***1030***
Lead (Filtered)	µg/L	0.02		10	0.6	-	0.68	0.4	0.3	-
Manganese (Filtered)	µg/L	1	***26***	50	***48***	-	***36***	***27***	***80***	-
Magnesium (Filtered)	µg/L	20			15,000	14,600	14,900	15,000	14,700	16,000
Mercury (Filtered)	µg/L	0.02		1	<0.02	-	<0.02	<0.02	<0.02	-
Phosphorus total (P2O5)	µg/L				4740	-	10,800	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	60	<100	-
Potassium (Filtered)	µg/L	100			3100	-	3200	2600	2700	-
Sodium (Filtered)	µg/L	200	***100850***	200000	55,100	58,400	59,000	34,700	47,200	49,800
Zinc (Filtered)	µg/L	5		5000	2490	-	1220	2420	3410	-
Inorganics										
Alkalinity (as CaCO3)	mg/L	5	***379***	500	336	342	346	324	308	310
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	387	350	***399***	***404***	383	***436***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***538***	***548***	***523***	***525***	***494***	***511***
Solids - Total Suspended (TSS)	mg/L	3			-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			464	193	102	124	230	112
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	2.2	***6.4***	***5.4***	2.7	2.8	0.8
Oxygen Demand - Biological (BOD)	mg/L	3			-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	<0.001	<0.002	<0.002	-
Sulphate (Filtered)	mg/L	1		500	9	9	11	15	10	12
Ammonia	mg/L	0.01			0.17	0.05	0.11	0.05	0.08	0.06
Nitrate (as N)	mg/L	0.05		10	0.11	<0.05	<0.05	<0.05	0.09	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.05	<0.05	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			1	-	1	0.8	0.8	-
Conductivity (lab)	µS/cm	1			978	996	981	985	931	960
pH (Lab)	-			6.5-8.5	7.94	8.02	8.16	7.67	7.8	7.86
Field										
DO (Field)	mg/L				6.14	3.9	10.82	5.68	9.48	9.1
Redox Potential (Field)	mV				-3	142	110	120	116	119
Temp (Field)	°C				16.4	12.4	13.4	3	12.2	10.8
Conductivity (field)	µS/cm				830	1020	1010	940	650	946
pH (Field)	-			6.5-8.5	5.52	7.33	7.7	7.47	-	7.63

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP3 2011-05-01	DP3 2012-05-01	DP3 2012-11-01	DP3 2013-06-06	DP3 2013-11-01	DP3 2014-05-08	DP3 2014-11-06	DP3 2015-04-23	DP3 2015-11-02	DP3 2016-04-26	DP3 2016-10-24	DP3 2017-06-08	DP3 2017-10-05
Metals																	
Arsenic (Filtered)	µg/L	0.1		25	<1	<3	-	<3	-	<3	-	<3	-	<3	-	0.7	-
Barium (Filtered)	µg/L	1	***385***	1000	***490***	***2220***	-	***417***	315	320	***650***	325	348	***408***	***561***	***407***	346
Boron (Filtered)	µg/L	5	***2505***	5000	110	153	-	215	167	132	270	178	175	150	209	177	145
Calcium (Filtered)	µg/L	20			160,000	-	-	122,000	95,700	107,000	121,000	113,000	112,000	101,000	138,000	106,000	97,700
Cadmium (Filtered)	µg/L	0.015		5	<0.1	<1	-	<1	-	<1	-	<1	-	<1	-	<0.014	-
Chloride	µg/L	500	***125685***	250000	110,000	66,200	48,900	91,100	58,600	27,900	69,800	57,400	60,500	39,700	***155,000***	57,600	21,600
Chromium (III+VI) (Filtered)	µg/L	1		50	<5	215	-	<3	-	<3	-	<3	-	3	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	<1	3	-	<2	-	<2	-	<2	-	<2	-	0.5	-
Iron (Filtered)	µg/L	5	***155***	300	***4200***	-	***1280***	***9210***	***5130***	***2020***	***12,000***	***2440***	***10,700***	***13,000***	***16,800***	***6650***	***7660***
Lead (Filtered)	µg/L	0.02		10	2.5	<2	-	<2	-	<2	-	<2	-	<2	-	0.42	-
Manganese (Filtered)	µg/L	1	***26***	50	***2800***	-	-	***2510***	-	***2850***	-	***1820***	-	***1470***	-	***1840***	-
Magnesium (Filtered)	µg/L	20			10,000	-	-	8100	6500	7280	8420	8230	17,100	6360	8680	6940	6330
Mercury (Filtered)	µg/L	0.02		1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.02	-
Phosphorus total (P2O5)	µg/L				13,000	5920	5220	41,100	-	2770	-	1800	-	14,000	-	2150	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			2700	-	-	2850	-	2620	-	1900	-	2170	2790	2300	-
Sodium (Filtered)	µg/L	200	***100850***	200000	60,000	-	-	63,700	42,500	32,200	56,100	49,100	41,600	31,500	51,900	55,600	28,800
Zinc (Filtered)	µg/L	5		5000	1400	11,000	-	1580	-	2420	-	4380	-	214	-	211	-
Inorganics																	
Alkalinity (as CaCO3)	mg/L	5	***379***	500	350	328	335	294	264	315	376	***380***	307	292	280	304	313
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	350	307	379	338	266	297	337	316	310	278	380	294	270
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	-	***410***	***688***	***570***	***420***	378	***566***	***476***	***388***	334	***744***	***455***	369
Solids - Total Suspended (TSS)	mg/L	3			-	6770	6880	23,100	15,100	4620	44,900	1780	9010	9080	2430	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			150	132	166	103	118	134	7	22	222	146	156	518	116
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	-	-	-	***18.5***	***10.1***	2.4	***4.4***	***3.4***	***4.3***	***4.4***	***4.9***	2.8	***10.9***
Oxygen Demand - Biological (BOD)	mg/L	3			-	28	<5	7	27	69	<5	<5	17	7	8	-	-
Phenols (4AAP)	mg/L	0.002			0.077	0.253	0.001	0.044	-	0.038	-	0.01	-	0.095	-	<0.001	-
Sulphate (Filtered)	mg/L	1		500	26	14.8	<0.1	-	24.6	6.28	12.3	18.2	16.3	11	35.5	22	4
Ammonia	mg/L	0.01			0.17	1.22	0.75	0.34	0.25	0.22	0.19	<0.02	0.24	0.22	0.23	0.16	0.06
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.1	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	<0.05	<0.05	<0.1	-	<0.25	-	<0.25	-	<0.25	<0.25	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			3	1.08	0.97	1.49	-	1.37	-	0.13	-	0.59	-	0.8	-
Conductivity (lab)	µS/cm	1			1050	775	1030	802	717	730	956	876	765	654	1030	828	671
pH (Lab)	-			6.5-8.5	7.77	8.04	8.43	8.11	8.06	8.09	8.13	8.13	7.99	8.28	7.73	7.88	8.04
Field																	
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	7.7	6.6	4.91	4.15
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-	49	135
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	3.9	8.8	11.9	12.4
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	743	943	480	730
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	7.9	8.3	7.26	7.3

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP3 2018-05-31	DP3 2018-11-14	DP3 2019-04-18	DP3 2019-11-13	DP3 2020-04-27	DP3 2020-11-11
Metals										
Arsenic (Filtered)	µg/L	0.1		25	1.5	-	0.3	-	0.3	-
Barium (Filtered)	µg/L	1	***385***	1000	356	***541***	350	***824***	380	***450***
Boron (Filtered)	µg/L	5	***2505***	5000	100	274	152	262	164	170
Calcium (Filtered)	µg/L	20			103,000	153,000	121,000	209,000	121,000	122,000
Cadmium (Filtered)	µg/L	0.015		5	<0.015	-	<0.015	-	<0.015	-
Chloride	µg/L	500	***125685***	250000	39,000	87,100	89,700	***327,000***	88,300	***135,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	1	-	<0.2	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	<0.1	-	<2	-	0.4	-
Iron (Filtered)	µg/L	5	***155***	300	***2440***	***10,100***	***1570***	***8630***	***4310***	***5510***
Lead (Filtered)	µg/L	0.02		10	0.44	-	0.53	-	0.63	-
Manganese (Filtered)	µg/L	1	***26***	50	***1450***	-	***1620***	-	***1460***	-
Magnesium (Filtered)	µg/L	20			6720	9960	7720	12,400	7230	7590
Mercury (Filtered)	µg/L	0.02		1	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				3580	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	20	-	<100	-
Potassium (Filtered)	µg/L	100			2300	-	2100	-	2000	-
Sodium (Filtered)	µg/L	200	***100850***	200000	26,300	59,700	41,200	***116,000***	59,900	66,000
Zinc (Filtered)	µg/L	5		5000	384	-	320	-	694	-
Inorganics										
Alkalinity (as CaCO3)	mg/L	5	***379***	500	266	***410***	275	349	277	241
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	285	***423***	334	***573***	332	336
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	332	***562***	***445***	***852***	***446***	***497***
Solids - Total Suspended (TSS)	mg/L	3			-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			175	157	121	350	398	141
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***14.8***	***4.9***	***3.2***	2	***3.5***	0.9
Oxygen Demand - Biological (BOD)	mg/L	3			-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			0.034	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	11	23	14	17	17	19
Ammonia	mg/L	0.01			0.21	0.21	0.12	0.22	0.35	0.23
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.7	-	0.7	-	1.3	-
Conductivity (lab)	µS/cm	1			640	1050	843	1560	845	935
pH (Lab)	-			6.5-8.5	8.09	7.76	7.7	7.78	7.82	7.69
Field										
DO (Field)	mg/L				8.95	6.56	6.8	2.68	7.61	5.42
Redox Potential (Field)	mV				101	143	133	168	108	161
Temp (Field)	°C				13.3	6.6	4	6.4	8.5	12.8
Conductivity (field)	µS/cm				560	1010	1540	1440	450	737
pH (Field)	-			6.5-8.5	7.83	7.14	7.7	6.69	-	7.6

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	DP4-R 2017-06-28	DP4-R 2017-10-05	DP4-R 2018-05-31	DP4-R 2018-11-14	DP4-R 2019-04-18	DP4-R 2020-04-27	DP4-R 2020-11-11
Metals											
Arsenic (Filtered)	µg/L	0.1		25	1.3	-	0.2	-	0.3	0.5	-
Barium (Filtered)	µg/L	1	***385***	1000	327	193	***445***	***421***	***427***	***600***	***571***
Boron (Filtered)	µg/L	5	***2505***	5000	26	25	20	20	26	23	37
Calcium (Filtered)	µg/L	20			164,000	94,100	196,000	199,000	204,000	286,000	267,000
Cadmium (Filtered)	µg/L	0.015		5	<0.014	-	0.025	-	0.047	0.14	-
Chloride	µg/L	500	***125685***	250000	***344,000***	***373,000***	***547,000***	***603,000***	***703,000***	***922,000***	***893,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	<1	-	<1	-	0.2	4	-
Copper (Filtered)	µg/L	0.1		1000	<2	-	0.1	-	<2	4.8	-
Iron (Filtered)	µg/L	5	***155***	300	***4080***	152	***8170***	***9690***	***10,300***	***15,400***	***19,500***
Lead (Filtered)	µg/L	0.02		10	1.34	-	2.66	-	5.1	21.1	-
Manganese (Filtered)	µg/L	1	***26***	50	***271***	-	***363***	-	***386***	***554***	-
Magnesium (Filtered)	µg/L	20			7230	4480	8740	8430	8640	11,500	11,200
Mercury (Filtered)	µg/L	0.02		1	0.03	-	<0.02	-	<0.02	<0.02	-
Phosphorus total (P2O5)	µg/L				3700	-	510	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	<10	100	-
Potassium (Filtered)	µg/L	100			1100	-	1100	-	1200	1300	-
Sodium (Filtered)	µg/L	200	***100850***	200000	***267,000***	***276,000***	***267,000***	***277,000***	***240,000***	***393,000***	***402,000***
Zinc (Filtered)	µg/L	5		5000	2480	-	27,200	-	86,100	42,900	-
Inorganics											
Alkalinity (as CaCO3)	mg/L	5	***379***	500	366	352	***394***	361	358	355	356
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	***440***	254	***526***	***532***	***546***	***762***	***714***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***1130***	***1160***	***1270***	***1370***	***1580***	***1850***	***1840***
Solids - Total Suspended (TSS)	mg/L	3			-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			995	254	183	54	142	119	108
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***9.2***	***7.7***	***6.2***	***5.4***	***5.2***	***3.7***	1.3
Oxygen Demand - Biological (BOD)	mg/L	3			-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	<0.001	-	<0.002	<0.002	-
Sulphate (Filtered)	mg/L	1		500	<1	<1	<1	<1	<1	<10	<10
Ammonia	mg/L	0.01			1.24	1.67	1.26	1.59	1.47	1.49	1.47
Nitrate (as N)	mg/L	0.05		10	0.06	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.05	-	0.23	<0.5	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			17.7	-	3.3	-	3.3	3.4	-
Conductivity (lab)	µS/cm	1			2050	2110	2300	2470	2830	3310	3280
pH (Lab)	-			6.5-8.5	7.49	7.97	7.68	7.55	7.36	7.36	7.34
Field											
DO (Field)	mg/L				9.92	10.19	9.28	10.51	4.2	7	4.66
Redox Potential (Field)	mV				67	50	50	145	134	131	162
Temp (Field)	°C				15.8	13.3	13.5	3.7	5	7.7	10.4
Conductivity (field)	µS/cm				1930	1050	1770	2200	1950	1120	3350
pH (Field)	-			6.5-8.5	7.03	8.23	7.23	6.98	7.05	-	7.24

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW12-2 2012-05-05	OW12-2 2013-11-28	OW12-2 2014-11-06	OW12-2 2015-04-17	OW12-2 2015-11-03	OW12-2 2016-10-24	OW12-2 2017-06-08	OW12-2 2018-05-31	OW12-2 2019-04-17	OW12-2 2020-04-27
Metals														
Arsenic (Filtered)	µg/L	0.1		25	5	-	-	<3	-	-	1.2	1.3	1.1	1.9
Barium (Filtered)	µg/L	1	***385***	1000	***693***	289	***1640***	***1210***	***1300***	***2140***	***694***	***828***	***1000***	***774***
Boron (Filtered)	µg/L	5	***2505***	5000	864	269	826	658	864	968	332	342	439	339
Calcium (Filtered)	µg/L	20			217,000	132,000	191,000	192,000	207,000	206,000	143,000	150,000	199,000	180,000
Cadmium (Filtered)	µg/L	0.015		5	<1	-	-	<1	-	-	<0.014	<0.015	<0.015	0.023
Chloride	µg/L	500	***125685***	250000	52,400	16,600	***252,000***	***129,000***	***167,000***	***210,000***	15,400	20,200	70,800	31,900
Chromium (III+VI) (Filtered)	µg/L	1		50	5	-	-	4	-	-	1	<1	3	29
Copper (Filtered)	µg/L	0.1		1000	<2	-	-	<2	-	-	0.3	<0.1	<2	2.6
Iron (Filtered)	µg/L	5	***155***	300	***22,100***	***3070***	***26,100***	***21,300***	***24,400***	***28,200***	***14,000***	***14,900***	***22,900***	***22,600***
Lead (Filtered)	µg/L	0.02		10	<2	-	-	<2	-	-	<0.05	<0.02	<0.02	1.18
Manganese (Filtered)	µg/L	1	***26***	50	***1780***	-	-	***1480***	-	-	***1260***	***1390***	***1710***	***1520***
Magnesium (Filtered)	µg/L	20			27,900	14,000	27,400	25,900	32,900	33,000	13,500	13,600	18,600	15,200
Mercury (Filtered)	µg/L	0.02		1	<0.1	-	-	<0.1	-	-	<0.02	<0.02	<0.02	<0.02
Phosphorus total (P2O5)	µg/L				90	-	-	1510	-	-	1740	5200	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	20	400
Potassium (Filtered)	µg/L	100			30,700	-	-	28,300	-	44,500	15,300	15,900	18,400	16,500
Sodium (Filtered)	µg/L	200	***100850***	200000	56,800	49,400	***150,000***	76,700	***126,000***	***127,000***	21,800	18,800	30,900	24,000
Zinc (Filtered)	µg/L	5		5000	<5	-	-	<5	-	-	<5	<5	<5	8
Inorganics														
Alkalinity (as CaCO3)	mg/L	5	***379***	500	***756***	***520***	***784***	***683***	***853***	***875***	***467***	***462***	***536***	***448***
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	***657***	387	***590***	***586***	***652***	***650***	***413***	***431***	***574***	***512***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***804***	***508***	***1030***	***808***	***1060***	***1080***	***515***	***482***	***670***	***520***
Solids - Total Suspended (TSS)	mg/L	3			700	1140	970	395	1650	686	5450	2900	1800	2140
Oxygen Demand - Chemical (COD)	mg/L	5			76	24	44	52	58	62	94	77	58	58
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***31***	***11.6***	***17.7***	***13.9***	***22***	***27.2***	***9.1***	***10.4***	***10.6***	***10.8***
Oxygen Demand - Biological (BOD)	mg/L	3			<5	25	11	6	6	9	9	11	10	4
Phenols (4AAP)	mg/L	0.002			<0.001	-	-	<0.001	-	-	<0.001	<0.001	0.003	<0.002
Sulphate (Filtered)	mg/L	1		500	20.5	9.26	6.3	18.6	3.9	1.5	4	4	8	5
Ammonia	mg/L	0.01			15.1	6.22	33	22.1	36	42.8	9.42	9.32	11	11
Nitrate (as N)	mg/L	0.05		10	<0.05	1.89	<0.5	<0.25	<1	<0.5	<0.05	0.13	<0.05	0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	-	<0.25	-	<0.5	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			23	-	-	21.6	-	-	11.6	11.7	12.7	11.6
Conductivity (lab)	µS/cm	1			1470	992	2160	1660	2030	2130	936	909	1240	976
pH (Lab)	-			6.5-8.5	7.45	7.78	7.22	7.61	7.74	7.54	7.56	7.52	7.01	7.21
Field														
DO (Field)	mg/L				-	-	-	-	-	4.3	3.54	2.26	2.31	3.26
Redox Potential (Field)	mV				-	-	-	-	-	-	16	79	134	166
Temp (Field)	°C				-	-	-	-	-	11.7	12.4	13.9	10	9.9
Conductivity (field)	µS/cm				-	-	-	-	-	1894	1000	1020	1070	690
pH (Field)	-			6.5-8.5	-	-	-	-	-	6.6	6.54	6.76	6.74	-

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW14-2 2011-05-01	OW14-2 2012-11-01	OW14-2 2013-06-06	OW14-2 2014-11-06	OW14-2 2015-04-20	OW14-2 2015-11-03	OW14-2 2016-06-01	OW14-2 2016-10-24	OW14-2 2017-10-05	OW14-2 2018-11-14	OW14-2 2019-11-13	OW14-2 2020-11-11
Metals																
Arsenic (Filtered)	µg/L	0.1		25	4	-	4	-	<3	-	-	<3	-	-	-	-
Barium (Filtered)	µg/L	1	***385***	1000	***710***	***1080***	***1100***	355	***428***	***393***	***452***	***445***	***1310***	***1250***	***1360***	***1270***
Boron (Filtered)	µg/L	5	***2505***	5000	870	540	613	875	699	942	946	936	1030	1020	1140	1060
Calcium (Filtered)	µg/L	20			180,000	224,000	214,000	189,000	284,000	259,000	241,000	253,000	228,000	220,000	243,000	261,000
Cadmium (Filtered)	µg/L	0.015		5	<0.1	-	<1	-	<1	-	-	<1	-	-	-	-
Chloride	µg/L	500	***125685***	250000	55,000	***284,000***	***269,000***	***361,000***	***655,000***	***556,000***	***524,000***	***627,000***	***235,000***	***235,000***	***327,000***	***308,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	<5	-	<3	-	3	-	-	5	-	-	-	-
Copper (Filtered)	µg/L	0.1		1000	<1	-	2	-	<2	-	-	<2	-	-	-	-
Iron (Filtered)	µg/L	5	***155***	300	***18,000***	***29,300***	***25,100***	***3120***	***1760***	***1700***	***2000***	***2510***	***26,900***	***28,400***	***22,400***	***27,300***
Lead (Filtered)	µg/L	0.02		10	<0.5	-	<2	-	<2	-	-	<2	-	-	-	-
Manganese (Filtered)	µg/L	1	***26***	50	***1600***	-	***4020***	-	***3480***	-	-	***3050***	-	-	-	-
Magnesium (Filtered)	µg/L	20			24,000	29,100	29,200	39,700	51,200	47,200	43,900	49,300	32,600	34,400	37,500	39,200
Mercury (Filtered)	µg/L	0.02		1	<0.1	-	<0.1	-	<0.1	-	-	<0.1	-	-	-	-
Phosphorus total (P2O5)	µg/L				<100	-	130	-	330	-	-	<50	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			30,000	-	29,200	-	32,800	-	30,100	32,600	-	-	-	-
Sodium (Filtered)	µg/L	200	***100850***	200000	59,000	***169,000***	***181,000***	***196,000***	***333,000***	***282,000***	***290,000***	***308,000***	***223,000***	***189,000***	***216,000***	***227,000***
Zinc (Filtered)	µg/L	5		5000	<5	-	7	-	<5	-	-	5	-	-	-	-
Inorganics																
Alkalinity (as CaCO3)	mg/L	5	***379***	500	***655***	***641***	***598***	***554***	***769***	***718***	***775***	***750***	***922***	***865***	***851***	***794***
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	***550***	***679***	***655***	***635***	***920***	***841***	***783***	***835***	***704***	***691***	***762***	***814***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***847***	***1200***	***1180***	***1360***	***1820***	***1760***	***1660***	***1770***	***1400***	***1240***	***1340***	***1340***
Solids - Total Suspended (TSS)	mg/L	3			-	355	16,800	219	1240	261	52	264	-	260	440	220
Oxygen Demand - Chemical (COD)	mg/L	5			72	48	10	24	27	31	36	34	141	81	86	63
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***23.3***	***18.2***	***32.8***	***11.5***	***12.2***	***13.9***	***15.9***	***12.3***	***12***	***12.4***	***7.3***	***4.8***
Oxygen Demand - Biological (BOD)	mg/L	3			-	6	<5	<5	<5	<5	<5	<5	-	10	15	14
Phenols (4AAP)	mg/L	0.002			0.002	-	0.001	-	<0.001	-	-	<0.001	-	-	-	-
Sulphate (Filtered)	mg/L	1		500	28	7.79	20	38.2	47.3	44.4	43.9	49.7	<1	<1	<1	<1
Ammonia	mg/L	0.01			25	8.58	7.97	2.57	5.4	5.44	6.28	6.8	30.5	25.6	35.9	22.7
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.25	1.7	<1	<1	<1	<1	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	-	<0.25	-	<1	-	<1	<1	-	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			23	-	12.4	-	6.23	-	-	8.43	-	-	-	-
Conductivity (lab)	µS/cm	1			1440	1920	1770	2230	3200	2870	2810	3090	2550	2240	2410	2420
pH (Lab)	-			6.5-8.5	7.73	8.18	7.93	8.2	7.87	7.8	7.7	7.82	7.64	7.53	7.63	7.53
Field																
DO (Field)	mg/L				-	-	-	-	-	-	4.3	4.2	2.78	3.32	3.63	5.04
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	125	171	76	242
Temp (Field)	°C				-	-	-	-	-	-	12.7	11.3	15.4	8	7.4	10.2
Conductivity (field)	µS/cm				-	-	-	-	-	-	2638	2346	2300	2000	2400	1927
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	7.7	7.2	6.93	6.86	6.56	7.08

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW17-3 2011-05-01	OW17-3 2012-05-08	OW17-3 2012-11-27	OW17-3 2013-11-28	OW17-3 2014-05-08	OW17-3 2014-11-06	OW17-3 2015-04-17	OW17-3 2015-11-02	OW17-3 2016-04-26	OW17-3 2016-10-24	OW17-3 2017-06-08	OW17-3 2017-10-05	OW17-3 2018-05-31
Metals																	
Arsenic (Filtered)	µg/L	0.1		25	<1	<3	-	-	<3	-	<3	-	<3	-	<0.7	-	<0.1
Barium (Filtered)	µg/L	1	***385***	1000	180	179	200	175	162	169	149	188	168	186	163	196	204
Boron (Filtered)	µg/L	5	***2505***	5000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<5	9	<5
Calcium (Filtered)	µg/L	20			110,000	96,300	90,900	112,000	110,000	74,700	94,300	79,300	117,000	86,000	99,700	85,400	105,000
Cadmium (Filtered)	µg/L	0.015		5	<0.1	<1	-	-	<1	-	<1	-	<1	-	<0.014	-	<0.015
Chloride	µg/L	500	***125685***	250000	2000	1870	2020	1780	1820	1650	1570	940	2220	1440	900	1000	600
Chromium (III+VI) (Filtered)	µg/L	1		50	<5	<3	-	-	<3	-	<3	-	<3	-	<1	-	1
Copper (Filtered)	µg/L	0.1		1000	<1	<2	-	-	<2	-	<2	-	<2	-	0.3	-	0.1
Iron (Filtered)	µg/L	5	***155***	300	<100	<10	<10	<10	<10	<10	<10	<10	<10	75	<5	<5	<5
Lead (Filtered)	µg/L	0.02		10	<0.5	<2	-	-	<2	-	<2	-	<2	-	0.07	-	<0.02
Manganese (Filtered)	µg/L	1	***26***	50	12	3	-	-	<2	-	<2	-	<2	-	<1	-	<1
Magnesium (Filtered)	µg/L	20			4800	5060	12,000	4510	4110	10,200	3880	12,100	4640	10,300	4470	9700	4990
Mercury (Filtered)	µg/L	0.02		1	<0.1	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	<0.02	-	<0.02
Phosphorus total (P2O5)	µg/L				<100	<50	-	-	130	-	340	-	140	-	450	-	250
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			500	590	-	-	490	-	480	-	1010	700	300	-	300
Sodium (Filtered)	µg/L	200	***100850***	200000	2200	1670	1930	2560	3360	1890	2900	1700	2090	1600	1600	1700	1300
Zinc (Filtered)	µg/L	5		5000	<5	15	-	-	<5	-	<5	-	<5	-	<5	-	<5
Inorganics																	
Alkalinity (as CaCO3)	mg/L	5	***379***	500	273	275	247	294	278	221	267	250	276	255	255	244	270
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	300	261	276	298	292	229	251	248	311	257	268	253	283
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	301	272	298	298	304	266	266	250	314	294	270	262	261
Solids - Total Suspended (TSS)	mg/L	3			-	308	456	213	180	980	540	1560	391	1880	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			<4	<5	<5	10	<5	<5	<5	<5	<5	<5	43	22	<5
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	0.8	1.3	0.7	***4.8***	1	0.7	0.8	0.8	1	1.6	0.8	***4.5***	***6.8***
Oxygen Demand - Biological (BOD)	mg/L	3			-	<5	<5	<5	<5	<5	<5	<5	<5	<5	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.001
Sulphate (Filtered)	mg/L	1		500	8	9.69	11.6	6.32	6.13	11.9	5.96	11.6	6.23	12.5	4	6	4
Ammonia	mg/L	0.01			<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.08	0.02	<0.02	0.08	0.06	0.01
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	<0.05	-	-	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			<5	0.31	-	-	0.18	-	<0.1	-	<0.1	-	0.3	-	0.3
Conductivity (lab)	µS/cm	1			472	498	484	544	572	418	524	464	501	476	490	477	505
pH (Lab)	-			6.5-8.5	7.92	8.05	8.19	7.95	7.96	7.86	7.97	7.96	8.13	7.97	7.8	8	7.92
Field																	
DO (Field)	mg/L				-	-	-	-	-	-	-	-	11.7	8.7	9.27	9.34	11.02
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-49	57	39
Temp (Field)	°C				-	-	-	-	-	-	-	-	6.1	9	9	10.6	9.3
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	584	454	500	510	500
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	8	8.1	6.87	7.43	7.21

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW17-3 2018-11-14	OW17-3 2019-04-18	OW17-3 2019-11-13	OW17-3 2020-04-27	OW17-3 2020-11-11
Metals									
Arsenic (Filtered)	µg/L	0.1		25	-	<0.1	-	<0.1	-
Barium (Filtered)	µg/L	1	***385***	1000	213	138	211	170	204
Boron (Filtered)	µg/L	5	***2505***	5000	<5	<5	<5	<5	7
Calcium (Filtered)	µg/L	20			84,700	105,000	93,600	112,000	96,400
Cadmium (Filtered)	µg/L	0.015		5	-	<0.015	-	<0.015	-
Chloride	µg/L	500	***125685***	250000	1100	1100	<500	1200	1300
Chromium (III+VI) (Filtered)	µg/L	1		50	-	0.2	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	-	<2	-	0.5	-
Iron (Filtered)	µg/L	5	***155***	300	<5	<5	14	8	14
Lead (Filtered)	µg/L	0.02		10	-	<0.02	-	<0.02	-
Manganese (Filtered)	µg/L	1	***26***	50	-	<1	-	<1	-
Magnesium (Filtered)	µg/L	20			11,900	3200	10,100	4640	9960
Mercury (Filtered)	µg/L	0.02		1	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	10	-	<100	-
Potassium (Filtered)	µg/L	100			-	400	-	400	-
Sodium (Filtered)	µg/L	200	***100850***	200000	1600	2100	1400	1200	1300
Zinc (Filtered)	µg/L	5		5000	-	<5	-	<5	-
Inorganics									
Alkalinity (as CaCO3)	mg/L	5	***379***	500	247	262	235	260	228
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	261	276	276	299	282
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	250	269	241	267	245
Solids - Total Suspended (TSS)	mg/L	3			-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			54	92	19	<5	11
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	2.3	2.5	2.6	1.9	<0.2
Oxygen Demand - Biological (BOD)	mg/L	3			-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	11	4	6	3	7
Ammonia	mg/L	0.01			0.04	0.08	0.05	0.02	0.02
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.05	0.06	<0.05
Nitrite (as N)	mg/L	0.05		1	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-	2.4	-	0.3	-
Conductivity (lab)	µS/cm	1			483	519	466	516	474
pH (Lab)	-			6.5-8.5	7.8	7.62	7.81	7.69	7.82
Field									
DO (Field)	mg/L				8.43	10.02	7.7	11.28	9.17
Redox Potential (Field)	mV				92	95	11	127	268
Temp (Field)	°C				8.2	7	6.7	7.4	10.4
Conductivity (field)	µS/cm				520	600	500	460	375
pH (Field)	-			6.5-8.5	7.84	7.84	8	-	7.13

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW19-2 2011-05-01	OW19-2 2012-05-11	OW19-2 2012-11-01	OW19-2 2013-06-07	OW19-2 2013-11-28	OW19-2 2014-05-08	OW19-2 2014-11-06	OW19-2 2015-04-17	OW19-2 2015-11-02	OW19-2 2016-04-26	OW19-2 2016-10-24	OW19-2 2017-06-08	OW19-2 2017-10-05
Metals																	
Arsenic (Filtered)	µg/L	0.1		25	<1	<3	-	<3	-	<3	-	<3	-	<3	-	<0.7	-
Barium (Filtered)	µg/L	1	***385***	1000	***1000***	***796***	***870***	***886***	***945***	***955***	***979***	***862***	***841***	***867***	***883***	***876***	***876***
Boron (Filtered)	µg/L	5	***2505***	5000	20	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	8	16
Calcium (Filtered)	µg/L	20			93,000	86,700	88,100	104,000	86,500	88,400	86,400	89,900	95,000	83,700	78,400	83,600	78,400
Cadmium (Filtered)	µg/L	0.015		5	<0.1	<1	-	<1	-	<1	-	<1	-	<1	-	<0.014	-
Chloride	µg/L	500	***125685***	250000	54,000	42,700	48,900	45,700	38,900	40,000	46,900	58,100	65,200	62,000	57,500	36,600	38,500
Chromium (III+VI) (Filtered)	µg/L	1		50	<5	<3	-	<3	-	<3	-	<3	-	<3	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	<1	<2	-	<2	-	<2	-	<2	-	<2	-	0.3	-
Iron (Filtered)	µg/L	5	***155***	300	***4500***	***3570***	***3780***	***4170***	***5380***	***4100***	***3870***	***3940***	***3630***	***3700***	***4150***	***4150***	***3850***
Lead (Filtered)	µg/L	0.02		10	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-	0.11	-
Manganese (Filtered)	µg/L	1	***26***	50	***290***	***237***	-	***268***	-	***293***	-	***282***	-	***279***	-	***294***	-
Magnesium (Filtered)	µg/L	20			3700	3160	3130	3520	2960	3150	3000	2970	2980	2770	2500	2830	2720
Mercury (Filtered)	µg/L	0.02		1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.02	-
Phosphorus total (P2O5)	µg/L				<100	<50	-	<50	-	<50	-	<50	-	<50	-	30	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			1000	1090	-	1290	-	1180	-	1160	-	1380	1430	1200	-
Sodium (Filtered)	µg/L	200	***100850***	200000	47,000	36,700	36,900	39,500	33,900	30,200	30,300	32,200	38,300	35,100	33,400	35,100	31,600
Zinc (Filtered)	µg/L	5		5000	<5	<5	-	6	-	5	-	<5	-	<5	-	<5	-
Inorganics																	
Alkalinity (as CaCO3)	mg/L	5	***379***	500	262	246	223	242	244	236	250	232	232	224	214	216	210
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	250	230	233	274	228	234	228	237	249	220	206	221	207
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	373	322	380	358	342	350	326	334	358	344	360	304	301
Solids - Total Suspended (TSS)	mg/L	3			-	<10	<10	74	23	18	10	12	12	<10	12	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			68	22	46	36	51	37	35	32	40	25	25	41	42
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***15.8***	***17.2***	***15.3***	***16.7***	***18.9***	***12.8***	***13.8***	***14.4***	***16.6***	***15.5***	***15.1***	***14.8***	***15.6***
Oxygen Demand - Biological (BOD)	mg/L	3			-	<5	<5	8	6	8	8	6	<5	8	7	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-
Sulphate (Filtered)	mg/L	1		500	<1	<0.1	<0.1	0.24	<0.2	<0.5	<0.2	<0.5	<0.2	<0.1	<0.1	<1	<1
Ammonia	mg/L	0.01			0.69	0.63	0.7	0.48	0.74	0.74	0.9	0.82	0.97	1.15	0.98	0.96	0.99
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.1	<0.1	<0.25	<0.1	<0.25	<0.1	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	<0.05	-	<0.1	-	<0.25	-	<0.25	-	<0.05	<0.05	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			35	0.88	-	2.05	-	1.04	-	1	-	1.4	-	1.4	-
Conductivity (lab)	µS/cm	1			680	563	564	582	589	612	614	630	636	585	555	553	547
pH (Lab)	-			6.5-8.5	8	7.8	8.19	7.41	7.81	7.94	7.97	7.88	7.96	8.07	7.85	7.8	7.83
Field																	
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	5.1	4.8	3.39	4
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-	-83	54
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	9.9	10	16.1	11.3
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	241	161	590	600
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	7.5	7.1	7.07	7.3

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW19-2 2018-05-31	OW19-2 2018-11-14	OW19-2 2019-04-18	OW19-2 2019-11-13	OW19-2 2020-04-27	OW19-2 2020-11-11
Metals										
Arsenic (Filtered)	µg/L	0.1		25	0.2	-	0.1	-	0.2	-
Barium (Filtered)	µg/L	1	***385***	1000	***1020***	***1020***	***971***	***1130***	***1120***	***1200***
Boron (Filtered)	µg/L	5	***2505***	5000	6	8	13	8	10	14
Calcium (Filtered)	µg/L	20			87,100	93,800	92,600	104,000	109,000	109,000
Cadmium (Filtered)	µg/L	0.015		5	<0.015	-	<0.015	-	<0.015	-
Chloride	µg/L	500	***125685***	250000	57,900	76,000	80,300	89,200	85,500	69,100
Chromium (III+VI) (Filtered)	µg/L	1		50	<1	-	0.3	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	<0.1	-	<2	-	1.6	-
Iron (Filtered)	µg/L	5	***155***	300	***4230***	***4630***	***4000***	***5100***	***5500***	***5400***
Lead (Filtered)	µg/L	0.02		10	<0.02	-	<0.02	-	0.05	-
Manganese (Filtered)	µg/L	1	***26***	50	***303***	-	***306***	-	***400***	-
Magnesium (Filtered)	µg/L	20			2900	3130	2960	3260	3470	3330
Mercury (Filtered)	µg/L	0.02		1	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				10	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	<10	-	<100	-
Potassium (Filtered)	µg/L	100			1200	-	1400	-	1500	-
Sodium (Filtered)	µg/L	200	***100850***	200000	30,800	38,300	36,900	42,900	44,000	45,600
Zinc (Filtered)	µg/L	5		5000	<5	-	<5	-	<5	-
Inorganics										
Alkalinity (as CaCO3)	mg/L	5	***379***	500	216	225	205	228	228	228
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	230	247	244	273	287	286
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	302	351	350	355	370	356
Solids - Total Suspended (TSS)	mg/L	3			-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			44	51	44	43	38	30
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***14.6***	***13.1***	***12.2***	***11.7***	***10.4***	***9.3***
Oxygen Demand - Biological (BOD)	mg/L	3			-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	<1	<1	<1	<1	<1	<1
Ammonia	mg/L	0.01			1.05	1.19	1.1	1.21	1.15	1.23
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.05	<0.05	0.07	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			1.6	-	1.7	-	1.5	-
Conductivity (lab)	µS/cm	1			583	675	674	684	712	686
pH (Lab)	-			6.5-8.5	7.87	7.67	7.51	7.77	7.63	7.59
Field										
DO (Field)	mg/L				6.57	4.41	3.97	3.75	7.31	4.64
Redox Potential (Field)	mV				40	115	123	69	68	155
Temp (Field)	°C				11.4	8.2	8	7.3	8.7	9.7
Conductivity (field)	µS/cm				610	710	730	710	730	714
pH (Field)	-			6.5-8.5	7.22	7.16	7.34	7.04	7.43	7.15

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW9 2011-05-01	OW9 2012-05-04	OW9 2012-11-01	OW9 2013-06-04	OW9 2013-11-01	OW9 2014-05-08	OW9 2014-11-06	OW9 2015-04-20	OW9 2015-11-03	OW9 2016-04-26	OW9 2016-10-24	OW9 2017-06-08	OW9 2017-10-05
Metals																	
Arsenic (Filtered)	µg/L	0.1		25	<1	3	-	<3	-	<3	-	<3	-	<3	-	0.96	-
Barium (Filtered)	µg/L	1	***385***	1000	***570***	***738***	***645***	***564***	379	***705***	***1090***	***654***	***641***	***720***	***835***	***811***	***759***
Boron (Filtered)	µg/L	5	***2505***	5000	330	473	300	402	169	428	799	300	644	394	470	703	893
Calcium (Filtered)	µg/L	20			150,000	194,000	167,000	179,000	141,000	177,000	250,000	203,000	198,000	211,000	236,000	224,000	204,000
Cadmium (Filtered)	µg/L	0.015		5	<0.1	<1	-	<1	-	<1	-	<1	-	<1	-	<0.014	-
Chloride	µg/L	500	***125685***	250000	***420,000***	***533,000***	***215,000***	***190,000***	76,700	***199,000***	***403,000***	***254,000***	***209,000***	***216,000***	***445,000***	66,500	***145,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	<10	18	-	<3	-	<3	-	<3	-	<3	-	1	-
Copper (Filtered)	µg/L	0.1		1000	<2	<2	-	<2	-	<2	-	<2	-	<2	-	0.6	-
Iron (Filtered)	µg/L	5	***155***	300	***17,000***	***17,000***	***16,100***	***16,600***	***12,000***	***18,600***	***23,800***	***19,400***	***17,900***	***20,400***	***36,300***	***23,900***	***18,300***
Lead (Filtered)	µg/L	0.02		10	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-	0.13	-
Manganese (Filtered)	µg/L	1	***26***	50	***2700***	***2740***	-	***2120***	-	***3070***	-	***2780***	-	***2860***	-	***2650***	-
Magnesium (Filtered)	µg/L	20			10,000	13,500	6530	11,100	5390	12,500	17,700	11,700	12,500	13,500	13,600	18,100	16,800
Mercury (Filtered)	µg/L	0.02		1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.02	-
Phosphorus total (P2O5)	µg/L				300	320	-	1920	-	210	-	270	-	300	-	340	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			18,000	21,900	-	19,900	-	17,900	-	16,000	-	17,400	21,900	26,200	-
Sodium (Filtered)	µg/L	200	***100850***	200000	***350,000***	***361,000***	***117,000***	***151,000***	54,200	***134,000***	***174,000***	***133,000***	***150,000***	***174,000***	***182,000***	***103,000***	***148,000***
Zinc (Filtered)	µg/L	5		5000	<5	5	-	9	-	6	-	<5	-	6	-	<5	-
Inorganics																	
Alkalinity (as CaCO3)	mg/L	5	***379***	500	***547***	***604***	***418***	***574***	***380***	***610***	***715***	***494***	***660***	***699***	***556***	***783***	***743***
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	***420***	***540***	-	***493***	374	***493***	***697***	***555***	***546***	***582***	***645***	***633***	***579***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***1360***	***1410***	***948***	***976***	***548***	***994***	***1310***	***996***	***960***	***1020***	***1420***	***943***	***1040***
Solids - Total Suspended (TSS)	mg/L	3			-	166	104	4770	99	93	110	54	88	67	125	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			57	26	39	105	26	38	42	28	39	45	37	67	72
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***11.1***	***17.3***	***12.4***	***36.6***	***8.3***	***10.5***	***18.1***	***10.6***	***16.8***	***16.6***	***14.9***	***17.5***	***12.3***
Oxygen Demand - Biological (BOD)	mg/L	3			-	<5	<5	13	13	<5	8	<5	<5	8	<5	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	<0.001	-	0.003	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-
Sulphate (Filtered)	mg/L	1		500	41	6.83	59.2	32.1	20.8	61.7	<1	51.3	2.6	33.7	61.1	23	<1
Ammonia	mg/L	0.01			5.7	6.78	3.25	6.93	1.99	8.49	18.5	7.66	10.7	11.8	13.2	19.9	22.3
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.25	<0.25	<0.5	<0.5	<0.25	<0.5	<0.25	<0.5	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	<0.05	-	<0.25	-	<0.5	-	<0.25	-	<0.25	<0.5	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			6.1	7.51	-	8.9	-	9.09	-	8.32	-	12.2	-	21.7	-
Conductivity (lab)	µS/cm	1			2440	2560	1450	1580	1020	1890	2520	1680	1760	1830	2270	1710	1890
pH (Lab)	-			6.5-8.5	7.71	7.57	7.91	7.72	7.59	7.65	7.67	7.79	7.73	7.99	7.63	7.09	7.34
Field																	
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	5.8	4.7	1.59	4
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-	47	151
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	4.5	10.2	11.7	12.6
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	1960	2156	1840	1820
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	7.4	7.2	6.47	6.76

Table 4 - Shallow Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW9 2018-05-31	OW9 2018-11-14	OW9 2019-04-18	OW9 2019-11-13	OW9 2020-04-27	OW9 2020-11-11
Metals										
Arsenic (Filtered)	µg/L	0.1		25	1	-	0.4	-	0.5	-
Barium (Filtered)	µg/L	1	***385***	1000	***857***	***456***	***1610***	***578***	***594***	***558***
Boron (Filtered)	µg/L	5	***2505***	5000	651	329	464	295	344	409
Calcium (Filtered)	µg/L	20			204,000	152,000	421,000	197,000	174,000	185,000
Cadmium (Filtered)	µg/L	0.015		5	<0.015	-	<0.015	-	<0.029	-
Chloride	µg/L	500	***125685***	250000	93,700	***169,000***	***1,640,000***	***420,000***	***780,000***	***360,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	<1	-	1.3	-	1	-
Copper (Filtered)	µg/L	0.1		1000	<0.1	-	<2	-	<0.2	-
Iron (Filtered)	µg/L	5	***155***	300	***18,200***	***13,500***	***36,100***	***14,000***	***15,200***	***13,200***
Lead (Filtered)	µg/L	0.02		10	<0.02	-	0.03	-	<0.09	-
Manganese (Filtered)	µg/L	1	***26***	50	***2300***	-	***4250***	-	***1720***	-
Magnesium (Filtered)	µg/L	20			16,200	7540	23,200	7620	8030	7660
Mercury (Filtered)	µg/L	0.02		1	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				410	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	<10	-	200	-
Potassium (Filtered)	µg/L	100			25,700	-	25,300	-	13,800	-
Sodium (Filtered)	µg/L	200	***100850***	200000	***121,000***	***141,000***	***640,000***	***178,000***	***559,000***	***273,000***
Zinc (Filtered)	µg/L	5		5000	<5	-	<5	-	<5	-
Inorganics										
Alkalinity (as CaCO3)	mg/L	5	***379***	500	***778***	***497***	***483***	367	***547***	***476***
Hardness (as CaCO3) (Filtered)	mg/L	1	***388***	500	***577***	***411***	***1150***	***524***	***468***	***494***
Solids - Total Dissolved (TDS)	mg/L	3	***384***	500	***9920***	***783***	***3330***	***994***	***1850***	***1110***
Solids - Total Suspended (TSS)	mg/L	3			-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			63	41	123	38	75	32
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3.1***	5	***15.8***	***8.6***	***5***	3	***6.4***	2.5
Oxygen Demand - Biological (BOD)	mg/L	3			-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	0.026	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	36	5	18	12	30	4
Ammonia	mg/L	0.01			20.8	5.77	15.9	6.1	7.3	5.38
Nitrate (as N)	mg/L	0.05		10	0.06	<0.05	<0.5	<0.05	<0.5	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.5	-	<0.5	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			23	-	17.7	-	9.3	-
Conductivity (lab)	µS/cm	1			1690	1440	5870	1810	3310	2010
pH (Lab)	-			6.5-8.5	7.6	7.32	6.91	7.21	7.46	7.26
Field										
DO (Field)	mg/L				2.17	2.5	5	3.3	6.53	4.3
Redox Potential (Field)	mV				100	155	199	138	181	158
Temp (Field)	°C				9.3	9	1	9	7.4	11.1
Conductivity (field)	µS/cm				1760	1390	4500	1780	1590	1672
pH (Field)	-			6.5-8.5	6.76	6.63	6.63	6.37	-	7

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-1 2016-10-24	BH16-1 2017-06-08	BH16-1 2017-10-05	BH16-1 2018-05-31	BH16-1 2018-11-14	BH16-1 2019-04-18	BH16-1 2019-11-13	BH16-1 2020-04-27	BH16-1 2020-11-11
Metals													
Arsenic (Filtered)	µg/L	0.1		25	-	9.67	-	2.3	-	0.5	-	0.9	-
Barium (Filtered)	µg/L	1	***333***	1000	49	141	164	149	104	94	106	91	108
Boron (Filtered)	µg/L	5	***2528***	5000	69	60	36	31	58	61	62	60	59
Calcium (Filtered)	µg/L	20			38,800	57,800	63,700	59,500	62,300	66,000	74,400	72,900	76,100
Cadmium (Filtered)	µg/L	0.015		5	-	0.118	-	<0.015	-	0.021	-	0.016	-
Chloride	µg/L	500	***125645***	250000	51,400	13,200	3200	3500	2100	1500	<500	31,800	1900
Chromium (III+VI) (Filtered)	µg/L	1		50	-	<1	-	3	-	0.2	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	-	<0.3	-	0.2	-	<2	-	1.8	-
Iron (Filtered)	µg/L	5	***155***	300	***738***	154	38	57	22	14	17	73	83
Lead (Filtered)	µg/L	0.02		10	-	0.07	-	0.03	-	<0.02	-	0.05	-
Manganese (Filtered)	µg/L	1	***28***	50	-	***511***	-	***179***	-	***86***	-	***129***	-
Magnesium (Filtered)	µg/L	20			7860	10,600	9540	9260	12,200	12,600	13,800	14,400	13,900
Mercury (Filtered)	µg/L	0.02		1	-	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				-	1430	-	3190	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	60	-	<100	-
Potassium (Filtered)	µg/L	100			12,800	7300	-	4900	-	3200	-	3200	-
Sodium (Filtered)	µg/L	200	***101300***	200000	***115,000***	79,200	48,000	51,300	26,800	13,200	12,700	11,300	9700
Zinc (Filtered)	µg/L	5		5000	-	<5	-	<5	-	<5	-	<5	-
Inorganics													
Alkalinity (as CaCO3)	mg/L	5	***364***	500	285	263	272	269	258	222	221	218	212
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	129	188	198	187	206	217	243	241	247
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***518***	***380***	334	285	260	245	240	244	239
Solids - Total Suspended (TSS)	mg/L				29,600	-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			44	217	92	105	90	33	12	54	<5
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***12.5***	***16.9***	***7.8***	***16.2***	***5.9***	***4***	2.6	2	1.1
Oxygen Demand - Biological (BOD)	mg/L				<5	-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			-	<0.001	-	<0.001	-	0.007	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	82	58	24	23	19	16	14	17	16
Ammonia	mg/L	0.01			<0.02	0.06	<0.01	0.02	0.04	0.06	0.02	0.03	0.02
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.1	<0.05	-	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-	<0.1	-	0.2	-	0.3	-	0.2	-
Conductivity (lab)	µS/cm	1			779	691	608	549	502	474	465	472	462
pH (Lab)	-			6.5-8.5	8.05	8.23	8.17	8.17	7.9	8.04	8	7.97	8.08
Field													
DO (Field)	mg/L				9.6	6.2	7.86	8.14	9.31	9.89	7.22	7.7	9.63
Redox Potential (Field)	mV				-	-11	102	56	127	122	0	13	99
Temp (Field)	°C				8.6	12.5	10.4	12.5	7.8	7	7	7.2	11.3
Conductivity (field)	µS/cm				684	660	590	570	540	520	520	520	479
pH (Field)	-			6.5-8.5	7.3	7.57	7.7	7.76	8.46	7.79	7.98	7.86	8.05

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-3D 2016-10-24	BH16-3D 2017-06-08	BH16-3D 2017-10-05	BH16-3D 2018-05-31	BH16-3D 2018-11-14	BH16-3D 2019-04-18	BH16-3D 2019-11-13	BH16-3D 2020-04-27	BH16-3D 2020-11-11
Metals													
Arsenic (Filtered)	µg/L	0.1		25	-	7	-	0.5	-	0.3	-	0.3	-
Barium (Filtered)	µg/L	1	***333***	1000	188	264	195	282	235	252	269	267	***343***
Boron (Filtered)	µg/L	5	***2528***	5000	100	64	51	38	38	40	30	33	32
Calcium (Filtered)	µg/L	20			66,100	74,200	58,400	69,300	68,900	77,000	84,500	82,300	98,300
Cadmium (Filtered)	µg/L	0.015		5	-	0.028	-	<0.015	-	<0.015	-	<0.015	-
Chloride	µg/L	500	***125645***	250000	***251,000***	89,200	57,100	67,000	96,000	99,800	106,000	89,000	107,000
Chromium (III+VI) (Filtered)	µg/L	1		50	-	1	-	<1	-	0.2	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	-	0.4	-	1	-	<2	-	6.2	-
Iron (Filtered)	µg/L	5	***155***	300	51	***689***	***265***	5	40	<5	11	13	12
Lead (Filtered)	µg/L	0.02		10	-	0.15	-	0.03	-	<0.02	-	0.15	-
Manganese (Filtered)	µg/L	1	***28***	50	-	***1320***	-	***244***	-	21	-	4	-
Magnesium (Filtered)	µg/L	20			3710	4350	3370	3280	3090	3660	3960	3950	4160
Mercury (Filtered)	µg/L	0.02		1	-	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				-	2400	-	780	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	20	-	<100	-
Potassium (Filtered)	µg/L	100			10,300	4800	-	2900	-	2900	-	2700	-
Sodium (Filtered)	µg/L	200	***101300***	200000	***195,000***	***143,000***	***118,000***	***111,000***	***113,000***	89,100	78,800	82,200	74,100
Zinc (Filtered)	µg/L	5		5000	-	<5	-	<5	-	<5	-	<5	-
Inorganics													
Alkalinity (as CaCO3)	mg/L	5	***364***	500	272	288	277	302	278	252	230	242	213
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	180	203	160	187	185	208	228	222	263
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***820***	***551***	***448***	***420***	***456***	***442***	***400***	***395***	***415***
Solids - Total Suspended (TSS)	mg/L				23,000	-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			23	105	350	82	149	100	17	21	11
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***14.7***	***13.8***	***15.4***	***8.6***	***6.8***	***4.5***	***3.5***	2.6	2.2
Oxygen Demand - Biological (BOD)	mg/L				<5	-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			-	<0.001	-	<0.001	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	48.1	51	33	23	14	14	13	13	13
Ammonia	mg/L	0.01			0.03	0.04	0.01	0.03	0.03	0.01	0.02	0.03	0.05
Nitrate (as N)	mg/L	0.05		10	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.25	<0.05	-	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-	1.1	-	0.9	-	0.6	-	0.4	-
Conductivity (lab)	µS/cm	1			1290	1000	814	800	863	839	765	755	790
pH (Lab)	-			6.5-8.5	8.05	7.95	8.07	8.13	7.87	7.86	7.82	7.71	7.71
Field													
DO (Field)	mg/L				10.2	9.03	7.3	7.6	8	8.36	6.8	7.67	6.02
Redox Potential (Field)	mV				-	-2	55	70	118	162	64	56	203
Temp (Field)	°C				10.4	12.6	13.4	12.6	9.7	7	8.2	7.7	12.2
Conductivity (field)	µS/cm				250	1040	810	800	840	2600	730	800	1085
pH (Field)	-			6.5-8.5	7	7.88	7.47	7.35	7.83	7.1	6.92	7.69	7.16

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	BH16-4D 2016-10-24	BH16-4D 2017-06-08	BH16-4D 2017-10-05	BH16-4D 2018-05-31	BH16-4D 2018-11-14	BH16-4D 2019-04-18	BH16-4D 2019-11-13	BH16-4D 2020-04-27	BH16-4D 2020-11-11
Metals													
Arsenic (Filtered)	µg/L	0.1		25	-	<0.7	-	0.1	-	0.1	-	0.2	-
Barium (Filtered)	µg/L	1	***333***	1000	***362***	***512***	***479***	***601***	***584***	***600***	***782***	***719***	***737***
Boron (Filtered)	µg/L	5	***2528***	5000	104	55	60	43	56	52	58	57	58
Calcium (Filtered)	µg/L	20			159,000	236,000	212,000	225,000	204,000	215,000	246,000	245,000	240,000
Cadmium (Filtered)	µg/L	0.015		5	-	0.052	-	<0.015	-	<0.015	-	0.019	-
Chloride	µg/L	500	***125645***	250000	***464,000***	***298,000***	***305,000***	***326,000***	***311,000***	***309,000***	***410,000***	***383,000***	***361,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	-	<1	-	<1	-	0.3	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	-	1	-	0.7	-	<2	-	7.2	-
Iron (Filtered)	µg/L	5	***155***	300	50	<5	31	13	<5	<5	<5	***325***	<5
Lead (Filtered)	µg/L	0.02		10	-	0.29	-	<0.02	-	<0.02	-	0.22	-
Manganese (Filtered)	µg/L	1	***28***	50	-	***371***	-	***154***	-	6	-	***32***	-
Magnesium (Filtered)	µg/L	20			11,400	18,000	19,800	18,500	19,700	17,400	20,900	20,500	21,600
Mercury (Filtered)	µg/L	0.02		1	-	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				-	440	-	7550	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	10	-	<100	-
Potassium (Filtered)	µg/L	100			12,900	8200	-	7000	-	6600	-	6900	-
Sodium (Filtered)	µg/L	200	***101300***	200000	***214,000***	97,800	84,200	80,400	97,800	81,400	***102,000***	97,100	96,300
Zinc (Filtered)	µg/L	5		5000	-	<5	-	<5	-	<5	-	5	-
Inorganics													
Alkalinity (as CaCO3)	mg/L	5	***364***	500	356	333	327	318	329	311	323	310	296
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	***444***	***664***	***611***	***639***	***591***	***609***	***701***	***697***	***689***
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***1210***	***1010***	***949***	***914***	***931***	***909***	***1000***	***962***	***946***
Solids - Total Suspended (TSS)	mg/L				72,600	-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			36	237	211	99	34	112	24	54	6
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***8.1***	0.7	2.8	1.1	1.8	1.9	1.1	0.9	<0.2
Oxygen Demand - Biological (BOD)	mg/L				<5	-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			-	<0.001	-	<0.001	-	0.015	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	47.6	20	19	22	22	24	22	22	24
Ammonia	mg/L	0.01			0.02	<0.01	0.02	0.02	0.04	0.02	0.03	0.02	0.02
Nitrate (as N)	mg/L	0.05		10	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.12	0.06
Nitrite (as N)	mg/L	0.05		1	<0.5	<0.05	-	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-	0.1	-	1.9	-	1.6	-	0.4	-
Conductivity (lab)	µS/cm	1			1970	1830	1730	1670	1700	1660	1830	1750	1730
pH (Lab)	-			6.5-8.5	7.97	7.88	8.06	8.05	7.75	7.53	7.72	7.74	7.76
Field													
DO (Field)	mg/L				7.1	6.46	6.79	5.58	5.79	5.93	6.27	6.92	6.2
Redox Potential (Field)	mV				-	80	147	127	178	390	182	60	217
Temp (Field)	°C				12.1	10	12	10	9.4	5	9.3	7.9	11.6
Conductivity (field)	µS/cm				1673	1780	1550	1600	1480	1520	1460	1400	1410
pH (Field)	-			6.5-8.5	7.5	7.1	7.28	7.37	6.93	7.16	6.55	7.39	7.34

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW12-1 2012-05-06	OW12-1 2014-11-06	OW12-1 2015-04-17	OW12-1 2015-11-03	OW12-1 2016-10-24	OW12-1 2018-05-31	OW12-1 2019-04-18	OW12-1 2020-04-27
Metals												
Arsenic (Filtered)	µg/L	0.1		25	4	-	<3	-	-	1.4	1.1	1.7
Barium (Filtered)	µg/L	1	***333***	1000	***693***	***1400***	***767***	***1090***	***594***	***854***	***1090***	***994***
Boron (Filtered)	µg/L	5	***2528***	5000	739	828	432	709	589	275	366	301
Calcium (Filtered)	µg/L	20			185,000	221,000	175,000	229,000	207,000	126,000	157,000	151,000
Cadmium (Filtered)	µg/L	0.015		5	<1	-	<1	-	-	<0.015	<0.015	0.021
Chloride	µg/L	500	***125645***	250000	32,000	116,000	39,600	65,600	118,000	28,000	16,200	20,100
Chromium (III+VI) (Filtered)	µg/L	1		50	5	-	<3	-	-	<1	0.6	2
Copper (Filtered)	µg/L	0.1		1000	<2	-	<2	-	-	<0.1	<2	1.5
Iron (Filtered)	µg/L	5	***155***	300	***15,700***	***24,400***	***13,300***	***20,200***	***10,500***	***12,200***	***13,700***	***15,200***
Lead (Filtered)	µg/L	0.02		10	<2	-	<2	-	-	<0.02	<0.02	2.56
Manganese (Filtered)	µg/L	1	***28***	50	***1510***	-	***1690***	-	-	***1250***	***1420***	***1360***
Magnesium (Filtered)	µg/L	20			20,700	27,400	19,100	26,900	26,100	12,100	15,700	14,800
Mercury (Filtered)	µg/L	0.02		1	<0.1	-	<0.1	-	-	<0.02	<0.02	0.02
Phosphorus total (P2O5)	µg/L				<50	-	2220	-	-	760	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	<10	600
Potassium (Filtered)	µg/L	100			19,700	-	17,600	-	30,900	12,100	14,800	13,400
Sodium (Filtered)	µg/L	200	***101300***	200000	39,200	87,800	32,900	56,200	86,700	15,300	26,700	22,500
Zinc (Filtered)	µg/L	5		5000	32	-	<5	-	-	<5	<5	13
Inorganics												
Alkalinity (as CaCO3)	mg/L	5	***364***	500	***611***	***813***	***612***	***799***	***835***	***464***	***371***	358
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	***547***	***665***	***516***	***683***	***624***	365	***457***	***438***
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***632***	***882***	***584***	***860***	***928***	***518***	***413***	***412***
Solids - Total Suspended (TSS)	mg/L				2730	628	992	240	630	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			48	56	22	52	50	54	53	55
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***22.6***	***22.6***	***10.1***	***23.6***	***16.7***	***10.1***	***10***	***9.7***
Oxygen Demand - Biological (BOD)	mg/L				<5	8	<5	6	8	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	<0.001	-	-	<0.001	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		500	16.3	3.2	12.2	7.8	2.8	11	7	6
Ammonia	mg/L	0.01			10.5	30.8	13	23.9	26.6	7.76	7.25	12.7
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.5	<0.25	<0.5	<0.5	<0.05	<0.05	0.07
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.25	-	<0.5	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			14.7	-	13.1	-	-	8.8	8.4	13.4
Conductivity (lab)	µS/cm	1			1170	1820	1260	1590	1800	972	788	785
pH (Lab)	-			6.5-8.5	7.51	7.3	7.7	7.74	7.51	7.63	7.23	7.29
Field												
DO (Field)	mg/L				-	-	-	-	4.4	10.33	8.1	9.29
Redox Potential (Field)	mV				-	-	-	-	-	57	160	166
Temp (Field)	°C				-	-	-	-	10.5	14.8	12	10
Conductivity (field)	µS/cm				-	-	-	-	1171	690	1120	650
pH (Field)	-			6.5-8.5	-	-	-	-	6.8	7.31	7.08	-

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW14-1 2011-05-01	OW14-1 2012-11-01	OW14-1 2013-06-06	OW14-1 2014-11-06	OW14-1 2015-04-20	OW14-1 2015-11-03	OW14-1 2016-05-16	OW14-1 2016-10-24	OW14-1 2017-10-05	OW14-1 2018-11-14	OW14-1 2019-11-13
Metals															
Arsenic (Filtered)	µg/L	0.1		25	2	-	<3	-	3	-	4	-	-	-	-
Barium (Filtered)	µg/L	1	***333***	1000	***510***	***439***	***445***	***1350***	***904***	***930***	***1300***	***1410***	***488***	***431***	***474***
Boron (Filtered)	µg/L	5	***2528***	5000	410	938	819	723	448	749	596	803	1090	1050	1080
Calcium (Filtered)	µg/L	20			140,000	269,000	300,000	96,500	161,000	213,000	242,000	249,000	239,000	228,000	247,000
Cadmium (Filtered)	µg/L	0.015		5	<0.1	-	<1	-	<1	-	<1	-	-	-	-
Chloride	µg/L	500	***125645***	250000	27,000	***651,000***	***634,000***	***376,000***	***220,000***	***218,000***	***395,000***	***342,000***	***371,000***	***326,000***	***452,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	<5	-	<3	-	<3	-	4	-	-	-	-
Copper (Filtered)	µg/L	0.1		1000	<1	-	<2	-	<2	-	<2	-	-	-	-
Iron (Filtered)	µg/L	5	***155***	300	***9200***	***2000***	***1930***	***32,500***	***20,100***	***21,100***	***34,800***	***29,800***	***3050***	***2830***	***3610***
Lead (Filtered)	µg/L	0.02		10	<0.5	-	<2	-	<2	-	<2	-	-	-	-
Manganese (Filtered)	µg/L	1	***28***	50	***1100***	-	***3350***	-	***3090***	-	***4940***	-	-	-	-
Magnesium (Filtered)	µg/L	20			16,000	48,900	54,300	23,200	23,200	27,200	34,800	30,300	45,200	43,700	45,400
Mercury (Filtered)	µg/L	0.02		1	<0.1	-	<0.1	-	<0.1	-	6	-	-	-	-
Phosphorus total (P2O5)	µg/L				<100	-	<50	-	2360	-	1030	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			14,000	-	32,800	-	28,000	-	30,600	34,800	-	-	-
Sodium (Filtered)	µg/L	200	***101300***	200000	39,000	***290,000***	***320,000***	***234,000***	***158,000***	***170,000***	***142,000***	***228,000***	***299,000***	***259,000***	***248,000***
Zinc (Filtered)	µg/L	5		5000	<5	-	<5	-	<5	-	<0.1	-	-	-	-
Inorganics															
Alkalinity (as CaCO3)	mg/L	5	***364***	500	***399***	***784***	***731***	357	***644***	***774***	***744***	***935***	***790***	***731***	***724***
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	***410***	***873***	***973***	336	***498***	***644***	***748***	***747***	***783***	***750***	***804***
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***525***	***1980***	***1840***	***1300***	***948***	***1100***	***1220***	***1450***	***1560***	***1380***	***1430***
Solids - Total Suspended (TSS)	mg/L				-	62	59	1040	4230	1460	1130	614	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			41	41	40	50	39	31	46	54	58	40	44
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***9.9***	***15.1***	***14.2***	***22.9***	***13.8***	***17.5***	***17.7***	***24.9***	***7.9***	***9***	***4.6***
Oxygen Demand - Biological (BOD)	mg/L				-	<5	<5	11	8	8	6	5	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	0.001	-	<0.001	-	<0.001	-	-	-	-
Sulphate (Filtered)	mg/L	1		500	19	52	48.9	19.9	20.1	<2	3.5	<2	42	30	25
Ammonia	mg/L	0.01			6.4	4.9	6.35	20.5	15.8	11.7	11.6	15.7	7.08	6.21	9.36
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.5	<0.5	<0.25	<1	<1	<1	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	-	<0.5	-	<0.25	-	<1	<1	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			6.5	-	7.32	-	16	-	13.1	-	-	-	-
Conductivity (lab)	µS/cm	1			864	3220	3010	1830	1780	1960	2360	2490	2840	2490	2570
pH (Lab)	-			6.5-8.5	7.9	7.97	7.65	8.16	7.78	7.87	7.98	7.68	7.59	7.45	7.55
Field															
DO (Field)	mg/L				-	-	-	-	-	-	3.2	4.6	2.76	1.97	3.06
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	137	162	84
Temp (Field)	°C				-	-	-	-	-	-	10.1	11.6	12.7	10.2	9.2
Conductivity (field)	µS/cm				-	-	-	-	-	-	233	2004	2600	2400	2200
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	7.3	6.8	6.78	6.8	6.68

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW14-1
					2020-11-11
Metals					
Arsenic (Filtered)	µg/L	0.1		25	-
Barium (Filtered)	µg/L	1	***333***	1000	***557***
Boron (Filtered)	µg/L	5	***2528***	5000	1100
Calcium (Filtered)	µg/L	20			256,000
Cadmium (Filtered)	µg/L	0.015		5	-
Chloride	µg/L	500	***125645***	250000	***436,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	-
Copper (Filtered)	µg/L	0.1		1000	-
Iron (Filtered)	µg/L	5	***155***	300	***4740***
Lead (Filtered)	µg/L	0.02		10	-
Manganese (Filtered)	µg/L	1	***28***	50	-
Magnesium (Filtered)	µg/L	20			47,000
Mercury (Filtered)	µg/L	0.02		1	-
Phosphorus total (P2O5)	µg/L				-
Phosphorus (Filtered)	µg/L	100			-
Potassium (Filtered)	µg/L	100			-
Sodium (Filtered)	µg/L	200	***101300***	200000	***268,000***
Zinc (Filtered)	µg/L	5		5000	-
Inorganics					
Alkalinity (as CaCO3)	mg/L	5	***364***	500	***696***
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	***833***
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***1460***
Solids - Total Suspended (TSS)	mg/L				-
Oxygen Demand - Chemical (COD)	mg/L	5			31
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	2.9
Oxygen Demand - Biological (BOD)	mg/L				-
Phenols (4AAP)	mg/L	0.002			-
Sulphate (Filtered)	mg/L	1		500	23
Ammonia	mg/L	0.01			10.4
Nitrate (as N)	mg/L	0.05		10	<0.05
Nitrite (as N)	mg/L	0.05		1	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			-
Conductivity (lab)	µS/cm	1			2620
pH (Lab)	-			6.5-8.5	7.41
Field					
DO (Field)	mg/L				5.49
Redox Potential (Field)	mV				198
Temp (Field)	°C				11.2
Conductivity (field)	µS/cm				1398
pH (Field)	-			6.5-8.5	7.08

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW16 2011-05-01	OW16 2012-05-07	OW16 2012-11-01	OW16 2013-06-06	OW16 2013-11-28	OW16 2014-05-08	OW16 2014-11-06	OW16 2015-04-20	OW16 2015-11-03	OW16 2016-04-26	OW16 2016-10-26
Metals															
Arsenic (Filtered)	µg/L	0.1		25	3	5	-	4	-	6	-	6	-	5	-
Barium (Filtered)	µg/L	1	***333***	1000	***990***	***946***	***1110***	***1050***	***968***	***1050***	***1150***	***933***	***800***	***952***	***1120***
Boron (Filtered)	µg/L	5	***2528***	5000	880	862	1070	881	900	958	998	753	843	922	964
Calcium (Filtered)	µg/L	20			260,000	281,000	247,000	302,000	254,000	229,000	219,000	257,000	244,000	251,000	262,000
Cadmium (Filtered)	µg/L	0.015		5	<0.1	<1	-	<1	-	<1	-	<1	-	<1	-
Chloride	µg/L	500	***125645***	250000	110,000	113,000	***177,000***	***127,000***	96,900	75,800	***334,000***	98,500	***167,000***	58,900	***327,000***
Chromium (III+VI) (Filtered)	µg/L	1		50	<30	12	-	<3	-	<3	-	3	-	<3	-
Copper (Filtered)	µg/L	0.1		1000	<1	<2	-	<2	-	<2	-	<2	-	<2	-
Iron (Filtered)	µg/L	5	***155***	300	***13,000***	***14,500***	***16,200***	***17,400***	***13,400***	***17,800***	***21,700***	***16,400***	***16,000***	***16,800***	***23,300***
Lead (Filtered)	µg/L	0.02		10	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-
Manganese (Filtered)	µg/L	1	***28***	50	***5000***	-	-	***4880***	-	***7410***	-	***4590***	-	***4680***	-
Magnesium (Filtered)	µg/L	20			27,000	28,200	24,700	30,100	24,800	23,200	21,100	24,200	23,800	24,700	24,700
Mercury (Filtered)	µg/L	0.02		1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-
Phosphorus total (P2O5)	µg/L				<100	<50	-	50	-	<50	-	<50	-	<50	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			28,000	32,600	-	33,500	-	27,500	-	31,400	-	32,400	32,500
Sodium (Filtered)	µg/L	200	***101300***	200000	***120,000***	***130,000***	***130,000***	***136,000***	***117,000***	85,900	***165,000***	***111,000***	***158,000***	92,900	***187,000***
Zinc (Filtered)	µg/L	5		5000	<5	<5	-	301	-	<5	-	<5	-	<5	-
Inorganics															
Alkalinity (as CaCO3)	mg/L	5	***364***	500	***929***	***1000***	***969***	***918***	***1020***	***924***	***683***	***941***	***927***	***977***	***911***
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	***770***	***818***	-	***878***	***736***	***667***	***634***	***741***	***707***	***728***	***756***
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***1200***	***1110***	***1230***	***1250***	***1130***	***1090***	***1300***	***1080***	***1160***	***1010***	***1360***
Solids - Total Suspended (TSS)	mg/L				-	56	44	153	45	67	102	92	113	51	65
Oxygen Demand - Chemical (COD)	mg/L	5			72	69	70	79	73	67	53	55	69	51	65
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***22.1***	***26.2***	***25.7***	***31***	***26***	***20.3***	***21.6***	***22.7***	***21.4***	***21.6***	***25***
Oxygen Demand - Biological (BOD)	mg/L				-	<5	<5	6	<5	<5	<5	<5	9	<5	<5
Phenols (4AAP)	mg/L	0.002			<0.001	0.002	-	0.004	-	<0.001	-	<0.001	-	<0.001	-
Sulphate (Filtered)	mg/L	1		500	30	21.3	24.6	25	20.4	27.6	10.4	42.5	22.4	27.3	11.7
Ammonia	mg/L	0.01			25	22.7	32.1	29.6	26.8	32.6	23.1	32	28.5	35.4	31
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.25	<1	<0.25	<0.5	<0.25	<1	<0.25	<1
Nitrite (as N)	mg/L	0.05		1	<0.01	<0.05	-	<0.25	-	<0.25	-	<0.25	-	<0.25	<1
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			24	28.8	-	31	-	31.4	-	31.4	-	37	-
Conductivity (lab)	µS/cm	1			2030	2000	2170	1880	2080	1980	2060	1980	2130	1860	2470
pH (Lab)	-			6.5-8.5	7.77	7.48	7.72	7.99	7.59	8.07	8.25	7.66	7.79	7.92	7.64
Field															
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	5.3	3.5
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	6.6	9.5
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	1592	2222
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	7.3	7.4

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW16 2017-06-08	OW16 2017-10-05	OW16 2018-11-14	OW16 2019-04-18	OW16 2019-11-13	OW16 2020-04-27	OW16 2020-11-11
Metals											
Arsenic (Filtered)	µg/L	0.1		25	2.25	-	-	3.6	-	2.6	-
Barium (Filtered)	µg/L	1	***333***	1000	***1100***	***1530***	***1170***	***876***	***1270***	***1070***	***1130***
Boron (Filtered)	µg/L	5	***2528***	5000	1070	1770	1250	886	1300	1060	1230
Calcium (Filtered)	µg/L	20			275,000	269,000	256,000	239,000	287,000	274,000	279,000
Cadmium (Filtered)	µg/L	0.015		5	0.029	-	-	0.019	-	0.016	-
Chloride	µg/L	500	***125645***	250000	94,000	***156,000***	***225,000***	41,100	***271,000***	56,000	96,600
Chromium (III+VI) (Filtered)	µg/L	1		50	3	-	-	1.1	-	1	-
Copper (Filtered)	µg/L	0.1		1000	0.7	-	-	<2	-	<0.1	-
Iron (Filtered)	µg/L	5	***155***	300	***21,800***	***21,600***	***22,000***	***16,400***	***23,600***	***21,300***	***21,000***
Lead (Filtered)	µg/L	0.02		10	2.31	-	-	<0.02	-	0.07	-
Manganese (Filtered)	µg/L	1	***28***	50	***4870***	-	-	***4280***	-	***5050***	-
Magnesium (Filtered)	µg/L	20			27,900	35,200	26,800	22,100	27,400	26,400	28,300
Mercury (Filtered)	µg/L	0.02		1	<0.02	-	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				50	-	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	<10	-	<100	-
Potassium (Filtered)	µg/L	100			34,800	-	-	27,200	-	34,000	-
Sodium (Filtered)	µg/L	200	***101300***	200000	***127,000***	***216,000***	***182,000***	65,300	***165,000***	89,800	***124,000***
Zinc (Filtered)	µg/L	5		5000	<5	-	-	<5	-	<5	-
Inorganics											
Alkalinity (as CaCO3)	mg/L	5	***364***	500	***1050***	***1280***	***925***	***818***	***858***	***858***	***896***
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	***801***	***817***	***750***	***688***	***830***	***794***	***814***
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***1250***	***1520***	***1330***	***931***	***1290***	***1010***	***1130***
Solids - Total Suspended (TSS)	mg/L				-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			93	123	83	53	71	71	63
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***24.7***	***22.7***	***16.4***	***15.3***	***9.9***	***20.1***	***10.7***
Oxygen Demand - Biological (BOD)	mg/L				-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	24	17	11	24	10	36	19
Ammonia	mg/L	0.01			35.5	58.1	35.7	26.7	37.8	36.8	42
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			40.9	-	-	27.5	-	39.2	-
Conductivity (lab)	µS/cm	1			2270	2760	2400	1700	2330	1840	2040
pH (Lab)	-			6.5-8.5	7.2	7.32	7.39	7.12	7.29	7.26	7.28
Field											
DO (Field)	mg/L				1.18	2.21	1.56	2.49	1.42	1.07	4.88
Redox Potential (Field)	mV				40	182	175	176	99	196	197
Temp (Field)	°C				11.2	10.2	9.4	7	9.4	8.5	10.6
Conductivity (field)	µS/cm				2300	2700	2200	1530	2400	1040	1662
pH (Field)	-			6.5-8.5	6.38	6.7	6.57	6.8	6.14	-	6.91

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW17-1 2011-05-01	OW17-1 2012-05-09	OW17-1 2012-11-01	OW17-1 2013-06-06	OW17-1 2013-11-28	OW17-1 2014-05-08	OW17-1 2014-11-06	OW17-1 2015-04-17	OW17-1 2015-11-02	OW17-1 2016-04-26	OW17-1 2016-10-24
Metals															
Arsenic (Filtered)	µg/L	0.1		25	<1	<3	-	<3	-	<3	-	<3	-	<3	-
Barium (Filtered)	µg/L	1	***333***	1000	100	155	111	107	103	108	118	110	99	109	111
Boron (Filtered)	µg/L	5	***2528***	5000	50	<10	46	57	73	49	56	47	53	48	56
Calcium (Filtered)	µg/L	20			70,000	73,900	72,900	73,500	69,800	69,300	68,400	63,100	65,700	72,000	68,500
Cadmium (Filtered)	µg/L	0.015		5	<0.1	<1	-	<1	-	<1	-	<1	-	<1	-
Chloride	µg/L	500	***125645***	250000	1000	1590	1960	2360	1290	1400	1390	1430	710	1340	1180
Chromium (III+VI) (Filtered)	µg/L	1		50	<5	<3	-	<3	-	<3	-	<3	-	<3	-
Copper (Filtered)	µg/L	0.1		1000	<1	<2	-	<2	-	<2	-	<2	-	<2	-
Iron (Filtered)	µg/L	5	***155***	300	<100	<10	<10	25	<10	<10	<10	<10	<10	<10	<10
Lead (Filtered)	µg/L	0.02		10	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-
Manganese (Filtered)	µg/L	1	***28***	50	16	<2	-	6	-	7	-	5	-	4	-
Magnesium (Filtered)	µg/L	20			17,000	17,700	17,400	17,400	16,200	16,600	16,900	15,700	17,100	16,400	15,500
Mercury (Filtered)	µg/L	0.02		1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-
Phosphorus total (P2O5)	µg/L				<100	<50	-	<50	-	<50	-	50	-	<50	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			2000	1080	-	2190	-	1940	-	1930	-	1960	1970
Sodium (Filtered)	µg/L	200	***101300***	200000	3300	1450	3620	3790	3700	2580	3130	3460	2620	2460	2420
Zinc (Filtered)	µg/L	5		5000	<5	<5	-	5	-	<5	-	<5	-	<5	-
Inorganics															
Alkalinity (as CaCO3)	mg/L	5	***364***	500	218	246	217	229	236	228	222	219	225	235	233
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	240	257	254	255	241	241	240	222	234	247	235
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	258	266	262	272	252	274	252	250	256	268	282
Solids - Total Suspended (TSS)	mg/L				-	616	35	15	14	152	268	141	59	43	38
Oxygen Demand - Chemical (COD)	mg/L	5			5	<5	<5	<5	7	<5	<5	<5	<5	<5	<5
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	0.5	1.1	0.9	0.9	0.7	0.8	0.7	0.6	0.9	0.8	1.7
Oxygen Demand - Biological (BOD)	mg/L				-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Phenols (4AAP)	mg/L	0.002			<0.001	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-
Sulphate (Filtered)	mg/L	1		500	22	24.2	20.5	20.4	19.1	19.8	21.4	19.5	21.2	22.4	22.8
Ammonia	mg/L	0.01			<0.05	<0.02	<0.02	0.02	<0.02	0.02	0.03	<0.02	<0.02	0.02	<0.02
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.05	<0.1	<0.1	<0.05	<0.05	<0.1	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	<0.05	-	<0.05	-	<0.1	-	<0.05	-	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			<0.2	0.15	-	0.27	-	<0.1	-	<0.1	-	<0.1	-
Conductivity (lab)	µS/cm	1			457	466	436	456	464	501	451	464	447	454	452
pH (Lab)	-			6.5-8.5	8.07	8.04	8.18	7.93	8.09	8.08	8.08	8.09	7.91	8.2	8.01
Field															
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	6.2	6.7
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	7.7	8.1
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	485	421
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	8.2	4.5

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW17-1 2017-06-08	OW17-1 2017-10-05	OW17-1 2018-05-31	OW17-1 2018-11-14	OW17-1 2019-04-18	OW17-1 2019-11-13	OW17-1 2020-04-27	OW17-1 2020-11-11
Metals												
Arsenic (Filtered)	µg/L	0.1		25	<0.7	-	<0.1	-	<0.1	-	<0.1	-
Barium (Filtered)	µg/L	1	***333***	1000	113	120	127	109	104	117	109	115
Boron (Filtered)	µg/L	5	***2528***	5000	60	69	59	54	57	58	61	55
Calcium (Filtered)	µg/L	20			72,100	67,900	71,200	69,200	71,000	75,300	72,900	76,000
Cadmium (Filtered)	µg/L	0.015		5	<0.014	-	<0.015	-	0.018	-	<0.015	-
Chloride	µg/L	500	***125645***	250000	800	900	700	1100	1100	<500	1400	1500
Chromium (III+VI) (Filtered)	µg/L	1		50	2	-	<1	-	<0.2	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	<0.3	-	<0.1	-	<2	-	5.2	-
Iron (Filtered)	µg/L	5	***155***	300	15	10	18	11	14	13	5	7
Lead (Filtered)	µg/L	0.02		10	<0.05	-	<0.02	-	<0.02	-	0.2	-
Manganese (Filtered)	µg/L	1	***28***	50	6	-	2	-	3	-	5	-
Magnesium (Filtered)	µg/L	20			18,200	18,100	17,500	17,600	17,000	17,900	18,000	18,400
Mercury (Filtered)	µg/L	0.02		1	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				40	-	20	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	<10	-	<100	-
Potassium (Filtered)	µg/L	100			1900	-	1900	-	1900	-	2000	-
Sodium (Filtered)	µg/L	200	***101300***	200000	2900	2900	2600	2600	2400	2600	2600	2600
Zinc (Filtered)	µg/L	5		5000	<5	-	<5	-	<5	-	<5	-
Inorganics												
Alkalinity (as CaCO3)	mg/L	5	***364***	500	231	230	249	228	219	215	217	209
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	255	244	250	245	247	262	256	266
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	262	262	234	245	246	236	238	238
Solids - Total Suspended (TSS)	mg/L				-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			<5	<5	<5	<5	<5	<5	<5	<5
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	0.8	***4.9***	1.5	1.5	2	2.2	1.2	0.9
Oxygen Demand - Biological (BOD)	mg/L				-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	<0.001	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	17	16	21	21	20	19	21	20
Ammonia	mg/L	0.01			0.14	<0.01	0.01	0.05	0.13	0.03	0.02	0.02
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			0.2	-	0.3	-	0.4	-	<0.1	-
Conductivity (lab)	µS/cm	1			476	477	452	474	475	456	461	461
pH (Lab)	-			6.5-8.5	8.04	8.08	8.08	7.78	7.8	7.92	7.9	8.01
Field												
DO (Field)	mg/L				5.02	7.05	2.11	5.48	6.92	5.89	7.61	5.65
Redox Potential (Field)	mV				-51	54	51	113	105	18	153	267
Temp (Field)	°C				9.9	9.8	10.2	7.6	10	7	8.4	9.4
Conductivity (field)	µS/cm				530	510	510	480	560	420	470	352
pH (Field)	-			6.5-8.5	7.28	7.62	7.66	8.77	8.35	7.73	-	7.46

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW19-1 2011-05-01	OW19-1 2012-05-10	OW19-1 2012-11-01	OW19-1 2013-06-07	OW19-1 2013-11-28	OW19-1 2014-05-08	OW19-1 2014-11-06	OW19-1 2015-04-17	OW19-1 2015-11-02	OW19-1 2016-04-26	OW19-1 2016-10-24
Metals															
Arsenic (Filtered)	µg/L	0.1		25	<1	<3	-	<3	-	<3	-	<3	-	<3	-
Barium (Filtered)	µg/L	1	***333***	1000	***1200***	***1040***	***954***	***967***	***1010***	***968***	***1020***	***874***	***919***	***895***	***894***
Boron (Filtered)	µg/L	5	***2528***	5000	10	<10	11	<10	<10	<10	16	<10	12	<10	11
Calcium (Filtered)	µg/L	20			99,000	87,700	96,500	102,000	93,400	88,400	88,500	90,300	99,300	85,700	78,100
Cadmium (Filtered)	µg/L	0.015		5	<0.1	<1	-	<1	-	<1	-	<1	-	<1	-
Chloride	µg/L	500	***125645***	250000	71,000	42,100	58,700	47,600	40,200	39,300	46,500	57,100	70,100	59,500	57,600
Chromium (III+VI) (Filtered)	µg/L	1		50	<5	<3	-	<3	-	<3	-	<3	-	<3	-
Copper (Filtered)	µg/L	0.1		1000	<1	<2	-	<2	-	<2	-	<2	-	3	-
Iron (Filtered)	µg/L	5	***155***	300	***7600***	***4550***	***4140***	***4440***	***4620***	***4080***	***4240***	***4040***	***4320***	***4010***	***3580***
Lead (Filtered)	µg/L	0.02		10	<0.5	<2	-	<2	-	<2	-	<2	-	3	-
Manganese (Filtered)	µg/L	1	***28***	50	***350***	***343***	-	***285***	-	***289***	-	***285***	-	***291***	-
Magnesium (Filtered)	µg/L	20			4400	3250	4860	3680	3370	3270	3110	2950	3530	2910	2530
Mercury (Filtered)	µg/L	0.02		1	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-
Phosphorus total (P2O5)	µg/L				<10	<50	-	<50	-	<50	-	<50	-	<50	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L	100			1100	1090	-	1290	-	1210	-	1190	-	1500	1440
Sodium (Filtered)	µg/L	200	***101300***	200000	51,000	37,600	41,300	39,700	36,500	30,600	31,300	32,500	37,800	35,500	33,300
Zinc (Filtered)	µg/L	5		5000	<5	12	-	<5	-	<5	-	<5	-	12	-
Inorganics															
Alkalinity (as CaCO3)	mg/L	5	***364***	500	279	247	255	247	259	220	237	233	253	221	213
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	270	232	261	270	247	234	234	238	262	226	205
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	***414***	334	***424***	362	348	352	324	344	362	342	356
Solids - Total Suspended (TSS)	mg/L				-	24	35	19	27	14	64	13	22	24	32
Oxygen Demand - Chemical (COD)	mg/L	5			49	26	42	36	46	39	27	27	37	26	19
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***85.5***	***17.9***	***16.1***	***16.5***	***17.5***	***13.3***	***14.1***	***13.8***	***16.5***	***15.6***	***14.5***
Oxygen Demand - Biological (BOD)	mg/L				-	<5	8	10	10	9	6	6	8	7	6
Phenols (4AAP)	mg/L	0.002			<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	<0.001	-
Sulphate (Filtered)	mg/L	1		500	<1	<0.1	<0.1	1.68	<0.5	1.44	<0.2	<0.5	<0.2	1	<0.1
Ammonia	mg/L	0.01			0.68	0.62	0.78	0.55	0.73	0.78	0.88	0.84	1.04	1.21	0.96
Nitrate (as N)	mg/L	0.05		10	<0.1	<0.05	<0.05	<0.1	<0.25	<0.25	<0.1	<0.25	<0.1	<0.1	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.01	<0.05	-	<0.1	-	<0.25	-	<0.25	-	<0.1	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			1.5	0.88	-	1.55	-	1.16	-	0.9	-	1.5	-
Conductivity (lab)	µS/cm	1			759	567	654	598	624	569	611	627	658	577	572
pH (Lab)	-			6.5-8.5	7.95	7.79	8.15	7.11	7.77	8.12	8.01	7.9	8.02	8.33	7.63
Field															
DO (Field)	mg/L				-	-	-	-	-	-	-	-	-	5.9	6.5
Redox Potential (Field)	mV				-	-	-	-	-	-	-	-	-	-	-
Temp (Field)	°C				-	-	-	-	-	-	-	-	-	9.5	10.2
Conductivity (field)	µS/cm				-	-	-	-	-	-	-	-	-	625	525
pH (Field)	-			6.5-8.5	-	-	-	-	-	-	-	-	-	7.5	7.1

Table 5 - Deep Groundwater Quality

	Unit	RDL	RUC	ODWQS	OW19-1 2017-06-08	OW19-1 2017-10-05	OW19-1 2018-05-31	OW19-1 2018-11-14	OW19-1 2019-04-18	OW19-1 2019-11-13	OW19-1 2020-04-27	OW19-1 2020-11-11
Metals												
Arsenic (Filtered)	µg/L	0.1		25	<0.7	-	0.2	-	0.2	-	0.2	-
Barium (Filtered)	µg/L	1	***333***	1000	***928***	***928***	***1060***	***1040***	***1020***	***1180***	***1130***	***1220***
Boron (Filtered)	µg/L	5	***2528***	5000	8	16	6	8	13	8	10	14
Calcium (Filtered)	µg/L	20			84,700	78,000	86,200	92,300	95,100	105,000	107,000	110,000
Cadmium (Filtered)	µg/L	0.015		5	<0.014	-	<0.015	-	<0.015	-	<0.015	-
Chloride	µg/L	500	***125645***	250000	37,600	39,600	58,100	77,200	83,000	90,300	86,300	76,200
Chromium (III+VI) (Filtered)	µg/L	1		50	<1	-	<1	-	0.8	-	<1	-
Copper (Filtered)	µg/L	0.1		1000	<0.3	-	<0.1	-	<2	-	1	-
Iron (Filtered)	µg/L	5	***155***	300	***4620***	***4200***	***4440***	***4740***	***4070***	***5640***	***5790***	***5790***
Lead (Filtered)	µg/L	0.02		10	0.08	-	<0.02	-	<0.02	-	0.03	-
Manganese (Filtered)	µg/L	1	***28***	50	***308***	-	***302***	-	***323***	-	***381***	-
Magnesium (Filtered)	µg/L	20			2960	2840	2930	3200	3060	3360	3460	3350
Mercury (Filtered)	µg/L	0.02		1	<0.02	-	<0.02	-	<0.02	-	<0.02	-
Phosphorus total (P2O5)	µg/L				80	-	50	-	-	-	-	-
Phosphorus (Filtered)	µg/L	100			-	-	-	-	<10	-	<100	-
Potassium (Filtered)	µg/L	100			1200	-	1200	-	1400	-	1500	-
Sodium (Filtered)	µg/L	200	***101300***	200000	35,500	31,500	30,700	38,700	37,100	42,900	43,900	45,600
Zinc (Filtered)	µg/L	5		5000	<5	-	<5	-	<5	-	<5	-
Inorganics												
Alkalinity (as CaCO3)	mg/L	5	***364***	500	221	218	228	230	214	229	232	236
Hardness (as CaCO3) (Filtered)	mg/L	1	***374***	500	224	207	228	244	250	276	282	289
Solids - Total Dissolved (TDS)	mg/L	3	***378***	500	315	311	312	***385***	358	357	***379***	372
Solids - Total Suspended (TSS)	mg/L				-	-	-	-	-	-	-	-
Oxygen Demand - Chemical (COD)	mg/L	5			39	41	42	42	42	66	42	26
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L	0.2	***3***	5	***14.9***	***15.7***	***13.4***	***13***	***11.7***	***11.6***	***10.1***	***9.4***
Oxygen Demand - Biological (BOD)	mg/L				-	-	-	-	-	-	-	-
Phenols (4AAP)	mg/L	0.002			<0.001	-	<0.001	-	<0.002	-	<0.002	-
Sulphate (Filtered)	mg/L	1		500	<1	<1	<1	<1	<1	<1	<1	<1
Ammonia	mg/L	0.01			1.02	1.1	1.15	1.3	1.21	1.29	1.29	1.25
Nitrate (as N)	mg/L	0.05		10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Nitrite (as N)	mg/L	0.05		1	<0.05	-	<0.05	-	<0.05	-	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1			1.4	-	1.6	-	1.7	-	1.6	-
Conductivity (lab)	µS/cm	1			572	566	602	689	690	688	727	716
pH (Lab)	-			6.5-8.5	7.68	7.79	7.81	7.59	7.46	7.71	7.6	7.53
Field												
DO (Field)	mg/L				6.43	2.88	2.2	3.2	2.39	1.72	7.01	5.11
Redox Potential (Field)	mV				0	52	30	126	126	63	82	157
Temp (Field)	°C				16.6	11.3	11.2	8.5	9	8.4	9.4	9.9
Conductivity (field)	µS/cm				540	590	570	720	720	680	750	719
pH (Field)	-			6.5-8.5	7.26	7.31	7.17	7.17	7.22	6.93	7.55	7.13

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	BH16-1	BH16-1	BH16-1	BH16-1	BH16-2	BH16-2	BH16-2	BH16-2	BH16-3D	BH16-3D	BH16-3D	BH16-3D
				2017-06-08	2018-05-31	2019-04-18	2020-04-27	2017-06-08	2018-05-31	2019-04-18	2020-04-27	2017-06-08	2018-05-31	2019-04-18	2020-04-27
BTEX															
Benzene	µg/L	0.5	**1**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VOCs															
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.2	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<5	<5	<0.3	<0.3	<5	<5	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	BH16-3S 2017-06-08	BH16-3S 2018-05-31	BH16-3S 2019-04-18	BH16-3S 2020-04-27	BH16-4D 2017-06-08	BH16-4D 2018-05-31	BH16-4D 2019-04-18	BH16-4D 2020-04-27	BH16-4S 2017-06-08	BH16-4S 2018-05-31	BH16-4S 2019-04-18	BH16-4S 2020-04-27
BTEX															
Benzene	µg/L	0.5	**1**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VOCs															
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.2	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<5	<5	<0.3	<0.3	<5	<5	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	DP1 2013-06-06	DP1 2015-04-17	DP1 2016-04-26	DP1 2017-06-08	DP1 2018-05-31	DP1 2019-04-18	DP1 2020-04-27	DP2-R 2017-06-08	DP2-R 2018-05-31	DP2-R 2019-04-18	DP2-R 2020-04-27
BTEX														
Benzene	µg/L	0.5	**1**	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VOCs														
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<0.3	<0.3	<0.3	<5	<5	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.17	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	DP3 2013-06-06	DP3 2015-04-17	DP3 2016-04-26	DP3 2017-06-08	DP3 2018-05-31	DP3 2019-04-18	DP3 2020-04-27	DP4-R 2017-06-08	DP4-R 2018-05-31	DP4-R 2019-04-18	DP4-R 2020-04-27
BTEX														
Benzene	µg/L	0.5	**1**	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	0.41	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
VOCs														
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<0.3	<0.3	<0.3	<5	<5	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.17	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW12-1	OW12-1	OW12-1	OW12-1	OW12-1	OW12-1	OW12-2	OW12-2	OW12-2	OW12-2	OW12-2	OW12-2	OW12-2
				2012-05-05	2014-11-06	2015-04-17	2017-05-31	2019-04-18	2020-04-27	2012-05-06	2014-11-06	2015-04-17	2017-06-08	2018-05-31	2019-04-17	2020-04-27
BTEX																
Benzene	µg/L	0.5	**1**	**2.4**	**2.2**	0.58	<0.5	<0.5	0.7	**2.4**	**1.2**	**1.3**	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.4	<0.4	<0.2	<0.5	<0.5	<0.5	<0.4	<0.4	<0.4	<0.5	<0.5	<0.5	<0.5
VOCs																
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.2	1.9	<0.1	<0.2	1.2	1	<0.2	1.5	<0.2	0.8	0.7	1.1	0.8
Methylene chloride	µg/L	5	**50**	<0.6	<0.6	<0.3	<0.3	<5	<5	<0.6	<0.6	<0.6	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.34	<0.34	<0.17	<0.2	<0.2	<0.2	<0.34	<0.34	<0.34	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW14-1	OW14-1	OW14-1	OW14-2	OW14-2	OW14-2
				2013-06-06	2015-04-20	2016-04-26	2013-06-06	2015-04-20	2016-06-01
BTEX									
Benzene	µg/L	0.5	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.2	0.31	<0.2	<0.2
VOCs									
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW16 2012-05-07	OW16 2013-06-06	OW16 2014-05-08	OW16 2015-04-20	OW16 2016-04-26	OW16 2017-06-08	OW16 2018-05-31	OW16 2019-04-18	OW16 2020-04-27
BTEX												
Benzene	µg/L	0.5	**1**	**1.5**	0.84	**1.1**	<0.80	<0.80	0.7	0.5	0.5	0.9
Toluene	µg/L	0.5	**60**	<0.20	<0.80	<0.80	<0.80	<0.80	<0.5	<0.5	<0.5	<0.5
VOCs												
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.4	<0.4	<0.4	<0.4	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<1.2	<1.2	<1.2	<1.2	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.68	<0.68	<0.68	<0.68	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW17-1 2012-05-08	OW17-1 2013-06-06	OW17-1 2014-05-08	OW17-1 2015-04-17	OW17-1 2016-04-26	OW17-1 2017-06-08	OW17-1 2018-05-31	OW17-1 2019-04-18	OW17-1 2020-04-27
BTEX												
Benzene	µg/L	0.5	**1**	<0.4	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.4	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
VOCs												
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.2	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.34	<0.17	<0.17	<0.17	<0.17	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW17-3 2014-05-08	OW17-3 2015-04-17	OW17-3 2017-06-08	OW17-3 2018-05-31	OW17-3 2019-04-18	OW17-3 2020-04-27
BTEX									
Benzene	µg/L	0.5	**1**	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
VOCs									
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW19-1 2012-05-10	OW19-1 2013-06-07	OW19-1 2014-05-08	OW19-1 2015-04-17	OW19-1 2016-04-26	OW19-1 2017-06-08	OW19-1 2018-05-31	OW19-1 2019-04-18	OW19-1 2020-04-27
BTEX												
Benzene	µg/L	0.5	**1**	<0.2	<0.8	<0.8	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.8	<0.8	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
VOCs												
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.4	<0.4	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<1.2	<1.2	<0.3	<0.3	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.68	<0.68	<0.17	<0.17	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW19-2 2012-05-11	OW19-2 2013-06-07	OW19-2 2014-05-08	OW19-2 2015-04-17	OW19-2 2017-06-08	OW19-2 2018-05-31	OW19-2 2019-04-18	OW19-2 2020-04-27
BTEX											
Benzene	µg/L	0.5	**1**	<0.2	<0.2	<0.8	<0.2	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.8	<0.2	<0.5	<0.5	<0.5	<0.5
VOCs											
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.4	<0.1	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<1.2	<0.3	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.68	<0.17	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	OW9 2012-05-04	OW9 2013-06-06	OW9 2014-05-08	OW9 2015-04-20	OW9 2016-04-26	OW9 2017-05-31	OW9 2017-06-08	OW9 2019-04-18	OW9 2020-04-27
BTEX												
Benzene	µg/L	0.5	**1**	0.33	0.24	<0.8	0.25	<0.2	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.8	<0.2	<0.2	<0.5	<0.5	<0.5	<0.5
VOCs												
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.4	<0.1	<0.1	<0.2	<0.2	<0.5	<0.5
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<1.2	<0.3	<0.3	<0.3	<0.3	<5	<5
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.68	<0.17	<0.17	<0.2	<0.2	<0.2	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	PW1 (Drilled)	PW1 (Drilled)	PW1 (Drilled)	PW1 (Drilled)	PW1 (Drilled)	PW1 (Drilled)	PW1 (Drilled)	PW1 (Drilled)	PW2	PW2	PW2	PW2	PW2	PW2
				2012-05-01	2013-06-06	2014-05-08	2015-04-17	2016-04-26	2017-06-08	2018-05-31	2019-04-18	2012-05-02	2013-06-06	2014-05-08	2015-04-17	2016-04-26	2017-06-08
BTEX																	
Benzene	µg/L	0.5	**1**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.5	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5
VOCs																	
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.17	<0.17	<0.17	<0.2	<0.2	<0.2	<0.17	<0.17	<0.17	<0.17	<0.17	<0.2

Table 6 - Groundwater Quality - VOCs

	Unit	RDL	ODWQS	PW3 (Raw)	PW3 (Raw)	PW3 (Raw)	PW3 (Raw)	PW3 (Raw)	PW3 (Raw)	PW3 (Raw)	PW3 (Treated)
				2012-05-03	2013-06-06	2014-05-08	2016-04-26	2017-06-08	2018-05-31	2019-04-18	2017-06-08
BTEX											
Benzene	µg/L	0.5	**1**	<0.2	<0.2	<0.8	<0.2	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	0.5	**60**	<0.2	<0.2	<0.8	<0.2	<0.5	<0.5	<0.5	<0.5
VOCs											
Dichlorobenzene, 1,4-	µg/L	0.5	**5**	<0.1	<0.1	<0.4	<0.1	<0.2	<0.2	<0.5	<0.2
Methylene chloride	µg/L	5	**50**	<0.3	<0.3	<1.2	<0.3	<0.3	<0.3	<5	<0.3
Vinyl chloride	µg/L	0.2	**1**	<0.17	<0.17	<0.68	<0.17	<0.2	<0.2	<0.2	<0.2

Table 7 - Residential Water Quality

	Unit	RDL	ODWQS	PW1 (Drilled) 2011-05-01	PW1 (Drilled) 2012-05-01	PW1 (Drilled) 2012-11-01	PW1 (Drilled) 2013-06-06	PW1 (Drilled) 2013-11-28	PW1 (Drilled) 2014-05-08	PW1 (Drilled) 2015-04-17	PW1 (Drilled) 2015-11-02	PW1 (Drilled) 2016-04-26	PW1 (Drilled) 2016-11-10	PW1 (Drilled) 2017-06-08	PW1 (Drilled) 2017-10-03	PW1 (Drilled) 2018-05-31	PW1 (Drilled) 2018-11-14	PW1 (Drilled) 2019-04-18
Metals																		
Arsenic (Filtered)	µg/L		**25**	<1	<3	-	<3	-	<3	<3	-	<3	-	<0.7	-	0.3	-	0.6
Barium (Filtered)	µg/L		**1000**	180	183	303	217	191	191	219	224	194	311	249	244	238	300	222
Boron (Filtered)	µg/L		**5000**	<10	<10	<10	<10	<10	<10	<10	15	<10	17	8	11	<5	9	10
Calcium (Filtered)	µg/L			90,000	98,800	127,000	114,000	98,100	96,200	103,000	114,000	93,200	139,000	107,000	107,000	96,900	119,000	103,000
Cadmium (Filtered)	µg/L		**5**	<0.1	<1	-	<1	-	<1	<1	-	<1	-	<0.014	-	<0.015	-	<0.015
Chloride	µg/L		**250000**	4000	3590	5820	3330	2920	2760	3920	2740	2450	3190	1200	1400	1000	1800	2400
Chromium (III+VI) (Filtered)	µg/L		**50**	<5	<3	-	<3	-	<3	<3	-	<3	-	<1	-	<1	-	0.6
Copper (Filtered)	µg/L		**1000**	<1	73	-	179	-	45	11	-	5	-	33.3	-	44	-	55
Iron (Filtered)	µg/L		**300**	**1200**	**1100**	234	**2110**	**1660**	**1640**	**1440**	**1790**	**1350**	**2630**	**1990**	**2340**	**1110**	**416**	**2590**
Lead (Filtered)	µg/L		**10**	<0.5	<2	-	<2	-	<2	<2	-	<2	-	0.17	-	0.1	-	0.57
Manganese (Filtered)	µg/L		**50**	**730**	**669**	-	**455**	-	**1270**	**548**	-	**601**	**522**	**453**	-	**624**	-	**330**
Magnesium (Filtered)	µg/L			7800	8350	10,200	9260	7840	8190	8670	8580	7580	10,700	8630	9110	8010	10,100	8330
Mercury (Filtered)	µg/L		**1**	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.02	-	<0.02	-	<0.02
Phosphorus total (P2O5)	µg/L			<100	<50	-	-	-	<50	<50	-	<50	-	20	-	10	-	-
Phosphorus (Filtered)	µg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	<10
Potassium (Filtered)	µg/L			700	880	-	970	-	770	690	-	730	970	700	-	700	-	600
Sodium (Filtered)	µg/L		**200000**	2200	2250	2430	2410	2080	1870	2030	2230	1830	2550	2100	2000	1600	2000	1500
Zinc (Filtered)	µg/L		**5000**	51	39	-	301	-	6	15	-	5	-	5	-	6	-	15
Inorganics																		
Alkalinity (as CaCO3)	mg/L		**500**	252	276	306	291	259	260	284	309	262	364	278	290	259	324	265
Hardness (as CaCO3) (Filtered)	mg/L		**500**	260	281	359	323	277	274	293	320	264	391	303	305	275	339	292
Solids - Total Dissolved (TDS)	mg/L		**500**	269	258	402	312	280	298	286	308	276	392	294	306	250	335	278
Oxygen Demand - Chemical (COD)	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L		**5**	3.2	4.3	4.4	4.6	4.7	3.3	3.6	**5.6**	3.5	**6.4**	4.2	**6.6**	3.9	**7.5**	4.6
Oxygen Demand - Biological (BOD)	mg/L			9	<5	<5	13	14	<5	<5	15	<5	16	14	8	11	21	-
Phenols (4AAP)	mg/L			<0.001	<0.001	-	<0.001	-	<0.001	<0.001	-	<0.001	-	<0.001	-	<0.001	-	<0.002
Sulphate (Filtered)	mg/L		**500**	4	2.14	24.2	5.46	4.18	4.02	5.68	5.12	5.18	6.9	4	2	2	11	6
Ammonia	mg/L			0.06	0.05	0.03	0.06	0.07	0.06	<0.02	0.08	0.08	0.09	0.1	0.1	0.07	0.08	0.05
Nitrate (as N)	mg/L		**10**	<0.1	0.08	0.25	<0.05	<0.1	<0.25	<0.25	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	0.12	<0.05
Nitrite (as N)	mg/L		**1**	<0.01	<0.05	-	<0.05	-	<0.25	<0.25	-	<0.05	<0.1	<0.05	-	<0.05	-	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L			0.3	0.1	-	1	-	0.22	<0.1	-	0.18	-	0.3	-	0.3	-	0.3
Conductivity (lab)	µS/cm			493	488	623	536	516	527	551	566	481	692	534	556	483	645	537
pH (Lab)	-		**6.5-8.5**	8.07	7.88	8.2	7.77	7.99	8.03	8.01	8	8.23	8.05	7.88	7.81	7.99	7.77	7.6
Field																		
DO (Field)	mg/L			-	-	-	-	-	-	-	-	7.8	6.3	5.77	6.85	6.22	7.29	-
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	-	-10	125	4	94	-
Temp (Field)	°C			-	-	-	-	-	-	-	-	8.5	12.2	11.6	19.4	13.1	9.6	-
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	509	624	500	570	500	660	-
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	7.7	8.4	7.04	7.31	7.3	7.72	-

Table 7 - Residential Water Quality

	Unit	RDL	ODWQS	PW2 2011-05-01	PW2 2012-05-02	PW2 2012-11-01	PW2 2013-06-06	PW2 2014-05-08	PW2 2014-11-06	PW2 2015-04-17	PW2 2015-11-02	PW2 2016-04-26	PW2 2016-10-24	PW2 2017-06-14	PW2 2017-10-03
Metals															
Arsenic (Filtered)	µg/L		**25**	<1	<3	-	<3	<3	-	<3	-	<3	-	<0.1	-
Barium (Filtered)	µg/L		**1000**	68	73	71	67	64	131	53	67	59	134	80	161
Boron (Filtered)	µg/L		**5000**	<10	11	18	<13	11	142	11	17	<10	174	<5	159
Calcium (Filtered)	µg/L			47,000	58,300	35,700	48,900	35,700	88,900	32,700	35,900	36,200	92,800	57,500	95,900
Cadmium (Filtered)	µg/L		**5**	<0.1	<1	-	<1	<1	-	<1	-	<1	-	<0.014	-
Chloride	µg/L		**250000**	2000	3140	5760	1750	1360	10,600	2290	6870	1300	14,600	3100	14,400
Chromium (III+VI) (Filtered)	µg/L		**50**	<5	<3	-	<3	<3	-	<3	-	<3	-	1	-
Copper (Filtered)	µg/L		**1000**	150	39	-	130	220	-	331	-	356	-	251	-
Iron (Filtered)	µg/L		**300**	<100	<10	<10	23	<10	<10	<10	<10	<10	<10	13	11
Lead (Filtered)	µg/L		**10**	0.7	<2	-	<2	<2	-	<2	-	<2	-	4.13	-
Manganese (Filtered)	µg/L		**50**	6	<2	-	<2	<2	-	<2	-	<2	-	<1	-
Magnesium (Filtered)	µg/L			1700	2290	1650	1780	1360	6280	1250	1390	1340	6790	2240	7900
Mercury (Filtered)	µg/L		**1**	<0.1	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	<0.02	-
Phosphorus total (P2O5)	µg/L			<100	<50	-	-	<50	-	<50	-	<50	-	<10	-
Phosphorus (Filtered)	µg/L			-	-	-	-	-	-	-	-	-	-	-	-
Potassium (Filtered)	µg/L			1000	880	-	1310	1090	-	1100	-	960	1550	1300	-
Sodium (Filtered)	µg/L		**200000**	1400	2250	3430	2290	1990	10,400	1620	2660	1540	12,200	2200	12,700
Zinc (Filtered)	µg/L		**5000**	13	<5	-	10	9	-	<5	-	6	-	87	-
Inorganics															
Alkalinity (as CaCO3)	mg/L		**500**	98	148	84	120	94	200	84	86	101	224	142	219
Hardness (as CaCO3) (Filtered)	mg/L		**500**	120	155	95.9	129	95	248	86.8	95.4	95.9	260	153	272
Solids - Total Dissolved (TDS)	mg/L		**500**	122	162	134	152	122	318	100	116	114	324	156	320
Oxygen Demand - Chemical (COD)	mg/L			-	-	-	-	-	-	-	-	-	-	-	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L		**5**	1.9	1.9	4.2	**31**	2.5	1.8	2.8	**6.2**	2.3	1.1	2.1	1.6
Oxygen Demand - Biological (BOD)	mg/L			10	<5	8	<5	6	<5	<5	17	<5	<5	<5	<5
Phenols (4AAP)	mg/L			<0.001	<0.001	-	<0.001	<0.001	9	<0.001	-	<0.001	-	<0.001	-
Sulphate (Filtered)	mg/L		**500**	5	6.15	7.86	4.66	3.71	50.2	4.29	4.56	3.59	56.8	4	43
Ammonia	mg/L			<0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.02
Nitrate (as N)	mg/L		**10**	<0.1	0.09	0.27	0.24	<0.05	<0.05	0.1	0.06	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L		**1**	<0.01	<0.05	-	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	<0.05	-
Total Kjeldahl Nitrogen (TKN)	mg/L			0.2	<0.1	-	0.87	<0.1	-	<0.1	-	<0.1	-	1	-
Conductivity (lab)	µS/cm			207	282	201	240	210	503	191	198	199	540	284	582
pH (Lab)	-		**6.5-8.5**	7.74	7.96	7.78	7.08	7.6	8.09	7.71	7.58	7.94	7.92	7.24	7.84
Field															
DO (Field)	mg/L			-	-	-	-	-	-	-	-	7.8	7.2	8.28	5.59
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	-	47	125
Temp (Field)	°C			-	-	-	-	-	-	-	-	8.8	9.3	13.2	13
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	210	499	340	590
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	7.4	7.8	6.71	7.2

Table 7 - Residential Water Quality

	Unit	RDL	ODWQS	PW3 (Raw) 2011-05-01	PW3 (Raw) 2012-05-03	PW3 (Raw) 2012-11-01	PW3 (Raw) 2013-06-06	PW3 (Raw) 2013-11-28	PW3 (Raw) 2014-05-08	PW3 (Raw) 2014-11-06	PW3 (Raw) 2015-11-02	PW3 (Raw) 2016-04-26	PW3 (Raw) 2017-06-28	PW3 (Raw) 2017-10-03	PW3 (Raw) 2018-05-31	PW3 (Raw) 2018-11-14	PW3 (Raw) 2019-04-18	PW3 (Raw) 2019-11-13	PW3 (Treated) 2017-06-28
Metals																			
Arsenic (Filtered)	µg/L		**25**	<1	<3	-	<3	-	<3	-	-	<3	0.8	-	0.4	-	0.4	-	0.5
Barium (Filtered)	µg/L		**1000**	130	108	191	190	158	413	**1630**	13	5	212	2	486	602	421	289	<1
Boron (Filtered)	µg/L		**5000**	20	<10	37	22	22	28	65	26	25	26	48	88	71	112	156	36
Calcium (Filtered)	µg/L			54,000	43,900	76,300	74,100	64,200	121,000	262,000	5110	1870	68,600	1050	129,000	139,000	145,000	132,000	280
Cadmium (Filtered)	µg/L		**5**	0.2	<1	-	<1	-	<1	-	-	<1	0.148	-	0.111	-	0.112	-	0.014
Chloride	µg/L		**250000**	33,000	12,000	51,400	69,900	31,500	**352,000**	**1,700,000**	**384,000**	**257,000**	96,100	195,000	**331,000**	<500	**445,000**	239,000	187,000
Chromium (III+VI) (Filtered)	µg/L		**50**	<5	<3	-	<3	-	<3	-	-	<3	<1	-	<1	-	0.4	-	<1
Copper (Filtered)	µg/L		**1000**	22	22	-	36	-	32	-	-	**1440**	29	-	9.4	-	11	-	151
Iron (Filtered)	µg/L		**300**	**13,000**	**10,900**	**15,000**	**13,500**	**13,800**	**29,300**	**44,400**	**1990**	**3220**	**2480**	**1470**	**14,000**	**19,100**	**6130**	**2160**	**1440**
Lead (Filtered)	µg/L		**10**	4.2	<2	-	<2	-	2	-	-	**21**	7.02	-	4.7	-	3.76	-	4.46
Manganese (Filtered)	µg/L		**50**	**2800**	**2410**	-	**3370**	-	**9430**	-	-	**93**	**2780**	-	**3910**	-	**2860**	-	7
Magnesium (Filtered)	µg/L			4800	3520	6560	6960	5050	7930	13,600	400	2920	7230	60	13,300	10,300	15,700	19,500	20
Mercury (Filtered)	µg/L		**1**	<0.1	<0.1	-	<0.1	-	<0.1	-	-	<0.1	0.03	-	<0.02	-	<0.02	-	0.03
Phosphorus total (P2O5)	µg/L			<100	<50	-	-	-	<50	-	-	<50	30	-	50	-	-	-	10
Phosphorus (Filtered)	µg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	<10	-	-
Potassium (Filtered)	µg/L			1100	1160	-	1590	-	2620	-	-	380	2000	-	3400	-	4400	-	300
Sodium (Filtered)	µg/L		**200000**	11,000	6890	23,300	30,900	19,300	93,000	**732,000**	**239,000**	159,000	66,800	196,000	156,000	**290,000**	189,000	86,900	159,000
Zinc (Filtered)	µg/L		**5000**	690	46	-	301	-	184	-	-	309	81	-	133	-	429	-	33
Inorganics																			
Alkalinity (as CaCO3)	mg/L		**500**	138	125	154	152	175	116	169	73	43	177	114	179	176	198	206	36
Hardness (as CaCO3) (Filtered)	mg/L		**500**	150	124	218	214	181	335	**710**	14.4	16.7	201	3	377	390	427	410	<1
Solids - Total Dissolved (TDS)	mg/L		**500**	217	170	380	382	286	**1120**	**2860**	**602**	402	414	**514**	**835**	**1260**	**1050**	**637**	454
Oxygen Demand - Chemical (COD)	mg/L			-	-	-	-	-	-	-	-	-	-	-	-	-	22	16	-
Organic Carbon - Dissolved (DOC) (Filtered)	mg/L		**5**	**10.3**	**13.4**	**14.3**	**14.3**	**17.4**	**6.5**	**11.6**	2.9	2.9	**13.7**	1.5	4.8	4.7	2.7	3.2	2.1
Oxygen Demand - Biological (BOD)	mg/L			38	18	40	32	47	26	25	6	12	49	<5	24	44	-	-	9
Phenols (4AAP)	mg/L			<0.001	<0.001	-	<0.001	-	<0.001	-	-	-	<0.001	-	<0.001	-	<0.002	-	<0.001
Sulphate (Filtered)	mg/L		**500**	7	1.21	35.2	9.5	5.73	7.34	13.3	<0.5	<0.5	11	<1	28	20	39	81	<1
Ammonia	mg/L			0.53	0.48	0.57	0.06	0.59	0.71	2.29	0.06	0.03	0.5	0.03	0.58	1.3	0.67	0.24	0.02
Nitrate (as N)	mg/L		**10**	<0.1	<0.05	<0.05	<0.05	<0.1	<0.25	<2.5	<0.25	<0.25	<0.05	<0.05	<0.05	0.28	0.06	<0.05	<0.05
Nitrite (as N)	mg/L		**1**	<0.01	<0.05	-	<0.05	-	<0.25	-	-	<0.25	<0.05	-	<0.05	-	0.07	-	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L			0.9	0.7	-	1.45	-	1.21	-	-	0.2	0.9	-	0.9	-	1.1	-	0.2
Conductivity (lab)	µS/cm			392	270	513	518	468	1430	5580	1330	850	752	934	1530	2270	1910	1180	826
pH (Lab)	-		**6.5-8.5**	7.23	6.97	7.51	7.34	7.1	7.11	7.45	7.22	7.22	6.76	6.93	7.37	7.02	7.25	7.79	**6.26**
Field																			
DO (Field)	mg/L			-	-	-	-	-	-	-	-	3.3	5.21	5.55	1.98	1.82	5.4	7.03	5.68
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	81	156	131	152	158	70	24
Temp (Field)	°C			-	-	-	-	-	-	-	-	20.6	15.7	22.1	12.5	11.5	14	12.3	17.3
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	9	820	1200	1470	2100	1670	1080	790
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	7.4	**6.31**	**6.3**	**6.45**	6.84	6.89	6.69	**5.84**

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW1 2011-05-01	SW1 2012-05-01	SW1 2012-11-01	SW1 2013-06-07	SW1 2013-11-01	SW1 2014-05-06	SW1 2014-11-06	SW1 2015-04-23	SW1 2015-11-02	SW1 2016-04-26	SW1 2016-10-24	SW1 2017-06-05	SW1 2017-10-03	SW1 2018-05-30	SW1 2018-11-13	SW1 2019-04-17	SW1 2020-04-22	SW1 2020-11-10
Metals																					
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	-	<3	-	<3	-	**163**	-	1	-	0.5	-	0.3	0.3	-
Barium	µg/L	1		280	559	-	275	-	164	-	195	-	-	-	252	-	290	-	184	283	-
Boron	µg/L	5	**200**	**380**	**431**	-	**452**	-	**214**	-	20	-	193	-	**372**	-	**377**	-	104	**295**	-
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.014	-	<0.015	-	0.022	0.016	-
Chloride	µg/L	500		150,000	206,000	171,000	161,000	145,000	64,000	131,000	1860	75,700	60,500	107,000	103,000	110,000	119,000	69,900	48,700	121,000	116,000
Chromium (III+VI)	µg/L	1	**8.9**	<5	6	-	<3	-	<3	-	<3	-	<3	-	<1	-	<1	-	<1	<1	-
Copper	µg/L	2	**1|5**	<1	<2	-	<2	-	<2	-	<2	-	2	-	1.2	-	0.9	-	<2	<2	-
Iron	µg/L	5	**300**	<100	**1980**	**862**	234	81	78	142	30	54	155	153	279	**886**	**371**	220	300	134	212
Lead	µg/L	0.02	**1|3|5**	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-	0.07	-	0.08	-	0.1	0.1	-
Mercury	µg/L			-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	0.03	-	<0.02	-	<0.02	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	**40**	**170**	**60**	<20	**80**	**60**	**80**	**80**	**40**	**60**	**40**	**40**	**40**	**40**	20	10	20	30
Zinc	µg/L	5	**20**	8	15	-	<5	-	20	-	<5	-	**27**	-	14	-	13	-	**24**	13	-
Inorganics																					
Alkalinity (as CaCO3)	mg/L	5		375	425	352	382	318	308	259	241	149	329	181	423	252	374	213	199	377	267
Hardness (as CaCO3)	mg/L	1		390	376	368	409	338	320	256	250	153	329	179	362	206	356	208	218	405	281
Solids - Total Dissolved (TDS)	mg/L	3		-	704	734	646	584	458	494	240	282	428	402	657	502	556	363	303	594	476
Solids - Total Suspended (TSS)	mg/L	3		-	68	14	<10	<10	100	<10	11	<10	<10	<10	4	4	48	<3	5	<3	22
Oxygen Demand - Chemical (COD)	mg/L	5		52	26	48	38	61	28	37	19	30	20	23	58	43	42	26	14	17	13
Oxygen Demand - Biological (BOD)	mg/L	3		-	<5	<5	6	<5	<5	<5	<5	<5	6	<5	3	2	3	4	<3	<3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	0.001	<0.001	**0.003**	<0.001	<0.001	**0.005**	<0.001	<0.001	**0.002**	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		25	6.21	61.6	14.1	10.1	19.6	26.9	9.61	13.6	16.8	20.9	15	2	6	29	6	11	5
Ammonia, Unionized (as N)	mg/L		**0.02**	-	**0.0395**	0.002	**0.0255**	-	0.012	**0.03**	<0.0002	0.0005	<0.001	<0.001	**0.044**	**0.028**	**0.043**	<0.005	<0.005	**0.04**	0.008
Ammonia	mg/L	0.01		3.2	4.22	1.87	1.89	0.03	0.79	3.75	<0.02	0.04	0.62	1.92	7.98	2.73	4.84	1.69	1.04	4.85	2.6
Nitrate (as N)	mg/L	0.05		0.2	0.96	0.17	<0.25	<0.25	<0.25	<0.25	<0.05	<0.1	0.15	<0.1	0.12	<0.05	<0.05	0.08	0.15	0.26	0.08
Nitrite (as N)	mg/L	0.05		0.03	<0.05	<0.05	<0.25	<0.25	<0.25	<0.25	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		4.6	7.48	3.02	4.11	1.31	1.42	5.04	0.46	1.08	1.74	3.1	9.9	4	5.9	2.4	1.5	5.5	3.3
Conductivity (lab)	µS/cm	1		1210	1330	1260	1150	1120	843	983	487	542	774	696	1190	913	1040	698	584	1110	899
pH (Lab)	-		**6.5-8.5**	8.17	8.05	7.92	7.75	7.92	8.05	8.12	7.98	7.89	8.26	7.97	7.73	8.17	7.97	7.77	7.81	7.91	7.98
Field																					
DO (Field)	mg/L			-	-	-	-	-	-	-	-	-	17.6	**4.8**	5.81	**4.76**	6.54	6.4	5.46	10.95	**4.55**
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	379	146	43	162	67	117	121	130	273
Temp (Field)	°C			-	-	-	-	-	-	-	5.4	-	8.9	6.9	16.1	15	23.8	1.8	9.9	8.2	8.2
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	813	668	1170	910	1090	700	390	1020	668
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	7.9	-	8.1	7.4	7.27	7.58	7.24	7.26	7.4	7.71	7.27

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW2 2011-05-01	SW2 2012-05-01	SW2 2012-11-01	SW2 2013-06-07	SW2 2013-11-01	SW2 2014-05-08	SW2 2015-04-20	SW2 2016-04-26	SW2 2019-04-17
Metals												
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	-	<3	<3	**166**	<0.1
Barium	µg/L	1		180	731	-	188	-	494	133	-	140
Boron	µg/L	5	**200**	140	122	-	108	-	127	52	60	16
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	-	**0.8**	<0.1	<0.1	<0.015
Chloride	µg/L	500		66,000	10,600	26,800	20,600	8130	16,400	21,500	13,700	7500
Chromium (III+VI)	µg/L	1	**8.9**	<5	5	-	<3	-	<3	<3	<3	<1
Copper	µg/L	2	**1|5**	2	**18**	-	<2	-	**15**	<2	<2	<2
Iron	µg/L	5	**300**	**500**	**6570**	294	**303**	**669**	**2090**	53	38	38
Lead	µg/L	0.02	**1|3|5**	<0.5	**30**	-	<2	-	**12**	<2	<2	0.03
Mercury	µg/L			-	<0.1	-	<0.1	-	<0.1	<0.1	<0.1	<0.02
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-
Phosphorus total (P2O5)	µg/L	10	**30**	30	**710**	**130**	20	**1130**	**2460**	20	30	<10
Zinc	µg/L	5	**20**	<5	**218**	-	<5	-	**111**	<5	<5	10
Inorganics												
Alkalinity (as CaCO3)	mg/L	5		302	236	298	267	280	212	216	254	179
Hardness (as CaCO3)	mg/L	1		320	282	347	297	317	255	233	254	196
Solids - Total Dissolved (TDS)	mg/L	3		-	294	390	312	322	310	284	296	205
Solids - Total Suspended (TSS)	mg/L	3		-	544	32	<10	338	3130	<10	<10	<3
Oxygen Demand - Chemical (COD)	mg/L	5		25	36	27	16	175	1000	9	6	<5
Oxygen Demand - Biological (BOD)	mg/L	3		-	32	<5	<5	22	9	<5	<5	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002
Sulphate (Filtered)	mg/L	1		18	46	35.2	7.43	12.1	14.4	14.1	11.4	5
Ammonia, Unionized (as N)	mg/L		**0.02**	-	0.0008	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.005
Ammonia	mg/L	0.01		<0.05	0.06	<0.02	0.02	0.05	0.12	0.03	0.04	0.02
Nitrate (as N)	mg/L	0.05		<0.1	0.54	<0.05	<0.1	<0.1	<0.25	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		<0.01	<0.05	<0.05	<0.1	<0.1	<0.25	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.4	2.01	0.79	0.76	5.19	1.71	<0.1	0.22	0.2
Conductivity (lab)	µS/cm	1		795	531	366	551	595	501	490	508	397
pH (Lab)	-		**6.5-8.5**	8.22	7.98	8.01	7.75	8.09	8.14	8.15	8.26	8.11
Field												
DO (Field)	mg/L			-	-	-	-	-	-	-	-	8.48
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	90
Temp (Field)	°C			-	-	-	-	-	4.4	-	-	4.8
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	410
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	7.9	-	-	7.9

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW3 2012-05-01	SW3 2012-11-01	SW3 2013-06-06	SW3 2013-11-01	SW3 2014-05-08	SW3 2015-04-17	SW3 2015-11-02	SW3 2016-04-26	SW3 2017-06-05	SW3 2018-05-30	SW3 2019-04-17	SW3 2019-11-12	SW3 2020-04-22
Metals																
Arsenic	µg/L	0.1	**5**	<3	-	<3	-	<3	<3	-	**318**	0.6	0.6	0.1	-	0.2
Barium	µg/L	1		547	-	293	-	231	231	-	-	292	423	174	-	263
Boron	µg/L	5	**200**	**400**	-	**343**	-	177	181	-	**228**	-	**316**	122	-	**227**
Cadmium	µg/L	0.015	**0.1|0.5**	<1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.014	**0.555**	<0.015	-	<0.015
Chloride	µg/L	500		131,000	136,000	116,000	99,700	69,600	68,100	102,000	92,800	81,400	80,400	63,100	110,000	96,200
Chromium (III+VI)	µg/L	1	**8.9**	6	-	<3	-	<3	<3	-	<3	<1	<1	<1	-	<1
Copper	µg/L	2	**1|5**	**11**	-	<2	-	<2	<2	-	5	1	**9**	<2	-	<2
Iron	µg/L	5	**300**	**1610**	**1200**	65	**927**	40	121	**985**	**490**	<5	**1240**	69	**640**	22
Lead	µg/L	0.02	**1|3|5**	5	-	<2	-	<2	<2	-	<2	<0.02	1.7	0.12	-	<0.02
Mercury	µg/L			<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	0.03	<0.02	<0.02	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	<0.02
Phosphorus total (P2O5)	µg/L	10	**30**	**90**	**1790**	<20	**130**	<20	**60**	**210**	**240**	10	**1050**	<10	**50**	<10
Zinc	µg/L	5	**20**	15	-	<5	-	<5	<5	-	10	12	**29**	9	-	<5
Inorganics																
Alkalinity (as CaCO3)	mg/L	5		400	345	387	375	302	334	350	359	388	363	220	316	320
Hardness (as CaCO3)	mg/L	1		359	384	383	402	320	319	350	355	375	388	256	331	375
Solids - Total Dissolved (TDS)	mg/L	3		566	610	608	554	468	424	482	504	568	480	344	497	502
Solids - Total Suspended (TSS)	mg/L	3		195	1580	116	500	<10	29	148	63	<3	330	<3	52	<3
Oxygen Demand - Chemical (COD)	mg/L	5		<5	122	17	132	6	25	84	12	43	130	9	44	9
Oxygen Demand - Biological (BOD)	mg/L	3		6	<5	<5	5	<5	<5	<5	<5	<2	10	<3	<3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.006**	<0.001	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		6.5	30.7	4.58	6.33	12	8.91	8.17	9.65	7	4	6	5	8
Ammonia, Unionized (as N)	mg/L		**0.02**	<0.001	0.0019	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.005	0.007	<0.005	<0.005	0.0092
Ammonia	mg/L	0.01		<0.02	0.87	0.04	<0.02	0.17	<0.02	<0.02	0.2	0.25	0.42	0.05	0.03	0.79
Nitrate (as N)	mg/L	0.05		0.43	1.71	<0.25	<0.25	0.33	0.93	<0.25	<0.25	0.16	0.88	0.92	2.6	1.73
Nitrite (as N)	mg/L	0.05		<0.05	<0.05	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		1.67	54	0.67	1.54	0.47	0.79	0.68	0.77	0.6	13.7	0.3	0.6	1
Conductivity (lab)	µS/cm	1		1040	639	1050	1060	851	871	102	911	1030	906	662	936	945
pH (Lab)	-		**6.5-8.5**	8.05	8.03	8.03	8.11	8.02	8.12	8.09	8.28	7.92	8.13	8.06	8.07	7.88
Field																
DO (Field)	mg/L			-	-	-	-	-	-	-	8.8	7.44	8.75	6.45	9.24	7.95
Redox Potential (Field)	mV			-	-	-	-	-	-	-	323	35	50	115	86	141
Temp (Field)	°C			-	-	-	-	-	-	-	7.5	13	19.2	7.5	4.1	7.8
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	960	1000	910	630	890	690
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	8.1	7.64	7.67	7.64	8.14	-

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW4 2011-05-01	SW4 2012-05-01	SW4 2012-11-01	SW4 2013-06-07	SW4 2013-11-01	SW4 2014-05-08	SW4 2014-11-06	SW4 2015-04-23	SW4 2015-11-02	SW4 2016-04-26	SW4 2016-10-24	SW4 2017-06-05	SW4 2018-05-30	SW4 2018-11-13	SW4 2020-04-22	SW4 2020-11-10
Metals																			
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	-	<3	-	<3	-	**75**	-	0.2	0.1	-	0.1	-
Barium	µg/L	1		170	157	-	211	-	173	-	74	-	-	-	126	179	-	103	-
Boron	µg/L	5	**200**	70	23	-	90	-	50	-	33	-	30	-	36	39	-	21	-
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.014	<0.015	-	0.018	-
Chloride	µg/L	500		48,000	84,600	90,200	34,200	42,800	18,600	38,700	30,500	63,300	19,800	31,100	19,000	28,500	31,800	36,300	88,700
Chromium (III+VI)	µg/L	1	**8.9**	<5	4	-	<3	-	<3	-	<3	-	<3	-	<1	<1	-	<1	-
Copper	µg/L	2	**1|5**	<1	<2	-	<2	-	<2	-	<2	-	<2	-	0.4	0.2	-	<2	-
Iron	µg/L	5	**300**	<100	**408**	**672**	<10	**814**	<10	<10	36	<10	17	<10	11	91	38	42	62
Lead	µg/L	0.02	**1|3|5**	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-	<0.02	0.05	-	0.23	-
Mercury	µg/L			-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	0.05	<0.02	-	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	15	**150**	**130**	<20	**200**	20	**50**	**50**	<20	**40**	30	20	**50**	**50**	20	**40**
Zinc	µg/L	5	**20**	<5	<5	-	11	-	<5	-	7	-	<5	-	12	**29**	-	5	-
Inorganics																			
Alkalinity (as CaCO3)	mg/L	5		228	244	243	222	252	215	229	130	138	143	128	210	241	126	145	233
Hardness (as CaCO3)	mg/L	1		250	232	217	261	263	228	253	139	193	139	155	196	251	153	187	306
Solids - Total Dissolved (TDS)	mg/L	3		-	370	412	306	368	284	336	202	286	196	280	262	284	201	217	386
Solids - Total Suspended (TSS)	mg/L	3		-	28	95	<10	212	<10	<10	<10	<10	<10	<10	3	3	<3	<3	38
Oxygen Demand - Chemical (COD)	mg/L	5		17	18	56	15	76	12	15	28	45	17	30	46	9	50	23	11
Oxygen Demand - Biological (BOD)	mg/L	3		-	<5	<5	<5	8	<5	<5	<5	<5	<5	<5	<2	3	8	<3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	**0.006**	<0.001	**0.002**	**0.006**	<0.001	**0.007**	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		11	2.39	17.3	8.21	7.8	9.31	16.9	7.52	12	2.33	30.7	3	3	14	5	5
Ammonia, Unionized (as N)	mg/L		**0.02**	-	<0.001	0.0002	<0.001	<0.001	0.017	<0.001	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		<0.05	<0.02	0.14	<0.02	0.02	0.11	<0.02	0.07	<0.02	0.03	<0.02	0.01	0.07	0.04	0.03	0.05
Nitrate (as N)	mg/L	0.05		<0.1	0.12	<0.05	<0.1	<0.25	<0.25	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		<0.01	<0.005	<0.05	<0.1	<0.25	<0.25	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.2	0.8	1.52	1.01	2.13	0.21	0.47	0.41	0.47	0.46	0.57	0.3	0.3	0.5	0.4	0.4
Conductivity (lab)	µS/cm	1		619	685	734	524	665	526	578	352	477	327	385	477	548	390	421	739
pH (Lab)	-		**6.5-8.5**	8.28	7.99	8.08	7.67	8.05	8.15	8.12	7.86	7.79	8.01	7.65	7.79	7.96	7.53	7.62	7.86
Field																			
DO (Field)	mg/L			-	-	-	-	-	-	-	-	-	5.4	5	**3.64**	**4.79**	**2.78**	5	**4.98**
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	272	239	4	45	91	122	129
Temp (Field)	°C			-	-	-	-	-	-	-	-	-	6	7.2	11.6	17.7	1.7	2.1	8.8
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	368	433	520	580	450	490	738
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	-	7.7	7.9	7.33	7.22	7.38	7.7	7.39

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW5 2011-05-01	SW5 2012-05-01	SW5 2012-11-01	SW5 2013-06-07	SW5 2013-11-01	SW5 2014-05-08	SW5 2015-04-23	SW5 2015-11-02	SW5 2016-04-26	SW5 2016-10-24	SW5 2017-06-05	SW5 2017-10-03	SW5 2018-05-30	SW5 2018-11-13	SW5 2019-04-17	SW5 2020-04-22	SW5 2020-11-10
Metals																				
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	-	<3	<3	-	**137**	-	0.4	-	0.1	-	<0.1	<0.1	-
Barium	µg/L	1		130	228	-	162	-	161	141	-	-	-	168	-	231	-	97	116	-
Boron	µg/L	5	**200**	30	29	-	28	-	19	14	-	47	-	15	-	17	-	8	10	-
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.014	-	<0.015	-	<0.015	<0.015	-
Chloride	µg/L	500		44,000	66,500	87,200	84,900	26,400	148,000	163,000	41,900	30,100	50,600	50,200	279,000	131,000	109,000	56,800	69,700	63,400
Chromium (III+VI)	µg/L	1	**8.9**	<5	<3	-	<3	-	<3	<3	-	<3	-	<1	-	<1	-	<1	<1	-
Copper	µg/L	2	**1|5**	<1	3	-	<2	-	<2	<2	-	<2	-	1.3	-	0.6	-	<2	<2	-
Iron	µg/L	5	**300**	<100	**6710**	**578**	**1660**	**4810**	**1810**	**1790**	<10	<10	<10	**731**	**661**	**338**	120	66	50	50
Lead	µg/L	0.02	**1|3|5**	<0.5	<2	-	<2	-	<2	<2	-	<2	-	1.13	-	0.04	-	0.09	<0.02	-
Mercury	µg/L			-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	0.03	-	<0.02	-	<0.02	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	**61**	**310**	**70**	<20	**690**	**160**	**100**	<20	<20	30	30	**50**	20	30	20	<10	20
Zinc	µg/L	5	**20**	7	**23**	-	<5	-	8	12	-	<5	-	**136**	-	**31**	-	12	<5	-
Inorganics																				
Alkalinity (as CaCO3)	mg/L	5		219	230	236	242	246	210	206	209	218	207	213	278	228	179	127	173	227
Hardness (as CaCO3)	mg/L	1		230	240	205	298	248	250	215	221	220	230	234	312	274	174	135	195	216
Solids - Total Dissolved (TDS)	mg/L	3		-	344	414	386	364	586	414	308	274	382	332	887	427	370	236	291	334
Solids - Total Suspended (TSS)	mg/L	3		-	246	58	17	184	68	39	<10	<10	<10	5	22	10	8	3	6	5
Oxygen Demand - Chemical (COD)	mg/L	5		21	29	42	28	208	59	27	24	6	15	47	34	22	42	21	8	11
Oxygen Demand - Biological (BOD)	mg/L	3		-	13	<5	6	23	<5	<5	<5	<5	<5	2	3	<2	4	<3	3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	**0.002**	**0.003**	<0.001	<0.001	<0.001	<0.001	**0.003**	<0.001	<0.001	**0.007**	<0.001	<0.001	<0.002	**0.005**	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		7	2.42	16.1	1.21	7.8	3.16	6.7	7.85	9.81	31	1	2	<1	8	5	5	4
Ammonia, Unionized (as N)	mg/L		**0.02**	-	0.0003	0.0001	<0.001	0.0002	<0.02	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		<0.05	0.03	0.07	<0.02	0.03	0.03	0.11	<0.02	<0.02	<0.02	<0.01	0.02	0.03	0.03	0.09	0.02	0.03
Nitrate (as N)	mg/L	0.05		<0.1	0.09	<0.05	<0.1	<0.1	<0.25	<0.25	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05
Nitrite (as N)	mg/L	0.05		<0.01	<0.05	<0.05	<0.1	<0.1	<0.25	<0.25	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.3	1.58	1.01	0.93	5.3	0.45	0.75	0.28	0.15	0.56	0.4	0.9	0.4	0.5	0.4	0.2	0.4
Conductivity (lab)	µS/cm	1		576	602	409	676	564	872	870	527	487	577	604	1610	812	713	456	561	643
pH (Lab)	-		**6.5-8.5**	8.18	8.01	7.93	7.43	7.92	8.07	7.87	8.04	8.33	7.62	7.86	8.06	8	7.76	7.96	7.74	8.06
Field																				
DO (Field)	mg/L			-	-	-	-	-	-	-	-	8.4	6.1	5.44	5.02	6.18	5.31	7.79	9.15	9.59
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	218	258	5	180	52	115	154	130	139
Temp (Field)	°C			-	-	-	-	-	-	-	-	8.4	7	14.2	11.2	23.4	2	7.1	7.4	8.1
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	535	630	1620	850	740	510	600	657
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	7.8	7.5	7.45	7.24	7.34	7.38	7.17	8.06	7.81

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW6 2011-05-01	SW6 2012-05-01	SW6 2012-11-01	SW6 2013-06-07	SW6 2014-05-06	SW6 2014-11-06	SW6 2015-11-02	SW6 2016-04-26	SW6 2016-10-24	SW6 2017-06-05	SW6 2017-10-03	SW6 2018-05-30	SW6 2018-11-13	SW6 2019-04-17	SW6 2020-04-22	SW6 2020-11-10
Metals																			
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	<3	-	-	**80**	-	0.4	-	0.1	-	<0.1	0.1	-
Barium	µg/L	1		110	523	-	138	109	-	-	-	-	164	-	199	-	108	149	-
Boron	µg/L	5	**200**	60	**246**	-	89	10	-	-	23	-	106	-	106	-	52	84	-
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	<0.1	-	-	<0.1	-	<0.014	-	0.044	-	<0.015	<0.015	-
Chloride	µg/L	500		58,000	145,000	8650	117,000	12,400	12,100	32,600	9410	11,300	52,300	7200	95,300	111,000	60,200	103,000	119,000
Chromium (III+VI)	µg/L	1	**8.9**	<5	<3	-	<3	<3	-	-	<3	-	<1	-	<1	-	<1	<1	-
Copper	µg/L	2	**1|5**	<1	**8**	-	<2	<2	-	-	<2	-	0.5	-	**5.8**	-	<2	<2	-
Iron	µg/L	5	**300**	300	**22,600**	34	78	104	36	77	11	127	137	43	**331**	142	62	38	111
Lead	µg/L	0.02	**1|3|5**	<0.5	**21**	-	<2	<2	-	-	<2	-	<0.02	-	0.38	-	0.02	<0.02	-
Mercury	µg/L			-	<0.1	-	<0.1	<0.1	-	-	<0.1	-	0.03	-	<0.02	-	<0.02	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	**31**	**1220**	<20	<20	**40**	**50**	<20	<20	30	20	**40**	30	30	<10	10	**40**
Zinc	µg/L	5	**20**	<5	**106**	-	<5	<5	-	-	<5	-	**84**	-	**22**	-	**22**	<5	-
Inorganics																			
Alkalinity (as CaCO3)	mg/L	5		173	238	143	216	125	180	204	130	162	256	210	260	219	148	203	251
Hardness (as CaCO3)	mg/L	1		180	252	164	262	133	199	216	129	166	239	195	261	252	177	253	284
Solids - Total Dissolved (TDS)	mg/L	3		-	506	180	430	176	230	270	166	252	380	242	385	408	263	380	459
Solids - Total Suspended (TSS)	mg/L	3		-	392	<10	<10	39	<10	<10	<10	<10	4	<3	<3	<3	<3	5	21
Oxygen Demand - Chemical (COD)	mg/L	5		31	168	30	32	24	15	13	5	20	51	5	25	30	7	14	15
Oxygen Demand - Biological (BOD)	mg/L	3		-	19	<5	<5	<5	<5	<5	<5	<5	4	<2	2	4	<3	<3	4
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	**0.002**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.004**	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		<1	8.24	22.2	3.18	4.08	6.23	4.98	4.26	8.32	3	5	1	8	5	7	3
Ammonia, Unionized (as N)	mg/L		**0.02**	-	0.0027	<0.001	0.0067	0.0002	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		<0.05	0.34	<0.02	0.55	0.03	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	0.02	0.03	0.03	0.03	0.04
Nitrate (as N)	mg/L	0.05		<0.1	0.37	<0.05	<0.25	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05
Nitrite (as N)	mg/L	0.05		<0.01	<0.05	<0.05	<0.25	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.5	5.51	0.32	0.89	0.39	0.26	0.25	0.16	0.55	0.4	0.5	0.6	0.5	0.2	0.3	0.5
Conductivity (lab)	µS/cm	1		532	829	218	748	311	393	487	274	343	691	440	738	779	509	729	869
pH (Lab)	-		**6.5-8.5**	8.11	7.91	7.86	7.74	7.88	8.14	8.09	7.55	7.96	7.91	8.25	8	7.74	7.89	7.94	8
Field																			
DO (Field)	mg/L			-	-	-	-	-	-	-	10.2	8.2	6.17	6.7	9.09	7.82	6.84	10.53	6.6
Redox Potential (Field)	mV			-	-	-	-	-	-	-	335	284	1	123	49	115	141	146	275
Temp (Field)	°C			-	-	-	-	-	-	-	7.6	8.4	15.6	10.5	24	1.5	6.3	6.6	7.1
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	2980	350	700	440	770	810	610	610	640
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	8.1	7.7	7.37	7.58	7.54	7.44	7.08	-	7.16

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW7 2012-05-01	SW7 2012-11-01	SW7 2013-06-07	SW7 2013-11-01	SW7 2014-05-06	SW7 2014-11-06	SW7 2015-04-17	SW7 2015-11-02	SW7 2016-04-26	SW7 2016-10-24	SW7 2017-06-05	SW7 2017-10-03	SW7 2018-05-30	SW7 2018-11-13	SW7 2019-04-17	SW7 2020-04-22	SW7 2020-11-10
Metals																				
Arsenic	µg/L	0.1	**5**	<3	-	<3	-	<3	-	<3	-	**95**	-	0.8	-	3	-	0.2	2.5	-
Barium	µg/L	1		107	-	80	-	73	-	78	-	-	-	83	-	156	-	78	340	-
Boron	µg/L	5	**200**	41	-	<10	-	19	-	82	-	39	-	25	-	56	-	17	62	-
Cadmium	µg/L	0.015	**0.1|0.5**	<1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.014	-	0.048	-	<0.015	**0.54**	-
Chloride	µg/L	500		58,100	25,100	38,100	32,900	25,300	36,300	28,000	51,900	32,200	59,400	36,900	59,100	69,900	103,000	65,800	92,000	78,600
Chromium (III+VI)	µg/L	1	**8.9**	5	-	<3	-	<3	-	<3	-	<3	-	<1	-	<1	-	<1	5	-
Copper	µg/L	2	**1|5**	<2	-	<2	-	<2	-	<2	-	<2	-	1.5	-	**6.6**	-	<2	**27**	-
Iron	µg/L	5	**300**	**6730**	**5810**	**3240**	**7530**	**1650**	**11,300**	**2130**	**12,900**	**4060**	**4480**	**4790**	**1840**	**29,400**	**8000**	**940**	**22,200**	**14,400**
Lead	µg/L	0.02	**1|3|5**	<2	-	<2	-	<2	-	<2	-	<2	-	0.61	-	0.91	-	0.05	**13.9**	-
Mercury	µg/L			<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.02	-	<0.02	-	<0.02	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	**3450**	**190**	<20	**240**	**90**	**790**	**310**	**1370**	**240**	**70**	**680**	**120**	**1600**	**440**	**100**	**2020**	**680**
Zinc	µg/L	5	**20**	12	-	<5	-	11	-	6	-	9	-	**96**	-	**34**	-	13	**138**	-
Inorganics																				
Alkalinity (as CaCO3)	mg/L	5		174	167	164	144	180	185	148	155	160	269	154	197	158	185	192	228	284
Hardness (as CaCO3)	mg/L	1		171	170	229	149	199	194	164	233	157	270	209	243	201	236	232	440	345
Solids - Total Dissolved (TDS)	mg/L	3		272	250	240	226	262	246	222	262	230	424	249	333	269	360	315	354	394
Solids - Total Suspended (TSS)	mg/L	3		60	178	47	58	50	253	52	468	358	182	60	56	320	170	55	2800	780
Oxygen Demand - Chemical (COD)	mg/L	5		38	158	40	74	27	33	74	296	23	35	73	39	1030	202	45	824	276
Oxygen Demand - Biological (BOD)	mg/L	3		8	<5	10	20	<5	30	<5	12	7	6	22	4	>18.3	19	<3	18	12
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	0.001	<0.001	<0.001	**0.002**	**0.004**	**0.017**	<0.001	**0.002**	**0.007**	<0.001	<0.001	**0.003**	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		0.84	3.5	0.76	0.27	1.38	2.35	5.65	2.1	3.88	1.54	<1	<1	<1	<1	<1	<1	2
Ammonia, Unionized (as N)	mg/L		**0.02**	0.0006	0.0005	<0.001	-	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		0.12	0.31	0.1	0.8	0.05	0.08	0.02	0.12	0.11	0.14	0.33	0.32	0.21	0.48	0.08	0.21	0.11
Nitrate (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.25	0.2	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05	0.25	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.05	<0.25	<0.1	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		2.43	9.84	1.31	2.76	0.55	4.6	2.54	6.3	1.51	0.93	4.7	1.4	8.4	4.3	1.1	33.7	9.8
Conductivity (lab)	µS/cm	1		472	248	409	415	451	506	397	451	394	664	453	605	519	693	608	682	754
pH (Lab)	-		**6.5-8.5**	7.9	7.75	7.27	7.79	8.16	7.89	7.88	7.96	8.07	7.84	7.61	8.02	7.83	7.47	7.79	7.55	7.67
Field																				
DO (Field)	mg/L			-	-	-	-	-	-	-	-	8	**3.1**	**1.85**	**2.56**	**4.45**	6.67	**4.99**	**3.77**	**1.96**
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	159	285	8	134	34	109	133	161	140
Temp (Field)	°C			-	-	-	-	-	-	-	-	13.7	9.5	15.6	14.7	23.4	2.5	9.1	3.2	10.2
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	379	621	480	610	640	700	730	640	830
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	7.8	7.1	7.17	7.31	7.03	7.32	7.1	7.51	6.94

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW8 2011-05-01	SW8 2012-05-01	SW8 2012-11-01	SW8 2013-06-07	SW8 2013-11-01	SW8 2014-05-08	SW8 2014-11-06	SW8 2015-04-23	SW8 2015-11-02	SW8 2016-04-26	SW8 2016-10-24	SW8 2017-06-05	SW8 2017-10-03	SW8 2018-05-30	SW8 2018-11-13	SW8 2019-04-17	SW8 2019-11-12	SW8 2020-04-22	SW8 2020-11-10
Metals																						
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	-	<3	-	<3	-	**22**	-	0.2	-	<0.1	-	0.1	-	<0.1	-
Barium	µg/L	1		160	134	-	131	-	32	-	76	-	-	-	25	-	47	-	25	-	22	-
Boron	µg/L	5	**200**	40	20	-	17	-	<10	-	13	-	<10	-	<5	-	<5	-	<5	-	<5	-
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.014	-	<0.015	-	<0.015	-	<0.015	-
Chloride	µg/L	500		44,000	8740	8370	9920	9160	24,100	233,000	19,900	75,300	21,100	164,000	7500	76,300	31,800	173,000	37,300	33,900	40,800	37,800
Chromium (III+VI)	µg/L	1	**8.9**	<5	<3	-	<3	-	<3	-	<3	-	<3	-	<1	-	<1	-	<1	-	<1	-
Copper	µg/L	2	**1|5**	<1	<2	-	<2	-	<2	-	<2	-	<2	-	0.3	-	0.4	-	<2	-	<2	-
Iron	µg/L	5	**300**	<100	104	34	26	**1770**	**1010**	**1290**	34	**316**	49	**1010**	**577**	**1660**	**2270**	**351**	109	250	54	**401**
Lead	µg/L	0.02	**1|3|5**	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-	0.09	-	0.37	-	0.05	-	0.04	-
Mercury	µg/L			-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	0.03	-	<0.02	-	<0.02	-	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	12	<20	<20	<20	**400**	**40**	**130**	<20	<20	<20	**50**	30	**50**	**50**	**50**	10	**50**	10	**40**
Zinc	µg/L	5	**20**	5	6	-	<5	-	<5	-	<5	-	<5	-	<5	-	7	-	13	-	6	-
Inorganics																						
Alkalinity (as CaCO3)	mg/L	5		220	139	145	164	46	40	274	121	83	35	265	40	108	58	78	26	35	28	51
Hardness (as CaCO3)	mg/L	1		250	182	161	215	44	45	150	125	60.6	35.6	87.7	35	88	60	92	36	55	34	51
Solids - Total Dissolved (TDS)	mg/L	3		-	206	176	200	86	108	750	164	228	90	570	63	285	109	430	99	130	102	121
Solids - Total Suspended (TSS)	mg/L	3		-	<10	<10	<10	90	<10	19	<10	<10	<10	<10	<3	3	5	3	<3	15	<3	<3
Oxygen Demand - Chemical (COD)	mg/L	5		22	<5	17	16	115	19	19	11	40	8	15	58	29	26	39	27	42	11	33
Oxygen Demand - Biological (BOD)	mg/L	3		-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	2	<2	<2	3	<3	<3	<3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	**0.007**	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		8	39.3	22.2	3.12	5.09	2.82	14.1	4.76	14.9	4.57	14.1	1	7	<1	48	4	28	4	4
Ammonia, Unionized (as N)	mg/L		**0.02**	-	<0.001	<0.001	<0.001	-	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		<0.05	<0.02	<0.02	0.03	0.05	0.02	0.09	<0.02	<0.02	0.02	<0.02	<0.01	0.02	0.03	0.04	0.02	0.04	0.02	0.05
Nitrate (as N)	mg/L	0.05		<0.1	1.91	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.1	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05
Nitrite (as N)	mg/L	0.05		<0.01	<0.05	<0.05	<0.05	<0.05	<0.05	<0.25	<0.05	<0.1	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.3	0.36	0.32	0.38	2.44	0.35	0.46	0.15	0.64	0.2	0.6	0.4	0.5	0.5	0.6	0.3	0.7	0.2	0.8
Conductivity (lab)	µS/cm	1		584	359	215	336	143	186	1240	300	421	141	978	115	518	214	818	194	255	199	237
pH (Lab)	-		**6.5-8.5**	8.23	7.91	7.89	7.61	7.31	7.11	7.93	8.07	7.53	7.58	8.07	7.04	7.85	7.28	7.39	6.99	7.03	7.08	7.24
Field																						
DO (Field)	mg/L			-	-	-	-	-	-	-	-	-	9.4	**4.3**	**2.64**	5.04	**3.05**	6.58	5.79	**4.76**	7.51	**1.21**
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	430	269	-22	146	44	129	110	58	133	283
Temp (Field)	°C			-	-	-	-	-	-	-	-	-	7.9	8.2	14	11.3	18.1	4.3	4.5	1.3	3.6	8.1
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	285	931	120	520	700	820	210	290	270	1043
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	-	8.1	8.2	6.52	7.34	6.71	7.61	7.13	7.75	-	7.03

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW9 2011-05-01	SW9 2012-05-01	SW9 2012-11-01	SW9 2013-06-07	SW9 2013-11-01	SW9 2014-05-08	SW9 2014-11-06	SW9 2015-04-23	SW9 2015-11-02	SW9 2016-04-26	SW9 2016-10-24	SW9 2017-06-05	SW9 2017-10-03	SW9 2018-05-30	SW9 2018-11-13	SW9 2019-04-17	SW9 2019-11-12	SW9 2020-04-22	SW9 2020-11-10
Metals																						
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	-	<3	-	<3	-	**70**	-	0.6	-	0.8	-	0.1	-	0.2	-
Barium	µg/L	1		110	182	-	134	-	105	-	43	-	-	-	215	-	548	-	176	-	223	-
Boron	µg/L	5	**200**	50	28	-	50	-	35	-	11	-	19	-	200	-	**272**	-	161	-	180	-
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.014	-	0.337	-	<0.015	-	0.018	-
Chloride	µg/L	500		26,000	130,000	537,000	52,600	34,000	84,500	172,000	63,100	288,000	42,900	372,000	72,300	77,600	76,600	67,200	48,800	116,000	87,600	92,400
Chromium (III+VI)	µg/L	1	**8.9**	<5	5	-	<3	-	<3	-	<3	-	<3	-	<1	-	2	-	<1	-	<1	-
Copper	µg/L	2	**1|5**	<1	2	-	<2	-	<2	-	<2	-	<2	-	0.7	-	**9**	-	<2	-	<2	-
Iron	µg/L	5	**300**	100	**6040**	60	222	<10	286	**4940**	165	**2440**	**440**	**974**	12	**388**	**1470**	115	30	115	46	34
Lead	µg/L	0.02	**1|3|5**	<0.5	**6**	-	<2	-	<2	-	<2	-	<2	-	<0.02	-	4.39	-	0.03	-	0.13	-
Mercury	µg/L			-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.02	-	0.1	-	<0.02	-	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	**31**	**70**	**60**	<20	<20	20	**630**	30	<20	**40**	20	30	**120**	**590**	10	**50**	20	20	**40**
Zinc	µg/L	5	**20**	<5	**28**	-	<5	-	<5	-	6	-	7	-	12	-	**53**	-	10	-	9	-
Inorganics																						
Alkalinity (as CaCO3)	mg/L	5		214	213	304	202	273	177	111	99	83	146	194	322	356	328	246	225	272	291	288
Hardness (as CaCO3)	mg/L	1		230	247	546	261	264	212	165	119	325	142	424	292	391	443	292	243	317	338	318
Solids - Total Dissolved (TDS)	mg/L	3		-	454	1230	312	332	368	428	228	642	234	1090	486	523	436	358	322	485	454	448
Solids - Total Suspended (TSS)	mg/L	3		-	111	176	<10	<10	<10	43	<10	26	19	10	6	26	1320	<3	12	19	11	9
Oxygen Demand - Chemical (COD)	mg/L	5		18	23	123	32	18	6	32	28	23	13	12	53	13	139	10	20	22	16	<5
Oxygen Demand - Biological (BOD)	mg/L	3		-	<5	<5	<5	<5	<5	6	<5	<5	<5	<5	2	5	8	4	<3	<3	<3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	**0.007**	<0.001	**0.002**	**0.006**	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		3	1.15	30.8	1.78	10.9	6.22	4.91	7.62	7.64	5.39	20.6	7	<1	3	11	5	7	7	3
Ammonia, Unionized (as N)	mg/L		**0.02**	-	0.0006	<0.001	0.0006	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		<0.05	0.07	0.04	0.07	<0.02	0.03	0.05	0.04	0.04	0.03	<0.02	<0.01	0.04	0.1	0.03	0.04	0.02	0.03	0.04
Nitrate (as N)	mg/L	0.05		<0.1	<0.05	<0.05	<0.1	0.31	<0.25	<0.1	<0.05	<0.25	<0.05	<0.25	<0.05	<0.05	0.06	<0.05	0.31	0.49	1.41	<0.05
Nitrite (as N)	mg/L	0.05		<0.01	<0.05	<0.05	<0.1	<0.25	<0.25	<0.1	<0.05	<0.25	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.5	0.86	3.03	0.72	0.2	0.37	2.21	0.43	0.29	0.47	0.31	0.4	1.3	5.9	0.2	0.6	0.5	0.4	0.4
Conductivity (lab)	µS/cm	1		489	765	1120	527	627	642	768	410	1070	401	1490	884	951	828	689	620	915	859	849
pH (Lab)	-		**6.5-8.5**	8.04	7.82	8.08	7.55	7.87	8.21	7.59	7.64	7.27	7.98	7.6	7.99	8	8.14	7.67	8.06	7.94	7.97	8
Field																						
DO (Field)	mg/L			-	-	-	-	-	-	-	-	-	5.9	**3.8**	5.15	9.1	8.84	**3.37**	7.91	8.69	11.25	7.72
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	202	244	0	159	55	106	114	94	137	131
Temp (Field)	°C			-	-	-	-	-	-	-	-	-	6.1	10.6	13.7	15.4	20	4.7	5.1	1.3	5.2	11.1
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	415	1334	890	900	850	720	580	870	690	841
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	-	7.9	7.8	7.48	7.54	7.91	7.33	7.82	7.89	-	7.58

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW10 2011-05-01	SW10 2012-05-01	SW10 2012-11-01	SW10 2013-06-07	SW10 2013-11-01	SW10 2014-05-08	SW10 2014-11-06	SW10 2015-04-23	SW10 2015-11-02	SW10 2016-04-26	SW10 2016-10-24	SW10 2017-06-05	SW10 2017-10-03	SW10 2018-05-30	SW10 2018-11-13	SW10 2019-04-17	SW10 2020-04-22	SW10 2020-11-10
Metals																					
Arsenic	µg/L	0.1	**5**	<1	<3	-	<3	-	<3	-	<3	-	**135**	-	0.3	-	0.2	-	<0.1	0.1	-
Barium	µg/L	1		170	182	-	170	-	155	-	113	-	-	-	145	-	247	-	121	130	-
Boron	µg/L	5	**200**	40	105	-	52	-	34	-	32	-	47	-	59	-	**231**	-	33	44	-
Cadmium	µg/L	0.015	**0.1|0.5**	<0.1	<1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.014	-	<0.015	-	<0.015	<0.015	-
Chloride	µg/L	500		43,000	101,000	527,000	54,900	34,200	49,000	10,400	43,800	59,700	49,300	207,000	34,100	82,900	71,500	96,900	51,500	67,600	97,100
Chromium (III+VI)	µg/L	1	**8.9**	<5	3	-	<3	-	<3	-	<3	-	<3	-	<1	-	<1	-	<1	<1	-
Copper	µg/L	2	**1|5**	1	<2	-	<2	-	<2	-	<2	-	<2	-	0.5	-	0.4	-	<2	<2	-
Iron	µg/L	5	**300**	<100	204	**1210**	174	51	37	32	60	**1380**	<10	**1840**	82	216	194	60	52	29	83
Lead	µg/L	0.02	**1|3|5**	<0.5	<2	-	<2	-	<2	-	<2	-	<2	-	<0.02	-	0.02	-	<0.02	<0.02	-
Mercury	µg/L			-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	<0.1	-	0.03	-	<0.02	-	<0.02	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	14	<20	**70**	<20	<20	<20	**40**	<20	**60**	<20	**110**	30	**40**	20	10	<10	<10	30
Zinc	µg/L	5	**20**	<5	**22**	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	9	<5	-
Inorganics																					
Alkalinity (as CaCO3)	mg/L	5		223	262	272	217	252	211	177	176	192	211	245	232	332	301	178	170	199	287
Hardness (as CaCO3)	mg/L	1		230	274	553	271	259	228	198	183	200	211	241	211	312	281	216	193	225	313
Solids - Total Dissolved (TDS)	mg/L	3		-	420	1200	326	358	320	232	256	288	292	604	327	512	398	350	270	318	451
Solids - Total Suspended (TSS)	mg/L	3		-	14	63	<10	<10	<10	<10	<10	43	<10	47	<3	6	<3	<3	<3	3	<3
Oxygen Demand - Chemical (COD)	mg/L	5		19	14	99	22	16	7	16	10	38	5	10	46	20	19	30	8	10	<5
Oxygen Demand - Biological (BOD)	mg/L	3		-	<5	15	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	4	<3	<3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	**0.002**	<0.001	<0.001	**0.006**	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		8	6.42	85.7	3.28	10.4	7.06	6.22	9.48	4.36	6.98	16	2	<1	2	12	6	8	3
Ammonia, Unionized (as N)	mg/L		**0.02**	0.007	<0.001	<0.001	0.0008	<0.001	<0.02	<0.02	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		<0.05	<0.02	0.03	0.08	0.04	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.01	0.07	0.02	0.03	0.03	0.01	0.03
Nitrate (as N)	mg/L	0.05		<0.1	<0.05	<0.05	<0.1	<0.25	<0.25	<0.05	<0.05	<0.1	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05
Nitrite (as N)	mg/L	0.05		<0.01	<0.05	<0.05	<0.1	<0.25	<0.25	<0.05	<0.05	<0.1	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		0.3	0.62	2.67	0.92	0.23	0.17	0.23	0.16	0.4	0.23	1.32	0.4	0.6	0.5	0.4	0.2	0.2	0.4
Conductivity (lab)	µS/cm	1		580	767	1160	572	612	611	386	479	543	532	1080	594	931	761	673	521	612	854
pH (Lab)	-		**6.5-8.5**	8.22	8.01	7.95	7.61	7.84	8.06	8.06	8.17	7.92	8.21	7.98	7.78	7.91	8.03	7.72	8	7.85	7.94
Field																					
DO (Field)	mg/L			-	-	-	-	-	-	-	-	-	8	**4.8**	**3.61**	**2.46**	**4.72**	5.09	6.25	8.64	5.04
Redox Potential (Field)	mV			-	-	-	-	-	-	-	-	-	462	258	13	155	61	111	110	127	135
Temp (Field)	°C			-	-	-	-	-	-	-	-	-	7.8	7.8	14	11.5	21.4	0.9	4.7	5	6.7
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	-	-	548	980	610	920	830	760	430	690	835
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	-	-	8.1	7.9	7.28	7.23	7.34	7.49	7.84	7.97	7.54

Table 8 - Surface Water Quality

	Unit	RDL	PWQO	SW11 2012-05-01	SW11 2012-11-01	SW11 2013-06-07	SW11 2013-11-01	SW11 2014-05-08	SW11 2015-04-17	SW11 2015-11-02	SW11 2016-04-26	SW11 2016-10-24	SW11 2017-06-05	SW11 2018-05-30	SW11 2018-11-13	SW11 2020-04-22	SW11 2020-11-10
Metals																	
Arsenic	µg/L	0.1	**5**	<3	-	<3	-	<3	<3	-	**248**	-	<0.1	0.2	-	<0.1	-
Barium	µg/L	1		572	-	236	-	281	195	-	-	-	238	309	-	246	-
Boron	µg/L	5	**200**	**223**	-	50	-	67	20	-	16	-	22	41	-	38	-
Cadmium	µg/L	0.015	**0.1|0.5**	<1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.014	<0.015	-	<0.015	-
Chloride	µg/L	500		10,700	17,600	3170	3460	4040	1860	2610	1910	6410	2100	2900	3500	3000	3500
Chromium (III+VI)	µg/L	1	**8.9**	<3	-	<3	-	<3	<3	-	<3	-	<1	<1	-	<1	-
Copper	µg/L	2	**1|5**	3	-	<2	-	<2	<2	-	<2	-	0.2	0.1	-	<2	-
Iron	µg/L	5	**300**	**332**	151	<10	<10	105	30	<10	33	154	48	28	32	19	33
Lead	µg/L	0.02	**1|3|5**	**6**	-	<2	-	<2	<2	-	<2	-	0.1	0.02	-	<0.02	-
Mercury	µg/L			<1000	-	<0.1	-	<0.1	<0.1	-	<0.1	-	0.03	<0.02	-	-	-
Mercury (Filtered)	µg/L	0.02	**0.2**	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	-
Phosphorus total (P2O5)	µg/L	10	**30**	**700**	**540**	<20	**70**	**260**	**80**	**40**	**60**	**590**	**40**	**40**	**80**	10	**50**
Zinc	µg/L	5	**20**	**67**	-	12	-	7	<5	-	7	-	**67**	9	-	<5	-
Inorganics																	
Alkalinity (as CaCO3)	mg/L	5		457	355	267	364	279	241	279	322	142	283	300	163	271	333
Hardness (as CaCO3)	mg/L	1		411	389	325	372	290	250	299	333	186	276	300	231	308	352
Solids - Total Dissolved (TDS)	mg/L	3		1130	492	278	380	306	240	296	324	318	295	287	220	291	331
Solids - Total Suspended (TSS)	mg/L	3		556	96	<10	<10	131	11	<10	124	46	3	5	6	<3	<3
Oxygen Demand - Chemical (COD)	mg/L	5		267	109	23	15	45	19	17	7	118	50	29	68	<5	29
Oxygen Demand - Biological (BOD)	mg/L	3		16	20	6	<5	7	<5	<5	<5	20	3	2	6	<3	<3
Phenols (4AAP)	mg/L	0.002	**0.001**	<0.001	**0.003**	0.001	0.001	<0.001	<0.001	**0.003**	<0.001	**0.01**	**0.004**	<0.001	**0.003**	<0.002	<0.002
Sulphate (Filtered)	mg/L	1		5.16	20	5.44	10.2	7.27	9.61	14	7.1	45.5	4	3	46	6	3
Ammonia, Unionized (as N)	mg/L		**0.02**	0.0002	0.0001	0.0007	0.0003	<0.02	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005	<0.005	<0.005	<0.005
Ammonia	mg/L	0.01		0.03	0.18	0.05	0.06	0.04	<0.02	<2	0.04	0.05	<0.01	0.03	0.06	0.03	0.02
Nitrate (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.25	<0.25	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	0.76	0.08	<0.05
Nitrite (as N)	mg/L	0.05		<0.05	<0.05	<0.05	<0.25	<0.25	<0.05	<0.1	<0.1	<0.05	<0.05	<0.05	0.07	<0.05	<0.05
Total Kjeldahl Nitrogen (TKN)	mg/L	0.1		7.45	2.84	0.71	0.34	0.53	0.46	0.39	0.52	5.88	0.4	0.6	1.2	0.2	0.7
Conductivity (lab)	µS/cm	1		786	737	495	682	579	487	534	568	362	537	554	427	561	637
pH (Lab)	-		**6.5-8.5**	7.9	8.07	7.81	7.91	7.89	7.98	7.95	8.29	7.59	7.98	8.13	7.68	7.75	8
Field																	
DO (Field)	mg/L			-	-	-	-	-	-	-	6	5.1	6.71	7.6	6.95	12.06	**3.94**
Redox Potential (Field)	mV			-	-	-	-	-	-	-	197	239	16	46	84	115	265
Temp (Field)	°C			-	-	-	-	-	-	-	4	5.8	13.7	20.1	1.6	7	10.6
Conductivity (field)	µS/cm			-	-	-	-	-	-	-	543	368	540	590	500	520	500
pH (Field)	-		**6.5-8.5**	-	-	-	-	-	-	-	7.7	7.4	7.47	7.4	7.43	-	7.72

Table 9 - Summary of Landfill Gas Monitoring Data

Well ID	Top of Screen Elevation (m)[3]	Water Elevation (mASL)[4]	Screen Saturated	Percent Methane by Volume					
				31-May-18	14-Nov-18	18-Apr-19	15-Nov-19	27-Apr-20	11-Nov-20
OW9	255.49	254.58	no	-	<0.05	<0.05	<0.05	<0.05	<0.05
OW12-1	249.23	252.41	yes	-	-	<0.05	-	<0.05	-
OW12-2	251.61	252.27	yes	-	-	<0.05	-	<0.05	-
OW14-1	249.83	252.43	yes	-	<0.05	-	<0.05	-	<0.05
OW14-2	251.69	252.05	yes	-	0.87	-	0.54	-	0.185
OW16	252.10	254.55	yes	-	<0.05	<0.05	<0.05	<0.05	<0.05
OW17-1	257.08	263.77	yes	-	<0.05	<0.05	<0.05	<0.05	<0.05
OW17-3	264.41	263.73	no	-	<0.05	-	<0.05	<0.05	<0.05
OW19-1	242.40	246.27	yes	<0.05	1.475	-	-	-	<0.05
OW19-2	245.43	246.28	yes	<0.05	<0.05	-	-	-	<0.05
DP1	247.44	247.58	yes	-	<0.05	<0.05	<0.05	<0.05	<0.05
DP2-R	246.10	246.10	yes	<0.05	-	<0.05	-	<0.05	<0.05
DP3	250.15	250.15	no	-	<0.05	-	<0.05	<0.05	<0.05
DP4-R	245.82	246.45	yes	<0.05	0.06	<0.05	-	-	-
BH16-1	245.13	251.57	yes	-	<0.05	<0.05	<0.05	<0.05	<0.05
BH16-2	245.03	246.44	yes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH16-3S	245.30	246.37	yes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH16-3D	240.45	246.10	yes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH16-4S	244.17	246.77	yes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
BH16-4D	240.54	247.12	yes	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

Notes:

3. Screen length is 3.05 m for all monitors except BH12-2, BH14-2, BH19-2, DP1, DP2-R, DP3, and DP4-R (1.53m screen).

4. Average water elevation since May 2014.

CAMBIUM

Table 10 - Monthly Summary of Materials Accepted and Transferred

Quantity accepted at the Site, as recorded on daily incoming waste forms									
Month	**Vehicles**	**Total Garbage Bags**	**Shingles & Drywall (yd³)**	**Major Appliances without Freon (quantity)**	**Major Appliances with Freon (quantity)**	**Reuse Centre Bins (40 yd - quantity)**	**Brush (tonnes)**	**Tires (quantity)[1]**	**Alcohol Containers (quantity)[2]**
January	1,398	2,304	-	-	-	-	-	-	-
February	1,650	2,287	-	-	-	-	-	-	-
March	2,192	3,033	-	-	-	-	-	-	-
April	2,896	4,042	-	-	-	-	-	-	-
May	3,322	4,800	-	-	-	-	-	-	-
June	3,525	4,867	-	-	-	-	-	-	-
July	4,452	6,165	-	-	-	-	-	-	-
August	4,587	6,353	-	-	-	-	-	-	-
September	3,611	4,736	-	-	-	-	-	-	-
October	3,201	4,105	-	-	-	-	-	-	-
November	2,671	3,546	-	-	-	-	-	-	-
December	2,407	3,470	-	-	-	-	-	-	-
Annual Total	**35,912**	**49,708**	**0**	**0**	**0**	**0**	**180.9**	**722**	**60,275**

Quantity reported to be removed from the Site, transported/processed as noted																		
Month	**Waste[3] (tonnes)**	**Loads[3]**	**Organics[4] (tonnes)**	**C&D Materials[5] (tonnes)**	**Containers[6] (tonnes)**	**Fibres[6] (tonnes)**	**Cardboard[6] (tonnes)**	**Hard Plastics[7] (tonnes)**	**Furniture[8] (tonnes)**	**Scrap Metals & White Goods[9] (tonnes)**	**WEEE[10] (tonnes)**	**MHSW[11,12] (tonnes)**	**Media[12,13] (m³)**	**Child Restraints[12,13] (quantity)**	**Hard Cover Books[12,14] (tonnes)**	**Polystyrene[12,14] (tonnes)**	**Mattresses[12,15] (tonnes)**	**Textiles[16] (tonnes)**
January	27.05	5	7.07	-	5.51	6.13	5.67	-	-	-	-	-	-	-	-	-	-	-
February	22.53	4	7.19	-	5.84	4.08	-	-	-	-	3.20	-	-	-	-	-	-	-
March	35.26	5	4.00	-	7.63	3.32	5.67	-	-	-		-	-	-	-	-	-	-
April	35.90	5	0.00	-	7.65	4.65	4.78	-	-	-	-	-	-	-	-	-	-	-
May	38.44	7	0.00	21.51	9.52	6.42	5.63	-	-	20.77		-	-	-	-	-	-	-
June	36.45	6	0.00	-	13.02	6.72	-	-	-	-	-	-	-	-	-	-	-	-
July	77.89	12	3.79	-	15.89	9.48	10.51	-	-	-		-	-	-	-	-	-	-
August	55.55	8	6.22	-	16.37	6.14	5.81	-	-	-	3.76	-	-	-	-	-	-	-
September	58.34	10	7.28	-	10.60	4.75	6.09	-	-	-		-	-	-	-	-	-	-
October	42.11	8	3.44	51.89	11.59	4.60	4.02	-	-	31.40	4.35	-	-	-	-	-	-	-
November	33.15	6	4.20	-	8.42	4.94	5.55	-	-	-		-	-	-	-	-	-	-
December	40.09	9	4.66	-	7.88	4.54	5.18	-	-	-	-	-	-	-	-	-	-	-
Annual Total	**502.76**	**85**	**47.85**	**73.40**	**119.90**	**65.75**	**58.91**	**-**	**-**	**52.17**	**11.31**	**-**	**-**	**-**	**-**	**-**	**-**	**2.95**

Notes:

1. Transferred off-site to retire your tired.

2. Transferred off-site by Community Living to the Beer Store.

3. Scaled weights from the Bensfort Road Waste Disposal Site

4. Transported by ABA Recycling to Harper Road Compost Facility or SusGlobal Energy Belleville

5. Transported by Kawartha Disposal to Waste Connections for processing.

6. Transported by Waste Connections of Canada to Peterborough Materials Recovery Facility for processing by HGC

7. Transported by ABA and Processed by Waste Logix, Lindsay

8. Collected at all MTL transfer stations, transferred to the Peterborough Waste Management Facility

9. Transported by Kawartha Disposal to Kings Auto Wreckers.

10. Transported and processed by Quantum Life Cycle LPP on contract with the County of Peterborough

11. Limited MHSW collected at all transfer sites, including batteries (Call 2 Cycle), flourscent tubes (Photech), empty oil/anitfreeze containers (Pnweko), and car batteries (Photech)

12. Not collected in 2020 due to the Covid 19 pandemic.

13. Transferred to County of Peterborough/Project Get Reel, Toronto

14. Transported and processed by HGC

15. Transported by County of Peterborough to Peterborough Waste Management Facility for consolidation and shipment to processor

16. Transferred to the Diabetes Association and Jakes House.

Appendix A

Environmental Compliance Approvals

Content Copy Of Original

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A341301
Issue Date: October 2, 2017

The Corporation of the Municipality of Trent Lakes
760 Peterborough County Road 36
Trent Lakes, Ontario
K0M 1A0

Site Location: Buckhorn Waste Transfer Station
37 Dump Road,
Municipality of Trent Lakes, County of Peterborough

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act , R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

a 1.8 hectare closed landfilling area within a total area of 6.43 hectare and associated attenuation zone, a Transfer Station for the receipt, temporary storage and transfer of solid, non-hazardous municipal waste, MHSW, WEEE and organic waste.

For the purpose of this environmental compliance approval, the following definitions apply:

a. ***"Act" and "EPA"*** means *Environmental Protection Act* , R.S.O. 1990, c. E. 19, as amended;

b. ***"Approval"*** means this Environmental Compliance Approva l Schedule l and any Schedules to it, including
the application and supporting documentation listed in Schedule "A";

c. ***"County"*** means the County of Peterborough;

d. **" *Director* "** means any *Ministry* employee appointed in writing by the *Minister* pursuant to section 5 of the *EPA* as a Director for the purposes of Part V of the *EPA* ;

e. **" *District Manager* "** means the *District Manager* of the local district office of the *Ministry* in which the *Site* is geographically located;

f **" *Household Hazardous Waste Collection Facility* "** or **" *MHSW* "** means the Municipal Hazardous and/or Special Waste restricted to Waste Class Nos.: 112, 121, 122, 145, 146, 147, 148, 212, 213, 221, 242, 252, 261, 263, 312 and 331 as described in the Ministry document "New Ontario Waste Classes" dated January, 1986.

g. **" *Ministry* "** and ***"MOECC "*** means the Ministry of the Environment and Climate Change;

h. ***"Municipality"*** means the Municipality of Trent Lakes;

i. " ***Ontario Regulation 393/04 "*** means Ontario Regulation 393/04 Waste Electrical and Electronic Equipment made under the Waste Diversion Act 2002;

j. " ***Ontario Regulation 463/10 "*** means Ontario Regulation 463/10, Ozone Depleting Substances and Other Halocarbons, made under the *EPA;*

k. **" *Operator* "** means any person, other than the Owner's employees, authorized by the *Owner* as having the charge, management or control of any aspect of the site;

l. **" *Owner* "** means any person that is responsible for the establishment or operation of the site being approved by this *Approval* , and includes the Municipality of Trent Lakes **,** and its successors and assigns;

m. **" *OWRA* "** means the *Ontario Water Resources Act* , R.S.O. 1990, c. O-40, as amended from time to time;

n. **" *PA* "** means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amend from time to time;

o. **" *Provincial Officer* "** means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the *OWRA* or section 5 of the *EPA* or section 17 of *PA* ;

p. **" *Regional Director* "** means the Regional Director of the local Regional Office of the *Ministry* in which the *Site* is located;

q. **" *Reg. 347* "** means Regulation 347, R.R.O. 1990, made under the *EPA* , as amended from time to time;

r. ***"Transfer Station"*** means the area of land for the handling and storage of the disposable waste, leaf & yard waste, recyclable materials, MHSW, WEEE, organic waste and all other waste materials.

s. **" *Site* "** means the Landfill Site and Transfer Station operations being approved under this Approval, at the Buckhorn Transfer Station, 37 Dump Road, Municipality of Trent Lakes, County of Peterborough;

t. ***"Source Separated Organics"*** means organic materials separated at the point of generation;

u. ***"Trained personnel"*** means knowledgeable in the following through instruction and/or practice:

i.. relevant waste management legislation, regulations and guidelines;
ii. major environmental concerns pertaining to the waste to be handled;
iii. occupational health and safety concerns pertaining to the processes and wastes to be handled;
iv. management procedures including the use and operation of equipment for the processes and wastes to be handled;
v. emergency response procedures;
vi. specific written procedures for the control of nuisance conditions;
vii. specific written procedures for refusal of unacceptable waste loads;
viii. the requirements of this *Approval* .

v. ***"Waste electrical and electronic equipment (WEEE)"*** means devices listed in Schedules 1 through 7 of *Ontario Regulation 393/04.*

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

PART 1 - GENERAL

Revoke and Replace

1. This Approval revokes Provisional Certificates of Approval No. A341301, issued February 24, 1992, Notice No. 1 issued May 19, 1999, Notice No. 2 issued April 18, 2007, Notice No. 3 issued September 25, 2007 and Notice 4 issued December 8, 2009. The approval given herein, including the terms and conditions set out, replaces all previously issued approvals and related terms and conditions under Part V of the EPA for this Site.

2. **Certificate of Requirement/Registration on Title**

The *Site*shall be registered on title in accordance with the following sub-conditions:

a. Pursuant to Section 197 of the *EPA* , no person having an interest in the *Site,* including the newly acquired contaminant attenuation lands, shall deal in any way with the *Site* without first giving a copy of this *Approval* to each person acquiring an interest in the *Site* as a result of the dealing.

b. Two copies of a completed Certificate of Requirement, containing a registerable description of the *Site* (the landfill plus all surrounding buffer lands and contamination attenuation lands), shall be submitted to the *Director* for the *Director's* signature within 60 calendar days of the date of this *Approval.*

c. The Certificate of Requirement shall be registered in the appropriate land registry office on title to the *Site* by the *Owner* within 10 calendar days of receiving the Certificate of Prohibition signed by the *Director,* and a duplicate registered copy shall be submitted to the *Director* .

d. Pursuant to Section 197 of the *EPA,* neither the *Owner* nor any person having an interest in the *Site* shall deal with the *Site* in any way without first giving a copy of this *Approval* to each person acquiring an interest in the *Site* as a result of the dealing.

Legal Requirements

3. The requirements specified in this *Approval*are the requirements under the *EPA.*The issuance of this *Approval*in no way abrogates the *Owner's*legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

4. The requirements of this *Approval*are severable. If any requirement of this *Approval,*or the application of any requirement of this *Approval*to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this *Approval*shall not be affected in any way.

5. The *Owner*shall ensure compliance with all the terms and conditions of this *Approval.*Any non-compliance constitutes a violation of the *EPA*and is grounds for enforcement.

6. a. The *Owner*shall, forthwith upon request of the *Director,District Manager*or *Provincial Officer*, furnish any information requested by such persons with respect to compliance with this *Approval,* including but not limited to, any records required to be kept under this *Approval;* and

b. In the event the *Owner*provides the *Ministry*with information, records, documentation or notification

in accordance with this *Approval*(for the purposes of this condition referred to as "Information"),

i. the receipt of Information by the *Ministry;*

ii. the acceptance by the Ministry of the Information's completeness or accuracy; or

iii. the failure of the *Ministry* to prosecute the *Owner,* or to require the *Owner* to take any action, under this *Approval* or any statute or regulation in relation to the Information;

shall not be construed as an approval, excuse or justification by the *Ministry* of any act or omission of the *Owner* relating to the Information, amounting to non-compliance with this *Approval* or any statute or regulation.

Inspections

7. The *Owner*shall allow *Ministry*personnel, or a *Ministry*authorized representative(s), upon presentation of credentials, to:

a. carry out any and all inspections authorized by Section 156, 157 or 158 of the *EPA,*Section 15, 16 or 17 of the *OWRA,*or Section 19 or 20 of the *PA,*of any place to which this *Approval*relates; and,
b. without restricting the generality of the foregoing, to:
    1. enter upon the premises where the records required by the conditions of this *Approval*are kept;
    2. have access to and copy, at reasonable times, any records required by the conditions of this *Approval;*
    3. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this *Approval;* and
    4. sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this *Approval.*

Interpretation

8. a. Where there is a conflict between a provision of any document referred to in Schedule “A”, and the conditions of this *Approval,*the conditions in this *Approval*shall take precedence; and

b. Where there is a conflict between documents listed in Schedule “A”, the document bearing the most recent date shall prevail.

Notification Requirements

9. The *Owner*shall ensure that all communications/correspondence made pursuant to this *Approval*includes reference to the *Approval*number.

10. The *Owner*shall notify the *Director*in writing of any of the following changes within thirty (30) days of the change occurring:

a. a change in ownership of the *Site;*
b. appointment of, or a change in, an *Operator*of the *Site;*
c. change of address of the *Owner;*
d. change of partners where the *Owner*or *Operator*is or at any time becomes a partnership, and a copy of the most recent declaration filed under the **Business Names Act**, 1991 shall be included in the notification to the *Director;*
e. any change of name of the corporation where the *Owner*is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of Ontario

Regulation 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the **Corporations Information Act** shall be included in the notification to the *Director;* and

f. change in directors or officers of the corporation where the *Owner*is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 9(d), supra.

11. In the event of any change in ownership of the *Site,* the *Owner* shall notify, in writing, the succeeding owner of the existence of this *Approval,* and a copy of such notice shall be forwarded to the *Director.*

Public Access to Information

12. Any information relating to this *Approval* and contained in *Ministry* files may be made available to the public in accordance with the provisions of the **Freedom of Information and Protection of Privacy Act**, R.S.O. 1990, C. F-31.

Record Retention

13. All records and monitoring data required by the conditions of this *Approval* must be kept on the *Owner's* premises for a minimum period of two (2) years from the date of their creation.

Security

14. The *Site*shall be operated and maintained in a secure manner, such that unauthorized persons cannot enter the *Site.*

PART 2 - LANDFILL SITE

Closure

15. The *Landfill Site* is hereby closed in accordance with the closure plan submitted to the Ministry, dated July 2, 2008.

16. The *Owner*shall take all necessary action to ensure that no additional waste is deposited in or on the *Landfill Site.*

Long Term Care and Monitoring Plan

17. The *Owner*shall ensure the groundwater and surface watersamples shall be collected and analysed at the pre-determined frequency in accordance with the Schedule "B" and Schedule "C".

18. The groundwater and surface water monitoring program, and the reporting scope and frequency may be amended from time-to-time with the written approval from the Director. Results of, and interpretation of, the monitoring program shall be included in the Annual Report required under Condition 80.

Inspections

19. The *Owner* shall perform inspections of the *Landfill Site*in accordance with Item 7 in Schedule "A".

PART 3 - TRANSFER STATION OPERATIONS

In Accordance

20. Except as otherwise provided by these conditions, the *Transfer Station* shall be located, constructed, used, maintained, operated, inspected, reported and closed, and all facilities, equipment and fixtures shall be built and installed, in accordance with the Environmental Compliance Approval application dated May 10, 2016, and the supporting documentation, plans and specifications listed in Item 5 of Schedule "A".

Hours of Operation

21. The *Owner* shall set operational hours which provides an adequate level of service. The hours of operation shall be any day of the week, during daylight hours.

22. Hours of operation may be changed by the *Owner*at any time, provided that the hours are correctly posted at the *Site* gate, and that suitable public notice is given of any change.

23. The *Owner* shall notify the *District Manager,* in writing, of any changes to the hours of operation.

Site Security

24. *The Transfer* Station shall be operated and maintained in a secure manner, such that unauthorized

persons cannot enter the *Transfer Station* .

Service Area

25. Only waste that is generated within the *Municipality of Trent Lakes*shall be accepted at the *Transfer Station.*

Signage

26. A sign shall be posted and maintained at the *Transfer Station* in a manner that is clear and legible, and shall include the following information:

a. the name of the *Transfer Station* and *Owner* ;
b. this *Approval* number;
c. the name of the *Operator* ;
d. the normal hours of operation;
e. the allowable and prohibited waste types;
f. a telephone number to which complaints may be directed;
g. a twenty-four (24) hour emergency telephone number (if different from above); and
h. a warning against dumping outside the *Transfer Station* .

Approved Waste and Quantities

27. The *Transfer Station*shall accept municipal waste limited to solid non-hazardous residential, industrial, commercial, institutional, *construction and demolition waste, WEEE,*Source Separated Organics (SSO), and *MHSW*from the Municipality of Trent Lakes located in the County of Peterborough.

28. The *Municipality*shall accept new materials at the *Transfer Station*including hard plastics and limited MHSW such as refrigerant appliances, florescent light bulbs and compressed gas tanks.

29. Disposal of waste from the Buckhorn Transfer Station shall be to a licensed Waste Disposal Site.

30. The *Transfer Station* shall receive up to 500 m 3 of waste and/or recyclables per day, of which a maximum of 20 m 3 may be *limited MHSW.*

31. The total volumes of waste/materials stored at the Transfer Station at any one time shall not exceed:

a) Municipal solid waste (disposable) 200 cubic metres
b) Recyclable materials 200 cubic metres
c) Furniture 400 cubic metres
d) Metal 400 cubic metres
e) Leaf & yard waste (i.e. wood & brush) 400 cubic metres
f) Tires 200 cubic metres
g) Appliances (white goods) 400 cubic metres
h) Construction and Demolition Waste 400 cubic metres
i) WEEE 30 cubic metres
j) Hard plastics 60 cubic metres
k) Source Separated Organic materials 10 cubic metres
l) Limited MHSW 50 cubic metres
m) Total waste/materials 2750 cubic metres

32. All incoming waste shall be inspected prior to being received at the *Transfer Station* to ensure that the Transfer Station is approved to accept such waste.

33. All recycling bins, roll-off containers and segregated waste storage areas shall be clearly marked showing the type of waste they are to contain.

34. The operator will monitor segregated waste and reuse areas daily to remove unauthorized materials.

35. The Owner shall ensure that all wastes at the Transfer Station are managed and disposed in accordance with Ontario Regulation 347, R.R.O. 1990, as amended, and the Environmental Protection Act.

36. Further to Condition 31(l), the 50 m 3 approved quantity of *MHSW* shall be further restricted as follows:

a. a maximum of 50 vehicular batteries;
b. a maximum of 20 compressed gas tanks weigh greater than one pound each and/or 30 compressed gas tanks weighing less than or equal one pound each;
c. a maximum of one 250 litre drum of lithium, dry cell and rechargeable batteries;
d. a maximum of one 250 litre capacity container for the bulk collection of empty motor oil containers;
e. a maximum of 50 units of fluorescent light bulbs.

37. All incoming waste shall be inspected prior to being received at the *Transfer Station* to ensure that the *Transfer Station* is approved to accept such waste.

Waste Storage

38. All recycling bins, roll-off containers and segregated waste storage areas shall be clearly marked showing the type of waste they are to contain;

39. The *Owner*shall monitor segregated waste and reuse areas daily to remove unauthorized

materials;

40. The *Owner*ensure that waste is stored in the following manner:

a. waste (non-segregated) shall be stored in designated bins;
b. recyclable materials shall be stored in designated bins;
c. *construction and demolition waste, clean wood,*bulky waste (including but not limited to furniture), tires, white goods and metal shall be stored in a designated concrete bunkers as shown on Item 13 of Schedule "A"; and
d. *leaf and yard waste*shall be stored in a designated area as shown on Item 6 of Schedule "A".

41. The *Owner* shall ensure that *MHSW* is stored as follows:

a. vehicles batteries shall be stored on pallets in a manner which protects them from the elements;
b. lithium, dry cell and rechargeable batteries shall be bulked into a 250 L plastic or metal drum, either bagged or with the terminal ends of each battery taped over or otherwise stored in a manner which prevents the terminal ends from touching;
c. empty motor oil containers shall be bulked into a 250 L plastic or metal drum;
d. fluorescent bulbs shall be stored in a rigid container in a manner which prevents the breakage of bulbs during storage and transport.

42. The *Owner* shall ensure that *WEEE* is stored in accordance with the *OES-Approved Collection Site Guidebook: Organizing & Operating Waste Electrical and Electronic Equipment (WEEE), November 2012* or the most updated version of the Guidebook.

43. White goods received at the *Transfer Station*which contain refrigerants shall:

a. be stored in an upright position and in such a manner to allow for the safe handling and removal from the *Site*for removal of refrigerants as required by *Ontario Regulation 463/10;* and

b. have refrigerants removed by a licensed technician in accordance with *Ontario Regulation 463/10,* or as amended prior to be transferred form the *Site;* or

c. shall be transferred only to facilities where the refrigerants can removed by a licensed technician in accordance with *Ontario Regulation 463/10.*

44. The *Owner*shall ensure that all bins used for storing the organic waste underground shall contain organic waste only and shall be located in accordance with Site Layout, identified as Item 7 of Schedule "A".

Waste Disposal

45. The *Owner*shall ensure that all wastes at the *Transfer Station*are managed and disposed in accordance with *Regulation 347,*and the *EPA.*

46. Disposal of waste from the *Transfer Station*shall be to a licensed Waste Disposal Site.

Waste Inspections

47. All waste shall be inspected by *Trained personnel* prior to being accepted at the *Transfer Station* to ensure that the waste is of a type approved for acceptance under this Approval.

48. In the event that any waste load is refused, a record shall be made in the daily log book of the reason the waste was refused and the origin of the waste, if known.

49 The *Owner*shall conduct daily inspections of the equipment and facilities at the *Transfer Station*to ensure that they are maintained in good working condition at all times. Any deficiencies, which might negatively impact the environment, detected during these inspections shall be recorded in a log, and

promptly corrected.

50. A record of the inspections, including the following information, shall be kept in the weekly log book:

a. the name and signature of person that conducted the inspection;

b. the date and time of the inspection;
c. a list of any deficiencies discovered;
d. any recommendations for remedial action; and
e. the date, time and description of actions taken.

Incoming / Outgoing Waste

51. All incoming and outgoing wastes shall be inspected by trained personnel prior to being received, transferred and/or shipped to ensure wastes are being managed and disposed of in accordance with the *EPA* and *Reg. 347.*

Labelling

52. All waste storage containers at the *Transfer Station* shall have a label or sign clearly identifying the contents.

Vermin, etc .

53. The *Transfer Station* shall be operated and maintained such that vermin, vectors, dust, litter, odour and noise do not create a nuisance.

Design and Operations Report

54. The Design and Operations Report shall consists of the details and specifications outlined in Item 5 of Schedule "A", and it shall be retained, kept up to date through periodic revisions, and made available for inspection by *Ministry* staff. Changes to the Design and Operations Report shall be submitted to the *Director* for approval .

Nuisance Control

55. The *Owner*shall ensure that the *Transfer Station*is operated in a safe and secure manner which minimizes the impacts of dust, odour, noise and litter on the general public, site personnel, and the natural environment.

56. The organics collection program shall be operated and maintained in such a manner that does not pose a danger or health risk to the environment or public.

Complaints

57. If at any time, the *Owner*receives complaints regarding the operation of the Site, the *Owner* shall respond to these complaints according to the following procedure:

(a) The *Owner* shall record and number each complaint, either electronically or in a log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

(b) The *Owner* , upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions

to eliminate the cause of the complaint and forward a formal reply to the complainant;

(c) The *Owner* shall complete and retain on-site a report written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

58. Within seven (7) days of receiving a complaint, the *Owner* shall contact the *District Manager,* notifying him of the nature of the complaint and provide him with a written description of the complaint and the actions taken to address the concern(s).

Emergency Response

59. (a) The Owner shall prepare an updated copy of the Transfer Station Safety and Emergency Response Procedures , Item 5 of Schedule A and the Municipality of Trent Lakes Emergency Management Program (By-law B2016-138 dated December 20, 2016) shall be kept on the *Site* at all times, in a central location available to all staff and for inspection by *a Provincial Officer*.

(b) The *Owner*shall review the Transfer Station Safety and Emergency Response Plan on

an annual basis, at a minimum, and update the document as required.

(c) Within three (3) days of any amendment to the Emergency Response Plan, the *Owner* shall notify, in writing, the *District Manager* and the local Fire Department.

60. In addition, the *Owner* shall submit to the *District Manager* a written report within three (3) business days of the emergency situation, outlining the nature of the incident, remedial measures taken, handling of waste generated as a result of the emergency situation and the measures taken to prevent future occurrences at the Site.

61. The *Owner* shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operation at this *Transfer Station,* including the operation of the organic collection system. All spills, as defined in the *EPA,* shall be immediately reported to the *Ministry's* Spills Action Centre at 416-325-3000 or 1-800-268-6060.

62. All wastes resulting from an emergency, spill or process upset shall be managed and disposed of in accordance with O.Reg. 347.

63. All equipment and materials required to handle emergency situations shall be:

(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the Site; and

(b) be adequately maintained and kept in good repair.

64. The *Owner* shall ensure that the emergency response personnel are familiar with the use of such equipment and its location(s).

Training Plan

65. A training plan shall be developed and maintained for all employees that operate the *Transfer*

Station . Only *Trained personnel* may operate the *Transfer Station* or carry out any activity required under this *Approval* .

66. The *Owner* shall ensure that *Trained personnel* are available at all times during the hours of operation of this *Transfer Station* . *Trained personnel* shall supervise all transfer or processing of waste material at *the Transfer Station* **.**

67. The *Owner* shall ensure that all operating personnel are trained in the following at a minimum:

a. an outline of the responsibilities of the *Site*personnel;

b. terms, conditions and operating requirements of this *Approval;*

c. receiving and recording procedures (including recording procedures of wastes which are refused at the *Site);*

d. storage, handling, sorting and shipping procedures;

e. operation of equipment, equipment inspection and maintenance procedures and procedures to be followed in the event of equipment malfunction / process upset;

f. housekeeping and nuisance control procedures;

g. *Site* inspection procedures;

h. occupational health and safety concerns pertaining to the wastes received and handled;

i. procedures for recording and responding to public complaints;

j. procedures to be followed in the event of a spill, fire, medical or other emergency.

Closure - Transfer Station

68. The *Owner*must submit, in writing to the *Director,* a notice stating the *Owner's*intent to close the *Transfer Station*one (1) month prior to the closure of the *Transfer Station.*This notice must include an updated description of the work that will be done to facilitate closure and cleanup of the *Transfer Station* and a schedule for completion of the work.

69. Within ten (10) days after closure of the *Transfer Station,*the *Owner*must notify the *Director,*in writing, that the facility has been closed in accordance with the approved Closure Plan.

PART 4 - DOCUMENTATION

Record Keeping

Log Book

70. A log shall be maintained, either in written format, and shall include the following information as a minimum:

a. the date;
b. quantity and source of waste received;

c. quantity of waste at the *Transfer Station* at the end of the operating week;
d. quantities and destination of each type of waste shipped from the *Transfer Station;*
e. a record of any spills or process upsets at the site, the nature of the spill or process upset and the action taken for the clean up or correction of the spill, the time and date of the spill or process upset, and for spills, the time that the *Ministry* and other persons were notified of the spill in fulfilment of the reporting requirements in the *EPA;and*
f. a record of any waste refusals which shall include; amounts, reasons for refusal and actions taken.

71. The *Owner* shall maintain on-site a written record of daily inspections of the *Transfer Station.* This record shall be in the form of a Transfer Station Inspection daily log(s) and shall include as a minimum:
a. date and time of inspection;

b. name, title and signature of trained personnel supervising the inspection;

c. a listing of all equipment, fencing, gates, etc. inspected and any deficiencies observed;

d. any maintenance conducted as a result of these inspections;

e. recommendations for remedial action and date remedial action, if necessary, was completed;

f. date and time of any complaints received at the *Site* and their nature; and

g. date and time of any environmentally significant incidents.

72. The *Owner*shall maintain a daily written record of the waste received at the *Transfer Station,*and the waste transferred from the *Transfer Station.*This record shall be in the form of a daily log(s) and shall include as a minimum the date, quantity and source of waste received and date, quantity and the destination of material removed/transferred from the *Site.*

73. The *Owner*shall maintain a daily written record of the *recyclable material*received at the *Transfer Station,*and the *recyclable material*transferred from the *Transfer Station.*This record shall be in the form of a daily log(s) and shall include as a minimum the date, quantity and source of *recyclable material* received and date, quantity and the destination of *recyclable material* removed/transferred from the *Site.*

74. The *Owner*shall maintain a written record of the *MHSW*received at the *Transfer Station,*and transferred from the *Transfer Station.*This record shall be in the form of daily log(s) and shall include as a minimum date, waste class, quantity, and source of *MHSW,*date, quantity, waste class and the destination of *MHSW* transferred from the *Site.*

75. For white goods which contain refrigerants, the *Owner* shall record the following additional information:

a. date of the record;

b. types, quantities and source of white goods which contain refrigerants received;

c. destination of the white goods; or

d. the details on removal of refrigerants, if conducted on *Site,*and the quantities and destination of the refrigerants transferred from the *Site.*

76. With respect to the organics collection, the *Owner*shall retain a record of the following information:

a. date the containers are emptied;

b. approximate volume transferred to the collection truck per load; and

c. a record of any spills that occur during emptying and a description outlining any remediation measures that were implemented.

77. The *Owner* shall record the details of any spills or upsets that occur at the *Site,*including, but not limited to, the following:

a. the date;

b. the nature of the spill or upset; and

c. the action taken for clean-up, correction and prevention of future occurrences.

Design and Operations Manual

78. The *Owner* shall have in place a Site Operation and Maintenance Manual outlining the *Site* operating procedures, as permitted by this *Approval* and defined by Condition 24. This manual shall include, but not be limited to:

a. incoming waste inspection procedures, including the follow-up on unacceptable waste delivered to the *Site;* and

b. *Site* operation and maintenance procedures, as described in the supporting documentation listed in Schedule "A" or as required by conditions of this *Approval;*

c. schedule for inspections at the *Site,* including outdoor storage facilities;

d. waste and recyclable materials handling and storage procedures;

e. *Site* clean-up schedule and proposed clean-up activities; and

f. contingency plans outlining a set of procedures to follow in the event of an operational disruption.

79. a. The *Owner* shall review the Site Operations and Maintenance Manual on an annual basis, at a minimum to ensure that it reflects current practices, and update it as necessary; and

b. Applications to amend this *Approval* shall include submission of the most current version of the Site Operation and Maintenance Manual.

PART 5 - REPORTING REQUIREMENT

Annual Report - Landfill Site

80. By March 31st of each year, the *Owner*shall submit an annual report to the *District Manager* concerning the status of the *Landfill Site*during the preceding calendar year. The annual report shall include the following:

a. the results, and an interpretive analysis of the results, of the surface water, groundwater and landfill gas monitoring;

b. a summary of the inspections of the *Landfill Site* undertaken;

c. recommendations respecting any proposed changes to the groundwater or landfill gas monitoring programs;

d. recommendations on the requirements for any remedial work or contingency activities based on the

monitoring results;

e. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903– R.R.O. 1990, Wells, amended to Ontario Regulation 128/03, made under the *OWRA;* and

f. any other information with respect to the *Site* which the *District Manager* may require from time to time.

81. In the event that the results of the monitoring program are such that an off-site exceedance of *Guideline B-7 – Incorporation of the Reasonable Use Concept Into MOEE Groundwater Management Activities (MOE, 1994),* or background groundwater chemistry for the *Site,* can reasonably be predicted to occur, the *Owner* shall include in the annual report:

a. the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;

b. a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;

c. a discussion of the modifications, if any, which should be made to the monitoring program; and

d. a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts.

Annual Report - Transfer Station

82. By March 31st of each year, the *Owner*shall submit to the *District Manager,* an annual report that reports on the previous calendar year, which shall include, but not be limited to, the following:

a. a monthly balance of waste received and transferred from the *Transfer Station;*

b. a summary of any rejected wastes;

c. a summary of any incidents;

d. a summary of complaints received;

e. any changes to the Site Operations and Maintenance Manual and/or the Transfer Station Safety and Emergency Response (Contingency) Plans since the last annual report;

f. any changes to the Design and Operations Report that have been approved by the *Director* since the last Annual Report*;*

g. a statement as to compliance with all conditions of this *Approval,* a description of any operational changes and/or *Transfer Station* improvements undertaken and all other operational issues; and

h. any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the *Site* and during the facility inspections and any mitigative actions taken.

Schedule "A"
This Schedule "A" forms part of this Environmental Compliance Approval

1. Application for a Environmental Compliance Approval for a Waste Disposal Site dated September 28, 2006 and supporting document prepared by Totten Sims Hubicki Associates.

2. Correspondance from Chris Visser, Totten Sims Hubicki Associates, dated January 26, 2007 to Jim Martherus, Senior Environmental Officer, Peterborough District Office, MOE, regarding additional surface water quality monitoring.

3. Electronic mail to Chris Visser, Totten Sims Hubicki Associates, dated March 20, 2007 from Khaled Mamun, P. Eng., MOE, regarding request for additional information.

4. Electronic mail to Khaled Mamun, P. Eng., MOE dated March 22, 2007 from Chris Visser, Totten Sims Hubicki Associates regarding the submission of additional information.

5. Environmental Compliance Approval application, signed by Lois O-Neill-Jackson, CAO/ Economic Development Officer, Municipality of Trent Lakes, dated May 10, 2016, and includes the Design & Operations Report and supporting documentation.

6. Correspondence from David Bucholtz, Cambium Inc., to MOECC, dated May 10, 2016, re: description of proposed changes sought under the application to amend ECA No. A341301 including the Existing Site Conditions and Figure 2- Proposed Site Layout, dated April and May 2016, respectively.

7. Email correspondence from David Bucholtz, Cambium Inc., to MOECC, with updated Figure 2- Proposed Site Layout, dated September 2017.

Schedule "B"
This Schedule "B" forms part of Environmental Compliance Approval

Groundwater Monitoring

PARAMETER	**FREQUENCY**	**LOCATIONS**	**PARAMETERS**
Ground Water Levels	**Twice per year** (April/May and October/ November)	OW9, OW12-I, OW12-II, OW14-1, OW14-II, OW16, OW17-I, OW17-III, OW18-I, OW19-I, OW19-II, OW20, OW21, DP1, DP2, DP3, DP4 PW1, PW2, and PW3	Water Level, Well Conditions Form
Ground Water Quality	**Twice per year** (April/May and October/ November)	OW9, OW12-I*, OW12-II*, OW14-1*, OW14-II*, OW16, OW17-I, OW17-III, OW18-I, DP1, DP2, DP3, DP4, OW19-I, OW19-II, OW20, OW21, PW1, PW2, and PW3	Spring: Lab: **Column 1**, Sched. 5, Reg.232/98, Hardness, VOC's Field: Temp., pH, Cond., D.O., ORP
			Fall: Lab: **Column 2**, Sched. 5, Reg.232/98, Hardness Field: Temp., pH, Cond., D.O.,

			ORP

Notes:
1. * Alternate between sampling events OW12 in spring, OW14 in fall
2. Complete well conditions form

Schedule "C"
This Schedule "C" forms part of Environmental Compliance Approval

Surface Water Monitoring

PARAMETER	FREQUENCY	LOCATIONS	PARAMETERS
Surface Water Flow Rates	Twice per year (April/May and October/ November)	SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8, SW9, SW10, SW11	Manual/Electronic Flows
Surface Water Quality	Twice per year (April/May and October/ November)	SW1, SW2, SW3, SW4, SW5, SW6, SW7, SW8, SW9, SW10, SW11	**Spring:** Lab: **Column 3**, Sched. 5, Reg.232/98, Hardness Field: Temp., pH, Cond., D.O., ORP
			Fall: Lab: **Column 4**, Sched. 5, Reg.232/98, Hardness Field: Temp., pH, Cond., D.O., ORP

The reasons for the imposition of these terms and conditions are as follows:

The reason for Condition 1 is to clarify that the previously issued Approval No. A341301 issued on February 24, 1992 *and subsequent Notices of Amendment issued* on May 19, 1999, April 18, 2007, September 25, 2007 and December 8, 2009 *are no longer in effect and has been replaced and superseded by the Terms and Conditions stated in this Approval.*

The reason for Condition 2 is required because Section 46 of the EPA prohibits any use being made of the lands after they cease to be used for waste disposal purposes within a period of twenty-five years from the year in which such land ceased to be used, unless the approval of the Minister for the proposed use has been given. The purpose of this prohibition is to protect future occupants of the land and the environment from any hazards which might occur as a result of waste being disposed of on the site. This prohibition and potential hazard should be drawn to the attention of future owners and occupants by the Approval being registered on title.

The reason for Conditions 3,4,5,6 and 12 is to clarify the legal rights and responsibilities of the Owner.

The reason for Condition 7 is to ensure that the appropriate Ministry staff have ready

access to information and the operations of the Landfill Site and Transfer Station which are permitted under this Approval. Condition 7 is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA, the OWRA, and the PA, as amended.

The reason for Condition 8 is to clarify how to interpret this Approval in relation to the application and supporting documentation submitted by the Owner.

The reason for Condition 9 is to ensure that information submitted is attributed to the correct Approval.

The reason for Condition 10 to ensure that the Site is operated under the corporate name which appears on the application form submitted for this Approval.

The reason for Condition 11 is to ensure that subsequent owners of the Site are informed of the terms and conditions of this Approval. This also applies to all supporting documentation listed in Schedule "A".

The reason for Condition 13 is to ensure the availability of records and drawings for inspection and information purposes.

The reason for Condition 14 is to ensure that the Site is secure when unattended to prevent vandalism or theft.

The reasons for Condition 15 is to ensure the Owner closes the Landfill Site in accordance with the submitted information in Schedule "A". This is to ensure the long-term health and safety of the public and the environment.

The reason for Conditions 16 is to ensure that landfilling of waste at the Site is discontinued.

The reason for Condition 17 is to ensure the Owner installs the environmental monitoring wells and conducts environmental monitoring at the Landfill Site in accordance with the Ministry's recommendations. This is to ensure the long-term health and safety of the public and the environment.

The reasons for Conditions 18 and 19 is to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken. Also, Condition 18 will provide a mechanism to permit changes to the monitoring program.

The reason for Condition 20 is to ensure that the Transfer Site is operated in accordance with the application and supporting documentation submitted by the Company, and not in a manner which the Director has not been asked to consider.

The reason for Condition 21, 22 and 23 is to specify the hours of operation for the Transfer Station and to provide a mechanism for amendment of the hours of operation, as required.

The reason for Condition 24 is to ensure proper security of the Site is maintained.

The reasons for Condition 25 is to specify the service area for which the Approval applies.

The reasons for Condition 26 is to ensure proper signage is placed at the Site.

The reason for Conditions 27 through to 31 and 36 is to ensure that the types and amounts of waste received at the Transfer Station are in accordance with that considered by the Director.

The reasons for Conditions 32, 37 and 51 is to ensure the Transfer Station only accepts waste it was approved for and that the waste accepted is first inspected before acceptance.

The reason for Conditions 33, 34, 35, 38 through to 44 are included to ensure that waste storage is done in a manner and duration which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Conditions 45 and 46 ensure that an approved end disposal site is available for the waste stored at the Transfer Station.

The reason for Conditions 47, 48, 49 and 50 is to ensure that routine Transfer Station inspections are completed, and that detailed records of Transfer Station inspections are recorded and maintained for inspection and information purposes.

The reason for Condition 52 is to ensure waste containers are properly labelled at the Site for clarity of its content.

The reason for Condition 54 is to ensure that an up-to-date Design and Operations Report is maintained on-site at all times.

The reason for Conditions 53, 55 and 56 is to ensure that the Transfer Station is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Conditions 57 and 58 is to ensure that any complaints regarding landfill operations at

this Site are responded to in a timely and efficient manner.

The reason for Conditions 59, 60, 61, 62, 63 and 64 are included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.

The reason for Conditions 65, 66 and 67 is to ensure that the Owner's staff are properly trained in the operation of the equipment used at the Site ad emergency response procedures.
The reason for Conditions 68 and 69 is to ensure that the Transfer Station is closed in accordance with the Ministry standards and to protect the health and safety of the public and the environment.

The reason for Conditions 70 through to 77 is to ensure that accurate records are maintained to ensure compliance with the conditions in this Approval, the EPA and its regulations.

The reason for Conditions 78 and 79 is to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner so that it does not result in a hazard or nuisance to the natural environment or any person.

The reason for Conditions 80, 81, and 82 is to ensure that the Site is operated and operating as approved.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A341301 issued on February 24, 1992

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

a. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
b. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by

this environmental compliance approval.

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The environmental compliance approval number;
4. The date of the environmental compliance approval;
5. The name of the Director, and;
6. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or** www.ert.gov.on.ca

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 2nd day of October, 2017

Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of
the *Environmental Protection Act*

CJ/
c: District Manager, MOECC Peterborough
Dave Bucholtz, Cambium Inc.

Ontario

Ministry of the Environment **Ministère de l'Environnement**

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A710166
Notice No. 1

County of Peterborough
470 Water Street
Peterborough, Ontario
K9H 3M3

Site Location: Part of Lot 11, Concession 6
Township of Galway-Cavendish & Harvey,
County Of Peterborough

You are hereby notified that I have amended Provisional Certificate of Approval No. A710166 issued on May 19, 1999 for the use and operation of a transfer site to collect household hazardous waste, as follows:

1. Condition 1 b) is hereby revoked and replaced with the following:

1. b) "Director" means a Director, Section 39, Environmental Protection Act;

2. Condition 13 f) viii is hereby revoked and replaced with the following:

13 f) viii. The hours of the Household Hazardous Waste depot shall conform to the hours stated in the Provisional Certificate of Approval No. A341301 of the landfill where it is located. If any further amendments to the hours of the Household Hazardous Waste depot are required, the Municipality shall notify the District Manager and receive written approval of the District Manager prior to commencing operations.

3. The Provisional Certificate of Approval No. A710166 is amended to include waste class 212 listed in the following document which is hereby added to Schedule "A".

The Application dated April 20, 2000 to amend the Certificate of Approval for a Waste Disposal Site (Transfer) and the supporting documentation submitted therewith.

The reason(s) for this amendment to the Certificate of Approval is (are) as follows:

1. The reason for Amendment 1 is to clarify the current structuring of the Ministry.

2. The reason for Amendment 2 is to alter the hours of the Household Hazardous Waste depot to conform to the hours of the landfill where the depot is located.

3. The reason for Amendment 3 is to update Schedule "A" of the Certificate to ensure the site is operated in accordance with the application and supporting information and not in any manner which the Director has not been asked to consider.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No.A710166 dated May 19, 1999.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Appeal Board within 15 days after receipt of this Notice, require a hearing by the Board. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Appeal Board
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Appeal Board's requirements for an appeal can be obtained directly from the Board at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 17th day of May, 2000

Dave Staseff, P.Eng.
Director
Section 39, *Environmental Protection Act*

SG/
c: District Manager, MOE Peterborough
Bill Pickard, County of Peterborough

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A710166
Notice No. 2
Issue Date: January 19, 2011

The Corporation of the Township of Galway-Cavendish-Harvey
701 County Road 36
Post Office Box, No. 820
Bobcaygeon, Ontario
K0M 1A0

Site Location: Part of Lot 11, Concession 6
Peterborough City, County of Peterborough

You are hereby notified that I have amended Provisional Certificate of Approval No. A710166 issued on May 19, 1999 and amended on May 17, 2000 for the use and operation of a transfer site to collect household hazardous waste, as follows:

I. This Certificate has been amended to add certain waste classes for collection and transfer, add to the list of materials for reuse, establish and operate a WEEE collection area and approve the addition of a solar-powered fibre compactor unit.

II. The following Definitions are hereby added:

"**waste electrical and electronic equipment (WEEE)**" means devices listed in Schedules 1 through 7 of *Ontario Regulation 393/04.*

"Township" means the Corporation of the Township of Galway-Cavendish-Harvey.

III. The following Conditions are hereby revoked and replaced with:

13. (a) The MHSW Depot shall only accept waste for bulking and temporary storage pending transfer to an approved carrier for disposal elsewhere, the following household hazardous wastes: Waste Class Nos. 112, 121, 122, 145, 146, 147, 148, 212, 213, 221, 242, 252, 261, 263, 312 and 331 as described in the Ministry document "New Ontario Waste Classes" dated January, 1986.

(f) The hours of operation of this Site will fall within the hours of operation of the Buckhorn Transfer Station. The hours of operation may be temporarily changed as necessary with the written consent of the District Manager.

16. Waste shall not be stored at the Site for longer than one-hundred eighty (180) days unless written consent of the District Manager is obtained.

IV. The following Conditions are hereby added:

22. Only waste from households within the County of Peterborough shall be accepted at the MHSW Depot.

23. In this Notice, the term "waste generators" means those waste generators identified in Condition 22 above.

24. (a) The MHSW Depot shall be operated and maintained in accordance with the plans and specifications contained in the documents listed in this Certificate, including Items 5, 6 and 7 in Schedule "A", subject to the Conditions of this Certificate.

(b) Incidental waste which does not conform to Condition 24(a) above shall either be:

(i) returned to the generator; or
(ii) in the absence of a known generator, characterized and managed in accordance with Ontario Regulation 347.

(c) A detailed record shall be made of any incidental waste discovered at the Facilities, including but not limited to:

(i) the date;
(ii) the type of waste;
(ii) the amount of waste;
(iii) the condition of the container; and
(iv) how the waste was managed.

(d) All biomedical waste (waste class 312) received at the Site shall be managed in accordance with the Operator's "Operations Manual for Handling and Storage of Biohazard Sharps or Needles" prepared in accordance with the Ministry document entitled "Guideline C-4: The Management of Biomedical Waste in Ontario" dated November 2009, as amended. This waste shall be limited to waste generated by residents of the County of Peterborough from households only.

25. Waste received at the MHSW Depot shall be stored in accordance with the "County of Peterborough Municipal Hazardous or Special Waste (MHSW) Facility Operations Manual update 28 May, 2010", submitted under Items 5 and 6 of Schedule "A" in such a manner that:

(a) all liquid wastes shall be stored in secondary containment that meets the requirements of the Ministry document entitled "Guidelines for Environmental Protection Measures at Chemical and Waste Storage Facilities" dated May 2007, as amended;
(b) containers and/or storage areas containing flammable and/or ignitable materials shall be adequately grounded;
(c) storage containers shall be clearly labelled indicating the type and nature of the hazardous waste stored as required by applicable legislation;
(d) incompatible waste types shall be segregated during storage;
(e) all waste being transported from the MHSW Depot shall be transported in accordance with Ontario Regulation 347 and the Environmental Protection Act.

26. The Operator shall not offer household hazardous waste for reuse unless:

(a) the waste is in its original packaging, and the label on the package is legible;

(b) the waste has been inspected by trained personnel to ensure the waste meets the requirements for reuse for that specific waste type; and

(c) the waste is one of the following:

(i) household cleaners, wheel and tire cleaners, other than bleach or ammonia;
(ii) varsol, turpentine, thinners, linseed oil;
(iii) polishes and waxes;
(iv) adhesives (tile and wood), glue (contact cement);
(v) caulking, grout, mortar (cement), drywall compound;
(vi) citronella (liquid or wax), lamp oil;
(vii) aerosols (hairspray, air fresheners, cleaners);
(viii) motor oil (auto marine, lawnmower), provided the original container has never been opened;
(ix) antifreeze, provided the original container has never been opened;
(x) barbeque starting fluid, windshield washer fluid and CLR
(xi) other items as determined by the Operator provided they comply with the conditions of this Certificate.
(xi) waste paint, subject to the requirements of Condition 27 below;

27. The Operator shall only offer waste paint for reuse provided that the following conditions are met:

(a) the waste paint is contained in the original manufacturer's container;

(b) the original manufacturer's label containing product information use and product hazards is clearly legible;
(c) the original manufacturer's container is in an undamaged state such that the material may be transported without risk of leaks or spills; and
(d) the Operator does not suspect the paint to have been manufactured prior to 1972.

28. The Operator shall only accept hazardous waste under the following restrictions:

(a) no waste shall be received from waste generators where the generator's activities include waste management;
(b) the Operator may only receive up to 60 kg of hazardous waste per visit;
(c) the Operator may only receive up to a maximum of 300 litres of liquid industrial waste per visit;
(d) no hazardous waste shall be received in containers greater than 25 litres in size;
(e) no liquid industrial waste shall be received in containers greater than 25 litres in size;
(f) all containers shall be closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of waste;
(g) no broken or leaking containers, or containers otherwise unsuitable for the type of waste they contain, shall be accepted at the MHSW Depot;

29. An area for the acceptance, storage and preparation for transport for recycling, of waste electrical and electronic equipment (WEEE), and subsequent transfer of such wastes by an approved carrier for disposal elsewhere shall be operated in accordance with the following:

(a) the materials shall be stored: in a roll-off bin (covered), a trailer or other suitable shelter; in an orderly fashion, to avoid breakage (broken materials shall be placed in containers), such that WEEE is sheltered from rain and snow, and as provided under the contractual agreement with the MOE approved program plan administrators.
(b) maximum storage volume is 40 cubic yards;
(c) the Site Plan submitted annually shall show the location of the storage area;
(d) a log shall be kept of the firm used for the transportation and the destination where the waste will be consolidated for recycling, re-use, refurbishment or disposal as per the WEEE Program Plan and in accordance with the Conditions of this Certificate.

30. A solar-powered fibre compactor unit described in Items 5 and 6 of Schedule "A" shall be operated at the Site in such a manner that dust, litter, odour, noise and traffic do not create a nuisance. The Operator shall implement the nuisance control measures listed in Items 5 and 6 of Schedule "A" as required to ensure compliance.

V. The following Items are hereby added to Schedule "A":

5. Application for a Provisional Certificate of Approval for a Waste Disposal Site dated June14, 2010, signed by Pat Kemp, Chief Administrative Officer, The Corporation of the Township of Galway-Cavendish-Harvey**,** including all documents attached to this application.

6. E-mail dated June 18, 2010, including all attachments to the e-mail, from Laurie Westaway, County of Peterborough (Project Technical Information Contact) to Nihar Bhatt, Ontario Ministry of the Environment, providing electronic copies of the appendices to the Operations Manual for the Site.

7. Report "Buckhorn Landfill Site - Closure Plan and Transfer Station Application", dated June 2008, prepared by TSH Engineers Architects Planners.

The reasons for this amendment to the Certificate of Approval is are as follows:

1. The reason for Conditions 22 and 23 is to define the generators from which waste will be accepted.

2. The reason for Conditions 13 (a), 24 and 28 is to ensure that only acceptable waste is received at the MHSW Depot, and to ensure all waste received is handled in an appropriate manner.

3. The reason for Conditions 25 is to ensure that all waste is handled in an appropriate manner, and that any spills are handled in an appropriate manner.

4. The reason for Conditions 26 and 27 is to allow the Operator to distribute certain wastes for reuse subject to restrictions.

5. The reason for Condition 29 is to ensure that waste electrical and electronic equipment (WEEE) is stored, transported and disposed of in an environmentally acceptable manner.

6. The reason for Condition 30 is to ensure that the Site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A710166 dated on May 19, 1999, as amended.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, 15th Floor
Toronto, Ontario
M5G 1E5

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act.

DATED AT TORONTO this 19th day of January, 2011

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

AT/
c: District Manager, MOE Peterborough
Laurie Westaway, County of Peterborough

Appendix B
Correspondence

Ontario

Ministry of the Environment, Conservation and Parks
Ministère de l'Environnement, de la Protection de la nature et des Parcs

Non-Hazardous WasteTransfer Processing Inspection Report

Client:	The Corporation of the Municipality of Trent Lakes Mailing Address: Post Office Box, 820, Bobcaygeon, Ontario, Canada, K0M 1A0 Physical Address: 760 County Road 36 N, Trent Lakes, Municipality, County of Peterborough, Ontario, Canada, K0M 1A0 Telephone: (705)738-3800, Extension: 228, email: dteggart@trentlakes.ca Client #: 2145-4SVP3B, Client Type: Municipal Government, NAICS: 913910		
Inspection Site Address:	Buckhorn Waste Transfer Station Address: 37 Dump Rd, Trent Lakes, Municipality, County of Peterborough District Office: Peterborough Site #: 2748-BLJTT3		
Contact Name:	Suzanne Lean	**Title:**	Waste Coordinator
Contact Telephone:	(705)738-3800 **ext**226	**Contact Fax:**	
Last Inspection Date:	2017/12/15		
Inspection Start Date:	2020/03/04	**Inspection Finish Date:**	2020/03/04
Region:	Eastern		

1.0 INTRODUCTION

The Corporation of the Municipality of Trent Lakes (herein referred to as "the Municipality") owns and operates the Buckhorn Closed Waste Disposal Site/Waste Transfer Station. The facility is located at 37 Dump Road, Municipality of Trent Lakes, east of the Village of Buckhorn (herein referred to as "the Site"). A privately-owned quarry is located to the north/northwest of the Site.

The purpose of this inspection was to determine if the waste transfer facility at the Site was being operated in accordance with the requirements of Environmental Compliance Approval Number A341301, the *Environmental Protection Act* , *Ontario Regulation 347* , and other relevant legislation under this ministry's mandate.

Provisional Certificate of Approval for a Waste Disposal Site Number A341301 was originally issued to the Township of Harvey on June 16, 1971. The Certificate has since been amended on a number of occasions, with the most recent amendment issued on October 2, 2017.

Note that by amendment to the *Environmental Protection Act* , as of October 31, 2011, CofA's are now known as Environmental Compliance Approvals (ECAs). For the purpose of this inspection report, Environmental Compliance Approval Number A341301 will be referred to as "the ECA."

Landfilling activities (approved under ECA # A341301) ceased at the Site in 2008, with final closure being completed in 2009; the Site has been operated as a waste transfer station since that time. As part of waste transfer operations at the Site, the ECA also authorizes the collection/transfer of Municipal Hazardous and/or Special Wastes. This inspection was limited to a review of the collection/storage/transfer of solid non-hazardous wastes at the Site.

At the time of inspection, the transfer station was open to the public.

During the Site inspection, ministry staff were accompanied by Mr. Dave Potter (Site Operator), Mr. Ivan Coumbs (Public Works Superintendent) and Mr. Bill Boath (Foreperson) of the Municipality of Trent Lakes. Additional assistance related to administrative requirements set in the ECA was provided by Ms. Suzanne Lean (Waste Coordinator, Municipality of Trent Lakes) at the Municipal office.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s): ● Yes ○ No
C of A Number(s): A341301

2.1 SITE OPERATION:

Specifics:

Records and/or environmental monitoring data required under the ECA are retained by the Municipality for a minimum of 2 years. **This addresses the requirements of Condition 13 of the ECA.**

At the time of inspection, it was noted that there was a slight discrepancy between the approved site plan and the actual layout of waste and/or recyclable storage containers. The changes are as follows:

- the Municipal Hazardous and/or Special Wastes facility has been relocated as per Item Number 7 (Site Plan Figure 2) listed in Schedule "A" of the ECA; and
- all other waste containers, recyclable containers and waste storage areas are in place in accordance with Item Number 6 (Site Plan Figure 1) listed in Schedule "A" of the ECA.

The most current approved site plan should reflect the existing site layout; as it currently stands, the site layout is a combination of Site Plan Figure 1 and Site Plan Figure 2. This is a contravention of Condition 20 of the ECA, which stipulates the following:

Except as otherwise provided by these conditions, the Transfer Station shall be located, constructed, used, maintained, operated, inspected, reported and closed, and all facilities, equipment and fixtures shall be built and installed, in accordance with the Environmental Compliance Approval application dated May 10, 2016, and the supporting documentation, plans and specifications listed in Item 5 of Schedule "A".

Since this is a relatively minor change to the Site layout, with no evident associated environmental impacts, it is recommended that the Municipality submit the revised site plan to the ministry along with an application to amend the ECA at a time when other Site changes and/or ECA amendments are proposed.

A per Condition 21 of the ECA, hours of operation shall be any day of the week, during daylight hours. Current operating hours are as follows:

Winter Hours
Wednesday 8:00 a.m. - 4:30 p.m.
Saturday 8:00 a.m. - 4:30 p.m.
Sunday 12:00 p.m. - 5:00 p.m.

Summer Hours
Wednesday 8:00 a.m. - 4:30 p.m.
Thursday 8:00 a.m. - 4:30 p.m.
Saturday 8:00 a.m. - 4:30 p.m.
Sunday 12:00 p.m. - 8:00 p.m.

Please be reminded of the following provisions and requirements of Conditions 22 & 23 of the ECA:

- Hours of operation may be changed by the Owner at any time, provided that the hours are correctly posted at the *Site* gate, and that suitable public notice is given of any change.
- The *Owner* shall notify the *District Manager,* in writing, of any changes to the hours of operation.

It is understood that the Municipality most recently notified the District Manager of a change in Site operating hours pursuant to the requirements of Condition 23 of the ECA on 2019/3/25.

Site security has been established at the Site; the entrances are secured with lockable gates. **This satisfies the requirements of Condition 24 of the ECA.**

Signage has been established at the Site; **this addresses the requirements of Condition 26 of the ECA.**

Under Condition 27 of the ECA, municipal waste limited to solid non-hazardous residential, industrial, commercial, institutional, *construction and demolition waste,* WEEE, Source Separated Organics (SSO), and MHSW from the Municipality of Trent Lakes may be accepted at the Site. **Based upon inspection observations and information provided to ministry staff, the Site is being operated in accordance with this requirement.**

Under Condition 28 of the ECA, The Municipality shall accept new materials at the Site including hard plastics and limited MHSW such as refrigerant appliances, florescent light bulbs and compressed gas tanks. As part of Environment Day activities at the Site, hard plastics (car seats, helmets, etc.) and mattresses are collected and sent for recycling or disposal (where necessary).

Waste materials collected at the Site are removed by licenced waste hauler (North Kawartha Disposal, ECA # 6905-8ATJ8H) and disposed of at a licenced waste disposal site. Solid wastes are disposed of at the Peterborough County (Oton-1) Landfill Site (ECA # A341508). Construction/demolition wastes and bulk furniture is removed from the Site by North Kawartha Disposal and disposed of at Stoney Lake Road Waste Transfer Station (ECA # A340901). **This addresses the requirements of Conditions 29 and 46 of the ECA.**

Trained municipal staff (site attendant) inspects incoming waste at the Site to ensure that materials are acceptable for receipt. This practice was observed during the Site inspection. **This satisfies the requirements of Conditions 32, 37 and 47 of the ECA.**

All recycling bins, roll-off containers and segregated waste storage areas (example: scrap metal lay down area) are clearly marked showing the type of waste they are to contain. **This meets the requirements of Conditions 33, 38 and 52 of the ECA.**

Recycling Bins

Unsegregated Waste Disposal (40 m3 bins)

Municipal staff monitor the waste disposal areas on a daily basis to ensure that only materials authorized under the ECA are being disposed of in appropriate locations at the Site. Any unauthorized materials not identified during the inspection of incoming waste, or materials not placed in designated areas, are removed by Municipal staff. **This satisfies the requirements of Conditions 34, 35 and 39 of the ECA.**

During the inspection, ministry staff observed that waste materials/recyclables were stored within required designated areas:

- Non-segregated wastes were stored in designated bins located on the west side of the Site (as required under Condition 40(a) of the ECA);
- recyclable materials (fibres and mixed containers) were stored in designated bins at the Site (as required under Condition 40(b) of the ECA);
- construction and demolition waste, clean wood, bulky waste (furniture), tires, scrap metal and white goods were stored in designated areas at the Site (as required under Condition 40(c) of the ECA); and
- leaf and yard waste was stored in the designated area identified in the ECA.

A shipping containers is in place at the Site for the collection/storage of waste electrical and electronic

equipment. **This meets the requirements of Condition 42 of the ECA.**

White goods containing refrigerants are received at the Site. At the time of inspection, untagged white goods (containing refrigerant) were observed to be stored in an upright position within the 'metal' collection area at the Site. **This complies with the requirements of Condition 43(a) of the ECA.**

Refrigerants are removed from white goods collected at the Site by a licenced technician (John Fenn/Fenntech, ODP # 958506, expiry 10/21/2023). **This meets the requirements of Condition 43(b) of the ECA.**

In situations where the Site operator refuses an incoming waste load, a record is made in a log book. Such logs were observed at the Site during the inspection. Municipal staff employ a redirection procedure to try and ensure rejected waste loads are disposed of in accordance with the requirements of *Ontario Regulation 347* . **This meets the requirements of Condition 48 of the ECA.**

Municipal staff conduct daily inspections of the Site to ensure facilities are in satisfactory working condition. **This meets the requirements of Condition 49 of the ECA.** Records related to the Site inspections are retained as per the requirements of Condition 50 of the ECA.

The Site is operated and maintained in a manner to minimize impacts related to vermin, vectors, dust, litter, odour and/or noise. At the time of inspection, the Site appeared to be in good condition. Calcium is applied at the Site by the Municipal Works Department on an as-needed basis to control dust. A litter collection program has been implemented at the Site. **This satisfies the requirements of Conditions 53 and 55 of the ECA.**

The Municipality has not received any environmental complaints related to the use/operation of the Site; therefore, records of environmental complaints have not been created. The Municipality is aware of the environmental complaint recording/reporting requirements set in Conditions 57 and 58 of the ECA.

The Municipality has prepared a Transfer Station Safety and Emergency Response Procedures document. A copy of the procedures is available for inspection in the attendant's office at the Site. **This meets the requirements of Condition 59(a) of the ECA.**

The Transfer Station Safety and Emergency Response Procedures document is reviewed on an annual basis by the Municipality (last review 2019/1/30). **This satisfies the requirements of Condition 59(b) of the ECA.**

Since the last inspection by ministry staff, there has been one environmental emergency (spills, fires, etc.) at the Site. A fire occurred in a waste bin at the Site on 2019/11/10. The matter was dealt with by Trent Lakes Fire Department, the Site operator and a contractor to minimize environmental impacts. The Municipality is required to take measures to ensure compliance with the environmental emergency reporting/recording requirements set in Conditions 60, 61 and 77 of the ECA.

The Municipality has developed and implemented a training plan for staff that operate the transfer station at the Site. Ministry staff were informed that only trained staff operate the transfer station. **This meets the requirements of Condition 65 of the ECA.**

Staff training records are outlined in annual reports submitted for the Site. Based upon information submitted to the ministry, staff have receiving training in the majority of the requirements set in Condition 67 of the ECA. It is asked that the Municipality make the necessary arrangements to ensure the following training requirements set in Condition 67 of the ECA are met:

b. terms, conditions and operating requirements of this *Approval;*
j. procedures to be followed in the event of a spill, fire, medical or other emergency.

Logs related to the quantity of wastes received and shipped from the Site have been created/retained. **This meets the requirements of Condition 70 of the ECA.**

A written record of daily inspections is retained at the Site. **The content of these records address the requirements of Condition 71 of the ECA.**

Daily records of waste received at the Site, as well as records of waste transferred from the Site, are created and retained. **The content of these records addresses the requirements of Condition 72 of the ECA.**

Condition 73 of the ECA stipulates the following:

> *The Owner shall maintain a daily written record of the recyclable material received at the Transfer Station,and the recyclable material transferred from the Transfer Station. This record shall be in the form of a daily log(s) and shall include as a minimum the date, quantity and source of recyclable material received and date, quantity and the destination of recyclable material removed/transferred from the Site.*

Currently there is no record of the daily amount of recyclable material received at the Site.

Records of recyclable material transferred from the Site are retained by the Municipality and Peterborough County. **This complies with the requirements of Condition 73 of the ECA.**

Records related to white goods received and shipped from the Site are retained by the Municipality. **This addresses the requirements of Conditions 75(a), 75(b) and 75(c) of the ECA.** It is noted that once refrigerants have been removed from white goods by a licenced technician, the white goods are included in scrap metal shipped from the Site.

Records related to the removal of refrigerants from white goods at the Site are retained by the Municipality. **This meets the requirements of Condition 75(d) of the ECA.**

The Municipality retains records of spills/environmental emergencies that occur at the Site. These events are documented in Incident Records. **This complies with the requirements of Condition 77 of the ECA.**

A Site Operation and Maintenance Manual has been created for the Site. **The Manual addresses the requirements of Condition 78 of the ECA.** The Manual is reviewed on an annual basis, as required under Condition 79 of the ECA.

Annual reports for the Site are submitted to the ministry. **The content of the reports address the requirements of Condition 82 of the ECA.**

2.2 FINANCIAL ASSURANCE:

Specifics:

Not applicable.

2.3 SITE SERVICE AREA:

Specifics:

Condition 25 of the ECA stipulates that the Site is approved to receive waste generated within the Municipality of Trent Lakes. **The Municipality is operating the Site in accordance with this requirement.**

2.4 APPROVED SITE CAPACITY:

Specifics:

Condition 30 of the ECA stipulates the following:

> The *Transfer* Station shall receive up to 500 m^3 of waste and/or recyclables per day, of which a maximum of 20 m^3 may be *limited MHSW.*

Based upon information provided to the ministry, the limit of 500 cubic metres of waste and/or recyclables per day has not been exceeded at the Site.

Condition 31 of the ECA stipulates the following:

> *The total volumes of waste/materials stored at the Transfer Station* ***at any one time*** *shall not exceed:*

a)	*Municipal solid waste (disposable)*	*200 cubic metres*
b)	*Recyclable materials*	*200 cubic metres*
c)	*Furniture*	*400 cubic metres*
d)	*Metal*	*400 cubic metres*
e)	*Leaf & yard waste (i.e. wood & brush)*	*400 cubic metres*
f)	*Tires*	*200 cubic metres*
g)	*Appliances (white goods)*	*400 cubic metres*
h)	*Construction and Demolition Waste*	*400 cubic metres*
i)	*WEEE*	*30 cubic metres*
j)	*Hard plastics*	*60 cubic metres*
k)	*Source Separated Organic materials*	*10 cubic metres*
l)	*Limited MHSW*	*50 cubic metres*
m)	***Total waste/materials***	***2750 cubic metres***

Based upon information reported to the ministry and Site observations, the facility is being operated in accordance with the requirements of Condition 31 of the ECA. The maximum waste capacity at the Site is limited by the available storage containers and segregated waste storage areas (refer to the approved Site plan).

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

The previous inspection by ministry staff identified the following non-compliance issue:

- Daily written records of recyclables are not being logged as per condition 73 of the ECA. **This issue remains outstanding.**

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?

No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?

No

Specifics:

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:

Was there any indication of minor administrative non-compliance?
Yes

Specifics:

Daily written records of recyclables are not being recorded/retained as per Condition 73 of the ECA.

The Municipal Hazardous and/or Special Wastes facilities have been relocated at the Site without approval, which is a violation of Condition 20 of the ECA.

The waste bin fire which occurred at the Site on 2019/11/10 was not reported to the ministry as required under Condition 60 and 61 of the ECA.

5.0 ACTION(S) REQUIRED

1. By no later than May 29, 2020, The Corporation of the Municipality of Trent Lakes shall submit an action plan/schedule of implementation to the undersigned Provincial Officer identifying measures to be taken to comply with the requirements of Conditions 60 and 61 of Environmental Compliance Approval Number A341301.

2. By no later than May 29, 2020, The Corporation of the Municipality of Trent Lakes shall develop training curriculum to address the requirements of Conditions 67(b) and 67(j) of Environmental Compliance Approval Number A341301. By May 29, 2020, submit to the undersigned Provincial Officer a copy of the training curriculum.

3. By no later than June 5, 2020, The Corporation of the Municipality of Trent Lakes shall administer the training curriculum developed pursuant to Item #2 above to all employees that operate the transfer station.

4. By no later than June 12, 2020, The Corporation of the Municipality of Trent Lakes shall provide the undersigned Provincial Officer with records of training administered pursuant to the requirements of Item #3 above.

5. By no later than May 8, 2020, The Corporation of the Municipality of Trent Lakes shall develop and maintain a daily logbook to record recyclable materials received at the Site to address the requirements of Condition 73 of the ECA.

6.0 OTHER INSPECTION FINDINGS

At the time of inspection, there was no evidence of waste being deposited in or on the closed landfilling area located at the Site. **This meets the requirements of Condition 16 of the ECA.**

7.0 INCIDENT REPORT

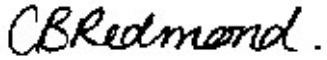
Applicable
8450-BMLJM6

8.0 ATTACHMENTS

PREPARED BY:
Environmental Officer:
Name: **Gary Muloin**
District Office: **Peterborough District Office**
Date: **2020/03/18**
Signature

REVIEWED BY:
District Supervisor:
Name: **Courtney Redmond**
District Office: **Peterborough District Office**
Date: **2020/03/27**

Signature:



File Storage Number: SI PB TL DU 660 - 37 DUMP ROAD, HARVEY

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

We want to hear from you. Please tell us about the quality of your interaction with our staff. You can provide feedback at 1-888-745-8888.

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Eastern Region
2nd Floor South Tower
300 Water St S
Peterborough ON K9J 8M5
Fax: (705) 755-4321
Tel:

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction régionale de l'Est
Bureau du district de Peterborough
Bureau du secteur de Peterborough
2e étage tour sud
300 rue Water S
Peterborough ON K9J 8M5
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Tél:

Ontario

July 15, 2020

The Corporation of the Municipality of Trent Lakes
Attn: Ms. Donna Teggart, CAO
760 County Road 36
Trent Lakes, ON K0M 1A0

Dear Ms. Teggart:

RE: Technical Support Section Comments - Surface Water
Buckhorn Closed Waste Disposal Site/Waste Transfer Station
Environmental Compliance Approval Number A341301
37 Dump Rd
Trent Lakes, County of Peterborough
Reference Number 4735-BP5JDJ

Staff from the ministry's Eastern Region Technical Support Section have completed a review of the 2019 Annual Monitoring Report for the Buckhorn Waste Disposal Site, produced by Cambium Inc., dated March 17, 2020. Ministry staff have reviewed this report from a surface water perspective and have provided several comments for your consideration. Please find attached for your review and information, a copy of technical support section comments, dated July 6, 2020.

You will note that based upon the above-noted review, ministry staff have agreed to the recommended changes to the surface water monitoring program at the site as proposed by Cambium Inc. in the letter to this office dated March 17, 2020 (accompanying the submission of the 2019 Annual Report) with the exception of the proposal removal of station SW6 (this shall remain part of the monitoring program at the site). Under Condition 18 of Environmental Compliance Approval Number A341301 (herein referred to as "the ECA), *the groundwater and surface water monitoring program, and the reporting scope and frequency may be amended from time-to-time with the written approval from the Director* . The Municipality therefore shall submit a completed application to amend the ECA to the ministry's Environmental Permissions Branch (135 St. Clair Avenue West, Toronto, Ontario, M4V 1P5) to have the monitoring changes formally approved by the ministry.

Should you have any questions or concerns regarding this matter, please do not hesitate to

contact me at (705)927-7811.
Yours truly,

Gary Muloin
Senior Environmental Officer
Peterborough District Office

File Storage Number: SI PB TL DU 610 - 37 DUMP ROAD, HARVEY
Ms. Stephanie Reeder, P.Geo., C.E.T., Cambium Inc., 52 Hunter Street East, Peterborough, ON K9H 1G5
Ms. Suzanne Lean, The Corporation of the Municipality of Trent Lakes

760 Peterborough County Road 36
Trent Lakes ON K0M 1AO
Telephone No. 705-738-3800
Fax 705-738-3801
www.trentlakes.ca

April 15, 2020

Ministry of the Environment, Conservation and Parks
Eastern Region
Peterborough District Office
300 Water Street, 2nd Floor South Tower
Peterborough, ON. K9J 8M5

Attention: Gary Muloin, Provincial Officer

Re: Buckhorn Waste Transfer Station – Extension Request
Environmental Compliance Approval Number A341301
Address: 37 Dump Road, Municipality of Trent Lakes, County of Peterborough

Dear Sir:

Given the current pandemic and physical distancing, the Municipality is requesting an extension to respond to the action items identified in the Non-Hazardous Waste Transfer Processing Inspection Report. In order to allow the municipality additional time to prepare the requested response, we respectfully request an extension to September 8, 2020.

Specifically, to allow time to implement action items 1, 2, 3 and 4. Action item 5 will be implemented by May 1, 2020 with a revision to the Daily Record of Incoming Waste Form. This form revision will allow transfer station employees to record recyclable materials received daily at the Site.

5.0 ACTION(S) REQUIRED

1. By no later than May 29, 2020, The Corporation of the Municipality of Trent Lakes shall submit an action plan/schedule of implementation to the undersigned Provincial Officer identifying measures to be taken to comply with the requirements of Conditions 60 and 61 of Environmental Compliance Approval Number A341301.

2. By no later than May 29, 2020, The Corporation of the Municipality of Trent Lakes shall develop training curriculum to address the requirements of Conditions 67(b) and 67(j) of Environmental Compliance Approval Number A341301. By May 29, 2020, submit to the undersigned Provincial Officer a copy of the training curriculum.

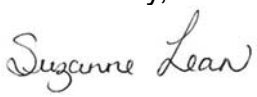
3. By no later than June 5, 2020, The Corporation of the Municipality of Trent Lakes shall administer the training curriculum developed pursuant to Item #2 above to all employees that operate the transfer station.

4. By no later than June 12, 2020, The Corporation of the Municipality of Trent Lakes shall provide the undersigned Provincial Officer with records of training administered pursuant to the requirements of Item #3 above.

5. By no later than May 8, 2020, The Corporation of the Municipality of Trent Lakes shall develop and maintain a daily logbook to record recyclable materials received at the Site to address the requirements of Condition 73 of the ECA.

I look forward to hearing from you. Should you have any questions or require additional information please feel free to contact me at 705-738-3800 ext. 226 or by email at slean@trentlakes.ca

Yours Truly,



Suzanne Lean
Temporary Waste Coordinator

760 Peterborough County Road 36
Trent Lakes ON K0M 1AO
Telephone No. 705-738-3800
Fax 705-738-3801
www.trentlakes.ca

September 8, 2020

Ministry of the Environment, Conservation and Parks
Eastern Region
Peterborough District Office
300 Water Street, 2nd Floor South Tower
Peterborough, ON. K9J 8M5

Attention: David Bradley, District Manager

Dear Sir:

Re: Non-Hazardous Waste Transfer Processing Inspection Report
Buckhorn Waste Transfer Station Site #: 2748-BLJTT3
Environmental Compliance Approval Number A341301
Address: 37 Dump Road, Municipality of Trent Lakes, County of Peterborough

In response to the above noted Inspection Report, the Municipality of Trent Lakes is providing the following response to the Actions Required as outlined.

5.0 ACTION(S) REQUIRED

1. By no later than May 29, 2020, The Corporation of the Municipality of Trent Lakes shall submit an action plan/schedule of implementation to the undersigned Provincial Officer identifying measures to be taken to comply with the requirements of Conditions 60 and 61 of Environmental Compliance Approval Number A341301.

- To comply with Condition 60 and 61 of Environmental Compliance Approval Number A341301, the Municipality has revised the Trent Lakes Transfer Station Safety, Emergency and Spills Procedures document. Specifically, Section C Emergency Response Plan and Procedures. The Fire section has been revised to reflect that "all fires" are to be reported to the Ministry of the Environment and Climate Change, not limited to just "fire emergencies". Also, in Section D. Spill Contingency Plan, the Ministry's Spills Action Centre phone numbers have been added.

- To comply with Condition 67 (b) and 67 (j), the Municipality has added an Acknowledgement and Agreement Form to the Transfer Station Safety, Emergency and Spills Procedures document. Transfer Station staff will be expected to read this document on an annual basis and sign the Acknowledgement and Understanding Form. In addition, Transfer Station staff will also be provided with a current copy of their respective Environmental Compliance Approval. They will be required to read this document and sign an Acknowledgement and Understanding Form that they agree to and will adhere to the Terms and Conditions contained in the ECA.

2. By no later than May 29, 2020, The Corporation of the Municipality of Trent Lakes shall develop training curriculum to address the requirements of Conditions 67(b) and 67(j) of Environmental Compliance Approval Number A341301. By May 29, 2020, submit to the undersigned Provincial Officer a copy of the training curriculum.

- To comply with Condition 67 (b) and 67 (j), on an annual basis, in addition to existing training, each employee will be required to review and sign an Acknowledgement and Understanding Form for the following two documents;
    - Transfer Station Safety, Emergency and Spills Procedures
    - Environmental Compliance Approval (Site Specific)

  This new procedure will be included in the Municipalities Annual Training Schedule that is to be administered and monitored by HR Live, the Municipalities Human Resources Consultant.

3. By no later than June 5, 2020, The Corporation of the Municipality of Trent Lakes shall administer the training curriculum developed pursuant to Item #2 above to all employees that operate the transfer station.

- To comply with Condition 67 (b) and 67 (j), the new training curriculum is scheduled to be administered to Transfer Station staff on Thursday October 1st 2020 at the Transfer Station Attendants Meeting. Subsequent training will be scheduled and monitored annually by HR Live, as noted above.

4. By no later than June 12, 2020, The Corporation of the Municipality of Trent Lakes shall provide the undersigned Provincial Officer with records of training administered pursuant to the requirements of Item #3 above.

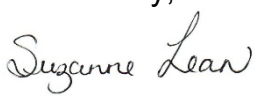
- Copies of the signed Acknowledgement and Agreement Forms for the Transfer Station Safety, Emergency and Spills Procedures and signed copies of the Environmental Compliance Approval Acknowledgement and Understanding Forms are attached. Originals will be retained in the employee's personnel file.

5. By no later than May 8, 2020, The Corporation of the Municipality of Trent Lakes shall develop and maintain a daily logbook to record recyclable materials received at the Site to address the requirements of Condition 73 of the ECA.

- This Action Item was implemented on May 1, 2020.

I trust the above information is sufficient to satisfy the Ministry as the Municipality of Trent Lakes has completed the required actions outlined in the above report. Should you have any questions or require additional information, please feel free to contact me at 705-738-3800 ext. 226 or by email at slean@trentlakes.ca

Yours Truly,



Suzanne Lean
Temporary Waste Coordinator

Ministry of the Environment, Conservation and Parks
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Kingston (Ontario) K7P 3J6
Tél: 613 549-4000
ou 1 800 267-0974

Ontario

M E M O R A N D U M

July 6, 2020

TO: Gary Muloin
Sr. Environmental Officer
Peterborough District Office
Eastern Region

FROM: Dana Cruikshank
Surface water Specialist
Water Resources Unit
Eastern Region

RE: Buckhorn WTS
2019 Annual Report
C of A # A341301
Township of Galway-Cavendish and Harvey
Municipality of Trent Hills

I have reviewed the above report prepared by Cambium on behalf of the Municipality of Trent Hills Township for surface water concerns only. Surface water last reviewed the 2014 Annual Report for this site.

For 2019 Cambium reports;

- Buckhorn LFS has been in operation since 1971 and ceased landfilling on December 31, 2008.
- Buckhorn LFS now operates as a Waste Transfer Station. Waste is transferred to the Bensfort Rd Landfill.
- There are two watercourses that drain through the landfill watershed. The westerly watercourse extends from SW1 ponding (wetland) west of the landfill through SW3 and then to SW9. The easterly watercourse commences at ponding south of the landfill at SW2, east of landfill at SW11 and then on to SW4. The southerly wetland watercourse is monitored by SW5, SW6 and SW10.
- The wetland along Hwy 36 drains through SW10 and SW6 to more wetlands before entering Lower Buckhorn Lake.
- SW8 and SW7 are representative of natural wetland conditions in this area.
- Shallow groundwater flow is interpreted to be in a southwesterly direction to the wetland
- There are no surface water stations upgradient of the site.
- The surface water stations were sampled in April and November. SW4 and SW11 were frozen in April, SW2 was dry in November and SW1, SW4, SW6, SW7, SW10 and SW11 were frozen in November.

- Leachate Indicator Parameters (LIPs) area alkalinity, ammonia, boron, iron, conductivity, chloride, calcium, barium, COD, BOD, TP, manganese, hardness, magnesium, potassium and sodium.
- SW11 is considered background and no samples were taken in 2019 due to frozen conditions.
- SW1 is the station closest to the waste mound and un-ionized ammonia exceeded PWQO.
- SW3 has elevated concentrations of most LIPs compared to SW11 with PWQO exceedances of iron and TP in 2019.
- SW9 and SW10 are interpreted to be impacted by CR36 deicing activities but generally have similar or better water quality then SW11.
- SW2 has similar water quality as SW11 and had no PWQO exceedances in 2019.
- SW4 and SW5 are interpreted to not be impacted by landfill leachate.
- SW7 has elevated concentrations of COD, chloride, TKN, iron, TP and ammonia compared to SW11. SW7 is adjacent to Fire Route 21 and a wetland and is interpreted not to impacted by landfill leachate. SW7 is interpreted as being representative of the natural wetland environment/
- SW6 and SW8 have similar water quality as SW7, SW4 and SW5. No PWQO exceedances at SW6 and PWQO exceedances at SW8 (low Do and TP)
- Concludes that all down-gradient and downstream surface water stations are in low lying ponded areas underlain by saturated organic soils that tend to produce elevated concentrations of ammonia, TKN, TP, iron, manganese and other trace metals. SW11 while having similar water as downgradient stations is adjacent to the waste mound and Cambium doesn't consider it to background. SW1 is impacted by landfill leachate/
- Concludes that there is no impact to surface water beyond the immediate waste footprint and no impacts to the Provincially Significant LBL complex is expected.
- Requests the removal of SW8, SW6, SW2, SW4 and SW5 from the programs and that SW7 be considered representative of background.

Reviewer's Comments:

The reviewer notes that the sampling frequency of two times per year is low and that to schedule sampling during periods of cold weather where the likelihood of shallow ponded areas being frozen over is high, extremely limits the value of the data set. When almost half the annual samples can't be taken impacts if any, cannot be determined properly.

As shown in the time-concentration graphs in the report. concentrations for the few parameters plotted show extreme variability which can be indicative of intermittent flow conditions, road impacts and wetland chemistry influences. SW7 and SW11 showed the least variability. Despite its proximity to the waste mound SW11 showed very little variability and declining concentrations over the 2010-2019 period.

Due to the influences of the various wetlands, road de-icing activities etc. the contributions of these activities on water quality in the area is likely more than what could be attributed to landfill leachate. The reviewer feels that the number of surface water stations at this site exceeds the number required to monitor a closed landfill. Cambium indicates that RUC exceedances noted in the report are not landfill related. This along with the consideration that there are minimal surface water flows at the site and other influences already mentioned allows for a reduction in the surface water monitoring plan.

Recommendations:

1. The data should be provided in electronic format to the technical reviewers.

2. The Surface water monitoring program can be modified as follows. SW stations SW8, SW2, SW4 and SW5 can be removed from the program if the groundwater reviewer concurs with Cambium's assessment of RUC exceedances. SW6 should be retained for the time being as it monitors the permanent flowing stream that eventually flows into the lake.

3. Sampling should occur when frozen conditions are unlikely to be encountered.

If you require additional clarification of the above comments or recommendations, I would be pleased to discuss them with you.

Dana Cruikshank

c: Robert Holland
Courtney Redmond
SW-PB-GC-03-06 (Buckhorn LFS, Twp. of Galway-Cavendish and Harvey)
SW-07-02-11-02-01, Lower Buckhorn Lake

Ministry of the Environment, Conservation and Parks
Eastern Region
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Peterborough ON K9J 8M5
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Tel:

Ministère de l'Environnement, de la Protection de la nature et des Parcs
Direction régionale de l'Est
Bureau du district de Peterborough
Bureau du secteur de Peterborough
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300 rue Water S
Peterborough ON K9J 8M5
Télécopieur: (705) 755-4321
Tél:

July 15, 2020

The Corporation of the Municipality of Trent Lakes
Attn: Ms. Donna Teggart, CAO
760 County Road 36
Trent Lakes, ON K0M 1A0

Dear Ms. Teggart:

RE: Technical Support Section Comments - Groundwater
Buckhorn Closed Waste Disposal Site/Waste Transfer Station
Environmental Compliance Approval Number A341301
37 Dump Rd
Trent Lakes, County of Peterborough
Reference Number 0500-BP5HWB

Staff from the ministry's Eastern Region Technical Support Section have completed a review of the 2019 Annual Monitoring Report for the Buckhorn Waste Disposal Site, produced by Cambium Inc., dated March 17, 2020. Ministry staff have reviewed this report from a hydrogeological perspective and have provided several comments. Please find attached for your review and information, a copy of technical support section comments, dated July 6, 2020.

You will note that based upon the above-noted review, ministry staff have agreed to the recommended changes to the groundwater monitoring program at the site as proposed by Cambium Inc. in the letter to this office dated March 17, 2020 (accompanying the submission of the 2019 Annual Report). Under Condition 18 of Environmental Compliance Approval Number A341301 (herein referred to as "the ECA), *the groundwater and surface water monitoring program, and the reporting scope and frequency may be amended from time-to-time with the written approval from the Director* . The Municipality therefore shall submit a completed application to amend the ECA to the ministry's Environmental Permissions Branch (135 St. Clair Avenue West, Toronto, Ontario, M4V 1P5) to have the monitoring changes formally approved by the ministry.

Should you have any questions or concerns regarding this matter, please do not hesitate to contact me at (705)927-7811.

Yours truly,

Gary Muloin
Senior Environmental Officer
Peterborough District Office

File Storage Number: SI PB TL DU 610 - 37 DUMP ROAD, HARVEY
Ms. Stephanie Reeder, P.Geo., C.E.T., Cambium Inc., 52 Hunter Street East, Peterborough, ON K9H 1G5
Ms. Suzanne Lean, The Corporation of the Municipality of Trent Lakes

Ministry of the Environment, Conservation and Parks
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1259, rue Gardiners, unité 3
Kingston (Ontario) K7P 3J6
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ou 1 800 267-0974

Ontario

M E M O R A N D U M

July 6, 2020

TO: Gary Muloin
Senior Environmental Officer
Peterborough District Office
Eastern Region

FROM: Thomas Guo
Hydrogeologist
Technical Support Section
Eastern Region

RE: 2019 Annual Report
Buckhorn Waste Disposal Site
Municipality of Trent Lakes
Lot 11, Concession VI, Geographic Township of Harvey
County of Peterborough

Environmental Compliance Approval (ECA): A341301

I have reviewed the hydrogeologically pertinent sections of the document entitled "2019 Annual Report, Buckhorn Waste Disposal Site" prepared by Cambium Inc. (Cambium) and dated March 17, 2020. The report documents the site condition in 2019.

Also, I have reviewed the letter to David Bradley, District Manager by Cambium and dated March 17, 2020. This letter is a formal request to reduce groundwater and surface water monitoring program.

I offer the following comments for your consideration.

Summary

- Reasonable Use Guideline B-7 (RUG) applies to operating waste disposal sites and sites closed post 1986. The site was closed in 2008, thus the RUG applies to the site;
- The site is assessed to be in compliance with the RUG given the monitoring wells in the contaminant attenuation zones (CAZs) are assessed not to be impacted by the site;
- The conceptual model is that vertical gradients and the impermeable nature of the bedrock will restrict the downward migration of impacted groundwater at the site;

- The primary receptor of impacted groundwater is interpreted to be area surface water when groundwater discharges to surface in the wetlands on and adjacent the site;
- In 2019, volatile organic compounds (VOCs) were analyzed in the collected samples. All samples were below laboratory detection limit;
- Landfill gas was monitored to be much less the explosive limit at the on-site groundwater wells in April and November 2019;
- The residential wells are assessed not to impacted by the site;
- I concur with Cambium's following recommendations for the groundwater monitoring program:
    - The following wells should be removed from the monitoring program: OW12-1, OW12-2, OW14-1, and OW14-2. These wells should continue to be maintained in compliance with Reg. 903and used for water elevation determination.
- The frequency of VOC sampling can be reduced to every five years.

Environmental Compliance Approval (ECA)

The site operates under ECA No. A341301. The site is located on Lot 11, Concession 6, geographic Township of Harvey, Municipality of Trent Lakes. The site is at 37 Dump Road, 3 km southeast of the community of Buckhorn and consists of an approved fill area of 1.8 ha within a total site area of 6.43 ha. The site ceased landfilling in 2008 and now operates as a waste transfer station.

Site Settings

The site is situated in the Kawartha Lakes tertiary watershed and the Miller Creek and Deer Bay quaternary watershed. The flow in the area generally collects from the northeast areas of Peterborough County and drains southwest through Trent Lakes and into Lower Buckhorn Lake.

Locally, surface water drainage is towards the south and southwest of the waste mound and site, through overland flow during times of increased precipitation. All surface water from the site eventually drains into a bay of Lower Buckhorn Lake. Immediately south of the site is the Lower Buckhorn Complex which is an identified provincially significant wetland with portions of the wetland in the designated Contaminant Attenuation Zone (CAZ).

Geology

Stratigraphic composition and thicknesses vary across the site, but is generally reported to be combinations of peat, sand and gravel, sandy silt to silty sand glacial till, overlying granitic bedrock.

- Peat deposits have been identified within the low-lying marsh/wetland areas to the southwest and southeast of the waste mound. The thickness of the peat unit varies in depth across the site, mostly notably extending to depths of 1.5 m below ground surface in some location;

- The lower overburden unit is generally composed of sandy silt to silty sand glacial till ranging in thickness from 0.8 m to 2.4 m. A significant number of boulders and cobbles were also identified in this unit; and
- The underlying bedrock formation and basement rocks is identified as biotite gneiss with granitic intrusions. Outcrops of the bedrock formation are “ridge-like” features to the northwest and southeast perimeter of the site.

Hydrogeology

Cambium determined the following hydrogeological characteristics for the site:

- There are currently two aquifers identified at the site: A shallow aquifer comprising overburdening soils, fractured portions of upper bedrock and a deeper aquifer in the lower extents of the bedrock (less fractured, more competent, greater lithostatic pressure);
- Shallow groundwater flow generally occurs in the upper sand unit. An increased abundance of fine sediments such as silt and clay within the lower till unit causes the hydraulics conductivity to decrease with depth in the overburden. The hydraulic conductivity for the lower till unit ranges from $6X10^{-5}$ m/s to $6X10^{-7}$ m/s, averaging $2X10^{-5}$ m/s;
- The vertical gradients at the site have historically been primarily upward. There are amount of flow along the contact between the upper aquifer and the relatively impermeable bedrock. Vertical gradients and the impermeable nature of the bedrock will restrict the downward migration of impacted groundwater at the site; and
- The primary receptor of impacted groundwater is interpreted to be area surface water when groundwater discharges to surface in the wetlands on and adjacent the site.

Background Groundwater Quality

Groundwater samples collected from monitoring wells OW17-1 (deep) and OW17-3 (shallow), both upgradient of the waste mound, have been considered to represent background quality at the site.

Water quality at deep monitoring well OW17-1 has historically been characterized as having low concentrations of chloride, iron, ammonia, and manganese. Water quality results in 2019 remained consistent with historical concentrations ranges and were observed to be stable.

Water quality at the shallow monitor OW17-3 has typically had some parameters with slightly elevated concentrations in comparison to adjacent bedrock monitor OW17-1. Water quality data has been observed to fluctuate seasonably at monitor 17-3. Chemical oxygen demand (COD) has remained elevated at this well since June 2017.

Leachate

Cambium uses the following parameters as leachate indicator parameters (LIPs): alkalinity, conductivity, barium, manganese, magnesium, ammonia, chloride, COD,

hardness, potassium, boron, calcium, dissolved organic carbon (DOC), total phosphorus, sodium, iron and total dissolved solids (TDS).

LIPs were identified at the downgradient shallow monitors OW9, OW12-2 and OW14-2, and deep monitors 12-1, OW14-1 and OW1. Water quality at the immediate downgradient monitors remained consistent with historical results and was stable. Only minor increasing trends noted at OW14-2.

Downgradient Water Quality

There are four (4) CAZs for the site. Cambium states that:

- Monitoring wells in CAZ 2 and CAZ 3, directly downgradient of the waste footprint were impacted by a weak leachate signature;
- Monitoring wells in CAZ 4 exhibited elevated concentrations of DOC, barium, iron, and manganese, which were not unexpected as the monitors are in a wetland area. Additionally, minor road salt impacts have been observed in elevated concentrations of chloride, sodium, and TDS.

Residential Water Quality

Residential wells included in the annual monitoring program are PW1, PW2 and PW3. Residential well PW2 was not sampled during the 2019 monitoring program as the house is being rebuilt after a fire.

Cambium states that:

- Elevated concentrations (TDS, chloride, iron and manganese) observed during the 2019 monitoring events were not attributed to the site, but rather naturally elevations in the area;
- Given the distance of the residential wells from the site and the depth to a suitable water supply aquifer, no adverse impacts from the site are expected.

I concur with these conclusions.

Groundwater Surface Water Interaction

Cambium interprets that local groundwater discharges into surface water bodies or wetlands.

Guideline B-7

Reasonable Use Guideline B-7 (RUG) applies to operating waste disposal sites and sites closed post 1986. The RUG limits exceedances were found as follows:

- DP1: TDS, DOC, iron and manganese;
- DP2-R: TDS, hardness, barium and iron;
- BH16-1: DOC and manganese;

- BH16-2: TDS, chloride and hardness;
- BH16-3S: TDS, chloride, hardness, barium, manganese and sodium;
- BH16-3D: TDS and DOC;
- BH16-4S: TDS, chloride, hardness, barium, manganese and sodium;
- BH16-4D: TDS, chloride, hardness and barium
- OW19-1: DOC, barium, iron, manganese; and
- OW19-2: DOC, barium, iron and manganese.

Cambium states that:

- The exceedance noted above were not indicative of site related impacts. The exceedances were attributed to proximity of monitors to roads and to naturally occurring at the site;
- The farthest downgradient wells (OW19-1 and OW19-2) were not interpreted to be impacted by the site and elevated concentrations were attributed to naturally occurring conditions (i.e. DOC, barium, iron, and manganese);
- Based on the assessment in 2019, the site was considered to meet the intent of the RUG.

I concur with these conclusions.

VOC sampling

In 2019, VOCs were analyzed in the collected samples. All samples were below laboratory detection limit.

Landfill Gas Monitoring

Landfill gas was monitored at the on-site groundwater wells in April and November 2019. Methane was observed at 0.54% by volume at OW14-2 and concentrations less than 0.05% by volume at all other locations, which are much less 5% methane explosive limit.

Groundwater Monitoring Program

Cambium provided the following recommendations for the groundwater monitoring program:

- The following wells should be removed from the monitoring program: OW12-1, OW12-2, OW14-1, and OW14-2. These wells should continue to be maintained in compliance with Reg. 903and used for water elevation determination.

I concur with this recommendation. Furthermore, the frequency of VOC sampling can be reduced to every five years.

Thomas Guo, M. Eng, P. Geo.
TG/

cc: File No. PB GC(TL) 01 03 (Buckhorn WDS – A341301)
TG/IDS# 0500-BP5HWB

ec: Victor Castro, Water Resources Supervisor

Appendix C
Field and Precipitation Data

LOCATION: Buckhorn WDS DATE: April 27, 2020 WEATHER (SAMPLE DAY): 2°C Sun 10°C

PROJECT NUMBER: 10520-006 SAMPLED BY: N. Morin and M. Pion WEATHER (PREVIOUS DAY): 7°C Overcast

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)[1]	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
OW9	2.24	4.47	50.8	0.77	14	14	7.4	-	1590	6.53	181	<5	Cloudy	Grey	Leachate	None	
OW12-1	0.02	6.49	32.1	0.00	16	Dry x 1 7	10.0	-	650	9.29	166	<5	Cloudy	Grey	Leachate	None	
OW12-2	0.07	2.61	50.8	0.50	16	16	9.9	-	690	3.26	166	<5	Cloudy	Grey	Leachate	None	
OW16	2.21	7.97	50.8	0.55	36	36	8.5	-	1040	1.07	196	<5	Clear	Yellow	Leachate	None	QA/QC #1
OW17-1	5.21	15.56	50.8	0.73	64	Dry x 1 35	8.4	-	470	7.61	153	<5	Clear	None	None	None	
OW17-3	4.91	8.07	50.8	0.50	20	20	7.4	-	460	11.28	127	<5	Cloudy	Brown	None	None	
OW19-1	0.56	6.93	50.8	0.52	39	39	9.4	7.55	750	7.01	82	-	Cloudy	Yellow	None	None	
OW19-2	0.42	2.25	50.8	0.38	12	12	8.7	7.43	730	7.31	68	-	Cloudy	Yellow	None	None	
DP1	1.24	2.66	32.1	0.93	3.50	Dry x 1 1.50	7.2	7.38	840	7.12	6	65	Opaque	Red-brown	Swampy	None	
DP2-2R	0.82	2.40	32.1	0.77	3.74	Dry x 1 1.25	12.2	-	650	9.48	116	<5	Cloudy	Brown	Swampy	None	
DP3	1.35	3.59	32.1	1.15	6	Dry x 1 2.00	8.5	-	450	7.61	108	<5	Opaque	Grey	None	None	
DP4-R	0.82	2.98	32.1	0.00	6	Dry x 1 2.00	7.7	-	1120	7.00	131	-	Cloudy	Brown	Swampy	None	No LFG, well in waist deep water
BH16-1	2.23	12.86	38.1	0.68	37	Dry x 1 20	7.2	7.86	520	7.70	13	<5	Cloudy	Grey	None	None	
BH16-2	1.39	5.87	38.1	0.79	16	Dry x 1 9	10.2	7.73	1530	7.43	53	15	Cloudy	None	None	None	
BH16-3S	1.41	5.86	38.1	0.92	16	Dry x 1 8	7.5	7.74	1200	6.12	65	10	Opaque	Yellow	None	None	
BH16-3D	1.87	10.80	38.1	0.91	31	Dry x 1 18	7.7	7.69	800	7.67	56	<5	Opaque	Grey	None	None	

LOCATION: Buckhorn WDS DATE: April 27, 2020 WEATHER (SAMPLE DAY): 2°C Sun 10°C

PROJECT NUMBER: 10520-006 SAMPLED BY: N. Morin and M. Pion WEATHER (PREVIOUS DAY): 7°C Overcast

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)[1]	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
BH16-4S	1.95	7.60	38.1	0.74	20	Dry x 1 10	7.4	7.23	1690	6.88	66	95	Cloudy	Grey	None	None	QA/QC #2
BH16-4D	1.50	11.12	38.1	0.72	33	Dry x 1 12	7.9	7.39	1400	6.92	60	115	Opaque	Grey	None	None	

Notes:

1. Meter malfunction.

LOCATION: Buckhorn WDS DATE: November 11, 2020 WEATHER (SAMPLE DAY): 10°C Rain/Overcast 17°C

PROJECT NUMBER: 10520-006 SAMPLED BY: M. Pion + N. Morin WEATHER (PREVIOUS DAY): 22°C Sun

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
OW9	2.70	4.47	50.8	0.77	11	11	11.1	7.00	1672	4.30	158	155	Cloudy	Black	Sulphur	None	
OW14-1	0.44	6.28	38.1	0.00	20	Dry x 1 8	11.2	7.08	1398	5.49	198	<5	Clear	None	None	None	
OW14-2	0.77	2.50	50.8	0.44	11	Dry x 1 4	10.2	7.08	1927	5.04	242	1850	Cloudy	Orange	None	None	
OW16	2.72	7.97	50.8	0.55	32	32	10.6	6.91	1662	4.88	197	<5	Clear	Yellow	Sulphur	None	QA/QC #1
OW17-1	6.25	15.56	50.8	0.73	57	Dry x 1 25	9.4	7.46	352	5.65	267	<5	Clear	None	None	None	
OW17-3	5.90	8.07	50.8	0.50	14	14	10.4	7.13	375	9.17	268	<5	Cloudy	Brown	None	None	
OW19-1	0.52	6.93	50.8	0.52	40	40	9.9	7.13	719	5.11	157	<5	Opaque	Grey	None	None	
OW19-2	0.39	2.25	50.8	0.38	12	12	9.7	7.15	714	4.64	155	<5	Opaque	Grey	None	None	
DP1	0.97	2.66	32.1	0.93	4.01	Dry x 1 2	11.7	7.34	962	7.70	125	150	Cloudy	Red-brown	None	None	
DP2-R	0.82	2.40	32.1	0.77	3.75	Dry x 1 2	10.8	7.63	946	9.10	119	<5	Opaque	Grey	Swampy	None	
DP3	2.06	3.59	32.1	1.15	3.75	Dry x 1 1.50	12.8	7.60	737	5.42	161	<5	Cloudy	Black	PHC	None	
DP4-R	1.00	2.98	32.1	0.00	4.75	Dry x 1 2.25	10.4	7.24	3350	4.66	162	-	Opaque	Yellow	Swampy	None	No gas measurement due to wet conditions
BH16-1	3.35	12.86	38.1	0.68	33	Dry x 1 18	11.3	8.05	479	9.63	99	<5	Cloudy	Grey	None	None	
BH16-2	1.39	5.87	38.1	0.79	16	Dry x 1 7	10.5	7.55	1532	9.45	152	<5	Opaque	Grey	None	None	QA/QC #2
BH16-3S	1.71	5.86	38.1	0.92	15	Dry x 1 6	11.6	7.17	1029	7.71	194	<5	Opaque	Grey	None	None	
BH16-3D	1.79	10.80	38.1	0.91	31	Dry x 1 12	12.2	7.16	1085	6.02	203	<5	Opaque	Grey	None	None	

LOCATION: Buckhorn WDS DATE: November 11, 2020 WEATHER (SAMPLE DAY): 10°C Rain/Overcast 17°C

PROJECT NUMBER: 10520-006 SAMPLED BY: M. Pion + N. Morin WEATHER (PREVIOUS DAY): 22°C Sun

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
BH16-4S	2.04	7.60	38.1	0.74	20	20	12.8	7.05	1617	4.67	214	<5	Cloudy	Brown	None	None	
BH16-4D	1.53	11.12	38.1	0.72	33	Dry x 1 12	11.6	7.34	1410	6.20	217	<5	Cloudy	Grey	None	None	

LOCATION: Buckhorn WDS DATE: April 22, 2020 WEATHER (SAMPLE DAY): -5/3°C Sun

PROJECT NUMBER: 10520-006 SAMPLED BY: N. Morin WEATHER (PREVIOUS DAY): 5°C Overcast

FIELD SHEET – SURFACE WATER SAMPLING

Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m^3/s)	Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Observations				
										Clarity	Colour	Odour	Sheen	Other
SW1	0.38	0.48	< 0.10	< 0.05	8.2	7.71	1020	10.95	130	Clear	None	None	None	
SW2	-	-	-		-	-	-	-	-	-	-	-	-	Dry
SW3	0.05	0.15	< 0.10	< 0.001	7.8	-	690	7.95	141	Clear	None	None	None	Area flooded
SW4	0.20	Ponded - No Observable Flow			2.1	7.70	490	5.00	122	Clear	None	None	None	
SW5	0.50	Ponded - No Observable Flow			7.4	8.06	600	9.15	130	Clear	None	None	None	
SW6	0.15	Ponded - No Observable Flow			6.6	-	610	10.53	146	Clear	None	None	None	
SW7	0.15	Ponded - No Observable Flow			3.2	7.51	640	3.77	161	Opaque	Brown	Swampy	None	
SW8	0.30	Ponded - No Observable Flow			3.6	-	270	7.51	133	Clear	None	None	None	
SW9	0.08	Ponded - No Observable Flow			5.2	-	690	11.25	137	Clear	None	None	None	
SW10	0.45	0.78	< 0.10	< 0.05	5.0	7.97	690	8.64	127	Clear	None	None	None	QA/QC
SW11	0.12	Ponded - No Observable Flow			7.0	-	520	12.06	115	Clear	None	None	None	

LOCATION: Buckhorn WDS

DATE: November 10, 2020

WEATHER (SAMPLE DAY): 8°C Sun 19°C

PROJECT NUMBER: 10520-006

SAMPLED BY: M. Pion + N. Morin

WEATHER (PREVIOUS DAY): 21°C Sun

FIELD SHEET – SURFACE WATER SAMPLING

Sample Location	Depth (m)	Width (m)	Velocity (m/s)	Discharge (m^3/s)	Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	Observations				
										Clarity	Colour	Odour	Sheen	Other
SW1	Ponded - No Observable Flow				8.2	7.27	668	4.55	273	Clear	None	None	None	QA/QC, Water Level Below Culvert
SW2	-	-	-	-	-	-	-	-	-	-	-	-	-	Dry
SW3	-	-	-	-	-	-	-	-	-	-	-	-	-	Insufficient Volumes for Sample Collection
SW4	0.15	Ponded - No Observable Flow			8.8	7.39	738	4.98	129	Clear	None	None	None	
SW5	0.15	Ponded - No Observable Flow			8.1	7.81	657	9.59	139	Clear	None	None	None	
SW6	Ponded - No Observable Flow				7.1	7.16	640	6.60	275	Clear	None	None	None	
SW7	0.12	Ponded - No Observable Flow			10.2	6.94	830	1.96	140	Opaque	Brown	Swampy	None	
SW8	0.30	Ponded - No Observable Flow			8.1	7.03	1043	1.21	283	Clear	Yellow	None	None	
SW9	0.12	Ponded - No Observable Flow			11.1	7.58	841	7.72	131	Clear	None	None	None	
SW10	0.30	0.78	< 0.10	<0.017	6.7	7.54	835	5.04	135	Clear	None	None	None	
SW11	0.12	Ponded - No Observable Flow			10.6	7.72	500	3.94	265	Clear	None	None	None	

Government of Canada / Gouvernement du Canada

Daily Data Report for April 2020

PETERBOROUGH A
ONTARIO
Current Station Operator: NAVCAN

Latitude:	44°13'48.000" N	**Longitude:**	78°21'48.000" W	**Elevation:**	191.40 m
Climate ID:	6166415	**WMO ID:**	71436	**TC ID:**	YPQ

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01	10.8	-1.7	4.6	13.4	0.0			0.0		34	33
02	13.8	-3.3	5.3	12.7	0.0			0.0		31	45
03	10.4	1.7	6.1	11.9	0.0			2.2		2	35
04	12.0	4.3	8.2	9.8	0.0			0.0		M	M
05	10.8	0.1	5.5	12.5	0.0			0.0		30	41
06	13.8	-4.0	4.9	13.1	0.0			0.0		29	42
07	15.4	-2.1	6.7	11.3	0.0			3.2		M	M
08	10.8	0.8	5.8	12.2	0.0			0.0		27	42
09	7.9	0.7	4.3	13.7	0.0			12.2		27	65
10	8.0	-0.1	4.0	14.0	0.0			0.0		32	68
11	8.2	-2.4	2.9	15.1	0.0			0.0		27	54
12	13.1	-2.7	5.2	12.8	0.0			0.0		M	M
13	14.6	1.9	8.3	9.7	0.0			13.7		26	72
14	6.4	-2.9	1.8	16.2	0.0			0.8		29	48
15	2.9	-6.9	-2.0	20.0	0.0			0.2		29	48
16	4.8	-4.9	-0.1	18.1	0.0			0.0		29	58
17	6.6	-6.5	0.1	17.9	0.0			0.0		18	37
18	9.9	-6.2	1.9	16.1	0.0			0.0		19	41
19	10.4	-1.9	4.3	13.7	0.0			4.5		23	54
20	7.1	-5.0	1.1	16.9	0.0			0.0		15	33
21	6.3	-3.9	1.2	16.8	0.0			0.5		27	80
22	3.2	-5.5	-1.2	19.2	0.0			0.0		28	63
23	8.7	-8.0	0.4	17.6	0.0			0.0		M	M
24	8.4	-1.7	3.4	14.6	0.0			0.0		5	35
25	16.4	-5.1	5.7	12.3	0.0			0.0		M	M
26	11.0	6.1	8.6	9.4	0.0			0.0		5	63
27	15.9	2.3	9.1	8.9	0.0			0.0		16	32
28	12.9	1.2	7.1	10.9	0.0			0.0		M	M
29	15.4	1.3	8.4	9.6	0.0			3.8		13	48
30	M	M	M	M	M			M		13	45
Sum				400.4^	0.0^			41.1^			
Avg	10.2^	-1.9^	4.2^								

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
Xtrm	16.4^	-8.0^								27^	80^

Summary, average and extreme values are based on the data above.

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

Date modified:

2020-09-17

LOCATION: Buckhorn WDS DATE: November 11, 2020 WEATHER (SAMPLE DAY): 10°C Rain/Overcast 17°C

PROJECT NUMBER: 10520-006 SAMPLED BY: M. Pion + N. Morin WEATHER (PREVIOUS DAY): 22°C Sun

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
OW9	2.70	4.47	50.8	0.77	11	11	11.1	7.00	1672	4.30	158	155	Cloudy	Black	Sulphur	None	
OW14-1	0.44	6.28	38.1	0.00	20	Dry x 1 8	11.2	7.08	1398	5.49	198	<5	Clear	None	None	None	
OW14-2	0.77	2.50	50.8	0.44	11	Dry x 1 4	10.2	7.08	1927	5.04	242	1850	Cloudy	Orange	None	None	
OW16	2.72	7.97	50.8	0.55	32	32	10.6	6.91	1662	4.88	197	<5	Clear	Yellow	Sulphur	None	QA/QC #1
OW17-1	6.25	15.56	50.8	0.73	57	Dry x 1 25	9.4	7.46	352	5.65	267	<5	Clear	None	None	None	
OW17-3	5.90	8.07	50.8	0.50	14	14	10.4	7.13	375	9.17	268	<5	Cloudy	Brown	None	None	
OW19-1	0.52	6.93	50.8	0.52	40	40	9.9	7.13	719	5.11	157	<5	Opaque	Grey	None	None	
OW19-2	0.39	2.25	50.8	0.38	12	12	9.7	7.15	714	4.64	155	<5	Opaque	Grey	None	None	
DP1	0.97	2.66	32.1	0.93	4.01	Dry x 1 2	11.7	7.34	962	7.70	125	150	Cloudy	Red-brown	None	None	
DP2-R	0.82	2.40	32.1	0.77	3.75	Dry x 1 2	10.8	7.63	946	9.10	119	<5	Opaque	Grey	Swampy	None	
DP3	2.06	3.59	32.1	1.15	3.75	Dry x 1 1.50	12.8	7.60	737	5.42	161	<5	Cloudy	Black	PHC	None	
DP4-R	1.00	2.98	32.1	0.00	4.75	Dry x 1 2.25	10.4	7.24	3350	4.66	162	-	Opaque	Yellow	Swampy	None	No gas measurement due to wet conditions
BH16-1	3.35	12.86	38.1	0.68	33	Dry x 1 18	11.3	8.05	479	9.63	99	<5	Cloudy	Grey	None	None	
BH16-2	1.39	5.87	38.1	0.79	16	Dry x 1 7	10.5	7.55	1532	9.45	152	<5	Opaque	Grey	None	None	QA/QC #2
BH16-3S	1.71	5.86	38.1	0.92	15	Dry x 1 6	11.6	7.17	1029	7.71	194	<5	Opaque	Grey	None	None	
BH16-3D	1.79	10.80	38.1	0.91	31	Dry x 1 12	12.2	7.16	1085	6.02	203	<5	Opaque	Grey	None	None	

LOCATION: Buckhorn WDS DATE: November 11, 2020 WEATHER (SAMPLE DAY): 10°C Rain/Overcast 17°C

PROJECT NUMBER: 10520-006 SAMPLED BY: M. Pion + N. Morin WEATHER (PREVIOUS DAY): 22°C Sun

FIELD SHEET – GROUNDWATER DEVELOPMENT & SAMPLING

Sample Location	Water Level	B.H. Depth (m)	B.H. Dia. (mm)	Stick – Up (m)	Purge Volumes (L)		Temp (°C)	pH (units)	Cond. (µS/cm)	DO (mg/L)	ORP (mV)	LFG (ppm)	Observations				
					Needed	Actual							Clarity	Colour	Odour	Sheen	Other
BH16-4S	2.04	7.60	38.1	0.74	20	20	12.8	7.05	1617	4.67	214	<5	Cloudy	Brown	None	None	
BH16-4D	1.53	11.12	38.1	0.72	33	Dry x 1 12	11.6	7.34	1410	6.20	217	<5	Cloudy	Grey	None	None	

Government of Canada / Gouvernement du Canada

Daily Data Report for April 2020

PETERBOROUGH A
ONTARIO
Current Station Operator: NAVCAN

Latitude:	44°13'48.000" N	**Longitude:**	78°21'48.000" W	**Elevation:**	191.40 m
Climate ID:	6166415	**WMO ID:**	71436	**TC ID:**	YPQ

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01	10.8	-1.7	4.6	13.4	0.0			0.0		34	33
02	13.8	-3.3	5.3	12.7	0.0			0.0		31	45
03	10.4	1.7	6.1	11.9	0.0			2.2		2	35
04	12.0	4.3	8.2	9.8	0.0			0.0		M	M
05	10.8	0.1	5.5	12.5	0.0			0.0		30	41
06	13.8	-4.0	4.9	13.1	0.0			0.0		29	42
07	15.4	-2.1	6.7	11.3	0.0			3.2		M	M
08	10.8	0.8	5.8	12.2	0.0			0.0		27	42
09	7.9	0.7	4.3	13.7	0.0			12.2		27	65
10	8.0	-0.1	4.0	14.0	0.0			0.0		32	68
11	8.2	-2.4	2.9	15.1	0.0			0.0		27	54
12	13.1	-2.7	5.2	12.8	0.0			0.0		M	M
13	14.6	1.9	8.3	9.7	0.0			13.7		26	72
14	6.4	-2.9	1.8	16.2	0.0			0.8		29	48
15	2.9	-6.9	-2.0	20.0	0.0			0.2		29	48
16	4.8	-4.9	-0.1	18.1	0.0			0.0		29	58
17	6.6	-6.5	0.1	17.9	0.0			0.0		18	37
18	9.9	-6.2	1.9	16.1	0.0			0.0		19	41
19	10.4	-1.9	4.3	13.7	0.0			4.5		23	54
20	7.1	-5.0	1.1	16.9	0.0			0.0		15	33
21	6.3	-3.9	1.2	16.8	0.0			0.5		27	80
22	3.2	-5.5	-1.2	19.2	0.0			0.0		28	63
23	8.7	-8.0	0.4	17.6	0.0			0.0		M	M
24	8.4	-1.7	3.4	14.6	0.0			0.0		5	35
25	16.4	-5.1	5.7	12.3	0.0			0.0		M	M
26	11.0	6.1	8.6	9.4	0.0			0.0		5	63
27	15.9	2.3	9.1	8.9	0.0			0.0		16	32
28	12.9	1.2	7.1	10.9	0.0			0.0		M	M
29	15.4	1.3	8.4	9.6	0.0			3.8		13	48
30	M	M	M	M	M			M		13	45
Sum				400.4^	0.0^			41.1^			
Avg	10.2^	-1.9^	4.2^								

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
Xtrm	16.4^	-8.0^								27^	80^

Summary, average and extreme values are based on the data above.

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
- T = Trace
- Y = Temperature missing but known to be < 0
- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
- † = Data that is not subject to review by the National Climate Archives

Date modified:

2020-09-17

Government of Canada / Gouvernement du Canada

Daily Data Report for November 2020

PETERBOROUGH A
ONTARIO
Current Station Operator: NAVCAN

Latitude:	44°13'48.000" N	**Longitude:**	78°21'48.000" W	**Elevation:**	191.40 m
Climate ID:	6166415	**WMO ID:**	71436	**TC ID:**	YPQ

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01	8.8	-0.3	4.3	13.7	0.0			5.6		31	65
02	5.8	-4.2	0.8	17.2	0.0			0.4		31	78
03	5.8	-2.3	1.8	16.2	0.0			0.2		32	58
04	16.7	-4.4	6.2	11.8	0.0			0.0		21	59
05	18.9	9.3	14.1	3.9	0.0			0.0		21	41
06	20.6	1.7	11.2	6.8	0.0			0.0		27	35
07	21.6	1.7	11.7	6.3	0.0			0.0		22	35
08	21.6	-0.4	10.6	7.4	0.0			0.0		M	M
09	21.5	1.7	11.6	6.4	0.0			0.0		M	M
10	22.5	2.6	12.6	5.4	0.0			0.0		20	35
11	20.1	3.7	11.9	6.1	0.0			0.0		27	48
12	9.7	-4.1	2.8	15.2	0.0			0.0		M	M
13	7.4	-4.0	1.7	16.3	0.0			0.0		31	46
14	7.5	-6.0	0.8	17.2	0.0			0.0		28	39
15	10.5	-3.5	3.5	14.5	0.0			7.6		26	81
16	5.3	1.4	3.4	14.6	0.0			0.0		25	55
17	2.2	-7.0	-2.4	20.4	0.0			0.2		28	61
18	-1.4	-9.0	-5.2	23.2	0.0			0.0		34	37
19	12.7	-3.4	4.7	13.3	0.0			0.0		22	55
20	17.0	4.2	10.6	7.4	0.0			0.0		22	45
21	5.0	0.4	2.7	15.3	0.0			0.0		30	41
22	1.6	-2.7	-0.6	18.6	0.0			16.1		7	32
23	2.9	-1.6	0.7	17.3	0.0			0.0		31	37
24	M	M	M	M	M			M		M	M
25	5.3	-3.4	1.0	17.0	0.0			4.9		M	M
26	8.3	3.3	5.8	12.2	0.0			0.0		27	32
27	6.7	3.0	4.9	13.1	0.0			0.0		M	M
28	6.7	1.3	4.0	14.0	0.0			0.5		28	41
29	9.8	-4.1	2.9	15.1	0.0			0.0		20	37
30	3.7	-1.1	1.3	16.7	0.0			19.5		1	37
Sum				382.6^	0.0^			55.0^			
Avg	10.5^	-0.9^	4.8^								

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
Xtrm	22.5^	-9.0^								26^	81^

Summary, average and extreme values are based on the data above.

Legend

- A = Accumulated
- C = Precipitation occurred, amount uncertain
- E = Estimated
- F = Accumulated and estimated
- L = Precipitation may or may not have occurred
- M = Missing
- N = Temperature missing but known to be > 0
- S = More than one occurrence
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- [empty] = Indicates an unobserved value
- ^ = The value displayed is based on incomplete data
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Date modified:

2020-09-17

Appendix D

Laboratory Certificates of Analysis

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93156 **REPORT No. B20-10611**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 23-Apr-20
DATE REPORTED: 30-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		SW8	SW6	SW11	SW3
			Sample I.D.		B20-10611-1	B20-10611-2	B20-10611-3	B20-10611-4
			Date Collected		22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Apr-20/O	28	203	271	320
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Apr-20/O	199	729	561	945
pH @25°C	pH Units		SM 4500H	27-Apr-20/O	7.08	7.94	7.75	7.88
Total Dissolved Solids	mg/L	3	SM 2540D	28-Apr-20/O	102	380	291	502
Total Suspended Solids	mg/L	3	SM2540D	24-Apr-20/K	< 3	5	< 3	< 3
BOD(5 day)	mg/L	3	SM 5210B	24-Apr-20/K	< 3	< 3	< 3	< 3
COD	mg/L	5	SM 5220D	27-Apr-20/O	11	14	< 5	9
Phenolics	mg/L	0.002	MOEE 3179	27-Apr-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	28-Apr-20/O	40.8	103	3.0	96.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	27-Apr-20/K	0.02	0.03	0.03	0.79
Sulphate	mg/L	1	SM4110C	28-Apr-20/O	4	7	6	8
Nitrite (N)	mg/L	0.05	SM4110C	28-Apr-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	28-Apr-20/O	0.09	0.05	0.08	1.73
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Apr-20/K	0.2	0.3	0.2	1.0
Mercury	mg/L	0.00002	SM 3112 B	27-Apr-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	28-Apr-20/O	34	253	308	375
Arsenic	mg/L	0.0001	EPA 200.8	28-Apr-20/O	< 0.0001	0.0001	< 0.0001	0.0002
Barium	mg/L	0.001	SM 3120	28-Apr-20/O	0.022	0.149	0.246	0.263
Boron	mg/L	0.005	SM 3120	28-Apr-20/O	< 0.005	0.084	0.038	0.227
Cadmium	mg/L	).000015	EPA 200.8	28-Apr-20/O	< 0.000015	< 0.000015	< 0.000015	< 0.000015
Chromium	mg/L	0.001	EPA 200.8	28-Apr-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.002	SM 3120	28-Apr-20/O	< 0.002	< 0.002	< 0.002	< 0.002
Iron (Total)	mg/L	0.005	SM 3120	28-Apr-20/O	0.054	0.038	0.019	0.022
Lead	mg/L	0.00002	EPA 200.8	28-Apr-20/O	0.00004	< 0.00002	< 0.00002	< 0.00002
Phosphorus-Total	mg/L	0.01	E3199A.1	24-Apr-20/K	0.01	0.01	0.01	< 0.01
Zinc	mg/L	0.005	SM 3120	28-Apr-20/O	0.006	< 0.005	< 0.005	< 0.005

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93156 **REPORT No. B20-10611**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 23-Apr-20
DATE REPORTED: 30-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		SW9	SW7	SW5	SW4
			Sample I.D.		B20-10611-5	B20-10611-6	B20-10611-7	B20-10611-8
			Date Collected		22-Apr-20	22-Apr-20	22-Apr-20	22-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Apr-20/O	291	228	173	145
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Apr-20/O	859	682	561	421
pH @25°C	pH Units		SM 4500H	27-Apr-20/O	7.97	7.55	7.74	7.62
Total Dissolved Solids	mg/L	3	SM 2540D	28-Apr-20/O	454	354	291	217
Total Suspended Solids	mg/L	3	SM2540D	24-Apr-20/K	11	2800	6	< 3
BOD(5 day)	mg/L	3	SM 5210B	24-Apr-20/K	< 3	18	3	< 3
COD	mg/L	5	SM 5220D	27-Apr-20/O	16	824	8	23
Phenolics	mg/L	0.002	MOEE 3179	27-Apr-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	28-Apr-20/O	87.6	92.0	69.7	36.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	27-Apr-20/K	0.03	0.21	0.02	0.03
Sulphate	mg/L	1	SM4110C	28-Apr-20/O	7	< 1	5	5
Nitrite (N)	mg/L	0.05	SM4110C	28-Apr-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	28-Apr-20/O	1.41	< 0.05	0.06	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Apr-20/K	0.4	33.7	0.2	0.4
Mercury	mg/L	0.00002	SM 3112 B	27-Apr-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	28-Apr-20/O	338	440	195	187
Arsenic	mg/L	0.0001	EPA 200.8	28-Apr-20/O	0.0002	0.0025	< 0.0001	0.0001
Barium	mg/L	0.001	SM 3120	28-Apr-20/O	0.223	0.340	0.116	0.103
Boron	mg/L	0.005	SM 3120	28-Apr-20/O	0.180	0.062	0.010	0.021
Cadmium	mg/L	).000015	EPA 200.8	28-Apr-20/O	0.000018	0.000540	< 0.000015	0.000018
Chromium	mg/L	0.001	EPA 200.8	28-Apr-20/O	< 0.001	0.005	< 0.001	< 0.001
Copper	mg/L	0.002	SM 3120	28-Apr-20/O	< 0.002	0.027	< 0.002	< 0.002
Iron (Total)	mg/L	0.005	SM 3120	28-Apr-20/O	0.046	22.2	0.050	0.042
Lead	mg/L	0.00002	EPA 200.8	28-Apr-20/O	0.00013	0.0139	< 0.00002	0.00023
Phosphorus-Total	mg/L	0.01	E3199A.1	24-Apr-20/K	0.02	2.02	< 0.01	0.02
Zinc	mg/L	0.005	SM 3120	28-Apr-20/O	0.009	0.138	< 0.005	0.005

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

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DATE RECEIVED: 23-Apr-20
DATE REPORTED: 30-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		SW QA/QC	SW10	SW1	
			Sample I.D.		B20-10611-9	B20-10611-10	B20-10611-11	
			Date Collected		22-Apr-20	22-Apr-20	22-Apr-20	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	27-Apr-20/O	201	199	377	
Conductivity @25°C	µmho/cm	1	SM 2510B	27-Apr-20/O	620	612	1110	
pH @25°C	pH Units		SM 4500H	27-Apr-20/O	7.85	7.85	7.91	
Total Dissolved Solids	mg/L	3	SM 2540D	28-Apr-20/O	322	318	594	
Total Suspended Solids	mg/L	3	SM2540D	24-Apr-20/K	< 3	3	< 3	
BOD(5 day)	mg/L	3	SM 5210B	24-Apr-20/K	< 3	< 3	< 3	
COD	mg/L	5	SM 5220D	27-Apr-20/O	7	10	17	
Phenolics	mg/L	0.002	MOEE 3179	27-Apr-20/K	< 0.002	< 0.002	< 0.002	
Chloride	mg/L	0.5	SM4110C	28-Apr-20/O	69.3	67.6	121	
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	27-Apr-20/K	0.01	0.01	4.85	
Sulphate	mg/L	1	SM4110C	28-Apr-20/O	7	8	11	
Nitrite (N)	mg/L	0.05	SM4110C	28-Apr-20/O	< 0.05	< 0.05	< 0.05	
Nitrate (N)	mg/L	0.05	SM4110C	28-Apr-20/O	0.09	0.08	0.26	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	24-Apr-20/K	0.2	0.2	5.5	
Mercury	mg/L	0.00002	SM 3112 B	27-Apr-20/O	< 0.00002	< 0.00002	< 0.00002	
Hardness (as CaCO3)	mg/L	1	SM 3120	28-Apr-20/O	236	225	405	
Arsenic	mg/L	0.0001	EPA 200.8	28-Apr-20/O	0.0001	0.0001	0.0003	
Barium	mg/L	0.001	SM 3120	28-Apr-20/O	0.137	0.130	0.283	
Boron	mg/L	0.005	SM 3120	28-Apr-20/O	0.046	0.044	0.295	
Cadmium	mg/L	).000015	EPA 200.8	28-Apr-20/O	< 0.000015	< 0.000015	0.000016	
Chromium	mg/L	0.001	EPA 200.8	28-Apr-20/O	< 0.001	< 0.001	< 0.001	
Copper	mg/L	0.002	SM 3120	28-Apr-20/O	< 0.002	< 0.002	< 0.002	
Iron (Total)	mg/L	0.005	SM 3120	28-Apr-20/O	0.032	0.029	0.134	
Lead	mg/L	0.00002	EPA 200.8	28-Apr-20/O	0.00006	< 0.00002	0.00010	
Phosphorus-Total	mg/L	0.01	E3199A.1	24-Apr-20/K	< 0.01	< 0.01	0.02	
Zinc	mg/L	0.005	SM 3120	28-Apr-20/O	< 0.005	< 0.005	0.013	

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93156 **REPORT No. B20-10611**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 23-Apr-20
DATE REPORTED: 30-Apr-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		SW QA/QC	SW10	SW1	
			Sample I.D.		B20-10611-9	B20-10611-10	B20-10611-11	
			Date Collected		22-Apr-20	22-Apr-20	22-Apr-20	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93144 **REPORT No. B20-10935**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

	Client I.D.				OW17-1	OW17-3	OW12-1	OW12-2
	Sample I.D.				B20-10935-1	B20-10935-2	B20-10935-3	B20-10935-4
	Date Collected				27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-20/O	217	260	358	448
Conductivity @25°C	µmho/cm	1	SM 2510B	29-Apr-20/O	461	516	785	976
pH @25°C	pH Units		SM 4500H	29-Apr-20/O	7.90	7.69	7.29	7.21
Total Dissolved Solids	mg/L	3	SM 2540D	01-May-20/O	238	267	412	520
Total Suspended Solids	mg/L	3	SM2540D	29-Apr-20/K				2140
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Apr-20/O	1.2	1.9	9.7	10.8
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-20/K				4
COD	mg/L	5	SM 5220D	30-Apr-20/O	< 5	< 5	55	58
Phenolics	mg/L	0.002	MOEE 3179	01-May-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	01-May-20/O	1.4	1.2	20.1	31.9
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	29-Apr-20/K	0.02	0.02	12.7	11.0
Sulphate	mg/L	1	SM4110C	01-May-20/O	21	3	6	5
Nitrite (N)	mg/L	0.05	SM4110C	01-May-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-20/O	0.08	0.06	0.07	0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-May-20/K	< 0.1	0.3	13.4	11.6
Mercury	mg/L	0.00002	SM 3112 B	01-May-20/O	< 0.00002	< 0.00002	0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Apr-20/O	256	299	438	512
Arsenic	mg/L	0.0001	EPA 200.8	01-May-20/O	< 0.0001	< 0.0001	0.0017	0.0019
Barium	mg/L	0.001	SM 3120	30-Apr-20/O	0.109	0.170	0.994	0.774
Boron	mg/L	0.005	SM 3120	30-Apr-20/O	0.061	< 0.005	0.301	0.339 1
Cadmium	mg/L	).000015	EPA 200.8	01-May-20/O	< 0.000015	< 0.000015	0.000021	0.000023
Calcium	mg/L	0.02	SM 3120	30-Apr-20/O	72.9	112	151	180
Chromium	mg/L	0.001	EPA 200.8	01-May-20/O	< 0.001	< 0.001	0.002	0.029
Copper	mg/L	0.0001	EPA 200.8	01-May-20/O	0.0052	0.0005	0.0015	0.0026
Iron	mg/L	0.005	SM 3120	30-Apr-20/O	0.005	0.008	15.2	22.6
Lead	mg/L	0.00002	EPA 200.8	01-May-20/O	0.00020	< 0.00002	0.00256	0.00118
Magnesium	mg/L	0.02	SM 3120	30-Apr-20/O	18.0	4.64	14.8	15.2

Michelle Dubien
Lab Manager

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CADUCEON ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93144 **REPORT No. B20-10935**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW17-1	OW17-3	OW12-1	OW12-2
			Sample I.D.		B20-10935-1	B20-10935-2	B20-10935-3	B20-10935-4
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Manganese	mg/L	0.001	SM 3120	30-Apr-20/O	0.005	< 0.001	1.36	1.52
Phosphorus	mg/L	0.1	SM 3120	30-Apr-20/O	< 0.1	< 0.1	0.6	0.4
Potassium	mg/L	0.1	SM 3120	30-Apr-20/O	2.0	0.4	13.4	16.5
Sodium	mg/L	0.2	SM 3120	30-Apr-20/O	2.6	1.2	22.5	24.0
Zinc	mg/L	0.005	SM 3120	30-Apr-20/O	< 0.005	< 0.005	0.013	0.008
Benzene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	0.7	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	1.0	0.8
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	29-Apr-20/R	< 5	< 5	< 5	< 5
Toluene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl Chloride	µg/L	0.2	EPA 8260	29-Apr-20/R	< 0.2	< 0.2	< 0.2	< 0.2

1 . Sediment present

Michelle Dubien
Lab Manager

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Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW16	GW QA/QC #1	OW9	DP3
			Sample I.D.		B20-10935-5	B20-10935-6	B20-10935-7	B20-10935-8
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-20/O	858	867	547	277
Conductivity @25°C	µmho/cm	1	SM 2510B	29-Apr-20/O	1840	1850	3310	845
pH @25°C	pH Units		SM 4500H	29-Apr-20/O	7.26	7.26	7.46	7.82
Total Dissolved Solids	mg/L	3	SM 2540D	01-May-20/O	1010	1020	1850	446
Total Suspended Solids	mg/L	3	SM2540D	29-Apr-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Apr-20/O	20.1	18.9	6.4	3.5
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-20/K				
COD	mg/L	5	SM 5220D	30-Apr-20/O	71	66	75	398
Phenolics	mg/L	0.002	MOEE 3179	01-May-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	01-May-20/O	56.0	55.3	780	88.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	29-Apr-20/K	36.8	35.9	7.30	0.35
Sulphate	mg/L	1	SM4110C	01-May-20/O	36	36	30	17
Nitrite (N)	mg/L	0.05	SM4110C	01-May-20/O	< 0.05	< 0.05	< 0.5	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-20/O	< 0.05	< 0.05	< 0.5	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-May-20/K	39.2	38.6	9.3	1.3
Mercury	mg/L	0.00002	SM 3112 B	01-May-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Apr-20/O	794	791	468	332
Arsenic	mg/L	0.0001	EPA 200.8	01-May-20/O	0.0026	0.0025	0.0005	0.0003
Barium	mg/L	0.001	SM 3120	30-Apr-20/O	1.07	1.06	0.594	0.380
Boron	mg/L	0.005	SM 3120	30-Apr-20/O	1.06	1.04	0.344	0.164
Cadmium	mg/L	).000015	EPA 200.8	01-May-20/O	0.000016	< 0.000015	< 0.000029	< 0.000015
Calcium	mg/L	0.02	SM 3120	30-Apr-20/O	274	273	174	121
Chromium	mg/L	0.001	EPA 200.8	01-May-20/O	0.001	0.002	0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	01-May-20/O	< 0.0001	< 0.0001	< 0.0002	0.0004
Iron	mg/L	0.005	SM 3120	30-Apr-20/O	21.3	21.2	15.2	4.31
Lead	mg/L	0.00002	EPA 200.8	01-May-20/O	0.00007	< 0.00004	< 0.00009	0.00063

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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93144 **REPORT No. B20-10935**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW16	GW QA/QC #1	OW9	DP3
			Sample I.D.		B20-10935-5	B20-10935-6	B20-10935-7	B20-10935-8
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Magnesium	mg/L	0.02	SM 3120	30-Apr-20/O	26.4	26.3	8.03	7.23
Manganese	mg/L	0.001	SM 3120	30-Apr-20/O	5.05	5.02	1.72	1.46
Phosphorus	mg/L	0.1	SM 3120	30-Apr-20/O	< 0.1	< 0.1	0.2	< 0.1
Potassium	mg/L	0.1	SM 3120	30-Apr-20/O	34.0	33.8	13.8	2.0
Sodium	mg/L	0.2	SM 3120	30-Apr-20/O	89.8	89.3	559	59.9
Zinc	mg/L	0.005	SM 3120	30-Apr-20/O	< 0.005	< 0.005	< 0.005	0.694
Benzene	µg/L	0.5	EPA 8260	29-Apr-20/R	0.9	0.8	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	29-Apr-20/R	< 5	< 5	< 5	< 5
Toluene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl Chloride	µg/L	0.2	EPA 8260	29-Apr-20/R	< 0.2	< 0.2	< 0.2	< 0.2

1 Sediment present

Michelle Dubien
Lab Manager

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Report To:

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Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		DP2-R	DP4-R	BH16-3D	BH16-3S
			Sample I.D.		B20-10935-9	B20-10935-10	B20-10935-11	B20-10935-12
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-20/O	308	355	242	161
Conductivity @25°C	µmho/cm	1	SM 2510B	29-Apr-20/O	931	3310	755	125
pH @25°C	pH Units		SM 4500H	29-Apr-20/O	7.80	7.36	7.71	7.50
Total Dissolved Solids	mg/L	3	SM 2540D	01-May-20/O	494	1850	395	680
Total Suspended Solids	mg/L	3	SM2540D	29-Apr-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Apr-20/O	2.8	3.7	2.6	2.0
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-20/K				
COD	mg/L	5	SM 5220D	30-Apr-20/O	230	119	21	14
Phenolics	mg/L	0.002	MOEE 3179	01-May-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	01-May-20/O	106	922	89.0	276
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	29-Apr-20/K	0.08	1.49	0.03	0.02
Sulphate	mg/L	1	SM4110C	01-May-20/O	10	< 10	13	24
Nitrite (N)	mg/L	0.05	SM4110C	01-May-20/O	< 0.05	< 0.5	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-20/O	0.09	< 0.5	< 0.05	0.20
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-May-20/K	0.8	3.4	0.4	0.3
Mercury	mg/L	0.00002	SM 3112 B	01-May-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Apr-20/O	383	762	222	290
Arsenic	mg/L	0.0001	EPA 200.8	01-May-20/O	0.0009	0.0005	0.0003	0.0002
Barium	mg/L	0.001	SM 3120	30-Apr-20/O	0.494	0.600	0.267	0.978
Boron	mg/L	0.005	SM 3120	30-Apr-20/O	0.180	0.023	0.033	0.022
Cadmium	mg/L	).000015	EPA 200.8	01-May-20/O	< 0.000015	0.000140	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	30-Apr-20/O	129	286	82.3	110
Chromium	mg/L	0.001	EPA 200.8	01-May-20/O	< 0.001	0.004	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	01-May-20/O	0.0003	0.0048	0.0062	0.0040
Iron	mg/L	0.005	SM 3120	30-Apr-20/O	0.818	15.4	0.013	0.007
Lead	mg/L	0.00002	EPA 200.8	01-May-20/O	0.00030	0.0211	0.00015	0.00007

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Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93144 **REPORT No. B20-10935**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		DP2-R	DP4-R	BH16-3D	BH16-3S
			Sample I.D.		B20-10935-9	B20-10935-10	B20-10935-11	B20-10935-12
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Magnesium	mg/L	0.02	SM 3120	30-Apr-20/O	14.7	11.5	3.95	3.68
Manganese	mg/L	0.001	SM 3120	30-Apr-20/O	0.080	0.554	0.004	0.001
Phosphorus	mg/L	0.1	SM 3120	30-Apr-20/O	< 0.1	0.1	< 0.1	< 0.1
Potassium	mg/L	0.1	SM 3120	30-Apr-20/O	2.7	1.3	2.7	2.2
Sodium	mg/L	0.2	SM 3120	30-Apr-20/O	47.2	393	82.2	147
Zinc	mg/L	0.005	SM 3120	30-Apr-20/O	3.41	42.9	< 0.005	< 0.005
Benzene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	29-Apr-20/R	< 5	< 5	< 5	< 5
Toluene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl Chloride	µg/L	0.2	EPA 8260	29-Apr-20/R	< 0.2	< 0.2	< 0.2	< 0.2

1 Sediment present

Michelle Dubien
Lab Manager

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Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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Final Report

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PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		BH16-4S	BH16-4D	GW QA/QC #2	OW19-1
			Sample I.D.		B20-10935-13	B20-10935-14	B20-10935-15	B20-10935-16
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-20/O	264	310	265	232
Conductivity @25°C	µmho/cm	1	SM 2510B	29-Apr-20/O	1630	1750	1650	727
pH @25°C	pH Units		SM 4500H	29-Apr-20/O	7.52	7.74	7.55	7.60
Total Dissolved Solids	mg/L	3	SM 2540D	01-May-20/O	894	962	900	379
Total Suspended Solids	mg/L	3	SM2540D	29-Apr-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Apr-20/O	1.6	0.9	1.6	10.1
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-20/K				
COD	mg/L	5	SM 5220D	30-Apr-20/O	43	54	48	42
Phenolics	mg/L	0.002	MOEE 3179	01-May-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	01-May-20/O	374	383	373	86.3
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	29-Apr-20/K	0.03	0.02	0.02	1.29
Sulphate	mg/L	1	SM4110C	01-May-20/O	16	22	16	< 1
Nitrite (N)	mg/L	0.05	SM4110C	01-May-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-20/O	0.12	0.12	0.13	0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-May-20/K	1.0	0.4	0.5	1.6
Mercury	mg/L	0.00002	SM 3112 B	01-May-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Apr-20/O	433	697	441	282
Arsenic	mg/L	0.0001	EPA 200.8	01-May-20/O	< 0.0001	0.0002	< 0.0001	0.0002
Barium	mg/L	0.001	SM 3120	30-Apr-20/O	0.312	0.719	0.314	1.13
Boron	mg/L	0.005	SM 3120	30-Apr-20/O	0.046	0.057	0.045	0.010
Cadmium	mg/L	).000015	EPA 200.8	01-May-20/O	< 0.000015	0.000019	< 0.000015	< 0.000015
Calcium	mg/L	0.02	SM 3120	30-Apr-20/O	161	245	164	107
Chromium	mg/L	0.001	EPA 200.8	01-May-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	01-May-20/O	0.0022	0.0072	0.0009	0.0010
Iron	mg/L	0.005	SM 3120	30-Apr-20/O	0.005	0.325	0.031	5.79

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93144 **REPORT No. B20-10935**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

	Client I.D.				BH16-4S	BH16-4D	GW QA/QC #2	OW19-1
	Sample I.D.				B20-10935-13	B20-10935-14	B20-10935-15	B20-10935-16
	Date Collected				27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Lead	mg/L	0.00002	EPA 200.8	01-May-20/O	0.00004	0.00022	< 0.00004	0.00003
Magnesium	mg/L	0.02	SM 3120	30-Apr-20/O	7.53	20.5	7.56	3.46
Manganese	mg/L	0.001	SM 3120	30-Apr-20/O	0.112	0.032	0.110	0.381
Phosphorus	mg/L	0.1	SM 3120	30-Apr-20/O	< 0.1	< 0.1	< 0.1	< 0.1
Potassium	mg/L	0.1	SM 3120	30-Apr-20/O	3.3	6.9	3.2	1.5
Sodium	mg/L	0.2	SM 3120	30-Apr-20/O	190	97.1	190	43.9
Zinc	mg/L	0.005	SM 3120	30-Apr-20/O	< 0.005	0.005	< 0.005	< 0.005
Benzene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	29-Apr-20/R	< 5	< 5	< 5	< 5
Toluene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl Chloride	µg/L	0.2	EPA 8260	29-Apr-20/R	< 0.2	< 0.2	< 0.2	< 0.2

1 . Sediment present

Michelle Dubien
Lab Manager

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93144 **REPORT No. B20-10935**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW19-2	DP1	BH16-1	BH16-2
			Sample I.D.		B20-10935-17	B20-10935-18	B20-10935-19	B20-10935-20
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	29-Apr-20/O	228	295	218	258
Conductivity @25°C	µmho/cm	1	SM 2510B	29-Apr-20/O	712	826	472	1900
pH @25°C	pH Units		SM 4500H	29-Apr-20/O	7.63	7.69	7.97	7.84
Total Dissolved Solids	mg/L	3	SM 2540D	01-May-20/O	370	435	244	1040
Total Suspended Solids	mg/L	3	SM2540D	29-Apr-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	30-Apr-20/O	10.4	4.2	2.0	1.3
BOD(5 day)	mg/L	3	SM 5210B	29-Apr-20/K				
COD	mg/L	5	SM 5220D	30-Apr-20/O	38	24	54	27
Phenolics	mg/L	0.002	MOEE 3179	01-May-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	01-May-20/O	85.5	79.4	31.8	459
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	29-Apr-20/K	1.15	0.06	0.03	0.01
Sulphate	mg/L	1	SM4110C	01-May-20/O	< 1	7	17	39
Nitrite (N)	mg/L	0.05	SM4110C	01-May-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	01-May-20/O	0.07	0.33	0.07	0.16
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	01-May-20/K	1.5	0.3	0.2	0.2
Mercury	mg/L	0.00002	SM 3112 B	01-May-20/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Apr-20/O	287	342	241	681
Arsenic	mg/L	0.0001	EPA 200.8	01-May-20/O	0.0002	0.0001	0.0009	0.0002
Barium	mg/L	0.001	SM 3120	30-Apr-20/O	1.12	0.237	0.091	0.274
Boron	mg/L	0.005	SM 3120	30-Apr-20/O	0.010	0.209	0.060	0.173
Cadmium	mg/L	).000015	EPA 200.8	01-May-20/O	< 0.000015	< 0.000015	0.000016	< 0.000015
Calcium	mg/L	0.02	SM 3120	30-Apr-20/O	109	109	72.9	217
Chromium	mg/L	0.001	EPA 200.8	01-May-20/O	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/L	0.0001	EPA 200.8	01-May-20/O	0.0016	0.0009	0.0018	0.0013
Iron	mg/L	0.005	SM 3120	30-Apr-20/O	5.50	11.8	0.073	0.008
Lead	mg/L	0.00002	EPA 200.8	01-May-20/O	0.00005	0.00003	0.00005	< 0.00004

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G93144 **REPORT No. B20-10935**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 28-Apr-20
DATE REPORTED: 06-May-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW19-2	DP1	BH16-1	BH16-2
			Sample I.D.		B20-10935-17	B20-10935-18	B20-10935-19	B20-10935-20
			Date Collected		27-Apr-20	27-Apr-20	27-Apr-20	27-Apr-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Magnesium	mg/L	0.02	SM 3120	30-Apr-20/O	3.47	17.0	14.4	33.8
Manganese	mg/L	0.001	SM 3120	30-Apr-20/O	0.400	0.323	0.129	0.002
Phosphorus	mg/L	0.1	SM 3120	30-Apr-20/O	< 0.1	< 0.1	< 0.1	< 0.1
Potassium	mg/L	0.1	SM 3120	30-Apr-20/O	1.5	2.9	3.2	4.5
Sodium	mg/L	0.2	SM 3120	30-Apr-20/O	44.0	49.6	11.3	116
Zinc	mg/L	0.005	SM 3120	30-Apr-20/O	< 0.005	0.643	< 0.005	< 0.005
Benzene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichlorobenzene,1,4-	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Dichloromethane (Methylene Chloride)	µg/L	5	EPA 8260	29-Apr-20/R	< 5	< 5	< 5	< 5
Toluene	µg/L	0.5	EPA 8260	29-Apr-20/R	< 0.5	< 0.5	< 0.5	< 0.5
Vinyl Chloride	µg/L	0.2	EPA 8260	29-Apr-20/R	< 0.2	< 0.2	< 0.2	< 0.2

1 Sediment present

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099262 **REPORT No. B20-35711**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 11-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		SW1	SW4	SW5	SW6
			Sample I.D.		B20-35711-1	B20-35711-2	B20-35711-3	B20-35711-4
			Date Collected		10-Nov-20	10-Nov-20	10-Nov-20	10-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	16-Nov-20/O	267	233	227	251
Conductivity @25°C	µmho/cm	1	SM 2510B	16-Nov-20/O	899	739	643	869
pH @25°C	pH Units		SM 4500H	16-Nov-20/O	7.98	7.86	8.06	8.00
Total Dissolved Solids	mg/L	3	SM 2540D	17-Nov-20/O	476	386	334	459
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K	22	38	5	21
BOD(5 day)	mg/L	3	SM 5210B	12-Nov-20/K	< 3	< 3	< 3	4
COD	mg/L	5	SM5220C	12-Nov-20/K	13	11	11	15
Phenolics	mg/L	0.002	MOEE 3179	25-Nov-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	16-Nov-20/O	116	88.7	63.4	119
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	17-Nov-20/K	2.60	0.05	0.03	0.04
Sulphate	mg/L	1	SM4110C	16-Nov-20/O	5	5	4	3
Nitrite (N)	mg/L	0.05	SM4110C	16-Nov-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Nitrate (N)	mg/L	0.05	SM4110C	16-Nov-20/O	0.08	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-Nov-20/K	3.3	0.4	0.4	0.5
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	281	306	216	284
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	0.212	0.062	0.050	0.111
Phosphorus-Total	mg/L	0.01	E3199A.1	23-Nov-20/K	0.03	0.04	0.02	0.04

M. Dubien

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099262 **REPORT No. B20-35711**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 11-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		SW7	SW8	SW9	SW10
			Sample I.D.		B20-35711-5	B20-35711-6	B20-35711-7	B20-35711-8
			Date Collected		10-Nov-20	10-Nov-20	10-Nov-20	10-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	16-Nov-20/O	284	51	288	287
Conductivity @25°C	µmho/cm	1	SM 2510B	16-Nov-20/O	754	237	849	854
pH @25°C	pH Units		SM 4500H	16-Nov-20/O	7.67	7.24	8.00	7.94
Total Dissolved Solids	mg/L	3	SM 2540D	17-Nov-20/O	394	121	448	451
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K	780	< 3	9	< 3
BOD(5 day)	mg/L	3	SM 5210B	12-Nov-20/K	12	< 3	< 3	< 3
COD	mg/L	5	SM5220C	12-Nov-20/K	276	33	< 5	< 5
Phenolics	mg/L	0.002	MOEE 3179	25-Nov-20/K	< 0.002	< 0.002	< 0.002	< 0.002
Chloride	mg/L	0.5	SM4110C	16-Nov-20/O	78.6	37.8	92.4	97.1
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	17-Nov-20/K	0.11	0.05	0.04	0.03
Sulphate	mg/L	1	SM4110C	16-Nov-20/O	2	4	3	3
Nitrite (N)	mg/L	0.05	SM4110C	16-Nov-20/O	< 0.05	< 0.05	< 0.05	0.06
Nitrate (N)	mg/L	0.05	SM4110C	16-Nov-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-Nov-20/K	9.8	0.8	0.4	0.4
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	345	51	318	313
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	14.4	0.401	0.034	0.083
Phosphorus-Total	mg/L	0.01	E3199A.1	23-Nov-20/K	0.68	0.04	0.04	0.03

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G099262 **REPORT No. B20-35711**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 11-Nov-20
DATE REPORTED: 27-Nov-20
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		SW4	SW QA/QC		
			Sample I.D.		B20-35711-9	B20-35711-10		
			Date Collected		10-Nov-20	10-Nov-20		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	16-Nov-20/O	333	266		
Conductivity @25°C	µmho/cm	1	SM 2510B	16-Nov-20/O	637	901		
pH @25°C	pH Units		SM 4500H	16-Nov-20/O	8.00	7.89		
Total Dissolved Solids	mg/L	3	SM 2540D	17-Nov-20/O	331	477		
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K	< 3	21		
BOD(5 day)	mg/L	3	SM 5210B	12-Nov-20/K	< 3	3		
COD	mg/L	5	SM5220C	12-Nov-20/K	29	12		
Phenolics	mg/L	0.002	MOEE 3179	25-Nov-20/K	< 0.002	< 0.002		
Chloride	mg/L	0.5	SM4110C	16-Nov-20/O	3.5	116		
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	17-Nov-20/K	0.02	2.54		
Sulphate	mg/L	1	SM4110C	16-Nov-20/O	3	5		
Nitrite (N)	mg/L	0.05	SM4110C	16-Nov-20/O	< 0.05	< 0.05		
Nitrate (N)	mg/L	0.05	SM4110C	16-Nov-20/O	< 0.05	0.09		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	23-Nov-20/K	0.7	3.2		
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	352	276		
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	0.033	0.217		
Phosphorus-Total	mg/L	0.01	E3199A.1	23-Nov-20/K	0.05	0.06		

Michelle Dubien
Lab Manager

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G89901 **REPORT No. B20-35809**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 12-Nov-20
DATE REPORTED: 20-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW17-1_B	OW17-3_A	OW14-1_B	OW14-2_A
			Sample I.D.		B20-35809-1	B20-35809-2	B20-35809-3	B20-35809-4
			Date Collected		11-Nov-20	11-Nov-20	11-Nov-20	11-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	209	228	696	794
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	461	474	2620	2420
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	8.01	7.82	7.41	7.53
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	238	245	1460	1340
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K				220
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-Nov-20/O	0.9	< 0.2	2.9	4.8
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K				14
COD	mg/L	5	SM5220C	16-Nov-20/K	< 5	11	31	63
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	1.5	1.3	436	308
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	0.02	0.02	10.4	22.7
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	20	7	23	< 1
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	266	282	833	814
Barium	mg/L	0.001	SM 3120	16-Nov-20/O	0.115	0.204	0.557	1.27
Boron	mg/L	0.005	SM 3120	16-Nov-20/O	0.055	0.007	1.10	1.06
Calcium	mg/L	0.02	SM 3120	16-Nov-20/O	76.0	96.4	256	261
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	0.007	0.014	4.74	27.3
Magnesium	mg/L	0.02	SM 3120	16-Nov-20/O	18.4	9.96	47.0	39.2
Sodium	mg/L	0.2	SM 3120	16-Nov-20/O	2.6	1.3	268	227

Michelle Dubien
Lab Manager

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G89901 **REPORT No. B20-35809**

Report To:

Cambium Environmental
PO Box 325, 52 Hunter Street East
Peterborough ON K9H 1G5 Canada
Attention: Stephanie Reeder

Caduceon Environmental Laboratories
285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 12-Nov-20
DATE REPORTED: 20-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW16_B	GW Qa/QC#1	OW9_A	DP3_A
			Sample I.D.		B20-35809-5	B20-35809-6	B20-35809-7	B20-35809-8
			Date Collected		11-Nov-20	11-Nov-20	11-Nov-20	11-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	896	895	476	241
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	2040	2040	2010	935
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	7.28	7.17	7.26	7.69
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	1130	1130	1110	497
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-Nov-20/O	10.7	10.3	2.5	0.9
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K				
COD	mg/L	5	SM5220C	16-Nov-20/K	63	61	32	141
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	96.6	97.6	360	135
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	42.0	42.1	5.38	0.23
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	19	20	4	19
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	< 0.05	< 0.05	< 0.05	< 0.05
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	814	815	494	336
Barium	mg/L	0.001	SM 3120	16-Nov-20/O	1.13	1.14	0.558	0.450
Boron	mg/L	0.005	SM 3120	16-Nov-20/O	1.23	1.22	0.409	0.170
Calcium	mg/L	0.02	SM 3120	16-Nov-20/O	279	280	185	122
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	21.0	21.1	13.2	5.51
Magnesium	mg/L	0.02	SM 3120	16-Nov-20/O	28.3	28.0	7.66	7.59
Sodium	mg/L	0.2	SM 3120	16-Nov-20/O	124	123	273	66.0

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Lab Manager

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285 Dalton Ave
Kingston Ontario K7K 6Z1
Tel: 613-544-2001
Fax: 613-544-2770

DATE RECEIVED: 12-Nov-20
DATE REPORTED: 20-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		BH16-4S_A	BH16-4D_B	BH16-3D_B	BH16-3S_A
			Sample I.D.		B20-35809-9	B20-35809-10	B20-35809-11	B20-35809-12
			Date Collected		11-Nov-20	11-Nov-20	11-Nov-20	11-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	357	296	213	241
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	1940	1730	790	878
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	7.42	7.76	7.71	7.81
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	1070	946	415	464
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-Nov-20/O	0.4	< 0.2	2.2	3.5
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K				
COD	mg/L	5	SM5220C	16-Nov-20/K	11	6	11	59
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	401	361	107	113
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	0.04	0.02	0.05	0.05
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	24	24	13	19
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	0.06	0.06	< 0.05	0.11
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	546	689	263	168
Barium	mg/L	0.001	SM 3120	16-Nov-20/O	0.380	0.737	0.343	0.624
Boron	mg/L	0.005	SM 3120	16-Nov-20/O	0.086	0.058	0.032	0.033
Calcium	mg/L	0.02	SM 3120	16-Nov-20/O	202	240	98.3	64.0
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	0.006	< 0.005	0.012	0.011
Magnesium	mg/L	0.02	SM 3120	16-Nov-20/O	9.97	21.6	4.16	2.03
Sodium	mg/L	0.2	SM 3120	16-Nov-20/O	211	96.3	74.1	144

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DATE RECEIVED: 12-Nov-20
DATE REPORTED: 20-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		OW19-1_B	OW19-2_A	DP4-R_A	BH16-2_A
			Sample I.D.		B20-35809-13	B20-35809-14	B20-35809-15	B20-35809-16
			Date Collected		11-Nov-20	11-Nov-20	11-Nov-20	11-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	236	228	356	246
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	716	686	3280	1600
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	7.53	7.59	7.34	7.95
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	372	356	1840	874
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-Nov-20/O	9.4	9.3	1.3	0.3
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K				
COD	mg/L	5	SM5220C	16-Nov-20/K	26	30	108	11
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	76.2	69.1	893	348
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	1.25	1.23	1.47	0.12
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	< 1	< 1	< 10	40
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	< 0.05	< 0.05	< 0.5	0.06
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	289	286	714	584
Barium	mg/L	0.001	SM 3120	16-Nov-20/O	1.22	1.20	0.571	0.240
Boron	mg/L	0.005	SM 3120	16-Nov-20/O	0.014	0.014	0.037	0.169
Calcium	mg/L	0.02	SM 3120	16-Nov-20/O	110	109	267	187
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	5.79	5.40	19.5	0.057
Magnesium	mg/L	0.02	SM 3120	16-Nov-20/O	3.35	3.33	11.2	28.4
Sodium	mg/L	0.2	SM 3120	16-Nov-20/O	45.6	45.6	402	92.3

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Lab Manager

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Tel: 613-544-2001
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DATE RECEIVED: 12-Nov-20
DATE REPORTED: 20-Nov-20
SAMPLE MATRIX: Groundwater

JOB/PROJECT NO.: Buckhorn WDS
P.O. NUMBER: 10520-006
WATERWORKS NO.

			Client I.D.		GWQA/QC	DP2-R_A	BH16-1_B	DP1_A
			Sample I.D.		B20-35809-17	B20-35809-18	B20-35809-19	B20-35809-20
			Date Collected		11-Nov-20	11-Nov-20	11-Nov-20	11-Nov-20
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	17-Nov-20/O	245	310	212	307
Conductivity @25°C	µmho/cm	1	SM 2510B	17-Nov-20/O	1610	960	462	911
pH @25°C	pH Units		SM 4500H	17-Nov-20/O	7.95	7.86	8.08	7.82
Total Dissolved Solids	mg/L	3	SM 2540D	18-Nov-20/O	877	511	239	483
Total Suspended Solids	mg/L	3	SM2540D	12-Nov-20/K				
Dissolved Organic Carbon	mg/L	0.2	EPA 415.2	10-Nov-20/O	0.4	0.8	1.1	1.9
BOD(5 day)	mg/L	3	SM 5210B	13-Nov-20/K				
COD	mg/L	5	SM5220C	16-Nov-20/K	13	112	< 5	19
Chloride	mg/L	0.5	SM4110C	17-Nov-20/O	356	109	1.9	96.2
Ammonia (N)-Total	mg/L	0.01	SM4500-NH3-H	18-Nov-20/K	0.11	0.06	0.02	0.04
Sulphate	mg/L	1	SM4110C	17-Nov-20/O	40	12	16	3
Nitrate (N)	mg/L	0.05	SM4110C	17-Nov-20/O	0.07	< 0.05	< 0.05	< 0.05
Hardness (as CaCO3)	mg/L	1	SM 3120	16-Nov-20/O	590	436	247	355
Barium	mg/L	0.001	SM 3120	16-Nov-20/O	0.243	0.577	0.108	0.253
Boron	mg/L	0.005	SM 3120	16-Nov-20/O	0.172	0.206	0.059	0.380
Calcium	mg/L	0.02	SM 3120	16-Nov-20/O	189	148	76.1	116
Iron	mg/L	0.005	SM 3120	16-Nov-20/O	0.054	1.03	0.083	3.95
Magnesium	mg/L	0.02	SM 3120	16-Nov-20/O	28.6	16.0	13.9	15.9
Sodium	mg/L	0.2	SM 3120	16-Nov-20/O	92.1	49.8	9.7	69.3

Michelle Dubien
Lab Manager

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Appendix E
Photographs

Photograph 1: Monitors OW9 (right) and OW16(left), November 2020

Photograph 2: Monitors OW9, April 2019

Photograph 3: Monitors OW12-1 and OW12-2, April 2019

Photograph 4: Monitors OW12-1 and OW12-2, April 2020

Photograph 5: Monitors OW14-1 and OW14-2, November 2018

Photograph 6: Monitors OW14-1 and OW14-2, October 2017

Photograph 7: Monitor OW16, November 2019

Photograph 8: Monitor OW16, April 2019

Photograph 9: Monitors OW17-1 and OW17-3, November 2019

Photograph 10: Monitors OW17-1 and OW17-3, April 2019

Photograph 11: Monitors OW19-1 and OW19-2, April 2020

Photograph 12: Monitors OW19-1 and OW19-2, April 2019

Photograph 13: Monitor DP1, April 2020

Photograph 14: Monitor DP1, April 2019

Photograph 15: Monitor DP2-R, April 2019

Photograph 16: Monitor DP2-R, April 2020

Photograph 17: Monitor DP3, April 2020

Photograph 18: Monitor DP3, November 2020

Photograph 19: Monitor DP4-R, November 2018

Photograph 20: Monitor DP4-R, April 2020

Photograph 21: Monitor BH16-1, April 2019

Photograph 22: Monitor BH16-1, April 2020

Photograph 23: Monitor BH16-2, April 2020

Photograph 24: Monitor BH16-2, April 2019

Photograph 25: Monitors BH16-3S and BH16-3D, April 2020

Photograph 26: Monitors BH16-3S and BH16-3D, April 2020

Photograph 27: Monitors BH16-4S and BH16-4D, April 2020

Photograph 28: Monitors BH16-4S and BH16-4D, April 2019

Photograph 29: Surface water monitoring station SW1, April 2020

Photograph 30: Surface water monitoring station SW1, November 2020

Photograph 31: Dry - Surface water monitoring station SW2, April 2020

Photograph 32: Dry - Surface water monitoring station SW2, November 2020

Photograph 33: Surface water monitoring station SW3, April 2020

Photograph 34: Insufficient Volumes - Surface water monitoring station SW3, November 2020

Photograph 35: Surface water monitoring station SW4, April 2020

Photograph 36: Surface water monitoring station SW4, November 2020

Photograph 37: Surface water monitoring station SW5, April 2020

Photograph 38: Surface water monitoring station SW5, November 2020

Photograph 39: Surface water monitoring station SW6, April 2020

Photograph 40: Surface water monitoring station SW6, November 2020

Photograph 41: Surface water monitoring station SW7, April 2020

Photograph 42: Surface water monitoring station SW7, November 2018

Photograph 43: Surface water monitoring station SW8, April 2020

Photograph 44: Surface water monitoring station SW8, November 2020

Photograph 45: Surface water monitoring station SW9, April 2020

Photograph 46: Surface water monitoring station SW9, November 2020

Photograph 47: Surface water monitoring station SW10, April 2020

Photograph 48: Surface water monitoring station SW10, November 2020

Photograph 49: Surface water monitoring station SW11, April 2020

Photograph 50: Surface water monitoring station SW11, November 2020

Appendix F
Borehole Logs

EXPLANATION OF THE FORM

BOREHOLE LOG

This explanatory section provides the background to assist in the use of the borehole logs. Each of the headings used on the borehole log, starting with "depth", is briefly explained.

DEPTH

This column gives the depth in metres below ground surface of interpreted geologic contacts. The elevation is surveyed unless otherwise noted.

STRATIGRAPHIC DESCRIPTION

This column gives a description of the soil based on visual examination of the samples and/or laboratory tests. Each stratum is described according to the following classification and terminology based on the proportion of individual particle sizes present.

Classification *		Terminology	Proportion
Clay	< 0.002 mm		
Silt	0.002 to 0.06 m	"trace" (eg. trace sand)	< 10%
Sand	0.06 to 2 mm	"some" (eg. some sand)	10% - 20%
Gravel	2 to 60 mm	adjective (eg. sandy)	20% - 35%
Cobbles	60 to 200 mm	"and" (eg. and sand)	35% - 50%
Boulders	> 200 mm	noun (eg. sand)	> 50%

* Extension of MIT Classification System

The use of the geologic term "till" implies that both disseminated coarser grained (i.e., sand, gravel, cobbles or boulders) particles and finer grained silt and clay particles may occur within the described matrix.

The compactness of cohesionless soils and the consistency of cohesive soils are defined by the following:

	COHESIONLESS SOIL		COHESIVE SOIL
Compactness	Standard Penetration Resistance "N", Blows / 0.3 m	Consistency	Standard Penetration Resistance "N", Blows / 0.3 m
Very Loose	0 to 4	Very Soft	0 to 2
Loose	4 to 10	Soft	2 to 4
Compact	10 to 30	Firm	4 to 8
Dense	30 to 50	Stiff	8 to 15
Very Dense	Over 50	Very Stiff	15 to 30
		Hard	Over 30

The moisture conditions of cohesionless and cohesive soils are defined as follows:

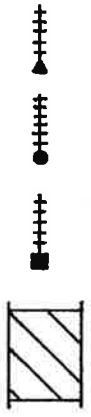
COHESIONLESS SOILS	COHESIVE SOILS	
Dry	DTPL	- Drier Than Plastic Limit
Moist	APL	- About Plastic Limit
Wet	WTPL	- Wetter Than Plastic Limit
Saturated	MWTPL	- Much Wetter Than Plastic Limit

STRATIGRAPHY

Symbols are used to pictorially identify the interpreted stratigraphy of the soil and rock strata.

MONITOR DETAILS AND NUMBER

This column shows the position and designation of standpipe and/or piezometer ground water monitors installed in the borehole or excavation. Also the water level may be shown for the date indicated.

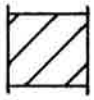


Standpipe and Designation

Piezometer and Designation

Gas Monitor and Designation

Borehole Seal (Peltonite, Bentonite or Hole Plug)



Cement Seal

Granular Pack

Granular Backfill

Native Soil Backfill

Where monitors are placed in separate boreholes, these are shown individually in the "Monitor Details" column. Otherwise, monitors are in the same borehole. For further data regarding seals, screens, etc., the reader is referred to the summary of monitor details table.

SAMPLE

These columns describe the sample type and number, the "N" value and water content for soils and the percentage recovery and Rock Quality Designation (RQD) for rock, of each sample obtained from the borehole or excavation. The location (depth) of each sample is plotted to scale. The legend for sample type is explained below:

SS	=	Split Spoon	GS	=	Grab Sample
ST	=	Thin Walled Shelby Tube	CS	=	Channel Sample
AS	=	Auger Flight Sample	WS	=	Wash Sample
CC	=	Continuous Core	RC	=	Rock Core

$$\% \text{ Recovery} = \frac{\text{Length of Core Recovered/Run}}{\text{Total Length of Run}} \times 100$$

Where diamond drilling has been carried out the term RQD is used. The Rock Quality Designation (RQD) is an indirect measure of the number of fractures and soundness of the rock mass. It is

obtained from the rock cores by summing up the length of core recovered, counting only those pieces of sound core that are 100 mm or more in length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD - Value (%)
Very poor quality	< 25
Poor quality	25 - 50
Fair quality	50 - 75
Good quality	75 - 90
Excellent quality	90 - 100

TEST DATA

The central section of the log provides graphs which are used to plot selected field and laboratory test results at the elevation at which they were carried out. The symbols and scales for the plotting are shown at the head of the column.

Dynamic Penetration Resistance - The number of blows required to advance a 50 mm diameter 60° steel cone fitted to the end of 45 mm OD drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

Standard Penetration Resistance - SPT "N" Value - The number of blows required to advance a 50 mm diameter standard split-spoon sampler 300 mm into the subsoil, driven by means of a 63.5 kg hammer falling freely a distance of 750 mm.

Water Content %. - The ratio of the mass of water to the mass of oven-dry solids in the soil expressed as a percentage.

W_p - Plastic Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

W_L - Liquid Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

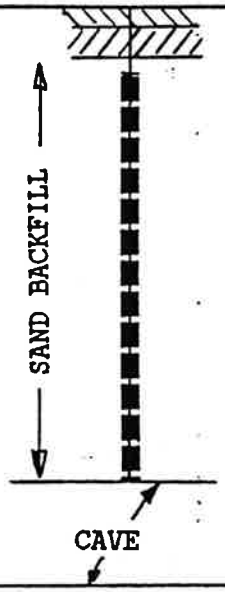
REMARKS

The last column describes pertinent drilling details or field observations and/or provides an indication of other field or laboratory tests that have been performed. The results of other tests not plotted on the form are given in an Appendix to the report.

GEO-ENVIRON LIMITED BH1

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey
PROJECT NO: 818
DATE: Jan 23-24/89
CONTRACTOR: Atcost Soil Drilling Inc.
EQUIPMENT: CME 55
WATER LEVEL: Dry
ELEVATION: 100.28 metres (Relative to local datum of 100.00 metres)

DEPTH METRES	DESCRIPTION	AS CONSTRUCTED	SAMPLE	COMMENTS
	SILT SAND TILL: medium brown, unsorted, abundant angular gravel and boulders, hard.		1 2 3 4 5	Using hollow stem augers augered to refusal at 1 metre, 0.3 metres, 3.4 metres, in separate holes Using solid stem augers drilled to refusal at 3.8 metres.
3.8				

FIGURE

\\\ CEMENT /// PELTONITE

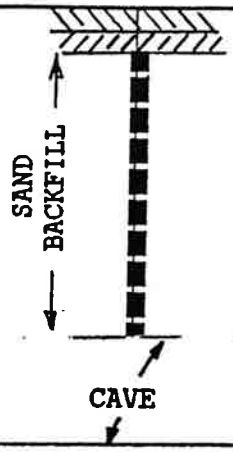
GEO-ENVIRON LIMITED

BH2

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey
EQUIPMENT: CME 55
ELEVATION: 99.83 metres (Relative local to datum of 100.00 metres)

PROJECT NO: 818
DATE: Jan 23/89
CONTRACTOR: Atcost Soil Drilling Inc.
WATER LEVEL: Dry

DEPTH METRES	DESCRIPTION	AS CONSTRUCTED	SAMPLE	COMMENTS
2.9	SILT SAND TILL: medium brown, unsorted, abundant angular, gravel and boulders, hard.		1 2 3 4	Used solid stem augers to drill to refusal at 1.7 metres, 2.3 metres and 2.9 metres in separate boreholes

FIGURE

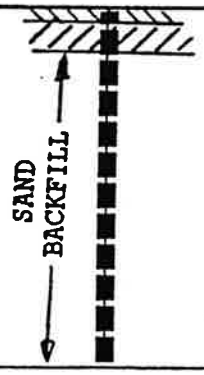
\\\ CEMENT /// PELTONITE

GEO-ENVIRON LIMITED BH3

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey
EQUIPMENT: CME 55
ELEVATION: 101.06 metres ASL (Relative to local datum of 100.00 metres)

PROJECT NO: 818
DATE: Jan. 24/89
CONTRACTOR: Atcost Soil Drilling Inc.
WATER LEVEL: 2.21 metres below surface

DEPTH METRES	DESCRIPTION	AS CONSTRUCTED	SAMPLE	COMMENTS
	FILL AND REFUSE: medium brown, silty fine-medium sand and gravel, unsorted, very loose, strong leachate smell.		1 2	Using solid stem augers Grinding at 2.3 metres Refusal at 2.4 metres
2.4				

FIGURE

\\\ CEMENT /// PELTONITE

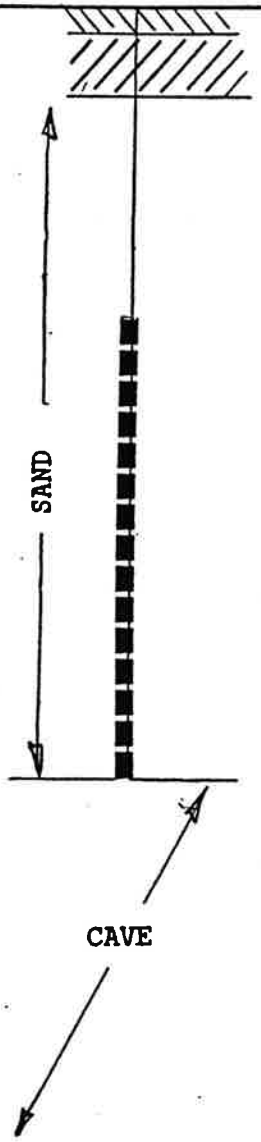
GEO-ENVIRON LIMITED

BH4

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey
EQUIPMENT: CME 55
ELEVATION: 100.11 metres (Relative to local datum of 100.00 metres)

PROJECT NO: 818
DATE: Jan 24/89
CONTRACTOR: Atcost Soil Drilling Inc.
WATER LEVEL: 3.10 metres below surface

DEPTH METRES	DESCRIPTION	AS CONSTRUCTED	SAMPLE	COMMENTS
	FILL: medium brown, fine sand with gravel and boulders, wood chips, very loose to compact, wet below ~ 3 metres.		1 2 3	Boulders to 1 metre depth, not possible to sample
4.0	SAND AND GRAVEL: medium brown, medium-coarse, poorly sorted, minor silt and clay, dense, wet.		4	Difficult drilling due to boulders to 4.9 metres
5.6	SILT SAND TILL: grey, unsorted subrounded gravel, massive, hard, wet.		5	
7.6			6	

FIGURE

\\\ CEMENT /// PELTONITE

GEO-ENVIRON LIMITED

BH5

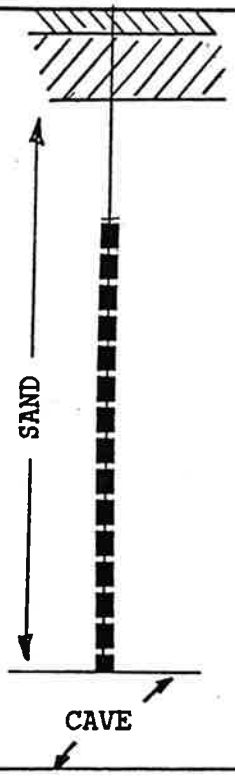
SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey

PROJECT NO: 818
DATE: Jan. 25/89
CONTRACTOR: Atcost Soil Drilling Inc.

EQUIPMENT: CME 55
ELEVATION: 96.07 metres (Relative to local datum of 100.00 metres)

WATER LEVEL: 1.95 metres below surface

DEPTH METRES	DESCRIPTION	AS CONSTRUCTED	SAMPLE	COMMENTS
	FINE-MEDIUM SAND: reddish-brown, trace gravel, well sorted, uniform, dense, moist.		1 2	
2.5	SILT SAND TILL: grey, unsorted abundant sub-angular gravel, hard.		3 4 5	
4.4	BEDROCK: biotite gneiss, weathered, black, hard.		6	Augered to refusal at 5.0 metres
5.0				

FIGURE

\\\ CEMENT /// PELTONITE

GEO-ENVIRON LIMITED

BH6 (Page 1 of 1)

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation
LOCATION: Township of Harvey, Buckhorn Landfill Site

PROJECT NO: 818
DATE: Jan. 25/89
CONTRACTOR: Atcost Soil Drilling Inc.

EQUIPMENT: CME 55
ELEVATION: 6-I: 99.64 m) Relative to
6-II: 99.72 m) local datum
of 100.00 m

WATER LEVEL:
6-I: 4.24 m below surface
6-II: 3:15 m below surface

DEPTH METRES	DESCRIPTION	6-I 6-II AS CONSTRUCTED	SAMPLE	COMMENTS
	FILL AND REFUSE: medium brown, fine-medium sand and gravel, compact, strong leachate smell.	BACKFILL; SAND	1	Monitors installed in separate boreholes
4.4	FINE-MEDIUM SAND: medium-light brown, trace unsorted subround gravel, compact, wet.	SILICA SAND	4	Drilling becomes harder at 5.2 metres
5.2	SILT SAND TILL: brownish-grey, unsorted abundant subangular gravel, massive, hard, wet.	BACKFILL WITH NATIVE MATERIAL	5, 6, 7	
10.0				

FIGURE

\\\ CEMENT /// PELTONITE

GEO-ENVIRON LIMITED

BH6 (Page 2 of 2)

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey

PROJECT NO: 818
DATE: Jan. 25/89
CONTRACTOR: Atcost Soil Drilling Inc.

EQUIPMENT: CME 55
ELEVATION: 6-I: 99.64 m) Relative to
6-II: 99.72 m) local datum
100.00 metres

WATER LEVEL:
6-I: 4.24 m below surface
6-II: 3.15 m below surface

DEPTH METRES	DESCRIPTION	AS CONSTRUCTED	SAMPLE	COMMENTS
	SILT SAND TILL (continued)	BACKFILL	8	No penetration of split spoon sampler at 11.1 metres. Probably bedrock
11.1				

FIGURE

\\\ CEMENT /// PELTONITE

GEO-ENVIRON LIMITED

BH7

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey
PROJECT NO: 818
DATE: Jan. 26/89
CONTRACTOR: Atcost Soil Drilling Inc.

EQUIPMENT: CME 55
ELEVATION: 7-I: 95.06 m) Relative to
7-II: 94.92 m) local datum
100.00 metres

WATER LEVEL:
7-I: 0.38 m below surface
7-II 0.32 m below surface

DEPTH METRES	DESCRIPTION	7-I —7-II AS CONSTRUCTED	SAMPLE	COMMENTS
	SILT SAND AND PEAT: black, abundant organic debris, trace gravel, very soft, sticky, wet.	BACKFILL; SILICA SAND	1	Located 3 metres from refuse face. Abundant boulders at surface. Drilled with solid stem augers
1.4				
	SILT SAND TILL: light brown, abundant unsorted angular gravel, hard, wet.		2	Monitors installed in separate boreholes
			3	
		CAVE	4	No penetration of split spoon at 3.9 metres; probably bedrock
3.9			5	

FIGURE

\\\ CEMENT /// PELTONITE

GEO-ENVIRON LIMITED

BH8

SUBSURFACE INVESTIGATION LOG

PROJECT: Hydrogeological Investigation, Buckhorn Landfill Site
LOCATION: Township of Harvey
EQUIPMENT: CME 55
ELEVATION: 102.25 m (relative to local (datum of 100.00 m

PROJECT NO: 818
DATE: Jan. 26/89
CONTRACTOR: Atcost Soil Drilling Inc.
WATER LEVEL: 7.60 m below surface

DEPTH METRES	DESCRIPTION	AS CONSTRUCTED	SAMPLE	COMMENTS
	FILL AND REFUSE: silty fine-medium sand and unsorted gravel, very loose, strong leachate smell.	SILICA SAND BACKFILL; CAVE\OPEN HOLE	1	No split spoon samples in refuse from surface to 6 metres
7.3	FINE-COARSE SAND: grey, dense, poorly sorted, wet.		2	No penetration of split spoon samples at 9.1 metres. Probably bedrock
9.1			3	

FIGURE

\\\ CEMENT /// PELTONITE

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 9

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION, TOWNSHIP OF HARVEY, BUCKHORN LANDFILL

PROJECT NO. 90231.00

CLIENT HYDROTERRA LIMITED

DATE DECEMBER 3, 1990

BOREHOLE TYPE 108 mm HOLLOW STEM AUGERS

FIELD SUPERVISOR EK

GROUND ELEVATION

ENGINEER AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION SPT 'N' VALUE / SHEAR STRENGTH (20 40 60)	WATER CONTENT % (10 20 30) W P W L	REMARKS
	FILL: Asphalt shingles, metal, springs, wood stumps.										
1.2				SS	18	11					
	SANDY SILT TO SILTY SAND: Grey brown to black brown sandy silt, trace clay occasional wood chip near top. - wet to saturated very loose becoming compact.			SS	2	36					
3.0				SS	22	46					
	TILL: Brown silty sand - saturated. dense			SS	34	12					
3.8											
	Borehole terminated at 3.8 m on assumed bedrock										

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 10

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION, TOWNSHIP OF HARVEY, BUCKHORN LANDFILL

PROJECT NO. 90231.00

CLIENT HYDROTERRA LIMITED

DATE NOVEMBER 29, 1990

BOREHOLE TYPE 108 mm HOLLOW STEM AUGERS

FIELD SUPERVISOR EK

GROUND ELEVATION

ENGINEER AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION SPT 'N' VALUE / SHEAR STRENGTH	WATER CONTENT %	REMARKS
	FILL: Bouldery at surface with rootlets. Woody material, some metal. Loose to compact wet.			SS	9	17					
1.2				SS	11	22					
1.4	TOPSOIL: Dark brown sandy silt										
	TILL: Red brown stony sandy silt till. - numerous large stones. - hard augering. Wet to saturated. Compact to very dense.			SS	91 for 254mm	5					
3.7	Borehole terminated at 3.7 m on assumed bedrock.										

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 11

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION
TOWNSHIP OF HARVEY, BUCKHORN LANDFILL

PROJECT NO. 90231.00

CLIENT HYDROTERRA LIMITED

DATE NOVEMBER 30, 1990

BOREHOLE TYPE 108 mm HOLLOW STEM AUGERS

FIELD SUPERVISOR EK

GROUND ELEVATION

ENGINEER AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION SPT 'N' VALUE / SHEAR STRENGTH (20 40 60)	WATER CONTENT % (10 20 30) W P W L	REMARKS
	TILL: Grey silty sand to sandy silt. Angular stones some random boulders and cobbles. Moist to wet. Compact to dense.			SS	22	10					- slight odour detected or saturated samples.
				SS	39	9					
2.1				SS	38	13					
	Borehole terminated at 2.1 m on assumed bedrock.										

JHL 5-88

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 12

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION, TOWNSHIP OF HARVEY, BUCKHORN LANDFILL

PROJECT NO. 90231.00

CLIENT HYDROTERRA LIMITED

DATE NOVEMBER 30, 1990

BOREHOLE TYPE 108 mm HOLLOW STEM AUGERS AND 75 mm NQ DIAMOND CORING

FIELD SUPERVISOR EK

GROUND ELEVATION

ENGINEER AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION SPT 'N' VALUE / SHEAR STRENGTH	WATER CONTENT %	REMARKS
	SAND AND GRAVEL: Brown changing to grey medium to coarse gravel with fine to coarse sand. - saturated. dense.		I II	SS	30	17			20 40 60	10 20 30 W P W L	
				SS	35	8					
1.7	FINE SANDY SILT TO SILTY FINE SAND: Grey. - saturated. compact.			SS	24	22					
				SS	25	22					
2.9	BIOTITE GNEISS: Upper portions weathered, recovery poor. Occasional reddish pegmatite zones.			NQ				10			
				NQ			100				
5.9	Borehole terminated at 5.9 m.		Monitors in separate boreholes								

JHL 5-88

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 13

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION
TOWNSHIP OF HARVEY, BUCKHORN LANDFILL

PROJECT NO. 90231.00

CLIENT HYDROTERRA LIMITED

DATE NOVEMBER 29, 1990

BOREHOLE TYPE 108 mm HOLLOW STEM AUGERS

FIELD SUPERVISOR EK

GROUND ELEVATION

ENGINEER AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE ROD (%)	CONE PENETRATION SPT 'N' VALUE / SHEAR STRENGTH	WATER CONTENT %	REMARKS
	PEAT: Black to dark brown peat with woody fragments trace to some silt. - saturated. very loose to loose.			SS	3	81			20 40 60	10 20 30 W P W L	
				SS	5	78					
1.4	TILL: Medium brown, grey brown sandy silt to silty sand till, mixed with fine to coarse gravel. - saturated. compact becoming very dense.			SS	17	13					
				SS	69	9					
3.8	Borehole terminated at 3.8 m on assumed bedrock.			SS	50 FOR 125mm	12					

JHL 5-88

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 14

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION, TOWNSHIP OF HARVEY, BUCKHORN LANDFILL

PROJECT NO. 90231.00

CLIENT HYDROTERRA LIMITED

DATE DECEMBER 4, 1990

BOREHOLE TYPE 108 mm HOLLOW STEM AUGERS AND 75 mm NQ DIAMOND CORING

FIELD SUPERVISOR EK

GROUND ELEVATION

ENGINEER AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I II	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION SPT 'N' VALUE 20 40 60 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 W P W L	REMARKS
	SAND: Brown medium sand. - saturated.										
0.90											
	SILTY SAND TO SANDY SILT TILL: Grey to grey brown with bands of coarse sand up to 30 mm thick. - wet to saturated. loose becoming dense.			SS	7	17					
				SS	33	12					- seal material and native caving soils intermixed through this zone.
3.1				SS	49	7					
	BIOTITE GNEISS: Upper run weathered slightly at till/ bedrock contact. Small porous areas with minor vugging or holes less than 1 mm in diameter in second drill run.			NQ			100	100			
				NQ			100	100			Bridging problems of seal in bedrock hole.
5.9											
	Borehole terminated at 5.9 m.		Both monitors in same borehole								

JHL 5-88

JAGGER HIMS LIMITED
CONSULTING ENGINEERS

BOREHOLE NO. 15

PROJECT NAME HYDROGEOLOGICAL INVESTIGATION, TOWNSHIP OF HARVEY, BUCKHORN LANDFILL

PROJECT NO. 90231.00

CLIENT HYDROTERRA LIMITED

DATE DECEMBER 4, 1990

BOREHOLE TYPE 108 mm HOLLOW STEM AUGERS

FIELD SUPERVISOR EK

GROUND ELEVATION

ENGINEER AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION SPT 'N' VALUE 20 40 60 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W P W L	REMARKS
	SAND: Brown coarse sand. Trace to some medium to fine sand. - wet to saturated. compact.			SS	13	76					
1.1											
	SANDY SILT TILL: Grey brown to brown grey till. - saturated. compact to very dense.			SS	23	18					
				SS	61	14					
				SS	32	10					
2.9											
	Borehole terminated at 2.9 m on assumed bedrock.										

BOREHOLE NO. 17

PROJECT NAME : HYDROGEOLOGICAL INVESTIGATION, BUCKHORN LANDFILL
PROJECT NO.: 90321.01

CLIENT: HYDROTERRA LIMITED
DATE : MARCH 20 & 23, 1992

BOREHOLE TYPE : 108 mm HOLLOW STEM AUGERS & 102 mm HQ DIAMOND CORING
GEOLOGIST : FMB

GROUND ELEVATION : NOT DETERMINED
REVIEWER : AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS (I II III)	SAMPLE TYPE	'N' VALUE	% WATER	% RECOVERY	RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0									20 40 40	10 20 30	
0.3	TOPSOIL: DARK BROWN SANDY SILT.										MONITORS I, II AND III ARE IN SAME BOREHOLE.
	SANDY SILT TILL TO SILTY SAND TILL: GREY BROWN, SANDY SILT TO SILTY SAND TILL, BECOMING MEDIUM BROWN AT 3.7 m. ANGULAR GRAVEL, SOME RANDOM BOULDERS AND COBBLES. RUSTY BROWN MARKS FROM MIDDLE TO BOTTOM. COBBLEY DRILLING. MOIST. DENSE BECOMING VERY DENSE BELOW 1.5 m.			SS1	4	8					
2				SS2	30	9					
4				SS3	55	7					
6				SS4	91	5					
8				SS5	109	6					
10				SS6	82	7					
5.6				SS7	98	9					
12	SANDY SILT TO SILT: BROWN, BECOMING GREY AT 7.9 m, SANDY SILT TO SILT, SOME FINE SAND WITH FINE SAND TO SILTY FINE SAND LAYER, APPROXIMATELY 2.5 cm THICK. TRACE GRAVEL. OCCASIONAL RUSTY BROWN MARKS AT TOP. HARD DRILLING. MOIST TO SATURATED. VERY DENSE.			SS8	50 for 76 mm	15					
14											
16				SS9	55 for 152 mm	19					
8.2											
18	SANDY SILT TILL: REDDISH BROWN, SANDY SILT TILL WITH BROWN SILTY FINE SAND LAYER, APPROXIMATELY 5 mm TO 12 mm THICK. SOME MICA FLAKES AND TRACE ANGULAR GRAVEL.			SS10	100	11					
20											

GENIVAR

BOREHOLE NO. 17 cont'd

PROJECT NAME : HYDROGEOLOGICAL INVESTIGATION, BUCKHORN LANDFILL **PROJECT NO.:** 90321.01

CLIENT: HYDROTERRA LIMITED **DATE :** MARCH 20 & 23, 1992

BOREHOLE TYPE : 108 mm HOLLOW STEM AUGERS & 102 mm HQ DIAMOND CORING **GEOLOGIST :** FMB

GROUND ELEVATION : NOT DETERMINED **REVIEWER :** AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
20			I II						20 40 40	10 20 30	
22	SANDY SILT TILL: AS ABOVE, BECOMING SILT WITH MICA FLAKES AT BOTTOM. OCCASIONAL BROWN SILT LAYERS LESS THAN 1 mm THICK, MOIST, VERY DENSE.			SS11	110 for 152 mm	6					
11.7											
24	PEGMATITE GRANITE: REDDISH PEGMATITE GRANITE WITH NUMEROUS FRACTURES, WEATHERED BROTITE GNEISS AT SILT/BEDROCK CONTACT, WEATHERED ZONE AT 14.0 m TO 14.3 m.										AUGER REFUSAL AT 11.7 m.
26				HQ			100	100			HQ ROCK CORE.
28				HQ			100	100			
30											
14.9	BOREHOLE TERMINATED AT 14.9 m IN PEGMATITE GRANITE.										
32											
34											
36											
38											
40											

GENIVAR

BOREHOLE NO. 18

PROJECT NAME : HYDROGEOLOGICAL INVESTIGATION, BUCKHORN LANDFILL **PROJECT NO.:** 90321.01

CLIENT: HYDROTERRA LIMITED **DATE :** MARCH 23 & 24, 1992

BOREHOLE TYPE : 108 mm HOLLOW STEM AUGERS & 102 mm HQ DIAMOND CORING **GEOLOGIST :** FMB

GROUND ELEVATION : NOT DETERMINED **REVIEWER :** AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0									20 40 40	10 20 30	
0.4	PEAT: BLACK TO DARK BROWN PEAT, WITH FIBROUS WOODY FRAGMANTS, COMPACT, SATURATED.			SS1	17	833					AUGER REFUSAL AT 0.4 m
	PEGMATITE GRANITE: REDDISH PEGMATITE GRANITE WITH LAYERS OF BIOTITE GNEISS, APPROXIMATELY LESS THAN 1 mm OT 260 mm THICK, UPPER RUN HAS NUMEROUS BREAKS.			HQ			100	100			
2											
				HQ			100	100			
4				HQ			100	100			
4.1	BOREHOLE TERMINATED AT 4.1 m IN PEGMATITE GRANITE.										
6											
8											
10											
12											
14											
16											
18											
20											

GENIVAR

BOREHOLE NO. 19

PROJECT NAME : HYDROGEOLOGICAL INVESTIGATION, BUCKHORN LANDFILL **PROJECT NO.:** 90321.01

CLIENT: HYDROTERRA LIMITED **DATE :** MARCH 19, 1992

BOREHOLE TYPE : 108 mm HOLLOW STEM AUGERS & 102 mm HQ DIAMOND CORING **GEOLOGIST :** FMB

GROUND ELEVATION : NOT DETERMINED **REVIEWER :** AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS I II	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE 20 40 40 / SHEAR STRENGTH	WATER CONTENT % 10 20 30 / W_P W_L	REMARKS
0	PEAT: BLACK TO DARK BROWN PEAT, WITH FIBROUS WOODY FRAGMANTS, DARK GREY SILTY SAND WITH ANGULAR FRAGMENTS AT BOTTOM, SATURATED, VERY LOOSE TO LOOSE.			SS1	2	537					MONITORS I AND II ARE IN SAME BOREHOLE.
				SS2	1	666					
2	1.9			SS3	6	460					AUGER REFUSAL AT 0.4 m
	PEGMATITE GRANITE: REDDISH PEGMATITE GRANITE, UPPER PORTION IN WEATHERED BIOTITE GNEISS AND INTERMITTENT SAND LAYERS.			HQ			100	100			
4				HQ			100	100			
6				HQ			100	100			
	6.4										
	BOREHOLE TERMINATED AT 6.4 m IN PEGMATITE GRANITE.										
8											
10											
12											
14											
16											
18											
20											

BOREHOLE NO. 20

PROJECT NAME : HYDROGEOLOGICAL INVESTIGATION, BUCKHORN LANDFILL **PROJECT NO.:** 90321.01

CLIENT: HYDROTERRA LIMITED **DATE :** MARCH 18, 1992

BOREHOLE TYPE : 108 mm HOLLOW STEM AUGERS & 102 mm HQ DIAMOND CORING **GEOLOGIST :** FMB

GROUND ELEVATION : NOT DETERMINED **REVIEWER :** AGH

DEPTH (m)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	SAMPLE 'N' VALUE	SAMPLE % WATER	SAMPLE % RECOVERY	SAMPLE RQD (%)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH	WATER CONTENT % (W_P – W_L)	REMARKS
0									20 40 40	10 20 30	
0.6	PEAT: BLACK TO DARK BROWN FIBROUS PEAT, MEDIUM BROWN SILTY SAND, SOME GRAVEL AND ROOTS AT BOTTOM, MOIST, VERY LOOSE TO VERY DENSE.			SS1	2	12					UNABLE TO GET MEASUREMENTS FOR SAND PACK LOCATION
2	BIOTITE GNEISS TO PEGMATITE GRANITE: UPPER PORTION IS WHEATERED BIOTITE GNEISS WITH FRACTURES CONTAINING SAND, NUMEROUS BREAKS, OCCASIONAL REDDISH PEGMATITE ZONES, APPROXIMATELY 10 TO 300 mm THICK, BECOMING REDDISH PEGMATITE GRANITE.			HQ			91	91			
4				HQ			97	97			
				HQ			100	100			
6				HQ			100	100			
6.8											
	BOREHOLE TERMINATED AT 6.8 m IN PEGMATITE GRANITE.										
8											
10											
12											
14											
16											
18											
20											

OW16-91

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC	LOT
Peterborough	Harvey Twp.	con. 6	11

OWNER (SURNAME FIRST)	ADDRESS	DATE COMPLETED
Harvey Twp.(Buckhorn)Landfill	Buckhorn, Ontario	DAY 30 MO 01 YR 91

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Brown	Sand	Stone, tires, rims & wood		0	14
Red, Green Gray	Granite			14	41

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
14 & 19	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL ☒ GAS
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL ☐ GAS
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL

CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	☒ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	.188	+ 3	14
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
0	10	Benseal

PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
☒ PUMP ☐ BAILER	5 GPM	HOURS — MINS 30

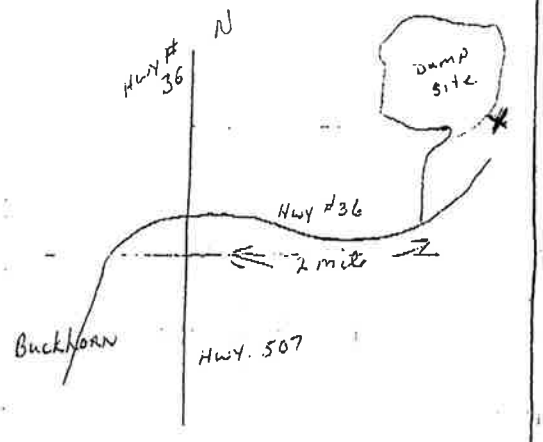
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING ☒ PUMPING ☐ RECOVERY	10 MINUTES	20 MINUTES	30 MINUTES	40 MINUTES
5 FEET	40 FEET		FEET	FEET	FEET	40 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	☒ CLEAR ☐ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☐ DEEP	FEET	5 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

☐ WATER SUPPLY ☐ ABANDONED, INSUFFICIENT SUPPLY
☒ OBSERVATION WELL ☐ ABANDONED, POOR QUALITY
☐ TEST HOLE ☐ UNFINISHED
☐ RECHARGE WELL

WATER USE

☐ DOMESTIC ☐ COMMERCIAL
☐ STOCK ☐ MUNICIPAL
☐ IRRIGATION ☐ PUBLIC SUPPLY
☐ INDUSTRIAL ☐ COOLING OR AIR CONDITIONING
☒ OTHER Dump Site ☐ NOT USED

METHOD OF DRILLING

☐ CABLE TOOL ☐ BORING
☐ ROTARY (CONVENTIONAL) ☐ DIAMOND
☐ ROTARY (REVERSE) ☐ JETTING
☒ ROTARY (AIR) ☐ DRIVING
☐ AIR PERCUSSION

CONTRACTOR

NAME OF WELL CONTRACTOR	LICENCE NUMBER
G. Hart & Sons Well Drilling Ltd.	2662

ADDRESS: Box 850, R.R.#1, Fenelon Falls, Ontario

NAME OF DRILLER OR BORER	LICENCE NUMBER
Charlie Duggan	

SIGNATURE OF CONTRACTOR — SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

CONTRACTOR'S COPY

FORM NO. 0506—4—77 FORM 7

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 **5118487** Municipality 5101 Con. CON 07

County or District	Township/Borough/City/Town/Village	Con	block	tract	survey, etc.	Lot
PEEL BOROUGH	FORMER HARVEY/GALWAY CAVANDISH.	7				9-10
[redacted]	Address BUCK HORN	Date completed 26 day 4 month 00 year				

21 Northing RC Elevation RC Basin Code

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
BROWN	SAND		SOFT.	0	2
RED/BLACK	GRANITE		HARD	2	368

31

32

41 WATER RECORD

Water found at - feet	Kind of water
360'	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 1/4	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	188	0	20'
6 1/8	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		20	368
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet
Material and type	Depth at top of screen feet	

61 PLUGGING & SEALING RECORD

☐ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	20	CEMENT.

71 PUMPING TEST

Pumping test method	Pumping rate	Duration of pumping
1 ☐ Pump 2 ☐ Bailer	5'0 GPM	Hours Mins

Static level	Water level end of pumping	Water levels during 1 ☐ Pumping 2 ☑ Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
feet	310 feet	+1 feet	+1 feet	+1 feet	+1 feet

If flowing give rate	Pump intake set at	Water at end of test
5 GPM	350 feet	☑ Clear ☐ Cloudy
Recommended pump type ☐ Shallow ☑ Deep	Recommended pump setting 350 feet	Recommended pump rate 5'0 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line.
Indicate north by arrow.

☐ WESTWIND INN.

BOBCAYGEON. 36

LAKE HURST ROAD.

BUCK HORN.

212712

FINAL STATUS OF WELL 54

1 ☑ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE 55-56

1 ☐ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☑ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION 57

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☐ Rotary (air) 5 ☑ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
BALDWIN	1312
Address RR#1 KIRKFIELD	
Name of Well Technician	Well Technician's Licence No.
CARL BALDWIN	T0300
Signature of Technician/Contractor	Submission date day 3 2000

2 - MINISTRY OF THE ENVIRONMENT COPY

MINISTRY USE ONLY

Data source	Contractor	Date received
	1312	JUL 25 2000
Date of inspection	Inspector	
Remarks		

CSS.ES0

0506 (11/98) Front Form 9

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A211299

Well Record

Regulation 903 Ontario Water Resources Act

S-19256 Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Municipality of Trent Lakes		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
760 Peterborough County Rd 36	Trent Lakes	ON	K0M1A0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
37 Dump Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Buckhorn	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	721293	4938386		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GRY	Gravel	Sand silt	Soft, loose	0	3
RED	Granite		hard, fractured	3	22

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m^3/ft^3)
-3	1	Monument Casing	
1	11	Bentonite	
11	22	Filter Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☑ Air percussion
☐ Other, *specify* ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.610	PVC	.145	0	12

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1900	PVC	10	12	22

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify* ____
☐ Other, *specify* ____

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify* ____	0	3	4.5
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify* ____	3	22	3
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify* ____			

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* ____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

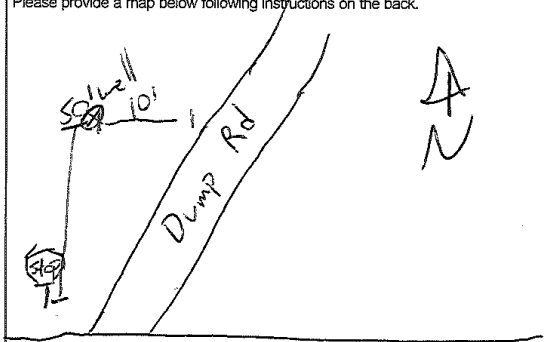
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: WSP General Contractors

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7141

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
ON	L3R8V2	wrecords@stratasoil.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
9057649304	Beatty Brian

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3161		2016 10 17

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 2016 09 14

Ministry Use Only

Audit No. Z233088

NOV 22 2016 Received

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

We Tag#: A 211298 Below)
A211298

Well Record

Regulation 903 Ontario Water Resources Act

S-9286 Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
	Municipality of Trent Lakes		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
760 Peterborough County Rd 36	Trent Lakes	ON	K0M1A0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
37 Dump Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Buckhorn	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	711272	4931386		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
GRY	Gravel	Sand	soft base	0	3
BLK	Granite		hard fractured	3	35

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
-3	1	monument casing	
1	24	bentonite	
24	35	filter sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☑ Air percussion
☐ Other, specify ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.610	PVC	.145	0	25

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.900	PVC	10	25	35

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☐ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify ____
☐ Other, specify ____

Water Details

Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify ____
Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify ____
Water found at Depth (m/ft)	☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify ____

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	3	4.5
3	35	3

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify ____

If pumping discontinued, give reason:

Pump intake set at (m/ft)

Pumping rate (l/min / GPM)

Duration of pumping ____ hrs + ____ min

Final water level end of pumping (m/ft)

If flowing give rate (l/min / GPM)

Recommended pump depth (m/ft)

Recommended pump rate (l/min / GPM)

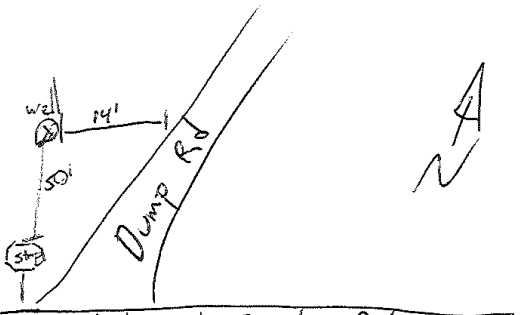
Well production (l/min / GPM)

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Peterborough County Rd 36

Comments:
WSP General Contractors

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
ON	L3R8V2	wrecords@stratasoil.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9057649304	Beatty Brian

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3616		2016 10 17

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2016 10 14

Ministry Use Only
Audit No. Z233086
Received NOV 22 2016

0506E (2014/11) Ministry's Copy

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A211302

Well Record

Regulation 903 Ontario Water Resources Act

S-4052 Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
Municipality	of Trent Lakes		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
760 Peterborough County Rd 36	Trent Lakes	ON	K0M1A0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
517 Dump Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Buckhorn	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	713055	4938424		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BLK	Topsoil		Soft Loose	0	1
RED	Granite		hard Fractured	1	17

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
3	1	monument casing	
1	6	Bentonite	
6	17	Filter Sand	

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* ____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☑ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.610	PVC	.145	0	7

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.900	PVC	10	7	17

Status of Well

☐ Water Supply
☐ Replacement Well
☑ Test Hole
☐ Recharge Well
☑ Dewatering Well
☑ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify* ____
☐ Other, *specify* ____

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*	Hole Diameter Depth (m/ft) From	To	Diameter (cm/in)
		0	3	4.5
		3	17	3

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* ____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

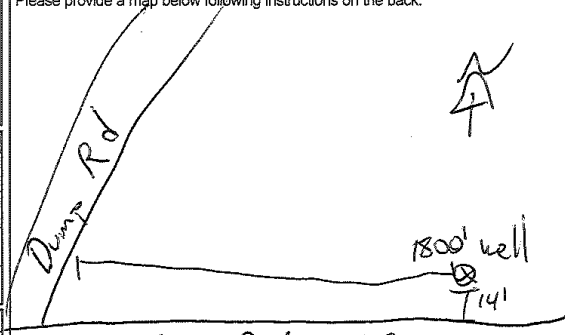
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

	Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level				
1			1	
2			2	
3			3	
4			4	
5			5	
10			10	
15			15	
20			20	
25			25	
30			30	
40			40	
50			50	
60			60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: WSP General Contractors

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
ON	L3R8V2	wrecords@stratasoil.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
9057649304	Beatty Brian

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3161		2016/10/07

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2016/09/13

Ministry Use Only

Audit No. Z233085

NOV 22 2016

Received

Ministry's Copy

Well ID Number: 7275166
Well Audit Number: *Z233084*
Well Tag Number: *A211301*

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	37 DUMP RD
Township	HARVEY TOWNSHIP
Lot	
Concession	
County/District/Municipality	PETERBOROUGH
City/Town/Village	BUCKHORN
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 713057.00 Northing: 4938424.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BLCK	LOAM		LOOS	0 ft	1 ft
RED	GRNT		FCRD	1 ft	33 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
-3 ft	1 ft	MONUMENT CASING	
1 ft	22 ft	BENTONITE	
22 ft	33 ft	FILTER SAND	

Method of Construction & Well Use

Method of Construction	Well Use
Air Percussion	Monitoring and Test Hole

Status of Well

Monitoring and Test Hole

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To
1.61 inch	PLASTIC	0 ft	23 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
1.9 inch	PLASTIC	23 ft	33 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7241

Results of Well Yield Testing

After test of well yield, water was	
If pumping discontinued, give reason	
Pump intake set at	
Pumping Rate	
Duration of Pumping	
Final water level	
If flowing give rate	
Recommended pump depth	
Recommended pump rate	
Well Production	
Disinfected?	

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
45		45	
50		50	
60		60	

Water Details

Water Found at Depth	Kind

Hole Diameter

Depth From	Depth To	Diameter
0 ft	3 ft	4.5 inch
3 ft	33 ft	3 inch

Audit Number: Z233084

Date Well Completed: October 13, 2016

Date Well Record Received by MOE: November 22, 2016

Updated: February 2, 2018
Rate Rate
Share facebook twitter Print

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☑ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A211309

Well Record

Regulation 903 Ontario Water Resources Act

S-1925b Page ____ of ____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
Municipality of	Trent Lakes		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. *(inc. area code)*
760 Peterborough County Rd 36	Trent Lakes	ON	K0M1A0	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
37 Dump Rd			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Buckhorn	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	712883	4983387		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
BLK	Topsoil		Soft loose	0	1
BRN	Sand	Silt Gravel	Soft loose	1	2.5
Red	Granite		hard fractured	2.5	17

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
-3	1	monument Casing	
1	6	bentonite	
6	17	filter Sand	

Method of Construction

☐ Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Jetting ☐ Rotary (Reverse) ☐ Driving ☐ Boring ☐ Digging ☐ Air percussion ☐ Other, *specify* ____

Well Use

☐ Public ☐ Commercial ☐ Not used ☐ Domestic ☐ Municipal ☐ Dewatering ☐ Livestock ☑ Test Hole ☐ Monitoring ☐ Irrigation ☐ Cooling & Air Conditioning ☐ Industrial ☐ Other, *specify* ____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1.610	PVC	.145	0	7

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1.900	PVC	10	7	17

Status of Well

☐ Water Supply ☐ Replacement Well ☑ Test Hole ☐ Recharge Well ☐ Dewatering Well ☑ Observation and/or Monitoring Hole ☐ Alteration (Construction) ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Water Quality ☐ Abandoned, other, *specify* ____ ☐ Other, *specify* ____

Water Details

Water found at Depth (m/ft)	Kind of Water: ☐ Fresh ☐ Untested ☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (m/ft) From	Depth (m/ft) To	Diameter (cm/in)
0	3	4.5
3	17	3

Results of Well Yield Testing

After test of well yield, water was: ☐ Clear and sand free ☐ Other, *specify* ____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping ____ hrs + ____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

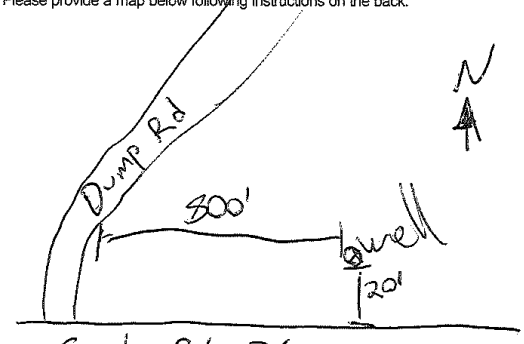
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments: WSP General Contractors

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Strata Drilling Group	7241

Business Address (Street Number/Name)	Municipality
165 Shields Court	Markham

Province	Postal Code	Business E-mail Address
ON	L3R8V2	wrecords@stratasoil.com

Bus. Telephone No. *(inc. area code)*	Name of Well Technician (Last Name, First Name)
9057649304	Beatty Brian

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3616		2016/10/17

Well owner's information package delivered ☐ Yes ☐ No

Date Package Delivered: ____

Date Work Completed: 2016/10/13

Ministry Use Only

Audit No. Z237977

Received NOV 2 7 2016

Well ID Number: 7275168
Well Audit Number: *Z237978*
Well Tag Number: *A211288*

This table contains information from the original well record and any subsequent updates.

Well Location

Address of Well Location	37 DUMP RD
Township	HARVEY TOWNSHIP
Lot	
Concession	
County/District/Municipality	PETERBOROUGH
City/Town/Village	BUCKHORN
Province	ON
Postal Code	n/a
UTM Coordinates	NAD83 — Zone 17 Easting: 712632.00 Northing: 4938544.00
Municipal Plan and Sublot Number	
Other	

Overburden and Bedrock Materials Interval

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To
BRWN	SAND	SILT	LOOS	0 ft	6 ft
RED	GRNT		BLDR	6 ft	10 ft
BRWN	SAND	SILT	LOOS	10 ft	12 ft
RED	GRNT		HARD	12 ft	55 ft

Annular Space/Abandonment Sealing Record

Depth From	Depth To	Type of Sealant Used (Material and Type)	Volume Placed
-3 ft	1 ft	MONUMENT CASING	
1 ft	44 ft	BENTONITE	
44 ft	55 ft	SAND	

Method of Construction & Well Use

Method of Construction	Well Use
Air Percussion	Monitoring and Test Hole

Status of Well

Monitoring and Test Hole

Construction Record - Casing

Inside Diameter	Open Hole or material	Depth From	Depth To
1.61 inch	PLASTIC	0 ft	45 ft

Construction Record - Screen

Outside Diameter	Material	Depth From	Depth To
1.9 inch	PLASTIC	45 ft	55 ft

Well Contractor and Well Technician Information

Well Contractor's Licence Number: 7241

Results of Well Yield Testing

After test of well yield, water was	
If pumping discontinued, give reason	
Pump intake set at	
Pumping Rate	
Duration of Pumping	
Final water level	
If flowing give rate	
Recommended pump depth	
Recommended pump rate	
Well Production	
Disinfected?	

Draw Down & Recovery

Draw Down Time(min)	Draw Down Water level	Recovery Time(min)	Recovery Water level
SWL			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
45		45	
50		50	
60		60	

Water Details

Water Found at Depth	Kind

Hole Diameter

Depth From	Depth To	Diameter
0 ft	13 ft	4.5 inch
13 ft	55 ft	3 inch

Audit Number: Z237978

Date Well Completed: October 12, 2016

Date Well Record Received by MOE: November 22, 2016

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 5111323 — MUNICIP — CON.

COUNTY OR DISTRICT: [redacted]
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: [illegible]RIES RI PETERBOROUGH
CON., BLOCK, TRACT, SURVEY, ETC: 7
LOT: 9
DATE COMPLETED: DAY 4 MO 6 YR 84
RC. ELEVATION RC. BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
BROWN	SAND	SHALE		0	4
GREY	GRANITE			4	131
RED	"			131	134
BLACK	"			134	136
GREY	"			136	156

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
144-145	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
153	1 ☑ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	CEMENT GROUT	0	6
6 1/4	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☑ OPEN HOLE	1.88	6	156
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER (INCHES)	LENGTH (FEET)

MATERIAL AND TYPE: | DEPTH TO TOP OF SCREEN (FEET):

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☑ BAILER
PUMPING RATE: 5 GPM
DURATION OF PUMPING: HOURS MINS
STATIC LEVEL: 6 FEET
WATER LEVEL END OF PUMPING: 146 FEET
WATER LEVELS DURING: 1 ☑ PUMPING 2 ☐ RECOVERY
15 MINUTES: FEET | 30 MINUTES: FEET | 45 MINUTES: FEET | 60 MINUTES: FEET
IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 156 FEET
WATER AT END OF TEST: 1 ☑ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP
RECOMMENDED PUMP SETTING: 154 FEET
RECOMMENDED PUMPING RATE: 5 GPM

LOCATION OF WELL

208

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.

DRILLERS REMARKS:

FINAL STATUS OF WELL
1 ☑ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE
1 ☑ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING
1 ☑ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☑ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: PRE-LEDGE WELL DRILLING — LICENCE NUMBER: 1904
ADDRESS: P.O. Box 93 PT80
NAME OF DRILLER OR BORER: SAME — LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: Russell Pledge — SUBMISSION DATE: DAY MO YR

MINISTRY OF THE ENVIRONMENT COPY

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: 210385
DATE OF INSPECTION | INSPECTOR
REMARKS

CSS.ES

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

3109

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 5111185 MUNICIP 51011 CON CON 07

COUNTY OR DISTRICT	TOWNSHIP	CON. BLOCK, TRACT, SURVEY ETC.	LOT 25-27
Peterborough	Harvey	7	009

[redacted] Lock St., Peterborough, Ont. K9J2Z7

DATE COMPLETED 48-53: DAY 08 MO 08 YR. 84

RC 37800 RC 5 ELEVATION 0800 RC 6 24

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
Red	granite rock		hard	0	10
Grey/red	granite rock		hard	10	165

MOE VE-17

(31) 0010721273 0165221273

32

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0155	☐ FRESH ☐ SULPHUR ☐ #5 ☐ MINERAL
0165 ~~untested~~	☐ FRESH ☐ SULPHUR ☐ #5 ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06 6¼	☒ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	.188	0	0022
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER (INCHES)	LENGTH (FEET)

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN (FEET)

(61) PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

(71) PUMPING TEST

PUMPING TEST METHOD: X AIR ☒ PUMP ☐ BAILER

PUMPING RATE: 0001 1/2 GPM

DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
020 FEET	150 FEET	075 FEET	100 FEET	150 FEET	150 FEET

WATER LEVELS DURING: ☒ PUMPING ☐ RECOVERY

IF FLOWING, GIVE RATE: -- GPM

PUMP INTAKE SET AT: 160 FEET

WATER AT END OF TEST: ☒ CLEAR ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

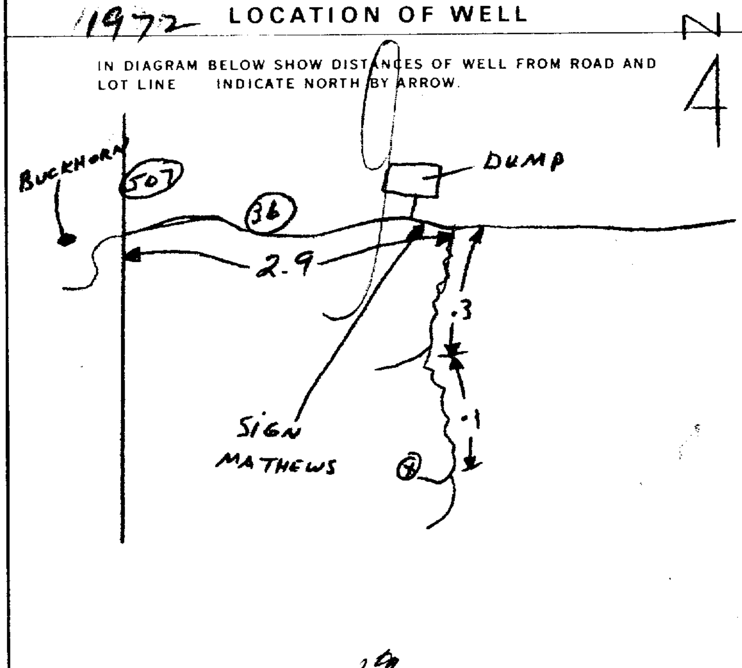
RECOMMENDED PUMP SETTING: 160 FEET

RECOMMENDED PUMPING RATE: 0001 1/2 GPM

LOCATION OF WELL

1972

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS 301 127 068

5 Y W

FINAL STATUS OF WELL 1

☒ WATER SUPPLY ☐ OBSERVATION WELL ☐ TEST HOLE ☐ RECHARGE WELL ☐ ABANDONED, INSUFFICIENT SUPPLY ☐ ABANDONED, POOR QUALITY ☐ UNFINISHED

WATER USE 01

☒ DOMESTIC ☐ STOCK ☐ IRRIGATION ☐ INDUSTRIAL ☐ OTHER ☐ COMMERCIAL ☐ MUNICIPAL ☐ PUBLIC SUPPLY ☐ COOLING OR AIR CONDITIONING ☐ NOT USED

METHOD OF DRILLING 4

☐ CABLE TOOL ☐ ROTARY (CONVENTIONAL) ☐ ROTARY (REVERSE) ☒ ROTARY (AIR) ☐ AIR PERCUSSION ☐ BORING ☐ DIAMOND ☐ JETTING ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Faulkner Well Drilling Co.Ltd — LICENCE NUMBER: 2104

ADDRESS: 789 Erskine Ave., Peterborough, Ont.

NAME OF DRILLER OR BORER: N. N. Faulkner — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: [signature]

SUBMISSION DATE: DAY 10 MO 8 YR. 84

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 2104 — DATE RECEIVED: 190984

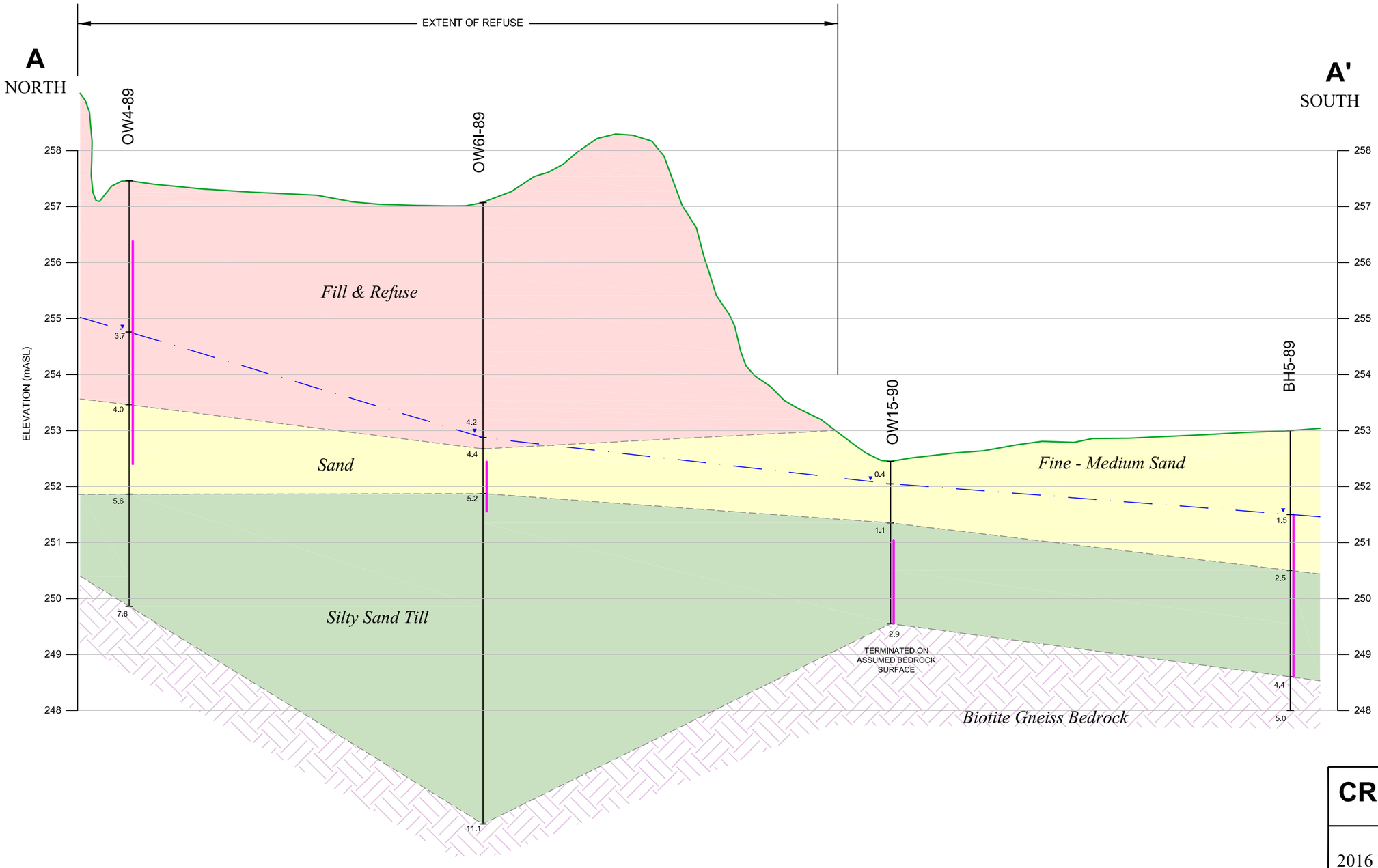
DATE OF INSPECTION: — INSPECTOR:

REMARKS:

CSS.ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506-4-77 FORM 7



LEGEND

OW15-90 — MONITORING WELL DESIGNATION

GROUND SURFACE

0.4 — INFERRED GROUNDWATER TABLE WITH OVERBURDEN WATER LEVEL (15/01/91)

SCREEN INTERVAL

1.1 — STRATIGRAPHIC CONTACT (mBGS)

BEDROCK POTENTIOMETRIC SURFACE (15/01/91)

2.9 — END OF BORING (mBGS)

10 0 20 m

HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:75
VERTICAL EXAGGERATION 10X

NOTES:

THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE BOREHOLE LOCATIONS ONLY. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS.

CROSS SECTIONS FROM DETAILED HYDROGEOLOGIC INVESTIGATION, BUCKHORN LANDFILL SITE, TOWNSHIP OF HARVEY, PROJECT 90231.00, JAGGER HIMS CONSULTING ENGINEERS, 1991.

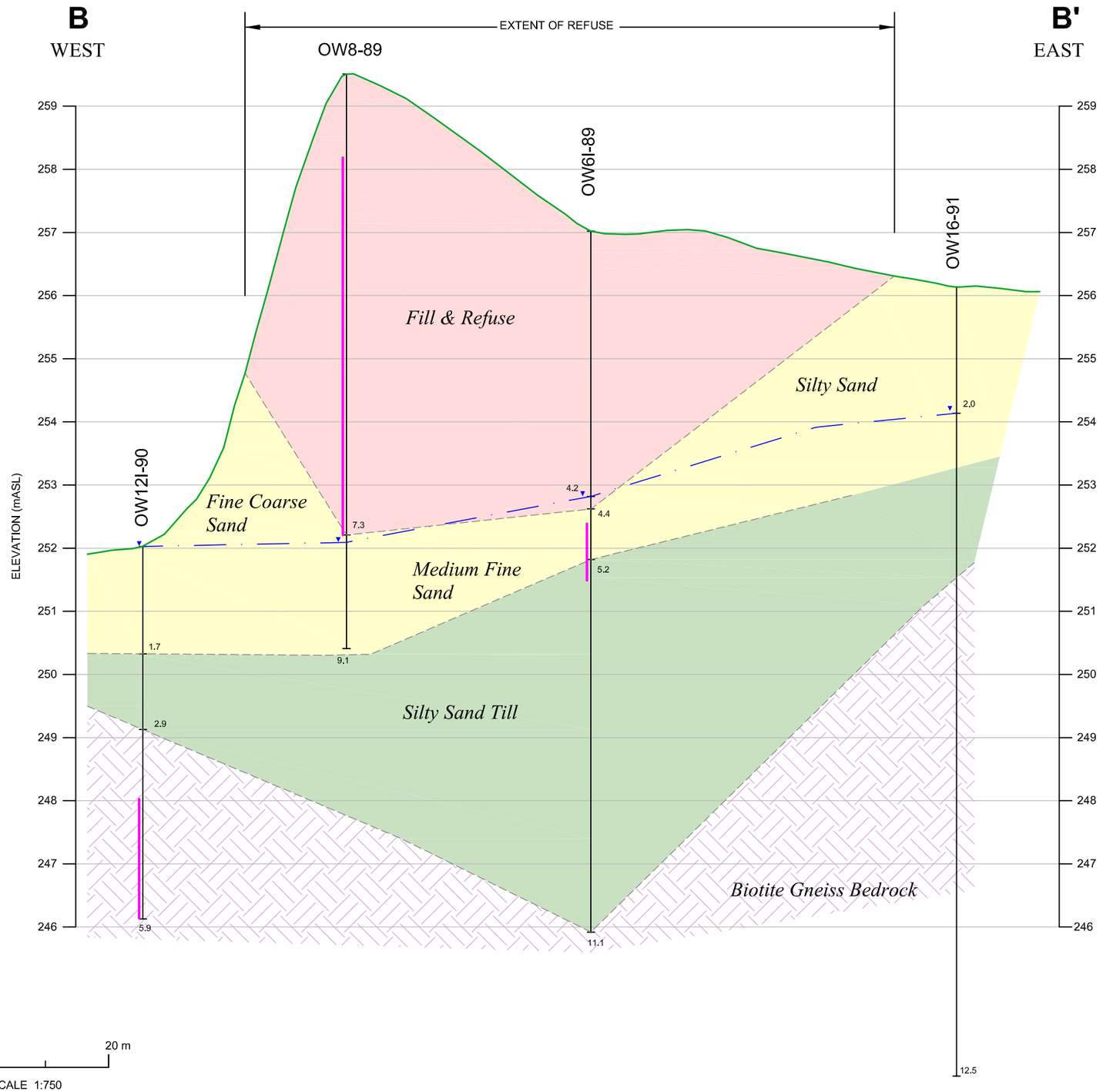
CROSS SECTION A-A'

2016 LANDFILL MONITORING REPORT
BUCKHORN LANDFILL SITE
For Municipality of Trent Lakes

DATE: FEBRUARY 2017	SCALES: AS SHOWN
PROJECT: 121-15605-00 160	FILE NO.: 121-15605-00 160-1 CR

WSP

FIGURE 5



LEGEND

OW15-90 — MONITORING WELL DESIGNATION

GROUND SURFACE

0.4 — INFERRED GROUNDWATER TABLE WITH OVERBURDEN WATER LEVEL (15/01/91)

SCREEN INTERVAL

1.1 — STRATIGRAPHIC CONTACT (mBGS)

BEDROCK POTENTIOMETRIC SURFACE (15/01/91)

2.9 — END OF BORING (mBGS)

10 0 20 m

HORIZONTAL SCALE 1:750
VERTICAL SCALE 1:75
VERTICAL EXAGGERATION 10X

NOTES:

THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE BOREHOLE LOCATIONS ONLY. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS.

CROSS SECTIONS FROM DETAILED HYDROGEOLOGIC INVESTIGATION, BUCKHORN LANDFILL SITE, TOWNSHIP OF HARVEY, PROJECT 90231.00, JAGGER HIMS CONSULTING ENGINEERS, 1991.

CROSS SECTION B-B'

2016 LANDFILL MONITORING REPORT
BUCKHORN LANDFILL SITE
For Municipality of Trent Lakes

DATE: FEBRUARY 2017	SCALES: AS SHOWN
PROJECT: 121-15605-00 160	FILE NO.: 121-15605-00 160-1 CR

WSP

FIGURE 6