March 28, 2025
Project No. 2402747

VIA EMAIL: cdulong@huronkinloss.com

Township of Huron-Kinloss
21 Queen Street
P.O. Box 130
Ripley, ON N0G 2R0

Re: **Annual Monitoring Report (2024)**
Huron Landfill Site
ECA No. 272601

Dear Cory:

Please find enclosed one copy of the 2024 Annual Monitoring Report for the Huron Landfill Site (Certificate of Approval No. A272601).

On behalf of the Township, we have submitted one copy of the report to Mr. Scott Gass, P. Eng., at the Ministry of the Environment, Conservation and Parks (MECP) District Office in Owen Sound.

As you are aware, several concerns have been raised regarding the final cover application on the landfill footprint, as well as the stormwater management onsite. To date, it is noted that a Stormwater Management Workplan (SWMP) has been developed for the Huron Landfill site. In response to MECP site inspections and associated memorandums, the SWMP indicated that appropriate vegetative cover be established over all bare areas of the landfill site (4.5 ha), and that re-grading onsite be completed. Based on correspondence provided by the Township, and onsite visits completed by GEI staff in 2024, re-grading activities have been completed onsite. Further, final cover has been placed within the northeasterly portion of the site, and interim cover has been placed on remaining areas of the site (with the exception of the working space). Seeding was also reportedly completed in the fall of 2024, however based on MECP concerns, it has also been replanned for spring of 2025.

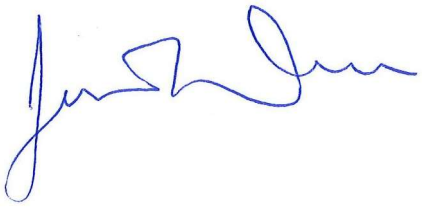
It has been proposed that moving forward, a sufficient area for one year of landfilling be stripped of interim cover and vegetation, prior to waste placement. Landfill progression shall continue with this recommended pattern of vegetation and interim cover removal for an area to allow for one year of waste placement. Progressive closure of finished areas of the landfill shall be completed through placement of final cover, consisting of 600 mm of clayey cap and 150 mm of topsoil and seed over all areas that are completed to the approved top contours on an annual basis.

Based on previous request from the MECP, a checklist has been provided with each report to support review by MECP staff. Please note that these checklists are not to be used as a replacement to the Annual Monitoring Reports, which provide the background information for the sites, and present a discussion of the findings, conclusions, and recommendations.

GEI Consultants Canada Ltd.
1260 2nd Avenue East, Unit 1
[519.376.1805]

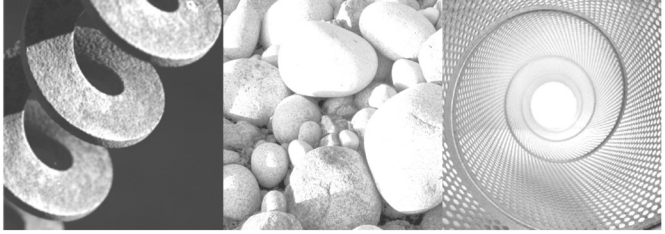
I trust this is sufficient for your use at this time. Please do not hesitate to contact the undersigned if you have any questions.

Sincerely,
GEI Consultants Canada Ltd.



Jessica K. Weller, C.E.T.
Technical Specialist

cc: MECP: Scott Gass, P.Eng. – scott.gass@ontario.ca
File No. 2402747



MECP Certificate of Approval No. A272601

Annual Monitoring Report – 2024
Huron Waste Disposal Site

Township of Huron- Kinloss

Submitted to:
The Township of Huron-Kinloss
21 Queen Street
Ripley, ON N0G 2R0

Submitted by:
GEI Consultants Canada Ltd.
1260 2nd Avenue East, Unit #1
Owen Sound, ON N4K 2J3
519.376.1805

March 2025
Project No. 2402747



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1. Introduction and Background

The Huron Landfill Site is located on Part Lots 19 and 20, Concession 5, Huron-Kinloss Township, Bruce County, ON. The site location is provided on Figure 1.1. The Township of Huron-Kinloss was formed in 1999 as a result of the amalgamation of the former Townships of Huron and Kinloss, as well as the Village of Lucknow. The Huron Landfill Site is approved to accept domestic, commercial, and solid non-hazardous industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill). No hazardous waste or liquid industrial waste is accepted at this site.

The Huron Landfill Site comprises a total area of 17.7 ha (43.7 acres), of which 8.0 hectares has been approved for landfilling at this time. The original ECA was issued July 31st, 1989, and amended July 6th, 2010, to incorporate numerous additional conditions. ECA No. 272601 was amended again on July 9th, 2010, to expand the service area to include the Village of Lucknow. The Huron Landfill Site additionally has an ECA for a Stormwater Management System under ECA No. 4076-BYRM6P consisting of approximately 4.5 ha (11.1 acres). The approval, and its amendments, are enclosed in Appendix A. Based on recent MECP correspondence, the ECA was also amended in 2020. At the time of the issuance of this report, the amended ECA was not found available. Subsequent reports will include this amended ECA.

Condition 11 of the current ECA requires that a report on the development, operation, and monitoring of the site be submitted annually to the District Manager by March 31st of the year following the period being reported upon. This Annual Operations and Monitoring Report, for the year 2024, has been prepared to satisfy the reporting requirements of the ECA for the Huron Landfill Site and includes a summary of the operational and environmental monitoring information.

It is noted that GEI Consultants Canada Ltd. (GEI) have been retained by the Township since 2024 to complete environmental monitoring requirements and the Annual Reports. Reporting requirements for the site were previously completed by WSP. Therefore, pre-2024 operational details and water quality results presented herein are based on the previous reports prepared by others.

As part of the established annual monitoring program, site visits were conducted on April 23 and November 19, 2024, during which site inspections, water level measurements, and the collection of groundwater and surface water samples were completed.

2. Site Usage

The Township of Huron-Kinloss is comprised of three former/geographic centers: Township of Huron, the former Township of Kinloss, and the former Village of Lucknow. Refuse received at the landfill site originates from full time and seasonal residents of the former Township of Huron, waste from the former Kinloss Township (as of 2002) and waste from the Villag of Lucknow (as of July 2018).

Waste collection is provided to the Township on a weekly basis, and recyclables are picked up on a bi-weekly basis. Currently, the Township subcontracts Bruce Area Solid Waste Recycling (BASWR) to complete the collection.

Activities that currently occur at the Huron landfill site include landfilling of residual waste and wood waste, waste collection of blue box materials, e-waste and other waste diversion streams, and stockpiling of scrap metal, white goods and tires, as appropriate. The site includes surface water management features, an access route from the northeast, a waste receiving and transfer area, supervisor office and scale, and a site maintenance shed.

3. Site Life Expectancy

3.1. Existing Conditions

The CofA allows for landfilling within a total landfill footprint of 17.7 ha with 8 ha approved for landfilling. The site historically utilized the trench method of landfilling (until 2010), including the filling of 6 trench areas (T1 to T6). Each trench area is comprised of a number of trenches and reportedly measure 5 m wide and 40 m long with a 1.0 m buffer between adjacent trenches, and a depth of 3 m. In 2010, landfilling commenced above ground utilizing the 'area ramp method' of operation and with six cells (Cell T1 to Cell T6) as indicated on Figure 3.

Currently, active landfilling is occurring within Cell 3. The final contours are presented on Figure 7.

3.2. Estimated Refuse Generation

Topographical surveys are typically completed to monitor site development. A topographical survey was completed in September of 2024, at which point the estimated volume of remaining capacity onsite was calculated to be 70,329m^3. This volume was calculated based on a comparison of the top of waste elevation surveyed in September of 2024 (i.e., existing conditions), and the revised final contour plan, which allows for a comparison of the remaining airspace between the existing surface and the eventual final surface as presented in the top contour plan. The remaining air space between the current waste elevation onsite and the final top contours was calculated to be 70,329$m^{3.}$ It is noted that this remaining volumetric capacity represents an increase from the remaining capacity previously reported , resulting in an additional 3 years of operating capacity. It is recommended that a comprehensive survey be completed in the fall of 2025 in order to compare the surface with that which was surveyed in 2024, and to allow for a higher level of certainty regarding the remaining site capacity.

3.3. Remaining Site Capacity

Based on the current remaining landfill capacity of an estimated 70,329 m^3 for waste and daily cover, and the five-year average fill rate (from 2019 to 2023) of 9,333 m^3/year, the remaining site life for the Huron Landfill is approximately 8 years. Based on the maximum fill rate reported during the last five years (13,161 m^3), the remaining site life would be approximately 5 years. Using the 2023 fill rate of 6,176 m^3/year, the remaining site life is about 11 years. A summary of the landfill volume capacity calculations for the Huron Landfill is provided in Table 1.

4. Burning Operations

Under Condition 4 of the CofA, issued in October 1991, the burning of clean wood and brush in accordance with the MOE Guideline "Burning at Landfill Sites" is allowed. Conditions 42 and 43 of the CofA outline the conditions in which burning of clean wood and brush can occur.

Burning at the site is to be restricted to clean, dry wood wastes such as brush, trees, and lumber. These wood wastes are to be stockpiled in a designated burn area located on-site and supervised burning of wood waste should occur intermittently on clear, dry windless days. Burning of designated wood wastes is to be carried out in an area at least 30 m away from the active landfilling area. At this time, the burn area is located within the southerly portion of the site. Additionally, an area of 4.5 m around the burn pit should be kept free of vegetation.

Burning should occur under the direct supervision of an attendant at all times. The site attendant is responsible to remove any non-wood wastes from the pile prior to burning, and to regularly remove cold ashes from the burn area for disposal in the active landfill area. The attendant must have the means to extinguish the fire if necessary.

5. Recycling/Waste Reduction

5.1. Recycling

The Township of Huron-Kinloss currently operates a curb side blue box recycling program for all residents where glass, steel and aluminium cans, paper (i.e., newspaper, magazines, and fine paper), boxboard, and plastic (PET and HDPE) drinking bottles and tubs are diverted from the landfill. Several recycling depots are maintained within the Township for the collection of cardboard since this material is not included in the blue box recycling program.

The Township also promotes the recycling of metals, tires, white goods, bale wrap, propane tanks, and electronics (e-waste) separately from the blue box program.

Bruce Area Solid Waste Recycling (BASWR) is the recycling contractor for the Township for both curb-side pickup and landfill recycling. BASWR has provided an analysis of the total recyclables diverted from the Huron landfill located in the Township of Huron-Kinloss for the 2024 calendar year. Based on the information and data provided, the amount of recyclables diverted from the Huron landfill for 2024 is presented below:

Recyclables	**Material Diverted from the Municipality of Huron-Kinloss (Tonnes unless otherwise noted)**	
Year	**2023**	**2024**
CURB-SIDE PICK –UP: BLUE BOX RECYCLABLE MATERIALS[1]		
Newspaper	79.68	61.63
Steel	25.39	19.64
Aluminium	17.22	13.32
Glass	80.95	62.61
HDPE Plastic	35.67	27.59
PET Plastic	52.86	40.89
Boxboard	62.31	48.20
Cardboard	102.99	98.93
Total (Blue Box)	**457.07**	**372.80**
Scrap Metal	128.2	74.54
Tires (Units)	3,808	3,175
Tires (est, tonnes)	29.11	37.90
E-waste	20.93	19.68
Other	18.69	16.22
Total Diverted	**654.0**	**521.14**

Currently, the waste collected at the Kinloss Landfill site is transferred to the Huron Landfill site. As such, the recycling totals (for Huron and Kinloss combined), have been provided in the above table. The total amount of recyclable goods diverted from both the Huron and Kinloss Landfills was generally in line with the average. The total diversion for 2024 is reported to be 521 tonnes. It is important that the Municipality continue to remove stockpiles of recyclable goods on a regular basis to prevent clutter and to maintain an aesthetically acceptable site.

5.2. White Goods & Miscellaneous Scrap Metal

The Township reports that they do not accept appliances containing chlorofluorocarbons (CFCs) at the Huron landfill site. Refrigeration units received at the site are to be tagged, indicating that they have been drained of CFCs by a qualified technician. White goods and scrap metal are to be segregated and temporarily stored on-site until they are picked up by a scrap dealer and removed offsite for recycling. In 2024, the Township reports that 74.54 tonnes scrap metal and no white good units were removed for recycling.

5.3. Batteries

Batteries should be stored in a single layer, within an enclosed container in order to prevent precipitation from coming in contact with the batteries. The storage container should also provide secondary containment in the event of leakage. In 2024, the Township reports that 0.24 tonnes of batteries were removed from the Huron Landfill site. Previously, batteries were collected by Environmental 360 Solutions. However, as of April 23, 2024 batteries are now included in e-waste and are collected by EPRA.

5.4. Tires

Tires should be stockpiled on the site and sold for recycling purposes. According to Environmental Protection Act there must be fewer than 5,000 tire units at any given time. The volume of tires within an individual stockpile should not exceed 300 m3 (or approximately 2,400 tire units based on 8 tires/m3). There must be greater than 15 m between the stockpile and the property line, buildings, and the active area of the landfill and greater than 30 m separation between the tire pile and the burn pile. Tires should be stockpiled in an area where there is no vegetation within 4.5 m. Individual stockpiles should be separated from each other and from other waste piles by a minimum of 6 m.

According to the site records, a total of 3,175 tires, approximately 37.90 tonnes of tires were removed from the site in 2024.

5.5. Bale Wrap

The collection of bale wrap creates an additional waste diversion stream. This material should be collected in a designated area which prevents the plastic from blowing (i.e., within a short wall of concrete blocks or in a designated storage bin). Previously, recycling of this material was limited to white wrap material. Small sections, weighing between 3 and 5 pounds should be cleaned of rocks and stones, with a minimal amount of dirt. No coloured wrap, twine or other plastic materials should be stored in this pile. Previously, pick-up of this material was arranged with Cleanfarms, however reportedly as of March 31, 2024 the Township could no longer receive silage bags, or bunker wrap. Bale wrap is still accepted at the site. Based on reported totals, approximately 3.26 tonnes of bale wrap and bunker cover was received at the site in 2024.

5.6. Leaf and Yard Waste

Yard wastes, derived from the small rural areas in the Huron-Kinloss Township, are collected for composting at the site. The leaf and yard waste are turned by the site operator on a regular basis. Surface water run-off was not observed and odours, related to the pile, were not noted by GEI personnel during either of the site visits. Topsoil generated from this service can be used for placement over the final cover. In 2024, approximately 126 tonnes of brush and stumps were received at the site.

5.7. Electronic Waste

A bin is available at the Huron landfill site for drop-off of e-waste. This material is recycled under the program run by Electronic Products Recycling Association (EPRA). For 2024, the Township reports that 19.68 tons of e-waste were removed from the Huron landfill site.

5.8. Municipal Hazardous or Special Waste (MHSW)

The MHSW program for the Township is operated by the County of Bruce through the Household Hazardous Waste Collection Program. Under the program, residents can drop-off the following hazardous materials free of charge.

- Paints and coatings, plus their containers
- Solvents, such as thinners for paint, lacquer and contact cement, paint strippers and degreasers, and their containers
- Oil filters
- Oil containers of 30 litres or less
- Single-use batteries
- Antifreeze and its containers
- Pressurized containers, such as propane tanks and cylinders, oxygen and helium tanks
- Lawn fertilizers that contain pesticides
- Pesticides, and their containers

6. General Operations

6.1. Site Controls

The site is open to the public on Tuesdays, Fridays and Saturdays from 10:00 AM to 4:00 PM.

The site is located in a relatively secluded setting, is surrounded by fencing, and is adequately screened from public view and from the Concession 6 East right-of-way by a constructed earthen berm and tree cover. When the site is closed to the public, a locked gate across the entrance road, located in the northeast corner of the site, controls access to the site.

Signs posted at the gate/main entrance to the Site note the hours of operation, the acceptable wastes that can be landfilled, a list of the emergency numbers and a contact number for the Township. The operator is equipped with a cell phone in the event of an emergency. Within the landfill area, portable signs are posted at the various designated disposal locations including the designated areas for waste, metals, the various recyclable materials, and wood waste. These signs are clearly visible. In 2021, a separate entrance was installed directly south of the current main entrance to allow residents to access the site for drop off of residential compost and burnable materials.

6.2. Site Cleanliness

The most important aspect of site cleanliness is to ensure that all landfill wastes have adequate soil cover so that refuse is not exposed. Application of an appropriate soil cover immediately following waste disposal reduces blowing litter, prevents surface water from percolating through the refuse to create leachate, and discourages rodent and vector activity.

Based on the 2024 site visits by both GEI staff, the Township generally maintains good daily covering operations at the site. However, on-site blowing litter and exposed refuse was observed during the site visits. A consistent effort should be made to ensure wastes are covered and blown litter is collected on a routine basis, especially along the north and east property boundaries. The Site operator is responsible for compaction and covering of refuse and for collecting blown litter. We recommend that waste is compacted and covered, and that litter is collected regularly to maintain good site appearance. Based on a Provincial Officer's Order (Order Number 1-516357730), several issues regarding final cover have previously been identified onsite. The Order was issued to address non-compliance with conditions listed in the Site's CofA and subsequently a Stormwater Management Workplan (SMWP) was developed. In response to MECP direction, the SWMP indicated that appropriate vegetative cover be established over all bare areas of the landfill site (4.5 ha), and that re-grading onsite be completed. Based on correspondence provided by the Township, and site visits completed by GEI staff in 2024, re-grading activities have been completed onsite, and final cover has been placed within the northeasterly portion of the site. However, based on the work being completed in late fall of 2024, the MECP has requested that the site be re-seeded in spring of 2025.

It is proposed that moving forward, a sufficient area for one year of landfilling be stripped of interim cover and vegetation, prior to waste placement. Landfill progression shall continue with this recommended pattern of vegetation and interim cover removal for an area to allow for one year of waste placement. Progressive closure of finished areas of the landfill shall be completed through placement of final cover, consisting of 600 mm of clayey cap and 150 mm of topsoil and seed over all areas that are completed to the approved top contours on an annual basis.

Another important aspect of site cleanliness is to ensure that accumulations of recyclable materials, including piled tires and waste metals, are efficiently managed, and that wood wastes are burned regularly to maintain a manageable pile, understanding that pick-ups may be limited by the receiver and/or contractors. Designated areas for recyclable goods at the Site appeared to be organized and well managed.

6.3. Site Operations

Waste compaction and covering operations are achieved with the use of a Caterpillar (CAT) 816 steel-wheeled sheepsfoot waste compactor. Historically the Township generally achieved satisfactory waste compaction and covering at the working face. During 2024, active landfilling at the site took place in Cell 3. Grade stakes were provided in 2024 to (i) control closure elevations, (ii) ensure that the proper slope is achieved on the final landfill mound . The existing landfill conditions for the landfill are shown on Figure 3.

Landfilling in Cell T5 has been completed and the landfill slopes should gradually be graded to final contours. Upon reaching final contours, the filled area should be capped with 600 mm of low permeability, silty clay material and a minimum of 150 mm of topsoil seeded to grass. Landfill development should continue in cell T4 where final contours can be tied into the existing topographical contours at T5. The final contour plan is shown on Figure 7.

7. Summary of Hydrogeologic Setting

7.1. Overburden Geology

The landfill site is located along the western edge of the physiographic region known as the Huron Slope. The site geology consists of poorly sorted glacial outwash sediments (i.e., mixtures of clay, silt, sand, gravel, and cobbles), with some localized deposits of sorted sands. Based on a review of the MECP water well records, the overburden is approximately 25 to 30 m thick in the vicinity of the site and overlies the grey-brown limestone and shale of the Onondaga formation formed during the Middle Devonian period.

Table 2 includes a summary of the well details including brief descriptions of each unit the screened interval at each well intersects. A brief review of the borehole logs confirms the complex nature of the soils at the Site, although the majority of the shallow overburden soils appear to be relatively fine (i.e., silty sand to silty clay). This complex discontinuous layering with fine-grained soils is thought to provide the variable water level data noted, depending on the units intersected by the monitoring wells. In this scenario, it is possible to have low permeability layers that have limited hydraulic connectivity to relatively coarser grained layers. Borehole logs are provided in Appendix D.

7.2. Site Topography

The surrounding lands are primarily agricultural, with the Town of Ripley located directly northeast of the Site. The site is located along a ridge that trends northwest to southeast, with high-lying lands located to the east (refer to Figure 1). The site topography is generally flat within the central and easterly portions. A significant slope is observed along the south and westerly property boundaries where ground elevations range from 230 metres above sea level (masl) to approximately 220 masl along the South Pine River.

7.3. Surface Drainage

The landfill is located directly east of the South Pine River. Local surface drainage within the waste diversion area slopes easterly towards the river, while the very north part of the site drains toward the roadside ditch along Concession 6 East. The South Pine River flows westerly and northwesterly immediately south of the landfill property. The South Pine River is noted to flow into the Pine River and ultimately into Lake Huron, Location approximately 10 km west of the site.

7.4. Regional Groundwater Flow

In general, the regional groundwater flow direction in the overburden is inferred to be westerly. The inferred groundwater flow direction is consistent with the regional topography, which consists of the pronounced ridge with lower lying lands to the west and south of the Site.

7.5. On-Site Groundwater Flow System

Water levels on-site form a complex pattern of groundwater flow likely controlled by both the local topography and the deeper regional groundwater system, depending on site geology. Based on an assessment of the groundwater elevation data available and our understanding of the overburden geology, topography, and the regional groundwater flow system it appears that there are likely several minor, or localized, groundwater flow systems at the site, that ultimately tie into the larger regional groundwater flow system that flows in a westerly direction.

Shallow groundwater in the vicinity of the landfill generally flows to the west towards the South Pine River (Figure 6) making the river the primary receptor for potential impacts from landfill leachate via discharge from shallow groundwater migration.

Water level elevations at monitoring locations OW7D, OW8S & D, OW9 and OW10S & D have consistently been lower than those measured in surrounding wells OW3, OW5 and OW11. Based on water level measurements collected, the groundwater chemistry comparisons, a review of the borehole logs (Appendix D) and well construction details (summarized in Table 2), the lower water levels typically associated with these wells are attributed to the relatively low-permeability soils. Within the area of the landfill, the soils at these locations were found to consist of layers of silt to silt with clay.

In conclusion, the lower water levels are thought to be associated with an area with limited hydraulic connectivity to the adjacent areas of groundwater discharge related to the more regional groundwater flow. Based on the more regional groundwater flow directions, and the geochemistry from wells north and west of the landfill, it is reasonable to expect that the potential leachate impacted groundwater migration would ultimately be in a westerly direction.

8. Monitoring Requirements

8.1. Sampling Requirements

Monitoring of groundwater and surface water is conducted in the spring and fall of each year. The existing sampling program is based on Schedule B of the CofA.

The monitoring wells are located around the perimeter of the landfill and monitor groundwater quality in both the shallow and intermediate overburden. The surface water monitoring locations are located to determine potential impacts to surface water from the landfill. Samples are obtained from one upstream location and one downstream location, and from an area of water ponding onsite.

8.1.1. Groundwater Sampling Locations

Groundwater quality monitoring was initiated at the site in 1989. Between 1989 and 2024, groundwater quality has been intermittently monitored at the site by twice annual sampling from a network of monitoring wells. The 2024 sampling program consisted of groundwater sampling from the thirteen monitoring wells required by the amended CofA, as shown on Figure 2.

Monitoring is completed twice annually (spring and fall). In addition, surface water samples are collected from two (2) locations twice annually in conjunction with the groundwater monitoring program. A summary of the groundwater and surface water quality monitoring programs and required parameters, as per the Approvals, is provided in Table 3 and Table 4, respectively (below).

TABLE 3: Summary of Groundwater Quality Monitoring Locations and Parameters

MONITORING LOCATIONS			MONITORING PARAMETERS
Sampling Location	Spring	Fall	
OW1	X	X	Alkalinity, Ammonia, Anions – Cl, NO2, NO3, SO4 Conductivity, Dissolved Metals DOC, Hardness, Phenols, pH, TKN
OW3	X	X	
OW4	X	x	
OW5	X	X	
OW6	X	x	
OW7S	X	X	
OW7D	X	X	
OW8S	X	x	
OW8D	X	X	
OW9	X	x	
OW10S	X	x	
OW10D	X	x	
OW11	X	x	

8.1.2. Surface Water

Historically, surface water has been monitored at two locations consisting of an upstream location (SW1) and one downstream location (SW2). In 2019, SW3 was added to the sampling program, collected from the ponded water located in the southwestern portion of the site.

TABLE 4: Summary of Surface Water Quality Monitoring Locations and Parameters

MONITORING LOCATIONS			MONITORING PARAMETERS
Sampling Location	**Spring**	**Fall**	
SW1 (Upstream)	X	X	Alkalinity, Ammonia, Anions (CL, NO2, NO3, SO4), Conductivity, Dissolved Metals, Total Phosphorus
SW2 (Downstream)	X	X	DOC, Hardness, Phenols, pH, TKN
SW3 (Onsite Pond)	X	X	Field Measurements: Temperature, pH, Conductivity

8.2. Sampling Procedures

For the groundwater sampling, the static groundwater level and well depth are measured in each monitoring well prior to purging three casing volumes of stagnant water from each monitoring well. GEI personnel also check to ensure that all monitoring wells are properly secured and in compliance with O.Reg. 903. After purging, monitoring wells are allowed to recharge with fresh groundwater before sampling occurs. Groundwater purging and sampling is conducted using dedicated Waterra™ tubing and inertial-type pumps. Samples collected for metals are field filtered using a 0.45 µm filter and placed in laboratory supplied containers with preservative. Samples are kept chilled following completion of the sampling program and sent within 24 hours of the sampling event to Bureau Veritas Laboratories of Mississauga for analysis. The laboratory analytical reports for the current monitoring period are included in Appendix H.

Surface water samples are collected by submerging the appropriate sample container into the water body and removing the container when a sufficient volume of sample has been collected. During collection, contact with the bottom sediment is avoided to prevent stirring-up sediment. When collecting surface water samples, direct dipping of the sample bottle is acceptable unless the bottle contains preservative. For those samples requiring preservative, a clean unpreserved bottle is used to obtain the sample then transferred into the appropriate preserved bottle. The surface water temperature is measured and recorded at the time of sampling.

9. Determination of Reasonable Use Criteria For the Site

9.1. Determination of Action Levels

The MOE Guideline B-7 establishes the basis for determining what constitutes the reasonable use of groundwater on a property adjacent to a landfill site, which is designed to protect existing and potential water uses. To be conservative, it is assumed that the shallow groundwater in the region will typically be used for domestic purposes. MOE Procedure B-7-1 provides technical details for the application of the reasonable use approach. Generally, the reasonable use criteria (RUC) for an adjacent property are determined using the following approach:

1. Quality cannot be degraded by more than 50% of the difference between background concentrations and the Ontario Drinking Water Standards for non-health related parameters, and

2. Quality cannot be degraded by more than 25% of the difference between background concentrations and the Ontario Drinking Water Standards for health-related parameters.

Background concentrations are considered to be the site-specific quality of the groundwater prior to any impact from landfill leachate.

9.2. Background Groundwater Quality

Based on groundwater flow direction at the site, OW5 was selected as the background monitoring location for shallow groundwater. OW5 was selected because it is located up-gradient from the landfill area, has the least chance of impact from the landfill, and historically has had the lowest concentrations of indicator parameters. Historical results were used to calculate average values of indicator parameters for subsequent calculation of the RUC values. Available historic data collected from 2007 to 2024 was used to calculate the average groundwater concentrations for leachate indicator parameters. Historical water quality for OW5 is provided in Appendix F.

The background water quality is typical of a carbonate system and is generally highly mineralized with an average background hardness of 407 mg/L. On average, the background chloride concentration is less than 50 mg/L and the background specific conductance (i.e., conductivity at 25° Celsius) is 860 µS/cm.

9.3. Calculation of Objective Levels

The objective levels for several groundwater quality indicator parameters were calculated to evaluate the acceptable level of contaminant concentrations at the site boundary. Background concentrations (Cb) are the site-specific values (discussed in the previous section). The Provincial maximum concentrations (Cr) are identified in the ODWS, August 2000. Acceptable concentrations at the site boundary (Cm) are calculated from MOE Procedure B-7-1 using the following formula:

$Cm = Cb + x(Cr – Cb)$

Where:

Cm = Maximum concentration acceptable in groundwater beneath an adjacent property.
Cb = Background concentration.
Cr = Maximum concentration that should be present in groundwater for domestic consumption according to the ODWS.
x = 0.5 for non-health related parameters (AO and OG) and 0.25 for health-related parameters (MAC and IMAC).

AO = Aesthetic Objective
OG = Operational Guideline
MAC = Maximum Acceptable Concentration, Parameters Related to Health
IMAC = Interim Maximum Acceptable Concentration, Parameters Related to Health

To determine if leachate is impacting groundwater, indicator parameters including hardness, alkalinity, chloride, and specific conductance are evaluated in conjunction with other indicator parameters and concentration trends. Additionally, leachate impacted groundwater is compared to the groundwater chemistry at locations with naturally elevated concentrations to determine if leachate contributes to the elevated concentrations.

9.4. Surface Water – Provincial Water Quality Objectives

The purpose of surface water quality management at the Site is to achieve the requirements established in the Provincial Water Quality Objectives (PWQO) set out by the MOE. The criteria set out by the PWQO, summarized in Table 4, were established to ensure that surface waters are of a quality, which is satisfactory for aquatic life and recreation. Areas that have water quality surpassing the PWQO requirements are to be maintained at or above the applicable objectives. Areas that have water quality that does not presently meet the PWQO are not to be degraded any further and are to be upgraded if practical. Background surface water quality at the Huron Landfill site is represented by SW1.

10. Water Quality

Leachate is produced when surface water percolates down through refuse resulting in impacted water that has the potential to migrate along the surface or in the ground. To determine the presence of potential impacts from leachate, several indicator parameters are monitored, and a trend analysis is conducted to determine changes in existing conditions.

The following sections discuss the potential impacts to groundwater and surface water leaving the property boundaries and compliance with the Reasonable Use Criteria (RUC). In 2024, the sampling events were conducted on May 06 and November 27. The surface water and groundwater quality results for 2024 are summarized in Tables 4 and 5, respectively. Historical groundwater and surface water sampling results and graphical trends of select indicator parameters are included in Appendices “F” and “G,” respectively.

10.1. On-Site Conditions – Leachate Generation

Leachate is produced when surface water percolates down through refuse and into the groundwater. In 2024, interim cover was applied to the portions of the landfill where active landfilling is not occurring. Moving forward, based on the Stormwater Management Plan (WSP, 2019) for the Huron landfill site, interim cover and vegetation is to be completed for the entire site and only stripped within the current active area. To date, the old fill area located directly north of the current active area has been capped and closed out. It is anticipated that these measures will reduce infiltration and leachate production in these areas of the landfill.

To determine the presence of potential impacts from leachate, several indicator parameters have historically been monitored, and a trend analysis is conducted to determine changes in existing conditions. The following Sections of this report discuss the analytical results in consideration of leachate production at the site, the potential impacts to groundwater and surface water leaving the property boundaries, and compliance with Reasonable Use Criteria (RUC). The results of the most recent and historical groundwater and surface water sampling are presented in tabular and graphical form in Appendix F and Appendix G, respectively.

Closest to the active landfill area in a general downgradient direction (i.e., to the south) is monitoring well OW6. Further south of the active landfill area, and installed in the former filled area of trench T1 is OW11. Both monitoring locations are screened within the waste and are considered to be representative of leachate conditions onsite. At both monitoring locations, the groundwater concentration trends.

Monitoring data reported until 2011/2012 displayed relatively stable concentration trends, with chloride concentrations typically ranging between 20 mg/L and 85 mg/L. Consistent with active landfilling activities occurring upgradient of OW11, since 2013 increased concentrations of leachate-indicator parameters have been reported.

Since 2011, OW6 has seen an increase in the measured concentration of leachate indicator parameters, and in particular a more pronounced increase in chloride and conductivity. This response is within values expected based on the fact that OW6 is near the toe of the active area and is situated directly downgradient of the landfill.

A review of the impacts at OW6 and OW11 supports the use of conductivity, chloride, hardness, TKN and alkalinity as primary leachate indicator parameters at the Huron Landfill Site.

10.2. North Boundary Condition

Groundwater

Groundwater quality along the north boundary of the site is monitored at OW4, and further northwest at OW10s and OW10D. locations of all the monitoring wells are presented on Figure 2.

OW4 is located approximately 20 m northwest of Trench T6, while monitoring wells OW10S and OW10D are located approximately 180 m northwest of Trench T6. Historical review of indicator parameters from OW4 indicates relatively stable trends of chloride, conductivity and hardness.

During the most recent sampling events, hardness, alkalinity, DOC and iron exceeded the RUC in the spring. It is noted that during fall sampling, no RUC exceedances were reported. It is inferred that the spring exceedances may be in part due to the extensive works being completed along the northerly portion of the site in 2024. It should also be noted that other leachate indicator parameters found to be elevated within the onsite wells including chloride, TKN and conductivity are all within the typical background range. Potential leachate influenced groundwater noted at this location would be limited in extent as groundwater would ultimately flow to the southeast as determined by the more regional groundwater flow direction.

Monitoring locations OW10S & D are located along Concession 6 East northwest of the landfill site, and hydraulically upgradient of the site. Based on the groundwater quality results, no impacts to OW10S or OW10D from landfill activities are evident. Indicator parameters continue to remain consistent with background conditions.

10.3. East Boundary Condition

Groundwater

The quality of the shallow groundwater located east of the landfill property is monitored at OW5, located east of the landfill along Concession 6 East.

Monitoring location OW5 is located hydraulically upgradient of the active landfilling area and is inferred to reflect background conditions at the site. Groundwater quality trends are noted to be stable with exception of the parameters that appear to be related to typical road salting/de-icing activities (i.e., conductivity, sodium, and chloride). A review of the other leachate indicator parameter concentrations indicates that they remain stable, and that the sodium : chloride ratio is consistent with road salting activities. The lack of other leachate indicator parameters, and in particular alkalinity, is a strong indication that the sodium and chloride concentrations are likely related to road salt.

Surface Water

An upstream surface water sample (SW1) is collected from the north side of Concession 6 East, prior to influence from road salt activities and the landfill. This sample is considered to represent background conditions. In 2023,

minor phosphorus and iron exceedances of the PWQO were reported. Historically, iron and/or phosphorus exceedances have been reported, however comparison of these periodic reported exceedances at this upgradient location is inferred to be in relation to potential sediment interference and not attributed to landfill operations.

10.4. South Boundary Condition

On-Site Groundwater

The groundwater quality along the southerly property boundary is monitored at wells OW11, OW7S and OW7D. Monitoring wells OW7S and OW7D are located approximately 20 m southwest of Trench T1 and approximately 20 m from the southerly property boundary. While hardness was reported above the RUC in both OW7s and OW7D, the values remain lower than background conditions. No evidence of leachate impacts is noted at OW7S or OW7D and the groundwater quality is considered to be similar to background conditions. In particular, chloride concentrations at both locations are generally noted to be less than 30 mg/L (i.e.., below the background chloride of 47 mg/L).

OW11 is located along the southerly boundary and is installed in the former filled area of trench T1. OW11 is screened within the waste, and therefore, the measured concentrations at this location are considered to be representative of leachate conditions onsite. Previously, there have been concerns raised regarding possible mounding in close proximity to the location of OW11, and possible leachate migrating south towards the South Pine River. Several potential remedial actions were identified as part of the 2010 Design and Operations Plan (Pryde Schropp McComb Inc., 2010) including the placement of berms, interceptor trenches, limiting or ceasing landfill operations in the southern area of the site, and closure and capping of suspect areas. It was reported that the remedial actions could be taken at such a time when a non-compliance event occurred. As part of the 2010 D&O, a Contingency Plan was produced. Further details regarding the approved Contingency Plan are provided in Section 12 below.

Historically, elevated concentrations of ammonia, iron, arsenic and manganese have been reported at the location of OW11. Ammonia concentrations appear to have peaked during the 2014 sampling periods, and a decreasing trend has been observed since. A similar trend has been noted for both iron and manganese concentrations, with a peak in concentrations noted in 2014 and a decreasing trend following. Based on the 2024 monitoring results, RUC exceedances, including hardness, alkalinity, chloride, and DOC were reported during both the spring and fall sampling periods. Typical with influence from road salt application, the ratio of chloride to sodium observed at OW11 is typically in the range of 2:1 or greater. In contrast, wells showing influence from leachate typically have a ratio of chloride to sodium in the range of closer to 1:1. The chloride concentrations combined with the elevated sodium levels indicate influence that is most likely from road salt rather than leachate influence.

Offsite Groundwater

OW3 is located south of the property boundary, on additional lands owned by the Municipality, approximately 30 m south of Trench T1. OW3 monitors groundwater directly south of the southerly property boundary and intersects groundwater inferred to be flowing offsite. Based on a review of concentration trends, impacts to the groundwater due to landfill leachate at this location are not occurring. No RUC exceedances were reported during the spring 2024 sampling period, and no sample was collected during the fall sampling due to insufficient water available at that time.

Based on the overall comparison and review of groundwater quality concentrations and trends, it is concluded that the RUC is being met along the southern compliance limit (Table 5). Therefore, while groundwater quality at well OW11 may have been influenced, in part, by landfill-leachate due to the radial groundwater flow patterns, it is

apparent that the impacts to the south are likely limited in extent, as evidenced by the general absence of leachate indicators at OW3.

Surface Water

SW3 is located within the southwesterly portion of the site and is collected from the ponded water that typically collects in that area. Leachate impact has typically been noted in this location. Based on the 2024 spring monitoring results, leachate impacts are again identified with elevated levels of conductivity, chloride, sodium, potassium and ammonia. RUC exceedances were reported for un-ionized ammonia, total phosphorus and boron. No sample was collected during the 2024 fall sampling period due to dry conditions.

10.5. West Boundary Condition

Groundwater

OW1 is located approximately 20 m southwest of Trench T1. While no RUC exceedances were reported for the 2024 sampling periods, several leachate indicator parameters are noted to be above background conditions, which could be indicative of minor influence from leachate impacted groundwater. Chloride concentrations have averaged approximately 55 mg/L, slightly above the background concentration, but remaining well below the RUC.

OW8S and OW8D are located in the central portion of the site, approximately 10 m downgradient of the westerly edge of Trench T2. OW8s is noted to be screened within the upper silty clay and sand soils while OW8D is noted to be installed approximately 5 m deeper within the more tightly confined silt layer. While elevated levels of sulphate have historically been identified at each of these locations, to the sulphate does not appear to be attributed to landfill leachate and is inferred to be naturally occurring. Both monitoring locations continue to exhibit groundwater quality similar to that observed at the background monitoring location. In 2024, no exceedances were reported during the spring or fall sampling at either sampling location.

Monitoring well OW9 is located approximately 100 m north of Trench T4. This monitoring well is noted to be screened within the deeper clayey silt layer located onsite. Historically, groundwater conditions at this location have been observed to be similar to background conditions. Similarly, during the most recent sampling events, no RUC exceedances were reported. Elevated sulphate levels are also reported at this location. However, the sulphate concentrations are noted to be well below the RUC (i.e., 220 mg/L and 110 mg/L in the spring and fall, respectively).

Surface Water

A downstream surface water sample (SW2) is collected approximately 380 m downstream of the landfill site (i.e., northwest of the site) and it considered to represent conditions downstream of SW1. Conditions observed at the downstream sample location appear to be similar to the concentrations observed at SW1. Consistent with the measured concentrations at SW1, an exceedance of total phosphorus was noted during the fall sample period.

10.6. Summary of Water Quality

Based on inferred groundwater flow direction and the location of the surface water features, the western property boundary is the focus for determining compliance with the RUC. The hydrogeology indicates that shallow groundwater flows towards the west from the site. Therefore, shallow groundwater is inferred to discharge westerly resulting in the South Pine River being the primary potential receptor for potential impacts from landfill leachate.

Consistent with the location of the former active area in the southerly portion of the Site, the concentrations of several indicator parameters are showing an increasing trend at OW11 (located adjacent to the southerly property boundary). While the results are likely indicative of leachate-impacted groundwater at this location, they are also attributed to, at least in part, impacts from road salting along the access road. It is anticipated that with the absence of further landfilling in this area, a decreasing concentration trend will develop over time, ultimately decreasing the magnitude and extent of influence to the south of the landfill. It is noted that Cell 6 is located along the southerly property boundary, and represents the final area of above ground landfilling onsite. It is recommended that prior to landfilling in this cell, monitoring of leachate indicator trends are reviewed to discern if an elevated trend remains.

With the installation of OW3 located downgradient of OW11, and in proximity to the southerly property boundary (and beyond OW11), groundwater quality along the compliance limit to the south can be more reliably assessed. Consistent with historical results, the water quality continues to meet the RUC and is generally consistent with background conditions with no evidence of landfill leachate influence.

Surface water quality monitoring within the South Pine River continues to suggest that no influence from landfill leachate is migrating offsite to the river. On-going monitoring of the ponded water within the southwesterly portion of the site (SW3) has shown some evidence of landfill leachate influence. It is inferred that with the recent grading and interim/final cover improvements onsite, that conditions will improve.

Historical and recent groundwater quality results continue to indicate that landfill leachate influence is not observed within the monitoring locations downgradient of the landfill (OW9, OW8S & D and to a lesser extend OW1 and OW7S & D).

11. Landfill Gas Generation

Methane is a colorless and odourless gas formed by the decomposition of organic matter under oxygen poor (anaerobic) conditions and is commonly associated with landfills. It is produced by anaerobic bacteria, which become active only when the oxygen in the landfill has been completely consumed. The primary concern related to this parameter is that, under certain conditions, the mixture of methane in air can be explosive within a confined area. Methane gas is measured relative to the lower explosive limit (LEL) which corresponds to 5% the concentration of methane in air.

Gas sampling at the four gas monitoring locations GP1, GP2, GP3 and GP4 (located around the perimeter of the site) has historically indicated that there is no off-site migration of methane gas. The Lower Explosive Limit (LEL) have been measured in each gas probe since 2006, and most recently, methane and oxygen levels have also been recorded. Results are summarized in Table 7.

In 2024, the oxygen levels remained greater than 19% (measured as % by volume), with the exception of GP3 during the spring sampling. It is noted that the more oxygen present in a landfill, the longer aerobic bacteria can decompose waste producing only carbon dioxide and water as by-products. LEL measurements for all gas monitoring locations produced readings of 0%, with the exception of GP3 during the spring monitoring sampling. Historically, LEL measurements from the gas probes have typically produced readings of zero (0) (with the exception of GP3). Based on the relatively high levels of oxygen recorded in each gas probe, it appears that the system is aerobic in the vicinity of the gas probes. In general, methane gas is not detected within the gas monitors, and we expect that landfill gases being produced are readily vented to the surface through the soils.

Historically, high levels of methane have been detected at GP3, which was reported in previous correspondence to be located directly adjacent the scalehouse. Based on a review of the figures attached as part of previous Annual

Monitoring Reports, GP3 is located adjacent to the waste diversion area, and GP1 is located adjacent to the scalehouse. In 2024, GP1 readings reported 0 methane and oxygen levels of approximately 19%, while GP3 readings were elevated during the spring sampling (i.e., 100% methane). It is reported that two methane detectors have been installed in the scalehouse. Monitoring within the scalehouse was also completed during the spring and fall sampling and 0% methane readings were collected by GEI staff. Reportedly, based on MECP correspondence, a gas detector was installed within the attendants shelter in 2011 and was to be used by staff when working in the attendant building. In 2022, reportedly a new gas detector was purchased and monitoring resumed in September of 2022. It is recommended that further methane monitoring be conducted onsite to discern the apparent discrepancies between GP1 And GP3, and to identify if any elevated methane readings occur.

12. Contingency Plan

A Contingency Plan was identified as part of the Design and Operations Plan (Revised) completed by Pryde Schropp McCombe Inc., in January of 2010. The contingency planning portion of the report describes the conditions under which contingency measures may be required (i.e., trigger levels) and outlines the corresponding contingency measures. The reviewer is referred to the DPO for a detailed outline of these measures. A brief summary and discussion of the trigger levels and contingency plan, and how it relates to the most recent groundwater and surface water quality results, is provided below.

The Contingency Plan identifies seven groundwater (OW1, OW3, OW7S, OW7D, OW8S, OW8D and OW9) trigger locations. The established trigger levels for the groundwater are based on MECP correspondence which suggested that the triggers for the groundwater monitoring wells be set at values slightly below the RUC to allow sufficient time to respond to potential trigger events. Based on the monitoring location distance from the property boundary, levels have been calculated at 80% of the RUC (OW8S and OW8D) at 85% of the RUC (OW1, OW3, OW7S and OW7D) and at the actual RUC value (OW9).

In general, the trigger locations showed no leachate impacts to groundwater quality flowing to the north and west from the landfill property, with leachate indicator parameter concentrations reported to be similar to background concentrations. Although RUC exceedances at OW1 and OW7S were previously reported during the 2023 sampling period for DOC, monitoring results from the 2024 sampling events do not indicate impacts from landfill leachate. In addition, surface water quality results indicate that there are no impacts to the water quality in the South Pine River. Therefore, the trigger levels outlined are being met and confirm that leachate impacted groundwater is attenuating as it flows off-site to the west.

Continued monitoring is recommended to discern if an elevated trend persists. If an upward trend is established, additional monitoring locations northwest/west of the landfill property may be recommended.

13. Closed Areas

To date, the portion of the Site identified as the “Old Fill Area” (located west of the trenching area) has been filled to capacity, closed, and capped. Information received from the Township indicates that the area was obtained by the Township in 1961. No information regarding waste disposal within this area was available. The landfill inspections completed in 2024 indicate that the closed area was successfully seeded to grass and has well established tree cover.

14. Conclusions

1. An updated Design and Operations Plan for the site was submitted in December 2010 to meet the requirements of the CofA and to address some concerns raised by the Ministry onsite.

2. Based on the remaining landfill capacity of approximately 70,329m^3 for waste and daily cover, and the average and maximum fill rates of 9,333 $m^{3/}$year and 13,161 m^3/year, respectively, the remaining life expectancy is estimated to be approximately 8 to 5 years.

3. In consideration of the unused space at the Kinloss Landfill , the combined site life for the Huron and Kinloss Wards is estimated to be approximately 20 to 23 years.

4. Continued attention to compaction and the application of daily cover at the active face of the landfill will help maintain an aesthetically acceptable site. In addition, continued application of daily cover and progressive closure, as final contours are reached, will reduce leachate production at the site.

5. At the surface water sampling locations, no impacts to surface water quality above the PWQO are attributed to landfill activities, with the exception of SW-3 (onsite pond).

6. Based on the groundwater quality and inferred groundwater flow direction at the site, no evidence of impacts above the RUC are noted beyond municipally owned lands to the north, east, and west.

7. Although groundwater quality does not meet the RUC for several parameters at OW11, situated near the southern property boundary, the groundwater quality directly downgradient of the southern property boundary at OW3 shows no evidence of impacts due to landfill leachate and is considered similar to background conditions. Furthermore, where the groundwater discharges to surface water downgradient of the westerly property boundary at SW2, no evidence of impacts are noted. Based on the observed attenuation of impacts between monitoring locations, landfill derived impacts off-site and to the south of the landfill property, above the RUC, are not anticipated.

15. Recommendations

1. Closed and capped areas of the landfill should continue to be inspected on a semi-annual basis to ensure the integrity of the cover material.

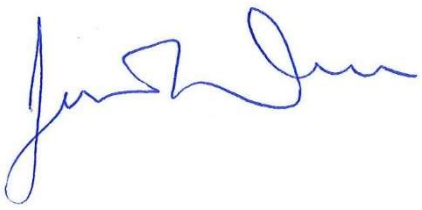
2. Landfill development should continue in Cell T4 where final contours can be tied into the existing topographical contours at T5. The final contours for these areas can be tied into the existing topographical contours, subsequently the capping of these areas with final cover and topsoil, seeded to grass, should be finalized as waste placement progresses.

3. During the 2024 sampling events, OW1 was noted to be in poor conditions and located within a significantly eroded stream bank. It is recommended that this monitoring location be decommissioned and a new monitoring well be installed in close proximity.

4. The monitoring program conducted in the spring and fall should continue to meet the requirements specified in Schedule B of the amended CofA and as outlined in the updated Design and Operations Report. The recommended sampling program is outlined below:

Groundwater Sample Location	Recommended Groundwater Parameters
OW1 OW4 OW5 OW6 OW7S OW7D OW8S OW8D OW9 OW10S OW10D OW11	Alkalinity, Ammonia, Chloride, Nitrate, Nitrite, Sulphate, Conductivity, Dissolved mentals by ICPMS, DOC, Hardness, Phenols, pH, TKN
Surface Water Sample Location	**Recommended Surface Water Parameters**
SW1 SW2 SW3	Alkalinity, Ammonia, Chloride, Nitrate, Nitrite, Sulphate, Conductivity, Dissolved mentals by ICPMS, DOC, Hardness, Phenols, pH, TKN, Total Phosphorus
	Field Parameters: Conductivity, pH, DO, Temperature

All of which is respectfully submitted,
GEI Consultants Canada Ltd.
Per:



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Tables

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Table 3: Summary of Groundwater Quality Monitoring Locations and Parameters

Table 4: Summary of Surface Water Quality Monitoring Locations and Parameters

Table 5: Summary of Surface Water Analytical Results

Table 6: Summary of Groundwater Analytical Results

Table 7: Reasonable Use Criteria

Table 8: Summary of Gas Monitoring Results

Figures

Figure 1: Site Location Plan

Figure 2: Site Layout

Figure 3: Existing Conditions

Figure 4: Section A-A

Figure 5: Section B-B

Figure 6: Groundwater Flow Map

Figure 7: Final Contour Plan

Appendix A **Environmental Compliance Approval No. A271902**

Appendix B Supporting Documents & Correspondence

Appendix C GEI Landfill Inspection Reports

Appendix D Monitoring Well Installation Details

Appendix E Historic Summary of Water Level Elevations

Appendix F Historic Groundwater Quality Results

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Appendix H Laboratory Certificate of Analysis

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TABLE 1
LANDFILL VOLUME CAPACITY (m^3) -
HURON LANDFILL

	2019	2020	2021	2022	2023	2024
Total Approved Capacity						
Total Capacity for Waste and Daily Cover	288,000	288,000	288,000	288,000	288,000	288,000
Total Capacity for Topsoil	6,840	6,840	6,840	6,840	6,840	6,840
Total Capacity for Final Cover	34,200	34,200	34,200	34,200	34,200	34,200
Total Air space Capacity	329,040	329,040	329,040	329,040	329,040	329,040
Volume Filled to Beginning of Year						
Volume of Waste and Daily Cover	191,848	205,009	213,097	221,892	232,335	--
Volume of Topsoil Used to Date	0	0	0	0	0	--
Volume of Final Cover Used to Date	0	0	0	0	0	--
Total Volume Filled	191,848	205,009	213,097	221,892	232,335	--
Available Capacity at Beginning of Year						
Capacity for Waste and Daily Cover	96,152	82,991	74,903	66,108	55,665	--
Capacity for Topsoil	6,840	6,840	6,840	6,840	6,840	--
Capacity for Final Cover	34,200	34,200	34,200	34,200	34,200	--
Total Available Capacity	137,192	124,031	115,943	107,148	96,705	--
Capacity Used During Year						
Capacity Used for Waste and Daily Cover	13,161	8,088	8,795	10,443	6,176	--
Volume of Topsoil Used	0	0	0	0	0	--
Capacity Used for Final Cover	0	0	0	0	0	--
Total Capacity Used	13,161	8,088	8,795	10,443	6,176	--
Volume Filled at End of Year						
Volume of Waste and Daily Cover	205,009	213,097	221,892	232,335	238,511	--
Volume of Topsoil	0	0	0	0	0	--
Volume of Final Cover	0	0	0	0	0	--
Total Volume Filled	205,009	213,097	221,892	232,335	238,511	--
Remaining Capacity at End of Year						
Capacity for Waste and Daily Cover	82,991	74,903	66,108	55,665	49,489	*70,329*
Capacity for Topsoil	6,840	6,840	6,840	6,840	6,840	*6,840*
Capacity for Final Cover	34,200	34,200	34,200	34,200	34,200	*34,200*
Total Remaining Capacity	124,031	115,943	107,148	96,705	90,529	*111,369*
Remaining Site Life (years)						
At 5 Year Average Fill Rate (9,333 m^3)	9	8	7	6	5	8
At 2023 Fill Rate (6176 m^3)	13	12	11	9	8	11
At 5 year maximum fill rate (10,443 m^3)	6	6	5	4	4	5

Notes:

1. Maximum capacity and final cover as provided in ECA No. A272601
2. Estimated fill rates prior to 2024 based on capacities as provided in the 2023 Annual Monitoring Report (WSP, 2024)

3. Remaining Capacity for Waste and Daily Cover in 2024 calculated based on 2024 topographic survey and comparison to final top of final waste contours

TABLE 2
SUMMARY OF MONITORING WELL DETAILS

Well ID	Year Installed	Well Condition\Status	Stick Up Elevation (masl)	ELEVATION				WELL SCREEN DETAILS					DEPTH TO BEDROCK		Depth Interval of Each Unit				Description of Unit Encountered
				Ground	ToPVC	BH Btm		Top		Bottom		Diameter			From	To	From	To	
				masl	masl	mbgs	masl	mbgs	masl	mbgs	masl	inches	mbgs	masl	mbgs		masl		
MONITORING LOCATIONS																			
OW1	1989	Monitored	0.70	229.43	230.13	6.1	223.33	4.49	224.94	5.99	223.44	-	Overburden Well		0.00	0.20	229.43	229.23	Topsoil
															0.20	0.91	229.23	228.52	Brown, dry silty sand
															0.91	1.07	228.52	228.36	Brown, dry gravel and sand with traces of silt
															1.07	1.83	228.36	227.60	Brown, dry sandy silt
															1.83	2.29	227.60	227.14	Brown, moist sandy silt with some clay
															2.29	3.35	227.14	226.08	Grey, moist silt with some clay and traces of sand
															3.35	6.10	226.08	223.33	Grey, dense silt with some sand and clay with some stones
OW2	*1989*	*Decommissioned*	-	-	-	-	-	-	-	-	-	-	*Overburden Well*		*0.00*	*0.91*	-	-	*Brown, dry silty sand*
															0.9	*1.52*	-	-	*Brown, dry silt with some clay and sand*
OW3	1989	Monitored	1.76	231.87	233.63	6.1	225.77	4.29	227.58	5.79	226.08	-	Overburden Well		0.00	1.37	231.87	230.50	Brown, dry fine sand
															1.37	1.83	230.50	230.04	Grey silt with some sand and clay
															1.83	3.66	230.04	228.21	Grey, dense silt with some clay and traces of sand
															3.66	6.10	228.21	225.77	Grey, dense silt with some sand and clay
OW4	1989	Monitored	0.80	230.08	230.88	4.27	225.81	2.52	0.0	4.02	226.06	-	Overburden Well		0.00	0.13	230.08	229.95	Topsoil
															0.13	1.07	229.95	229.01	Brown, dry gravel and sand with traces of silt
															1.07	1.52	229.01	228.56	Brown, dry fine sand with some silt and traces of clay
															1.52	4.27	228.56	225.81	Grey, dry, dense silt with some sand and clay
OW5	1989	Monitored	1.07	231.81	232.88	6.1	225.71	3.22	228.59	4.72	227.09	-	Overburden Well		0.00	0.20	231.81	231.61	Topsoil
															0.20	0.61	231.61	231.20	Brown, dry fine sand with some silt
															0.61	3.66	231.20	228.15	Grey, dense silt with some sand and clay with traces of stones
															3.66	6.10	228.15	225.71	Grey, dense silt with some sand and clay
OW6	1997	Monitored	2.36	232.88	235.24	9.76	223.12	7.67	225.21	9.17	223.71	2	Overburden Well		0.00	0.61	232.88	232.27	Fill - silt, sand and clay, brown, dense, damp, no apparent colour
															0.61	8.23	232.27	224.65	Fill - garbage, grey, wet to saturated, strong putrid odour
															8.23	9.76	224.65	223.12	Silt - some sand and clay, grey, dense, cohesive, slight putrid odour
OW7S	1997	Monitored	0.93	230.98	231.91	9.14	221.84	7.39	223.59	9.14	221.84	2	Overburden Well		0.00	0.30	230.98	230.68	Topsoil - organics, silt dark brown, dense, dry, no apparent odour
															0.30	9.14	230.68	221.84	Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour
OW7D	1997	Monitored	0.3	230.92	231.22	13.7	217.22	12.1	218.79	13.7	217.22	2	Overburden Well		0.00	0.30	230.92	230.62	Sand (topsoil), fine grained sand, little silt, poorly graded, black, dry
															0.30	11.27	230.62	219.65	Sand, fine grained sand, little to trace silt, poorly graded, brown, moist
															11.27	12.03	219.65	218.89	Clay, clay and silt lense, brown, moist
															12.03	13.70	218.89	217.22	Sand, coarse to medium grained sand, trace silt, moderately graded, gray, saturated, occasional pebble/stone
OW8S	1997	Monitored	0.61	230.08	230.69	8.8	221.28	5.3	224.8	8.8	221.28	2	Overburden Well		0.00	0.20	230.08	229.88	Topsoil - organics, silt, dark brown, compact, dry, no apparent odour
															0.20	6.40	229.88	223.68	Silt to silty clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour
															6.40	7.92	223.68	222.16	Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour
															7.92	8.50	222.16	221.58	Silt and clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour
OW8D	1997	Monitored	0.6	230.11	230.71	13.71	216.4	12.0	218.11	13.71	216.4	2	Overburden Well		0.00	0.20	230.11	229.91	Topsoil - organics, silt, dark brown, compact, dry, no apparent odour
															0.20	6.40	229.91	223.51	Silt to silt clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour
															6.40	7.92	223.51	222.19	Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour
															7.92	11.40	222.19	218.71	Silt and clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour
															11.40	13.71	218.71	216.40	Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent oour
OW9	1997	Monitored	0.84	230.06	230.9	18.28	211.78	15.0	215.06	18.28	211.78	2	Overburden Well		0.00	0.30	230.06	229.76	Fill - topsoil, organics, dark brown, dry, dense, no apparent colour
															0.30	1.52	229.76	228.54	Fill - silt and small amount of debris, porcelain plate, wood, ashes, dry, brown, no apparent odour
															1.52	17.06	228.54	213.00	Silt - some clay, occasional sand and gravel, fine grained, cohesive, dense, damp to moist, no apparent odour
															17.06	18.28	213.00	211.78	Clayey silt - occasional sand and gravel sizes, light brown, mottled gray, saturated, compact to dense, no apparent odour
OW10S	2003	Monitored	0.93	224.55	225.48	5.64	218.91	2.6	221.95	5.64	218.9	2	Overburden Well		0.00	0.05	224.55	224.50	Topsoil - black, organics and moist
															0.05	3.05	224.05	221.50	Clay - brown, dense, with some gravel and sand & dry
															3.05	4.57	221.50	219.98	Clay - grey, dense, with soeme gravel and sand, moist
															4.57	5.64	219.98	218.91	Clay - grey, dense, with some gravel and sand, wet
OW10D	2003	Monitored	0.72	224.5	225.22	13.41	211.09	11.9	212.6	13.41	211.1	2	Overburden Well		0.00	0.05	224.50	224.45	Topsoil - black, organics , moist
															0.05	3.05	224.45	221.45	Clay - brown, dense, with some gravel and sand & dry
															3.05	4.57	221.45	219.93	Clay - grey, dense, with some gravel and sand, moist
															4.57	7.92	219.93	216.58	Clay - grey, dense, with some gravel and sand, wet
															7.92	10.97	216.58	213.53	Clay - grey, dense, with some gravel and sand, dry
															10.97	11.78	213.53	212.72	Clay - grey, dense, with some gravel and sand, moist
															11.78	13.41	212.72	211.09	Gravel & Sand - some some clay and silt, sample is saturated
OW11	2003	Monitored	3.28	234.58	237.86	5.79	228.79	3.8	230.78	5.79	228.8	2	Overburden Well		0.00	1.52	234.58	233.06	Clay fill - dense, brown, dry
															1.52	4.72	233.06	229.86	Waste fill - black, strong odour, plastic in cuttings, wet
															4.72	5.79	229.86	228.79	Clay - native, grey, with some fine gravel and sand, dense, wet
GP1	2006	Monitored	-	-	-	2.45	-	0.5	-	2.0	-	1	Overburden Well		0.00	0.40	-	-	Light brown gravelly fine to medium sand; massive, compact, moist
															0.40	1.10	-	-	Medium grey silt, some clay, trace sand, trace gravel, weathered to 0.7 m, stiff, moist
															1.10	1.20	-	-	Black sand, partly organic, moist
															1.20	1.50	-	-	Medium brown fine sand, massive, loose, saturated
															1.50	1.80	-	-	Medium grey fine sand, some silt, massive, compact, saturated
															1.80	2.40	-	-	Medium grey silt, some clay, occasional 2 to 5 cm thick seams of silty fine sand, stiff, saturated
															2.40	2.45	-	-	Medium grey silt, some clay, trace sand, trace gravel, very still, moist
GP2	2006	Monitored	-	-	-	2.45	-	0.6	-	2.1	-	1	Overburden Well		0.00	0.20	-	-	Dark brown silt, some sand, partly organic, loost, moist (topsoil)
															0.20	0.40	-	-	Light red-brown fine sand, trace silt, loose, moist
															0.40	0.70	-	-	Light grey-brown silt, some clay, trace fine sand, red iron staining, weathered, very stiff, moist
															0.70	0.95	-	-	Light grey-brown silt, some very fine sand, non-plastic, red iron staining, saturated seams
															0.95	1.20	-	-	Light grey-brown silt, trace clay, trace sand, trace gravel , very stiff, wet
															1.20	1.30	-	-	Medium red-brown silty fine sand, loose, moist
															1.30	2.45	-	-	Medium grey-brown clayey silt, trace sand, trace gravel, very stiff, moist
GP3	2006	Monitored	-	-	-	2.45	-	0.9	-	2.4	-	1	Overburden Well		0.00	0.15	-	-	Light brown silty fine sand, some gravel, trace organic matter, loose, dry
															0.15	0.35	-	-	Medium brown silt, some clay, some sand, some gravel, wood fragments, stiff, moist (fill)
															0.35	0.45	-	-	Light brown silty fine sand, layered with layers of dark brown partly organic silt, moist (fill)
															0.45	1.00	-	-	Medium grey-brown silt, some clay, some sand, some gravel, weathered to 0.68m, very stiff, moist
															1.00	1.35	-	-	Dark brown to black silt, some clay, some sand, some gravel, sandy seams, stiff, moist (fill)
															1.35	1.55	-	-	Dark brown to medium grey-brown silty sand, some gravel, loose, saturated
															1.55	2.45	-	-	Medium grey-brown silt, some clay, some sand, some gravel, grading to medium brown then medium red-brown, firm becomining very stiff below 2.0m, moist, wet becoming moist below 2.0m.
GP4	2006	Monitored	-	-	-	2.45	-	0.9	-	2.4	-	1	Overburden Well		0.00	0.35	-	-	Medium brown to red-brown silty fine sand, some organic matter, layered, loose, moist
															0.35	0.65	-	-	Light red-brown sandy silt, layered, firm, wet
															0.65	1.20	-	-	Light red-brown silt, some clay, trace fine sand, weathered to 0.75m, grey discolouration along fractures, firm, moist
															1.20	1.80	-	-	Medium brown silt, trace clay, trace sand, trace gravel, layered wit saturated fine sand seams, firm, moist
															1.80	2.45	-	-	Medium brown clayey silt, trace sand, trace gravel, very stiff, moist

Note - Information presented within this table has been obtained from Borehole logs prepared by others (WSP Annual Reports) and Table 4-1 in WSP 2020 AMR.
- HSA = Hollow Stem Auger

TABLE 5
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS

	PWQO	SW1		SW2		SW3	
Sampling Date	mg/L	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24
Conductivity (µS/cm)	NV	450	520	540	540	1200	DRY
Calc. Hardness (CaCO3)	NV	280	270	320	290	280	
pH (unitless)	6.5 to 8.5	8.4	8.3	8.3	8.3	8.0	
Alkalinity	See Note	250	240	250	240	380	
Ammonia	NV	<0.050	<0.050	<0.050	<0.050	6.5	
Un-ionized ammonia	0.02	0.003	0.001	0.003	0.001	**0.17**	
Chloride	NV	2.8	17	12	18	140	
Total Phosphorous	0.03*	<0.020	**0.04**	<0.020	**0.04**	**0.07**	
Sulphate	NV	2.4	11	14	20	14	
Dissolved Organic Carbon	NV	4.8	6.9	3.9	5.4	39	
Aluminium	0.075*	--	--	--	--	--	
Barium	NV	0.02	0.04	0.03	0.03	0.04	
Boron	0.2*	<0.01	0.02	0.02	0.02	**1.1**	
Cadmium	0.0005*	--	--	--	--	--	
Calcium	NV	70	67	70	70	58	
Chromium	0.001	--	--	--	--	--	
Copper	0.005*	--	--	--	--	--	
Iron	0.3	<0.1	**0.44**	0.19	0.23	0.30	
Lead	0.005*	--	--	--	--	--	
Magnesium	NV	19	24	25	25	31	
Manganese	NV	0.02	0.02	0.02	0.02	0.08	
Potassium	NV	0.44	6.4	2.1	5.0	44	
Sodium	NV	1.6	6.8	5.7	8.1	110	
Zinc	0.02*	--	--	--	--	--	
Phenols	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.001	
Field Conductivity (µS/cm)	NV	602	640	539	610	1137	
Field pH (unitless)	6.5 to 8.5	8.0	8.2	8.4	8.0	7.9	
Field Tempurature (°C)	NA	14	6.0	15	5.4	15	

Notes:

1. PWQO refers to the Provincial Water Quality Objectives established by the Ministry of the Environment (July 1994)
2. * denotes IPWQO - Interim Provincial Water Quality Objective (July 1994)
3. Alkalinity should not be decreased by more than 25% of the natural background concentration
4. A Total Phosphorous concentration of 0.03 mg/L applies to streams and rivers
5. Un-ionized ammonia calculated using pH and Temperature per PWQO Guidelines
6. NM = Not Monitored; NV = No value specified; NA = Not Applicable
7. Concentrations in mg/L unless otherwise specified; µS/cm = microsiemens per centimeter
8. Values shaded and in bold represent results greater than the PWQO

TABLE 6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

	Background	ODWS	RUC	Upgradient and Cross-Gradient										Leachate			
				OW10S		OW10D		OW4		OW5		OW3*		OW11		OW6	
Parameter	**(mg/L)**	**(mg/L)**	**(mg/L)**	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24
Conductivity (uS/cm)	860	NV	NV	800	770	580	550	1200	670	500	930	880		2300	2300	3700	3800
Hardness (OG)	407	80-100	407	**350**	**340**	**240**	**180**	**560**	**170**	**260**	**380**	**400**		**940**	**930**	**1100**	**1200**
pH (Unitless)	7.94	6.5 to 8.5		8.1	8.2	8.2	8.3	7.7	8.2	8.2	8.1	8.1		7.6	7.7	7.7	7.8
Total Kjeldahl Nitrogen	0.46	NV	NV	<0.10	<0.10	0.1	<0.10	16.0	<0.10	0.2	0.2	0.2		24	25	41.0	41.0
Alkalinity (OG)	350	500	425	260	270	210	180	**640**	100	250	330	320		**860**	**880**	**1400**	**1400**
Ammonia	0.08	NV	NV	<0.050	<0.050	<0.050	<0.050	15	<0.050	<0.050	0.12	<0.050		23	23	29	30
Chloride (AO)*	47	250	149	1.2	1.4	5.8	3.0	5.7	1.7	1.3	90	77		**260**	**260**	**470**	**470**
Sulphate (AO)	54	500	277	160	160	80	100	12	220	18	29	13		1.3	<1.0	<1.0	<1.0
DOC (AO)*	2.8	5.0	3.90	0.41	0.54	0.48	0.61	**5.4**	1.1	0.5	2.2	2.3	ISW	**16**	**16**	**130**	**130**
Barium (MAC)*	0.1	1.0	0.27	0.03	0.03	0.11	0.08	0.10	0.02	0.09	0.10	0.09		0.26	0.25	0.75	0.70
Calcium	86	NV	NV	74	70	55	37	180	37	60	77	81		180	170	150	140
Iron (AO)*	0.03	0.3	0.17	<0.1	<0.1	<0.1	<0.1	**0.67**	<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	0.25	0.27
Magnesium	47	NV	NV	41	41	25	21	29	18	26	45	48.00		120.00	120.00	180	190
Nitrite (MAC)	0.05	1.0	0.26	<0.010	<0.010	0.02	<0.010	<0.010	<0.010	<0.010	0.01	<0.010		<0.010	<0.010	<0.010	<0.010
Nitrate (MAC)*	0.11	10	2.82	0.21	<0.10	0.69	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10
Potassium	1.7	NV	NV	1.5	1.7	1.2	1.1	13	1.1	0.73	1.5	1.6		20	20	25	26
Sodium (AO)*	32	200	116	39	39	19	27	14	75	6.8	37	38		110	110	**420**	**440**
Field Measurements																	
Temperature	--	--	--	10.0	9.0	11.3	9.0	11.6	8.2	11.8	8.8	10.7		14.0	9.6	11.8	9.3
Conductivity (Field-uS/cm)	860	NV	NV	880	890	600	580	770	730	900	930	888	ISW	2244	2080	3560	3660
pH (Field-Unitless)	7.54	6.5 to 8.5		7.89	7.88	8.00	7.99	7.94	8.12	7.42	7.60	7.88		6.99	6.78	6.94	6.98

Notes:
1. ODWS = Ontario Drinking Water Standards (June 2003, Revised June 2006)
2. AO: Aesthetic Objective; OG = Operational Guideline; MAC = Maximum Acceptable Concentration; ISW: Insufficient Water
   IMAC = Interim Maximum Acceptable Concentration
3. NV = No value specified
4. NM = Not Measured
5. Values in bold represent results greater than the ODWS
6. Shaded values represent results greater than the Reasonable Use Criteria (RUC)
7. Samples analyzed by Bureau Veritas Laboratories
8. Results presented in mg/L unless otherwise specified; µS/cm = microsiemens per centimeter
9. *Identified trigger paremeters and locations

TABLE 6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS

	Background	ODWS	RUC	Downgradient											
				OW1*		OW7S*		OW7D*		OW9*		OW8S*		OW8D*	
Parameter	**(mg/L)**	**(mg/L)**	**(mg/L)**	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24	8-May-24	27-Nov-24
Conductivity (uS/cm)	860	NV	NV	980	940	510	500	450	450	680	740	770	750	690	680
Hardness (OG)	407	80-100	407	**450**	**430**	**140**	**120**	82	**65**	**170**	**380**	**240**	**220**	**170**	**160**
pH (Unitless)	7.94	6.5 to 8.5		8.1	8.2	8.2	8.3	8.2	8.3	8.1	8.1	8.2	8.3	8.2	8.2
Total Kjeldahl Nitrogen	0.46	NV	NV	0.32	0.35	0.14	<0.10	<0.10	<0.10	<0.10	0.24	<0.10	<0.10	0.13	0.15
Alkalinity (OG)	350	500	425	360	360	180	170	160	160	100	290	220	220	150	150
Ammonia	0.08	NV	NV	<0.050	0	<0.050	<0.050	<0.050	<0.050	<0.050	0.07	<0.050	<0.050	<0.050	<0.050
Chloride (AO)*	47	250	149	55	54	27	25	9.4	12	1.2	10	53	54	7.9	8.5
Phosphorus		NV	NV	<0.1	<1.0	<0.1	<1.0	<0.1	<1.0	<0.1	<0.1	<0.1	<1.0	<0.1	<1.0
Sulphate (AO)	54	500	277	75	78	42	38	54	45	220	110	87	83	180	170
DOC (AO)*	2.8	5.0	3.90	3.2	3.5	0.5	0.6	0.7	0.9	0.9	1.8	0.8	0.5	0.6	0.8
Barium (MAC)*	0.1	1.0	0.27	0.10	0.09	0.04	0.03	0.04	0.03	0.02	0.08	0.05	0.04	0.03	0.02
Iron (AO)*	0.03	0.3	0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Magnesium	47	NV	NV	52	52	16	15	8.3	6.7	18	42	34	30	19	18
Nitrite (MAC)	0.05	1.0	0.26	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Nitrate (MAC)*	0.11	10	2.82	0.17	0.21	0.15	<0.10	0.16	<0.10	0.10	0.18	0.11	<0.10	0.14	0.21
Potassium	1.7	NV	NV	2.4	2.3	0.9	0.9	0.9	0.9	1.1	1.5	1.3	1.3	1.3	1.2
Sodium (AO)*	32	200	116	40	39	56	52	71	61	78	19	64	60	83	82
Field Measurements															
Temperature	--	--	--	11.3	8.4	11.7	7.7	10.7	8.9	11.9	8.4	11.3	8.1	12.7	8.8
Conductivity (uS/cm)	495	NV	NV	934	990	495	590	443	510	667	810	739	810	653	730
pH (Unitless)	7.54	6.5 to 8.5		7.78	7.59	8.34	8.24	8.33	8.27	8.40	7.57	7.93	7.93	8.12	7.98

Notes:
1. ODWS = Ontario Drinking Water Standards (June 2003, Revised June 2006)
2. AO: Aesthetic Objective; OG = Operational Guideline; MAC = Maximum Acceptable Concentration; IMAC = Interim Maximum Acceptable Concentration
3. NV = No value specified
4. NM = Not Measured
5. Values in bold represent results greater than the ODWS
6. Shaded values represent results greater than the Reasonable Use Criteria (RUC)
7. Samples analyzed by Bureau Veritas Laboratories
8. Results presented in mg/L unless otherwise specified; µS/cm = microsiemens per centimeter

TABLE 7
REASONABLE USE CRITERIA

GROUNDWATER INDICATOR PARAMETERS HURON LANDFILL SITE					
Parameter	**Units**	**Background Concentration (Cb)**	**Maximum Concentration (Cr)**	**ODWS Classification**	**Objective Level (Cm)**
Conductivity	µS/cm	860	NV	NV	NV
Hardness	mg/L	407	80 to 100	OG	407
pH	unitless	7.94	6.5 to 8.5	OG	6.5-8.5
Alkalinity	mg/L	350	500	OG	425
Chloride	mg/L	47	250	AO	149
Nitrate	mg/L	0.11	10	MAC	2.58
Nitrite	mg/L	0.05	1	MAC	0.53
DOC	mg/L	2.81	5	AO	3.91
Ammonia	mg/L	0.08	NV	NA	NV
TKN	mg/L	0.46	NV	NA	NV
Sulphate	mg/L	53.5	500	AO	277
Iron	mg/L	0.03	0.3	AO	0.17
Sodium	mg/L	32	200	AO	116

Notes:

Background concentrations are derived from the averages of OW-5 from 2007 to 2024

NV = No Value

AO = Aesthetic Objective

OG = Operational Guideline

MAC = Maximum Acceptable Concentration (Health Related Paramater)

Concentrations in mg/L unless otherwise specified

MOE Procedure B-7-1

Cm = Cb+x (Cr-Cb)

Where:

Cm = Maximum Concentration Acceptable in Groundwater at Property Line

Cb = Background Concentrations taken from OW1-92

Cr = Maximum Concentration Acceptable as per the Ontario Drinking Water Standards (ODWS)

x = A Constant, 0.5 for Non-Health related Parameters, and 0.25 for Helath Related Parameters

TABLE 8
SUMMARY OF GAS MONITORING RESULTS

DATE	Oxygen (% by volume)					Methane (% by volume)					LEL (% by volume)				
	GP1	GP2	GP3	GP4	Scalehouse	GP1	GP2	GP3	GP4	Scalehouse	GP1	GP2	GP3	GP4	Scalehouse
July-07	NM	NM	NM	NM	NM	NM	NM	0.2%	NM	NM	0.0	0.0	4	0.0	NM
December-07	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0	0.0	NM
January-08	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0	0.0	NM
July-08	NM	NM	NM	NM	NM	NM	NM	2.5%	NM	NM	0.0	0.0	49	0.0	NM
December-08	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0	0.0	NM
January-09	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0	0.0	NM
March-10	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	0	0.0	NM
February-11	NM	NM	NM	NM	NM	NM	NM	9.0%	NM	NM	0.0	0.0	>100	0.0	NM
March-12	NM	NM	NM	NM	NM	NM	NM	16%	NM	NM	0.0	0.0	>100	0.0	NM
February-13	NM	NM	NM	NM	NM	NM	NM	77%	NM	NM	0.0	0.0	>100	0.0	NM
January-14	NM	NM	NM	NM	NM	NM	NM	35%	NM	NM	0.0	0.0	>100	0.0	NM
January-15	NM	NM	NM	NM	NM	NM	NM	24%	NM	NM	0.0	0.0	>100	0.0	NM
February-16	NM	NM	NM	NM	NM	NM	NM	10%	NM	NM	0.0	0.0	>100	0.0	NM
February-17	NM	NM	NM	NM	NM	NM	NM	4.5%	NM	NM	0.0	0.0	90	0.0	NM
February-18	NM	NM	NM	NM	NM	NM	NM	52%	NM	NM	0.0	0.0	>100	0.0	NM
March-19	NM	NM	NM	NM	NM	NM	NM	41%	NM	NM	0.0	0.0	>100	0.0	NM
February-20	NM	NM	NM	NM	NM	NM	NM	15%	NM	NM	0.0	0.0	>100	0.0	NM
February-21	NM	NM	NM	NM	NM	NM	NM	26%	NM	NM	0.0	0.0	>100	0.0	NM
February-22	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	0.0	0.0	34	0.0	NM
February-23	NM	NM	NM	NM	NM	NM	NM	9.3%	NM	NM	0.0	0.0	>100	0.0	NM
April-24	19.3	19.2	14.8	--	19.9	0.0	0.0	100.0%	--	0.0	0.0	0.0	0.0	--	0.0
October-24	19.7	20.1	20.2	20.2	20.2	0.0	0.0	0.0%	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:
1. NM = Not Monitored.
2. LEL = Lower Explosive Limit

Figures

Figure 1: Site Location Plan

Figure 2: Site Layout

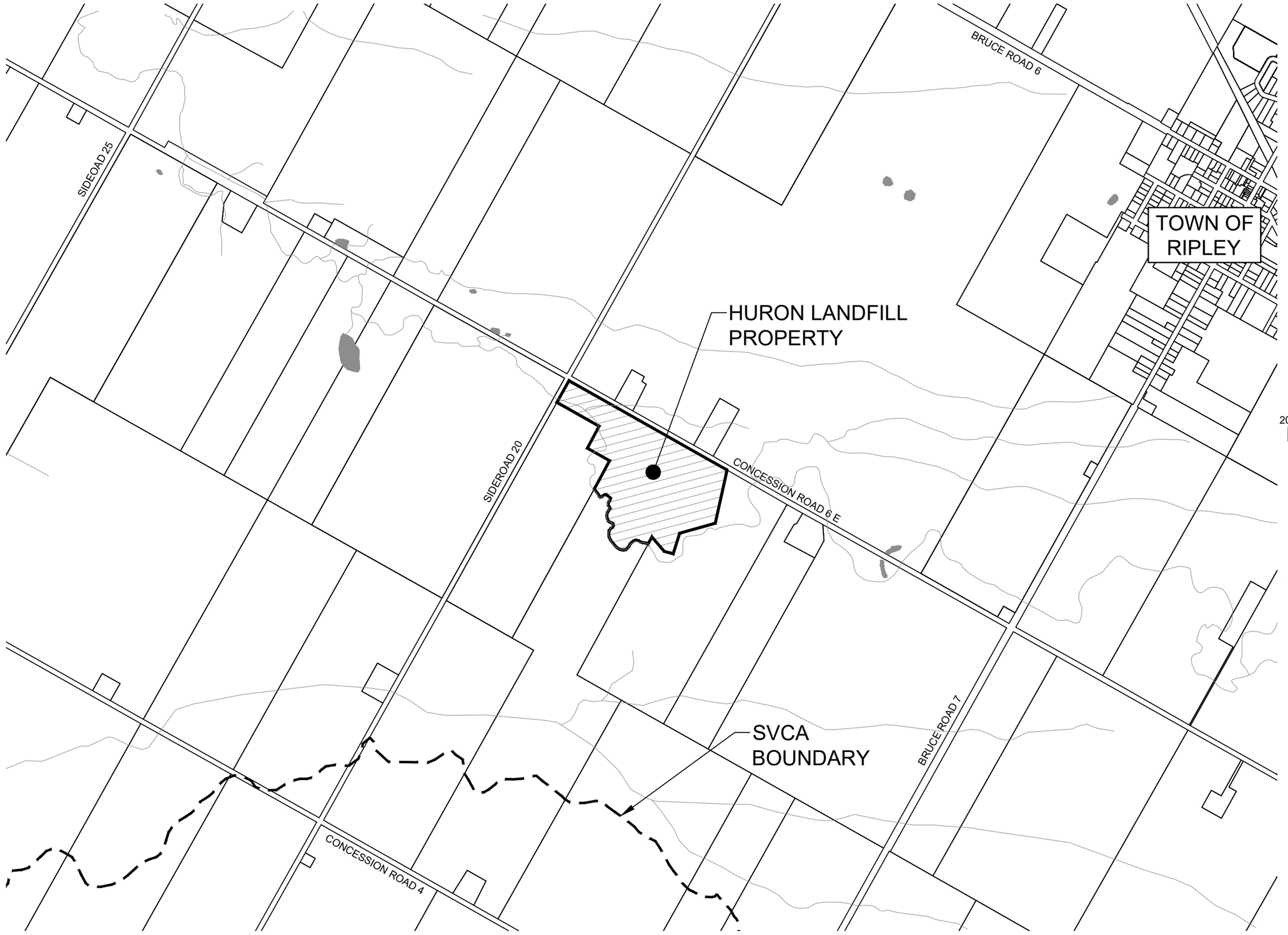
Figure 3: Existing Conditions

Figure 4: Section A-A

Figure 5: Section B-B

Figure 6: Groundwater Flow Map

Figure 7: Final Contour Plan



HURON-KINLOSS TOWNSHIP

LEGEND

- PROPERTY LINE
- RIVER / DRAIN
- SURFACE WATER
- SITE BOUNDARY
- SVCA BOUNDARY

200 100 0 200 400 600

1:15000(m)

SITE LOCATION PLAN

HURON LANDFILL SITE

Figure No. 1

GEI Consultants
GEI CONSULTANTS, CANADA, LTD.
1260-2ND AVENUE EAST
OWEN SOUND, ONTARIO N4K 2J3
(519)376-1805

2402747
MARCH 2025
Scale: 1:15,000 | NAD 1983 UTM Zone 17N

FILE:B:\Working\HURON KINLOSS ON, TWP OF\2402747 - 224058 Annual Monitoring & Reporting - Huron Landfill Site\Drawings\2402747 - Figure 1 - Site Location.dwg LAYOUT:Site Location
LAST SAVED BY:Chrpol4099, 3/11/2025 9:18:46 AM PLOTTED BY:Polhamus, Christopher 3/24/2025 8:49:31 AM

CONCESSION ROAD 6 E

SIDEROAD 20 (UNOPENED)

SURFACE WATER SAMPLING LOCATION

SOUTH PINE RIVER

APPROX EXTENT OF OLD WASTE AREA

ACTIVE LANDFILLING AREA

CELL T6

CELL T5

CELL T4

CELL T3

CELL T2

CELL T1

GRAVEL ACCESS ROAD

GRAVEL ACCESS ROAD

OW10D OW10S

OW4

GP2

OW5

GP1

WEIGHT SCALE, OFFICE AND GARAGE

FUTURE ENTRANCE GRADING

SEACANS

OW9

GP3

OW8D OW8S

OW6

WOOD WASTE STORAGE AND BURN AREA

OW1

OW7S OW7D OW2

OW11

OW3

GP4

WASTE DIVERSION AREA (TIRES, METAL & RECYCLABLES)

HURON-KINLOSS TOWNSHIP

LEGEND

- PROPERTY LINE
- WATERCOURSE
- SITE BOUNDARY
- WASTE BOUNDARY
- STRUCTURES
- EDGE OF GRAVEL
- CELL BOUNDARY
- ▲ GP# GAS PROBE
- OW## OBSERVATION WELL

30 15 0 25 50 100

1:2500 (m)

SITE LAYOUT

HURON LANDFILL SITE

Figure No. 2

GEI Consultants

GEI CONSULTANTS, CANADA, LTD.
1260-2ND AVENUE EAST
OWEN SOUND, ONTARIO N4K 2J3
(519)376-1805

2402747
MARCH 2025
Scale: 1:2500 | NAD 1983 UTM Zone 17N

FILE:B:\Working\HURON KINLOSS ON, TWP OF\2402747 - 224058 Annual Monitoring & Reporting - Huron Landfill Site\Drawings\2402747 - Figure 2 - Site Layout.dwg LAYOUT:Site Layout
LAST SAVED BY:Chrpol4099, 3/24/2025 8:45:36 AM PLOTTED BY:Polhamus, Christopher 3/24/2025 8:49:41 AM

FILE:B:\Working\HURON KINLOSS ON, TWP OF\2402747 - 224058 Annual Monitoring & Reporting - Huron Landfill Site\Drawings\2402747 - Figure 3 - Existing Conditions.dwg LAYOUT:Existing Conditions
LAST SAVED BY:Chrpol4099, 3/24/2025 8:48:04 AM PLOTTED BY:Polhamus, Christopher 3/24/2025 8:49:52 AM

CONCESSION ROAD 6 E

OW10D OW10S OW4 OW5 OW9 OW8D OW8S OW6 OW1 OW7S OW7D OW2 OW11 OW3

GP1 GP2 GP3 GP4

CELL T6 CELL T5 CELL T4 CELL T3 CELL T2 CELL T1

APPROX EXTENT OF OLD WASTE AREA

ACTIVE LANDFILLING AREA

GRAVEL ACCESS ROAD

WEIGHT SCALE, OFFICE AND GARAGE

FUTURE ENTRANCE GRADING

SEACANS

WOOD WASTE STORAGE AND BURN AREA

A A

B B

ELEVATIONS

ELEVATIONS HEREIN ARE GEODETIC, REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928 (CGVD28) BY CONVERTING ELLIPSOIDAL HEIGHTS TO ORTHOMETIC ELEVATIONS USING THE HTv2.0(2010) GEOID MODEL PROVIDED BY NATURAL RESOURCES CANADA.
COORDINATES HEREIN ARE ADJUSTED GROUND COORDINATES CONVERTED FROM GRID COORDINATES OF THE UTM 17N NAD83(CSRS-V7) COORDINATE SYSTEM AND ARE BASED ON OBSERVATIONS FROM A NETWORK OF PERMANENT GPS/GNSS REFERENCE STATIONS. THIS PLAN CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO.

HURON-KINLOSS TOWNSHIP

LEGEND

- PROPERTY LINE
- WATERCOURSE
- SITE BOUNDARY
- WASTE BOUNDARY
- STRUCTURES
- EDGE OF GRAVEL
- CELL BOUNDARY
- ▲ GP# GAS PROBE
- ⌖ OW## OBSERVATION WELL

20 10 0 20 40 60
1:1500 (m)

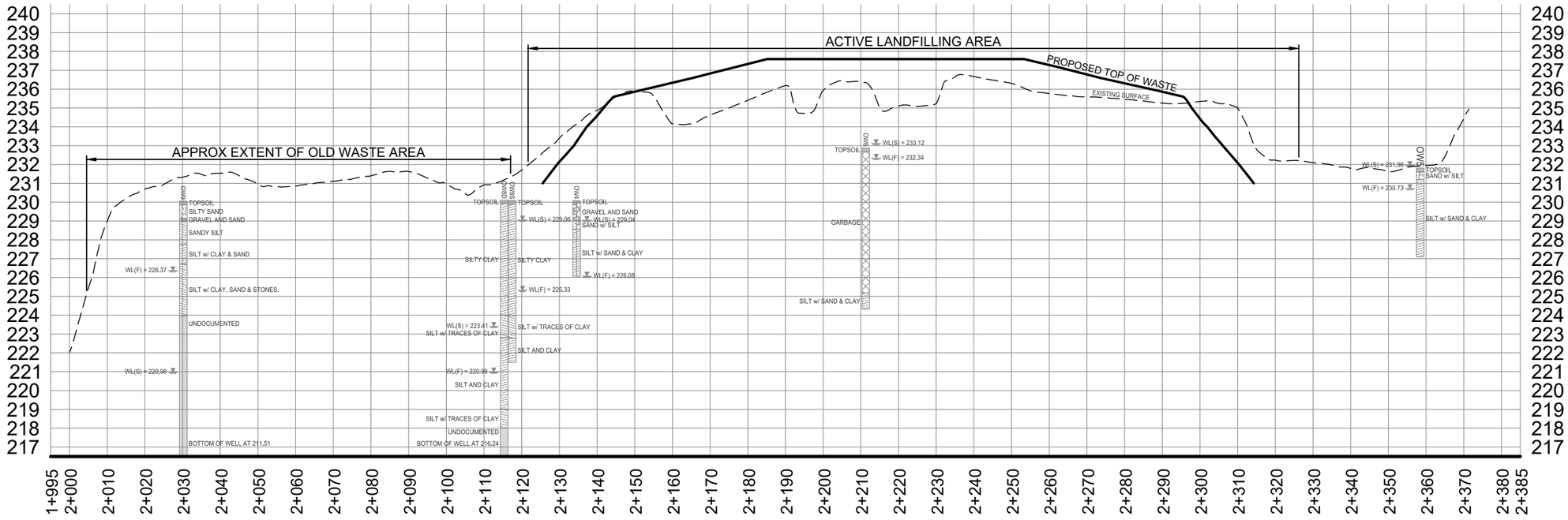
EXISTING CONDITIONS

HURON LANDFILL SITE

Figure No. 3

GEI Consultants
GEI CONSULTANTS, CANADA, LTD.
1260-2ND AVENUE EAST
OWEN SOUND, ONTARIO N4K 2J3
(519)376-1805

2402747
MARCH 2025
Scale: 1:1500 | NAD 1983 UTM Zone 17N



SECTION A-A

H = 1:1250
V = 1:250

HURON-KINLOSS TOWNSHIP

LEGEND

EXISTING SURFACE

SECTION A-A

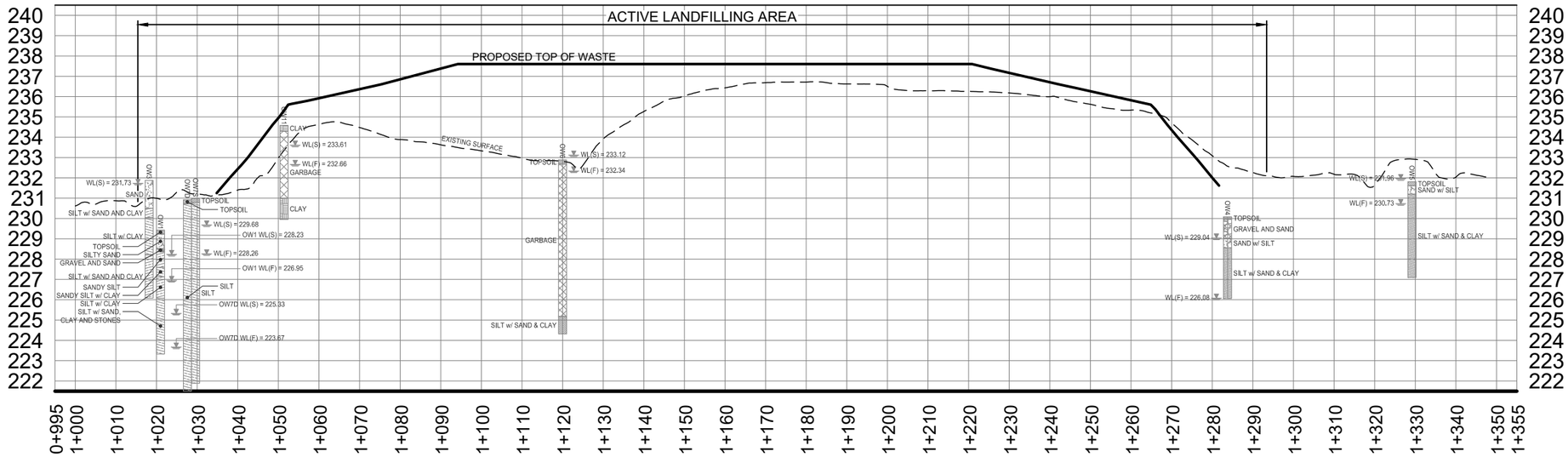
HURON LANDFILL SITE

Figure No. 4

GEI Consultants
GEI CONSULTANTS, CANADA, LTD.
1260-2ND AVENUE EAST
OWEN SOUND, ONTARIO N4K 2J3
(519)376-1805

2402747
MARCH 2025
Scale: AS NOTED | NAD 1983 UTM Zone 17N

FILE:B:\Working\HURON KINLOSS ON, TWP OF\2402747 - 224058 Annual Monitoring & Reporting - Huron Landfill Site\Drawings\2402747 - Figure 4 And 5 - Sections.dwg LAYOUT:Section A-A
LAST SAVED BY:Chrpol4099, 3/17/2025 10:15:56 AM PLOTTED BY:Polhamus, Christopher 3/24/2025 8:50:00 AM



SECTION B-B

H = 1:1250
V = 1:250

HURON-KINLOSS TOWNSHIP

LEGEND

EXISTING SURFACE

SECTION B-B

HURON LANDFILL SITE

Figure No. 5

GEI Consultants
GEI CONSULTANTS, CANADA, LTD.
1260-2ND AVENUE EAST
OWEN SOUND, ONTARIO N4K 2J3
(519)376-1805

2402747
MARCH 2025
Scale: AS NOTED | NAD 1983 UTM Zone 17N

FILE:B:\Working\HURON KINLOSS ON_ TWP OF\2402747 - 224058 Annual Monitoring & Reporting - Huron Landfill Site\Drawings\2402747 - Figure 4 And 5 - Sections.dwg LAYOUT:Section B-B
LAST SAVED BY:Crrpol4099, 3/17/2025 10:15:56 AM PLOTTED BY:Polhamus, Christopher 3/24/2025 8:50:01 AM

FILE:B:\Working\HURON KINLOSS ON, TWP OF\2402747 - 224058 Annual Monitoring & Reporting - Huron Landfill Site\Drawings\2402747 - Figure 6 - GW Flow Map.dwg LAYOUT:GW Flow Map
LAST SAVED BY:Chrpol4099, 3/24/2025 8:47:53 AM PLOTTED BY:Polhamus, Christopher 3/24/2025 8:50:12 AM

CONCESSION ROAD 6 E

OW10S
CL(S)=55mg/L
WL(S)=223.85
CL(F)=54mg/L
WL(F)=221.83

OW10D
CL(S)=5.8mg/L
WL(S)=222.32
CL(F)=3.0mg/L
WL(F)=217.84

OW4
CL(S)=5.7mg/L
WL(S)=229.04
CL(F)=1.7mg/L
WL(F)=226.08

GP2

OW5
CL(S)=1.3mg/L
WL(S)=231.96
CL(F)=90mg/L
WL(F)=230.73

APPROX EXTENT OF OLD WASTE AREA

ACTIVE LANDFILLING AREA

WEIGHT SCALE, OFFICE AND GARAGE

GP1

FUTURE ENTRANCE GRADING

GRAVEL ACCESS ROAD

SEACANS

OW9
CL(S)=1.2mg/L
WL(S)=220.98
CL(F)=10mg/L
WL(F)=226.37

GP4

OW8S
CL(S)=53mg/L
WL(S)=229.06
CL(F)=54mg/L
WL(F)=225.33

OW8D
CL(S)=7.9mg/L
WL(S)=223.41
CL(F)=8.5mg/L
WL(F)=220.99

OW6
CL(S)=470mg/L
WL(S)=233.12
CL(F)=470mg/L
WL(F)=232.34

GRAVEL ACCESS ROAD

WOOD WASTE STORAGE AND BURN AREA

OW1
CL(S)=55mg/L
WL(S)=228,23
CL(F)=54mg/L
WL(F)=226.95

OW7S
CL(S)=27mg/L
WL(S)=229.68
CL(F)=25mg/L
WL(F)=228.26

OW7D
CL(S)=9.4mg/L
WL(S)=225.33
CL(F)=12mg/L
WL(F)=223.67

OW2

OW11
CL(S)=260mg/L
WL(S)=233.61
CL(F)=260mg/L
WL(F)=232.66

OW3
CL(S)=77mg/L
WL(S)=231.73
CL(F)=ISW
WL(F)=ISW

GP3

ELEVATIONS

ELEVATIONS HEREIN ARE GEODETIC, REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928 (CGVD28) BY CONVERTING ELLIPSOIDAL HEIGHTS TO ORTHOMETIC ELEVATIONS USING THE HTv2.0(2010) GEOID MODEL PROVIDED BY NATURAL RESOURCES CANADA.
COORDINATES HEREIN ARE ADJUSTED GROUND COORDINATES CONVERTED FROM GRID COORDINATES OF THE UTM 17N NAD83(CSRS-V7) COORDINATE SYSTEM AND ARE BASED ON OBSERVATIONS FROM A NETWORK OF PERMANENT GPS/GNSS REFERENCE STATIONS. THIS PLAN CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO.

HURON-KINLOSS TOWNSHIP

LEGEND

- PROPERTY LINE
- WATERCOURSE
- SITE BOUNDARY
- WASTE BOUNDARY
- STRUCTURES
- EDGE OF GRAVEL
- ▲ GP# GAS PROBE
- OW## OBSERVATION WELL
- 230 GROUNDWATER CONTOUR

20 10 0 20 40 60
1:1500 (m)

GROUND WATER FLOW MAP

HURON LANDFILL SITE

Figure No. 6

GEI Consultants
GEI CONSULTANTS, CANADA, LTD.
1260-2ND AVENUE EAST
OWEN SOUND, ONTARIO N4K 2J3
(519)376-1805

2402747
MARCH 2025
Scale: 1:1500 | NAD 1983 UTM Zone 17N

HURON-KINLOSS TOWNSHIP

CONCESSION ROAD 6 E

OW10D OW10S OW4 GP2 OW5

APPROX EXTENT OF OLD WASTE AREA

ACTIVE LANDFILLING AREA

GRAVEL ACCESS ROAD

WEIGHT SCALE, OFFICE AND GARAGE

FUTURE ENTRANCE GRADING

SEACANS

GP1

OW9

GP4 OW8S OW8D OW6

WOOD WASTE STORAGE AND BURN AREA

OW1 OW7S OW7D OW2 OW11 OW3 GP3

A A

B B

LEGEND

- PROPERTY LINE
- WATERCOURSE
- SITE BOUNDARY
- WASTE BOUNDARY
- STRUCTURES
- EDGE OF GRAVEL
- ▲ GP# GAS PROBE
- OW## OBSERVATION WELL
- 230 FINAL CONTOURS

20 10 0 20 40 60

1:1500 (m)

ELEVATIONS

ELEVATIONS HEREIN ARE GEODETIC, REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928 (CGVD28) BY CONVERTING ELLIPSOIDAL HEIGHTS TO ORTHOMETIC ELEVATIONS USING THE HTv2.0(2010) GEOID MODEL PROVIDED BY NATURAL RESOURCES CANADA.
COORDINATES HEREIN ARE ADJUSTED GROUND COORDINATES CONVERTED FROM GRID COORDINATES OF THE UTM 17N NAD83(CSRS-V7) COORDINATE SYSTEM AND ARE BASED ON OBSERVATIONS FROM A NETWORK OF PERMANENT GPS/GNSS REFERENCE STATIONS. THIS PLAN CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO.

FINAL CONTOUR PLAN

HURON LANDFILL SITE

Figure No. 7

GEI Consultants
GEI CONSULTANTS, CANADA, LTD.
1260-2ND AVENUE EAST
OWEN SOUND, ONTARIO N4K 2J3
(519)376-1805

2402747
MARCH 2025
Scale: 1:1500 | NAD 1983 UTM Zone 17N

FILE:B:\Working\HURON KINLOSS ON, TWP OP\2402747 - 224058 Annual Monitoring & Reporting - Huron Landfill Site\Drawings\2402747 - Figure 7 - Final Contour Plan.dwg LAYOUT:Final Contour Plan
LAST SAVED BY:Chrpol4099, 3/24/2025 8:46:54 AM PLOTTED BY:Polhamus, Christopher 3/24/2025 8:50:22 AM

Appendix A **Environmental Compliance Approval No. A271902**

Ontario

of the Environment

de l'Environnement

Provisional Certificate of Approval for a Waste Disposal Site

Certificat provisoire d'autorisation du lieu d'élimination des déchets

Provisional Certificate of Approval No. A-272601
Certificat provisoire d'autorisation nº

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Aux termes de la Loi sur la protection de l'environnement et des règlements y afférents et sous réserve des restrictions qui s'y appliquent, ce Certificat provisoire d'autorisation est délivré à:

Township of Huron,
P. O. Box 149,
Ripley, Ontario
N0G 2R0

For the use and operation of an 8 hectare landfilling site within a total area of 17.7 hectares.

All in accordance with the following plans and specifications:

1. An application for a Certificate of Approval for a Waste Disposal Site (Landfill) completed by the Township of Huron, dated August 27, 1991.

2. Letter Re: Township of Huron Waste Disposal Site # A272601 dated August 20, 1991 from Maitland Engineering Services Ltd.

Located at: Part of Lots 19 and 20, Concession 5, Township of Huron, County of Bruce

Which includes the use of the site only for the disposal of the following categories of waste: (Note: Use of the site for additional categories of wastes requires a new application and amendments to the Provisional Certificate of Approval.) domestic, commercial, and non-hazardous solid industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill).

Serving: The residents of the Township of Huron and the Village of Ripley.

and Subject to the following conditions:

1. This Certificate of Approval shall be registered on the title to the lands comprising the waste disposal site. No operation shall be carried out at the site after sixty days from this condition becoming enforceable unless this Certificate including the reasons for this condition has been registered by the applicant as an instrument in the appropriate Land Registry Office against title to the site and a duplicate registered copy thereof returned by the applicant to the Director, Approvals Branch, Ministry of the Environment.

Dated this 15 day of October, 19 91

Date de / jour de

Ontario

of the Environment

de l'Environnement

Provisional Certificate of Approval for a Waste Disposal Site

Certificat provisoire d'autorisation du lieu d'élimination des déchets

Provisional Certificate of Approval No. A-272601
Certificat provisoire d'autorisation no

Under the Environmental Protection Act and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Aux termes de la Loi sur la protection de l'environnement et des règlements y afférents et sous réserve des restrictions qui s'y appliquent, ce Certificat provisoire d'autorisation est délivré à:

2. Site monitoring under the direction of a professional consultant shall be in accordance with the attached Schedule "B".

3. The Municipality shall submit an annual report, prepared by their Consultant, to the Owen Sound District Office, Ministry of the Environment, addressing the requirements of Section 5.1.5 of report Schedule "A" Item 3, for each year by the subsequent March 31, of the following year, commencing March 31, 1990. Provided that on-site till material is used for final cover, Section 5.1.5 (c) need not be addressed.

4. No waste other than segregated brush, lumber and clean wood shall be burned at this site, in an area separate from the stump waste and only under conditions that will not cause any adverse off-site impact.

5. Access to the burning area by the public and other unauthorized personnel is prohibited when burning is being carried out.

6. No burning shall be carried out unless supervision is provided by the operating authority at all times.

7. The terms and conditions set out in this Provisional Certificate of Approval replace all terms and conditions set out in any Certificate No. A-272601 issued previous to the date of this Certificate of Approval.

Dated this _____ day of _____ 19 _____
date de jour de

SCHEDULE "A"

This Schedule "A" forms part of Provisional Certificate of Approval No. A-272601 dated

1. Application for a Certificate of Approval for a waste disposal site dated July 13, 1972 submitted by the Township of Huron.

2. Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated December 20, 1985 submitted by the Township of Huron.

3. "Plan of Development and Operation, Township of Huron Waste Disposal Site, Township of Huron, County of Bruce" dated April 15, 1985, Revised October 11, 1985 prepared by Maitland Engineering Services Ltd.

4. Letter from the Township of Huron to the Ministry of the Environment dated November 26, 1987 requesting an emergency Certificate of Approval to include waste from the Village of Ripley.

5. Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated August 27, 1991, submitted by the Township of Huron.

092702

SCHEDULE "B"

Water quality monitoring of the groundwater (three wells) and the surface water (Pine River upstream and downstream of the waste disposal site) plus the interceptor ditch shall be undertaken twice yearly in the periods of September-October and April-May commencing September-October, 1989.

Background water quality consisting of the following parameters shall be obtained on the first two monitoring occasions: pH, phenols, potassium, magnesium, calcium, sodium, sulphate, chloride, carbonate, bicarbonate, electrical conductivity, total kjeldahl nitrogen, nitrate, dissolved organic carbon and total metals (As, Cd, Co, Cr, Cu, Sg, Mn, Ni, Pb, Se, So, Cn, Zn).

Subsequent water quality monitoring shall be only for the following "indicator parameters": pH, conductance, chloride, hardness, DOC and phenols.

All surface water samples shall be tested for turbidity, total phosphorous and ammonia in addition to those parameters listed above.

All groundwater samples shall be field filtered utilizing a 0.45 micron filter.

Static water levels are to be obtained in the groundwater monitoring wells prior to commencing the sampling procedure. Each well is to be bailed the equivalent of three casing lengths of water prior to obtaining the sample.

TO:

Township of Huron
P. O. Box 149
Ripley, Ontario
N0G 2R0

You are hereby notified that Provisional Certificate of Approval No. A 272601 has been issued to you subject to the conditions outlined therein.

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

1. The reason for Condition 1 requiring registration of the Certificate is that Section 45 of the Environmental Protection Act, 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 site 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 Certificate being registered on title.

2. The reasons for Conditions 2 and 3, are to ensure that the approved water quality monitoring program is established with interpretation on a routine basis in conjunction with the site operation and development to document and remedy, if warranted, potential environmental problems associated with the operation of the site.

3. The reason for Condition 4, is that the burning of wastes other than segregated brush, lumber and clean wood results in unacceptable emissions of air contaminants.

4. The reason for Conditions 5 and 6 is that restricted access to the burning area and adequate supervision are required to ensure that burning is carried out in an acceptable manner under the proper conditions and only suitable types of waste are burned.

5. The reason for Condition 7 is to clarify that this Certificate sets out all of the requirements imposed with respect to this site other than requirements imposed by legislation and the common law.

The use and operation of this site without the above conditions may create a nuisance or result in a hazard to the health and safety of any person.

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 122a of the Environmental Protection Act, R.S.O. 1980, c. 141, as amended, provides that the Notice requiring the hearing shall state the portions of each term or condition in the approval in respect of which the hearing is required and the grounds on which you intend to rely at the hearing.

This Notice should be served upon:

The Secretary
Environmental Appeal Board
112 St. Clair Avenue West
Suite 502
Toronto, Ontario.
M4V 1N3

AND

The Director
Section 38, E.P.A.
Ministry of the Environment
250 Davisville Ave.
Toronto, Ontario.
M4S 1H2

Dated at ~~Toronto~~ London this 15th day of October, 1991

Director,
Section 38, E.P.A.
Ministry of the Environment

RECEIVED
JUL 16 2010
orig - BPP
MW copy - file 0094

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A272601
Notice No. 2
Issue Date: July 6, 2010

The Corporation of the Township of Huron-Kinloss
21 Queen St
Ripley, Ontario
N0G 2R0

Site Location: Huron Landfill Site
Lot 19 and 20, Concession 5
Huron-Kinloss Township, County of Bruce

You are hereby notified that I have amended Provisional Certificate of Approval No. A272601 issued on October 15, 1991, as amended for a waste disposal Site, consisting of 8.0 hectares Waste Fill Area within a total Site Area of 17.7 hectares , as follows:

1. LANDFILLING BY AREA METHOD

Pursuant to Section 27 of the *Environmental Protection Act,* approval is hereby granted to change the landfilling operation at the Huron Landfill from Trench method to Area method, for the disposal of domestic, commercial, and solid non-hazardous industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill); and

2. OPERATION OF WASTE SEGREGATION/RECYCLING AND WEEE FACILITIES

Pursuant to Section 27 of the *Environmental Protection Act,* approval is hereby granted for the establishment and operation of waste segregation/recycling centre and WEEE program at the Huron Landfill Site, for the acceptance, temporary storage, and transfer of non-putricible recyclable waste;

all in accordance with the following documentation which is added to Schedule "A", and forms part of the Provisional Certificate of Approval No. A272601, and subject to the terms and conditions listed herein:

Note: Use of the Site for any other type of waste and/or any other waste management activity is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

For the purpose of this Provisional Certificate of Approval and the terms and conditions specified below, the following definitions apply:

DEFINITIONS:

a. "*Certificate* " means this entire Provisional Certificate of Approval No. A272601, issued in accordance with section 39 of the *EPA* , and includes any schedules to it, the application and the supporting documentation listed in schedule "A;

b. "*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;

c. "*District Manager* " means the District Manager of the Owen Sound district office of the Ministry of the Environment;

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

e. "*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 and includes its successors or assigns;

f. "*Owner* " means any person that is responsible for the establishment or operation of the site being approved by this *Certificate* , and includes the Township of Huron-Kinloss, its successors and assigns;

g. "*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* .

h. "*Regional Director* " means the Regional Director of the Southwestern Regional Office of the Ministry or the Environment;

i. "*Regulation 232* " or "*Reg. 232* " means Ontario Regulation 232/98 (New Landfill Standards) made under the *EPA* , as amended from time to time;

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

k "*Site* " means the entire waste disposal site, including the buffer lands/contaminant attenuation zone, located at Lot 19, 20, Concession 5, Huron-Kinloss Township, County of Bruce, approved by this *Certificate* .

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

- relevant waste management legislation, regulations and guidelines;

- major environmental concerns pertaining to the waste to be handled;
- occupational health and safety concerns pertaining to the processes and wastes to be handled;
- management procedures including the use and operation of equipment for the processes and wastes to be handled;
- emergency response procedures;
- specific written procedures for the control of nuisance conditions;
- Specific written procedures for refusal of unacceptable waste loads;
- the requirements of this *Certificate* .

m. "OWRA" means *Ontario Water Resources Act, R. S. O. 1990*

n. "WEEE" means Waste Electrical and Electronic Equipment (**WEEE**) Program

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

TERMS AND CONDITIONS

1.0 GENERAL

1.1 Except as otherwise provided by these conditions, the Site shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and installed, in accordance with the Applications for Provisional Certificate of Approval for a Waste Disposal Site, dated August 29, 2008 and April 23, 2009, and supporting documentation, and plans and specifications listed in Schedule "A".

1.2 The requirements specified in this Certificate are the requirements under the **Environmental Protection Act**, R.S.O. 1990. The issuance of this Certificate in no way abrogates the Owner/Operator's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

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

1.4 The Owner/Operator shall ensure compliance with all the terms and conditions of this Certificate. Any non-compliance constitutes a violation of the **Environmental Protection Act**, R.S.O. 1990 and is grounds for enforcement.

1.5 (a) The Owner/Operator shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Certificate, including but not limited to, any records required to be kept under this Certificate; and

(b) In the event the Owner/Operator provides the Ministry with information, records, documentation or notification in accordance with this Certificate (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/Operator, or to require the Owner/Operator to take any action, under this Certificate 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/Operator relating to the Information, amounting to non-compliance with this Certificate or any statute or regulation.

1.6 The Owner/Operator shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to carry out any and all inspections authorized by Section 156, 157 or 158 of the **Environmental Protection Act**, R.S.O. 1990, Section 15, 16 or 17 of the **Ontario Water Resources Act**, R.S.O. 1990, or Section 19 or 20 of the **Pesticides Act**, R.S.O. 1990, as amended from time to time, of any place to which this Certificate relates; and, without restricting the generality of the foregoing, to:

a. enter upon the premises where the records required by the conditions of this Certificate are kept;

b. have access to and copy, at reasonable times, any records required by the conditions of this Certificate;

c. inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Certificate; and

d. sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Certificate.

1.7 (a) Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this Certificate, the conditions in this Certificate 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.

1.8 The Owner/Operator shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to the Provisional Certificate of Approval Number, A272601.

1.9 The Owner/Operator shall notify the Director in writing of any of the following changes within

thirty (30) days of the change occurring:

a. change of Owner or Operator of the Site or both;

b. change of address or address of the new Owner;

c. any change of name of the company, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 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

d. change in directors or officers of the company, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 12(c), supra.

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

1.11 Any information relating to this Certificate 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.

1.12 All records and monitoring data required by the conditions of this Certificate must be kept on the Site for a minimum period of two (2) years from the date of their creation.

Transferral or Encumbrance of Site

1.13 No portion of this Site shall be transferred or encumbered prior to or after closing of the Site, unless the Director is notified in advance in writing and is satisfied with the arrangements made to ensure that all terms and conditions of this Certificate will be carried out and sufficient financial assurance (EPA, Part XII) is deposited with the Ministry, to ensure that these terms and conditions will be carried out.

2.0 SITE DESIGN AND DEVELOPMENT

Service Area

2.1 Only waste generated from within the geographic boundaries of the **Township of Huron-Kinloss** shall be received for disposal at this Site. No waste generated and/or transferred from outside the **Township of Huron-Kinloss** shall be received for disposal at this Site.

Waste Types

2.2 Only domestic, commercial, and solid non-hazardous industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill), shall be received for disposal at this Site. **No hazardous**

waste or liquid industrial waste, as defined in Reg. 347, and as amended, shall be disposed at the Site.

Waste Fill Rate

2.3 The maximum rate at which the Site shall receive waste for disposal, is limited to **100 tonnes per day**, and **3,000 tonnes per calendar year**. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurence from the District Manager.

Site Capacity

2.4 The total waste disposal capacity of the Site (waste filled by trench method and by area method), including waste, daily cover and interim cover is **288,000 cubic metres.**

Waste Placement

2.5 Landfilling operations shall be conducted by **Area method** in which waste shall be filled and compacted over the prepared base or on previously filled areas, as applicable, in layers and covered with approved cover material, in accordance with the "Design and Operations Plan (Revised)" (Section 3.4), Item 8 in Schedule "A", attached to this Certificate.

2.6 The Site shall be developed in a progressive manner from the northwest corner (Cell 1) towards eastward and landfilling shall be carried out sequentially from the top surface of the existing waste, in cells 1 to 6, each cell measuring appproximately 40 metres in width, as shown on Map 3, "Initial Stage of Landfilling Operation", dated August 13, 2008, included in the "Design and Operations Plan (Revised)", Item 8, in Schedule "A", attached to this Certificate. No waste shall be landfilled outside the **limit of the 8.0 hectares footprint fill area**, surrounded on all sides by a minimum **30 metres** wide buffer.

2.7 Prior to landfilling by **Area method**, detailed Drawing showing the base preparation grades/contours consistent with the conceptual design minimum base elevations (i.e. top of existing waste by trench method), shall be submitted by the Owner/Operator, copied to the District Manager, for approval by the Director. No waste shall be landfilled below the top surface of the existing waste , as shown on Map 2, (Site Plan), dated January 6, 2010, included in Item 8, in Schedule "A", attached to this Certificate.

2.8 No waste shall be landfilled at any time above the **final contours** shown on Map 6, "Final Contours", dated January 6, 2010, included in the "Design and Operations Plan (Revised)", Item 8, in Schedule "A", attached to this Certificate. The maximum elevation of the fill area, including final cover, shall not exceed **238.75 metres above sea level**. Final slopes above grade at the time of site closure within the waste fill area shall be within the range of 4H:1V (25%) on the sides, and 20H:1V (5%) on the top surface.

2.9 Prior to waste placement in each cell, the existing vegetation, topsoil and cover material shall be

stripped to the top of the existing waste to provide hydraulic continuity through the existing and the new waste masses.

3.0 SITE OPERATIONS

Hours of Operation

3.1 The Site shall be opened to receive waste for disposal from **Monday to Saturday,** from **08:00 am to 5:00 pm,** as described in Item 13 in Schedule "A", attached to this Certificate. The Site shall be closed on statutory holidays.

3.2 The hours of operation may be amended from time to time to accommodate seasonal or unusual demand, based on prior concurrence from the District Manager.

Daily, Interim and Final Covers

3.3 Daily, interim and final cover material shall be applied in accordance with the Design & Operations Plan (Revised), (Section 3.5), Item 8 in Schedule "A", attached to this Certificate, and as follows:

a. **Daily Cover** - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as **compost, wood-chips or foundry sand**. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards.

b. **Interim Cover** - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minmum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.

c. **Final Cover** - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule "A", attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of $10^{-5cm}/_{sec}$ or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

Alternative Daily and Interim Cover Materials

3.4 Alternative materials to that approved under Condition 3.3 above, may be used as daily and interim cover material, based on an application with supporting information and applicable fee for a trial use or permanent use, submitted by the Owner/Operator to the Director, copied to the District Manager, and as approved by the Director via an amendment to this Certificate. The alternative material shall be non-hazardous according to Reg. 347 and will be expected to perform at least, as well as soil in relation to the following functions:

a. Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;

b. Provision for an aesthetic condition of the landfill during the active life of the Site;

c. Provision for vehicle access to the active tipping face; and

d. Compatibility with the design of the Site for groundwater protection, leachate management and landfill gas management.

Site Supervision and Security

3.5 No waste shall be received, landfilled or transferred from the Site/Facilities unless a site supervisor

or attendant is present and supervises the operations during operating hours. The Site shall be closed when a site attendant is not present to supervise landfilling and/or waste transfer operations.

3.6 The Site shall be operated and maintained in a secure manner with lockable entrance and exit gates, such that unauthorized persons cannot enter the Site, during non-operating hours.

Nuisance Controls and Adverse Effects

3.7 The Owner/Operator shall implement control measures for odour, litter, birds, vector and vermin, as described in Sections 3.12 and 3.13 in Item 8 in Schedule "A", attached to this Certificate. Effectiveness of the control measures shall be reviewed and monitored regularly and updated/revised, as required, based on operational experience and complaints.

3.8 (a). The *Owner/Operator* shall ensure that wind-blown litter originating from the waste management activities at the Site is picked up regularly along the Site perimeter roads and access roads.

(b). The *Owner/Operator* shall, at its own expense, remove wind-blown litter originating from the waste management activities at the Site, from adjacent neighbouring properties of the Site, a minimum once per month or more frequently when wind-blown litter from the Site becomes severe.

3.9 The Site shall be operated and maintained such that any other operational impacts, including dust, noise and traffic, do not create a nuisance. Any adverse effect on the natural environment or impairment of water quality resulting from the operations of the site, shall be ameliorated promptly, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the impairment.

Signage

3.10 The existing sign shall be maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:

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

3.11 Signs shall also be posted along internal access roads controlling vehicle speed, turning movements and to direct vehicles and/or users to the working face and other designated areas and facilities on the Site, as appropriate. All landfill signs shall be kept legible, in good repair, and cleaned when required.

4.0 WASTE SEGREGATION/RECYCLING AND WEEE FACILITIES

Design and Operations Manual

4.1 By December 31, 2010, the Owner/Operator shall submit for the approval of the Director, copy to the District Manager, an application with applicable fees, supported by detailed Design and Operations Manual for the Waste Segregation/Recycling and WEEE program Facilities. The detailed design and operations manual for the Facilities shall reflect the conceptual design and operations, as presented in Item 8 (Section 3.11), in Schedule "A", attached to this Certificate. The manual shall as a minimum, include, but not be limited to the following:

(a) a full-scale site plan and specifications, showing the footprint of the 8.0 hectares waste fill area, the boundaries of the buffer/contaminant attenuation zone and the entire Site boundaries; and indicating all waste management activities, as well as the location and type of finished surface for each storage area, and identifying any storage bins;
(b) specify the area and storage capacity for each designated storage location;
(c) operating hours for receipt of materials at the facilities which shall be within the general hours of operation of the landfill site, and frequency for removal/transfer of stockpiled materials;
(d) an outline of the responsibilities of site personnel;
(e) personnel training protocols;
(f) procedure for monitoring incoming waste, and record-keeping procedures;
(g) proper storage, containment, handling, sorting and shipping procedures which shall avoid the creation of environmental nuisance or adverse effect;
(h) details on the inspection/monitoring, maintenance, repair and replacement of the facilities, as necessary;
(i) contingency measures and procedures to be followed by personnel in the event of fire, or spills or litter, or complaints, or any environmental nuisance or hazard, or other emergencies;
(j) proper management of other diverted materials such as rough fill (i.e. concrete slabs and stumps). provide detailed description of the final disposal/removal of this material;
(k) procedure detailing how unauthourized materials will be dealt with.

4.2 Any design optimization or modification that is inconsistent with the conceptual design and operation shall be clearly identified, along with an explanation of the reasons for the change.

4.3 The Waste Segregation/Recycling and the WEEE Facilities shall only accept **scrap metals, tires, white goods, solid non-hazardous recyclable materials, including cardboards, rough fill (i.e. concrete slabs and stumps), bale-wrap, propane canisters and E-waste,** which shall be segregated, stored temporary for a period not exceeding 120 days from the date of first receipt, or as needed, and transferred for off-site disposal, to ensure that the design storage capacities are not exceeded at any time. The storage of specific material beyond 120 days may be allowed, only with prior notification and written concurence from the District Manager.

4.4 If the storage of material causes nuisance, or adverse effect, or fire hazard, the material shall be removed or transferred immediately regardless of the permitted storage period. If for any reason

waste cannot be transferred from the Waste Segregation/Recycling Facility, the Waste Segregation/Recycling Facility shall cease accepting waste.

4.5 The Waste Segregation/Recycling and the WEEE program Facilities shall be operated in a secure manner within containment structures or in storage containers, such that temporary storage of waste materials will not create nuisance, or fire hazard, or adverse effect. Containment structures or storage containers shall be clearly labeled to indicate the type and nature of the waste stored.

4.6 Any material/waste containing soluble or decomposable substances which may adversely impact the quality of surface water and groundwater, shall be placed on a floor/pad, to minimize the potential for adverse impacts.

4.7 Any white goods received which contain refrigerants shall have the refrigerants removed by a licencesed technician in accordance with Ontario Regulation 189, prior to being shipped off-site.

4.8 The maximum number of **tire units** stored at the facility at any one time shall not exceed **5,000 units.**

5.0 INSPECTION AND MAINTENANCE

5.1 The Owner/Operator shall conduct regular inspections of the Site, including the active waste tipping area, Waste Segregation/Recycling and WEEE Facilities and associated equipment, buildings/shacks, final cover, security fencing and barriers, to ensure that all are maintained in good working order and secure at all times and to ensure that no off-site impacts such as vermin, vectors, odour, dust, and litter, result from the operations of the Site/Facilities to cause any nuisance or adverse effect on the environment.

5.2 If any inspection indicates that there is an area of ponding or zero slope in the final soil capped area, and/or any deficiencies detected during these regular inspections, the Owner/Operator shall take all steps necessary to provide positive drainage and rehabilitate the final soil cap, and/or any deficiencies detected as soon as practically possible.

5.3 A written record of the inspections shall be maintained at the Site, and shall include the following:

(a) name and signature of trained personnel conducting the inspection;
(b) date and time of the inspection;
(c) list of equipments and Facilities inspected and all deficiencies and/or any nuisance impacts observed;
(d) a detailed description of any maintenance/repairs carried out and/or remedial action taken in order to control the nuisance;
(e) date and time of maintenance/repair activity; and
(f) recommendations for remedial action and any preventative measures taken to prevent future reoccurrences.

6.0 ENVIRONMENTAL CONTROL AND MONITORING

6.1 Subject to the addidtion of Arsenic and Nitrate-N in the suite of parameters listed in Table 4, for groundwater quality monitoring, the Owner/Operator shall carry out monitoring programs for surface water, groundwater/leachate and landfill gas, as described in Section 6.4 and summarized in Table 4, in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, and as per written recommendations of the District Manager, through the review of annual monitoring Reports, and any related OWRA requirements.

6.2 The groundwater quality at the site boundary shall meet the Ontario Drinking Water Quality Standards (DWQS)and the Provincial Water Quality Objectives (PWQO). The applicable parameters to meet the DWQS and PWQO, shall be selected and monitored through a recommendation in the Annual Monitoring Report, subject to the prior approval of the District Manager.

6.3 Upon commencement of landfilling by area method, the Owner/Operator shall commence developing a leachate quality profile, updated leachate quantity estimate generated, and the appropriate long-term leachate management plan for the Site. The results of the leachate management plan shall be included in the first annual report for the Site, as required by this Certificate.

6.4 If monitoring results show exceedance of the Provincial Water Quality Objectives along the Site boundary due to the landfill operations, the Owner/Operator shall install new wells downgradient of the existing wells, to confirm the suitability of groundwater quality discharging off-site. The appropriate sampling stations shall be determined and reviewed with the Ministry, prior to installation.

6.5 The Owner/Operator shall replace any on-site and/or off-site monitoring wells installed under the monitoring program, which are destroyed or in any way made inoperable for sampling, in a timely manner, so that regular sampling event is not severely compromised.

Surface Water Management

6.6 Within one (1) year of the date of this Notice, the Owner/Operator shall submit an application with applicable fees, for approval under OWRA, copied to the District Manager, to install a stormwater management facility for the site, as described in Section 7.0 in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, to assess the interaction between groundwater and surface water, and on-site and the South Pine River.

Landfill Gas Monitoring

6.7 The Owner/Operator shall ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

6.8 The Owner/Operator shall ensure that any proposed changes to the monitoring programs under this Certificate shall be implemented subject to prior written concurrence of the District Manager.

7.0 TRIGGER MECHANISM AND CONTINGENCY PLANS

7.1 The Owner/Operator shall carry out trigger mechanism for surface water, groundwater/leachate and landfill gas, as described in Section 9.0 and summarized in Table 5, in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, and as per written recommendations of the District Manager, through the review of annual monitoring Reports.

7.2 In the event of a confirmed exceedance of the site-specific trigger level relating to groundwater/leachate, or surface water impacts due to leachate, or landfill gas, the Owner/Operator shall immediately notify the District Manager, and an investigation into the cause and the need for implementation of remedial or contingency actions shall be carried out by the Owner/Operator in accordance with the trigger mechanisms and associated contingency plans, as described in Section 9.2 in Item 8 in Schedule "A", attached to this Certificate.

7.3 The Owner/Operator shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the groundwater and surface water, shall be approved in writing and in advance, by the District Manager.

8.0 STAFF TRAINING PLAN

8.1 The Owner/Operator shall develop and maintain a training plan for Site operations employees and shall ensure that all site operations employees have been adequately trained and received on-going training with respect to the following, as amended:

(a) terms, conditions and operating requirements of this Certificate, A272601 and Notices for the Site;
(b) the operation, inspection, and maintenance of the Site with respect to the approved design and operations documents;
(c) Relevant waste management legislation and regulations;
(d) Environmental concerns related to waste management at the Site;
(e) Occupational Health and Safety concerns related to waste management at the Site; and
(f) Emergency procedures and contingency plans in case of fire, spills, off-site impacts and any other emergency situations.

9.0 SPILLS AND EMERGENCY RESPONSE AND REPORTING

9.1 All spills, upsets and fires shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the spill or upset, and the action taken for clean-up, correction and prevention of future occurrences.

9.2 The Owner/Operator shall immediately take all measures necessary to contain and clean up any spill or leak which may result from the operations at this Site.

10.0 DAILY LOG BOOK

10.1 The Owner/Operator shall ensure that a log book of records of observations made during site inspections and daily records of Site operations, are maintained for each operating day during the operation of the Site, and that the records are retained at the Site for at least two years after they are created. The daily records shall include the following information:

(a) the date, time of arrival, name of hauler, vehicle license plate number, type, origin and quantity (tonnes) of all waste and cover material received at the site, and of all wastes rejected by the site;
(b) quantity and type of waste (by waste class and name) received, temporarily stored and transferred from the Site;
(c) any complaints from the public received by the Owner/Operator concerning landfilling operations as well as all other waste management activities, and a description of the action taken by the Owner/Operator in response;
(d) a record of litter collection activities and the application of dust suppressants;
(e) results of any tests done to determine the acceptability of waste at the site.
(f) the area of the Site in which waste disposal operations are taking place;
(g) quantity and type of any rejected wastes;
(h) the receiving Site for the waste shipped from the Site;
(i) the amount of any leachate removed, or treated and discharged from the Site if any;
(j) a record of the daily inspections, including equipment and Site Inspection report as required under Condition 5.2 above; and
(k) a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.
(l) a record of nuisance impact control;
(m) all spills, fires, upsets or other problems encountered during the operation of the Site and action(s) taken to remediate the problem; and
(n) records of staff training, as required under Condition 8.0.

11.0 ANNUAL REPORT

Condition 3 in Notice dated October 15, 1991 is hereby revoked and replaced with Condition 10.1 as follows:

11.1 The Owner/Operator shall continue the preparation of an Annual Report on the development, operations and monitoring of the Site, based on Section 6.3 in the Design and Operations Plan (Revised), (Items 8) in Schedule "A" as amended by Item 12, in Schedule "A" attached to this Certificate, or as from time to time amended. The report shall be prepared by a qualified consultant, and submitted to the District Manager, with copies to the Regional Director, by **March 31** each year, and shall cover the preceding calendar year. The report shall as a minimum, include the following:

a. The results and an interpretive analysis of the results of all leachate, groundwater, surface water, and landfill gas monitoring, including an assessment of leachate elevation data with

respect to trigger elevations; shallow aquifer watertable elevation mapping and groundwater flow direction; regional aquifer piezometric elevation mapping and groundwater flow direction; and an assessment of the need to amend the monitoring programs and trigger mechanisms or to implement contingency measures;

b. Review and assessment of the effectiveness of the nuisance control programs, including the following information:

   i. Impact and status of the Site operation on the wetlands and/or South Pine River;
   ii. Implementation and effectiveness of active control measures;
   iii. Changes undertaken, or required, to improve the effectiveness of nuisance control programs.

c. An assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;

d. Site plans showing the existing contours of the Site; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final cover, vegetative cover, and any intermediate cover application; the progress of liner placement and leachate collection system placement; previously existing site facilities; facilities installed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;

e. Calculations of the volume of waste, daily and intermediate cover, final cover material deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;

f. A calculation of the remaining capacity of the Site and an estimate of the remaining Site life;

g. Summaries of the monthly, maximum daily (as available), and total annual quantity (tonnes) of waste received at the Site;

h. a summary of any public complaints received by the Owner/Operator and the responses made;

i. a discussion of any operational problems encountered at the Site and corrective action taken;
j. the status of compliance with all conditions of this Certificate, including the inspection, monitoring and reporting requirements in the conditions of this Certificate;
k. the extent to which the monitoring results indicate compliance with the conditions of this certificate, PWQO, ODWS, the Reasonable Use Guideline and any other relevant statutes and guidelines; and
l. any other information with respect to the Site which the Regional Director or District Manager may require from time to time.

12.0 SITE CLOSURE PLAN

12.1 At least two (2) years prior to the anticipated date of closure of this Site or the date 90 per cent of the total waste disposal volume is reached, whichever occurs first, the Owner/Operator, shall submit to the Director for approval, with copies to the District Manager, a detailed Site Closure Plan pertaining to the termination of landfilling operations at this Site, post-closure inspection, maintenance and monitoring, and end-use plan for the Site. The Site closure plan shall as a minimum, include the following:

a. A plan showing Site appearance after closure;

b. A description of the proposed end-use of the Site;

c. Descriptions of the procedures for closure of the Site, including:

i. advance notification of the public of the landfill closure;
ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
iii. completion, inspection and maintenance of the final cover and landscaping;
iv. site security;
v. removal of unnecessary landfill-related structures, buildings and facilities; and
vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;

d. Description of the procedures for post-closure care of the Site, including:

i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
ii. record keeping and reporting; and
iii. complaint contact and response procedures;

e. An assessment of the adequacy of and need to implement the contingency plans for leachate and landfill gas; and

f. An updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date;

SCHEDULE "A"

The following documentation is hereby added to Schedule "A", and forms part of the Provisional Certificate of Approval No. A272601. If there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall apply:

Documentation

6. Letter dated June 28, 2007, from Tesfaye Gebrezghi, Waste Supervisor, Ministry of the Environment to John Tidball, Miller Thomson LLP and Mary Rose Walden, CAO-Administrator, the Corporation of the Township of Huron-Kinloss, Re: the approved theretical capacity for the Huron Landfill Site.

7. Letter dated August 14, 2008, from Brad R. Pryde, President - Pryde Schropp McComb Inc., to Tesfaye Gebrezghi, Waste Supervisor, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the landfilling operation at the Huron Landfill from Trench method to Area method. (MOE Ref # 7021-7HJKZF).

8. Report entitled "Design and Operation Plan (Revised), Huron Landfill, Township of Huron-Kinloss", dated January, 2010, prepared by Pryde Schropp McComb Inc.

9. Letter dated August 26, 2008, from Brad R. Pryde, President - Pryde Schropp McComb Inc., to Gabriela Sadowska, Application Assessment, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the landfilling operation at the Huron Landfill from Trench method to Area method, with attached completed Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated August 29, 2008, signed by Joanna Molott, Deputy Clerk, the Corporation of the Township of Huron-Kinloss. (MOE Ref # 7021-7HJKZF).

10. Letter dated May 1, 2009, from Stephen J. Cobean, Pryde Schropp McComb Inc., to the Director of Approvals, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the service area of the Huron Landfill to include the Village of Lucknow, with attached completed Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated April 23, 2009, signed by Hugh Nichol, Superintendent of Public Works, the Corporation of the Township of Huron-Kinloss. (MOE Ref # 1307-RQMZH).

11. Report entitled "Service Area Study, Huron Landfill, Township of Huron-Kinloss", dated April, 2009, prepared by Pryde Schropp McComb Inc.

12. Letter dated January 14, 2010, from Stephen J. Cobean, Pryde Schropp McComb Inc., to Dickson Odame-Osafo, Ministry of the Environment, Re: Response to the Ministry of the Environment review comment on the Design and Operation Plan, Huron Landfill (MOE Ref # 7021-7HJKZF).

13. Letter dated June 9, 2010, from Stephen J. Cobean, Pryde Schropp McComb Inc., to Dickson Odame-Osafo, Ministry of the Environment, Re: Draft Certificate of Approval Review, Huron Landfill

Site (MOE Ref # 7021-7HJKZF).

REASONS

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

1. The reason for **Conditions 1.1, 2.5, 2.6, 2.9, 4.1, 4.2, 4.3, 6.8 and 7.3** is to ensure that the landfill Site is designed, developed, operated, monitored and maintained in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

2. The reason for **Conditions 1.2 to 1.5, 1.7 and 1.11** is to clarify the legal rights and responsibilities of the Owner.

3. The reason for **Condition 1.6** is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Certificate of Approval. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.

4. The reason for **Condition 1.8** is to ensure that all correspondence relevant to this Certificate of Approval is properly identified by the Certificate of Approval number for ease of reference.

5. The reasons for **Conditions 1.9 and 1.13** are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer or encumbrance can be made only on the basis that it will not endanger compliance with this Certificate of Approval.

6. **Condition 1.10** is included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.

7. The reason for **Condition 1.12** is to ensure the availability of records, including drawings for inspection and information purposes.

8. The reasons for **Conditions 2.1, 2.2 and 2.3** are to specify the approved area from which waste may be accepted at the Site, the types of waste that may be accepted for disposal at the Site, and the maximum rates at which this Site may receive waste, based on the Owner's application and supporting documentation.

9. The reason for **Conditions 2.4, 2.7 and 2.8** is to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the site.

10. The reasons for **Conditions 3.1 and 3.2** are to specify the hours of operation for the landfill Site and a mechanism for amendment of the hours of operation, as may be necessary.

11. The reason for **Condition 3.3** is to ensure that daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site

appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.

12. The reason for **Condition 3.4** is to specify the approval requirements for use of alternative cover material at the Site.

13. The reasons for **Conditions 3.5 and 3.6** are to ensure that the Site is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person, and to ensure a controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.

14. The reason for **Conditions 3.7 to 3.9** and **4.4 to 4.8** is to ensure that the Site is operated in an environmentally acceptable manner for the protection of the natural environment and public health and safety.

15. The reason for **Conditions 3.10 and 3.11** is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations and access under this Certificate of Approval.

16. The reason for **Conditions 5.1 and 5.2** is to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

17. The reasons for **Conditions 6.1 to 6.6** are to demonstrate that the site performs in conformance with the requirements of this Certificate, the EPA and its regulations, and OWRA and its Regulations. 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.

18. The reasons for **Conditions 7.1 and 7.2** are to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment and public health and safety.

19. The reason for **Condition 8.1** is to ensure that the Site is operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

20. The reason for **Conditions 9.1 and 9.2** is to ensure that the Ministry is notified forthwith of any spills as required in Part X of the EPA, so that appropriate spills response can be determined.

21. The reasons for **Conditions 5.3 and 10.1** are to ensure the availability of records for inspection and information purposes, to provide for the proper assessment of effectiveness and efficiency of site design and operation, their effect or relationship to any nuisance or environmental impacts, and the occurrence of any public complaints or concerns. Record keeping is necessary to determine compliance with this Certificate of Approval, the EPA and its regulations.

22. The reasons for **Condition 11.1** are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified, and to ensure that potential impacts on the local wetland are reviewed/updated regularly. An annual report is an important tool used in reviewing site activities and for determining the effectiveness of site design.

23. The reasons for **Condition 12.1** are to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A272601 dated July 31, 1989

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 6th day of July, 2010

THIS CERTIFICATE WAS MAILED
ON July 9, 2010
TC
(Signed)

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

DO/

c: District Manager, MOE Owen Sound
Brad Schropp, Pryde Schropp McComb Inc. ✓

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A272601
Notice No. 3
Issue Date: July 9, 2010

The Corporation of the Township of Huron-Kinloss
21 Queen St
Post Office Box, No. 130
Ripley, Ontario
N0G 2R0

Site Location: Huron Landfill Site
Concession Road 6
Lot 19, 20, Concession 5
Huron-Kinloss Township, County of Bruce
N0G 2R0

You are hereby notified that I have amended Provisional Certificate of Approval No. A272601 issued on October 15, 1991, as amended for a waste disposal Site, consisting of 8.0 hectares Waste Fill Area within a total Site Area of 17.7 hectares , as follows:

1. EXPANSION OF SERVICE AREA

Pursuant to Section 27 of the *Environmental Protection Act*, approval is hereby granted to expand the service area of the Huron Landfill site to include the Village of Lucknow;

all in accordance with the following documentation which is added to Schedule "A", and forms part of the Provisional Certificate of Approval No. A272601, and subject to the terms and conditions listed herein:

Note: Use of the Site for any other type of waste and/or any other waste management activity is not approved under this Certificate, and requires obtaining a separate approval amending this Certificate.

Documentation

The following documentation is hereby added to Schedule "A", and forms part of the Provisional

10. Letter dated May 1, 2009, from Stephen J. Cobean, Pryde Schropp McComb Inc., to the Director of Approvals, Ministry of the Environment, Re: Application for Approval of Waste Disposal Site Amendment to Certificate of Approval, No. A272601, to change the service area of the Huron Landfill to include the Village of Lucknow, with attached completed Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated April 23, 2009, signed by Hugh Nichol, Superintendent of Public Works, the Corporation of the Township of Huron-Kinloss. (MOE Ref # 1307-RQMZH).

11. Report entitled "Service Area Study, Huron Landfill, Township of Huron-Kinloss", dated April, 2009, prepared by Pryde Schropp McComb Inc.

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

Service Area

2.1 Only waste generated from within the geographic boundaries of the **Township of Huron-Kinloss** which include the Township of Huron, the Township of Kinloss and the Village of Lucknow, shall be received for disposal at this Site. No waste generated and/or transferred from outside the **Township of Huron-Kinloss** shall be received for disposal at this Site.

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

The reason for **Condition 2.1,** is to specify the approved area from which waste may be accepted at the Site, due to amalgamation, based on the Owner's application and supporting documentation.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A272601 dated July 31, 1989

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 9th day of July, 2010

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

DO/
:: District Manager, MOE Owen Sound
Steve J. Cobean, Pryde Schropp McComb Inc.

Appendix B Supporting Documents & Correspondence

Ministry of the Environment
Environmental Assessment and
Approvals Branch
Floor 12A
2 St Clair Ave W
Toronto ON M4V 1L5
Fax: (416)314-8452
Telephone: (416) 314-7029

Ministère de l'Environnement
Direction des évaluations et des
autorisations environnementales
Étage 12A
2 av St Clair O
Toronto ON M4V 1L5
Télécopieur: (416)314-8452
Téléphone: (416) 314-7029

Ontario

June 28, 2007

John Tidball, Certified Specialist, Environmental Law
Miller Thomson LLP
600, 60 Columbia Way
Markham, ON, L3R 0C9

Mary Rose Walden, CAO-Administrator
The Corporation of the Township of Huron-Kinloss
PO Box 130
Ripley, Ontario
N0G 2R0

Dear Mr. John Tidball:

Re: Application for Approval of Waste Disposal Sites
Amendment to CofA No. A272601: Huron Landfill Site
Huron-Kinloss Township, County of Bruce
MOE Reference Number 7333-6ZV8GY

I am writing in response to your later dated October 17, 2006, in which you have enquired about the outstanding capacity calculation issue on the above noted file. The following provides a summary of the issues and the Ministry's current position:

HISTORY:

1. As you have noted in your letter Nafiseh Pourhassani in her letter dated August 13, 2004 calculated the capacity to be 204,600 cubic meters. This letter and calculation was part of a series of on going discussions with the consultant, Mr. Bob Kearse, R. J. Burnside, and was not the final "decision" of the Ministry. Ms. Pourhassani had used a depth of excavation of 5 meters in her calculation.

2. Shortly after preparing the above noted calculation, on October 27, 2004, Nafiseh Pourhassani received a call from Larry Struthers, Environmental Officer for the site who informed her that the final revision of the 1985 PDO dated October 11, 1985, had a one page addendum, "Addendum Number 1" which contained the following modification to the site design:

" The depth of excavation for trenches used for the burial of refuse shall be 3 meters below original grade as opposed to 5 meter depth indicated."

This final revision was missing from Ms. Pourhassani's file and Mr. Struthers provided a copy.

3. Ms. Pourhassani made a note in the file and communicated this new fact with Mr. Kearse immediately. She offered to provide a copy to Mr. Kearse; however, he indicated that he was already aware of the addendum and had a copy. The capacity calculation in Ms. Pourhassani's letter dated July 14, 2005, used the revised reduced depth of excavation of 3 meters.

UPDATE:

4. We have revisited the file and have obtained legal advice on the capacity issue. The Ministry's final position is that, in this particular case, the reduction in depth of excavation should not be interpreted as a reduction in capacity and should be viewed as an operational issue. Furthermore, we have also determined that the capacity should be calculated using the 8 ha footprint specified in the original application as well as the certificate of approval. Accordingly, using the depth of excavation of 10 feet and height of fill of 2 feet (also taken from the original application) the capacity is determined to be 288,000 cubic meters.

5. At this point we are prepared to issue an amendment approving the change of operation from the trench method to area method (the original intent of the July 2004 application) and specify the maximum approved capacity. However, the Township will be required to submit an updated design and operation plan within a year of issuance of the amendment to reflect landfill capacity and address the remaining design and operation issues (refer to items 2 through 9, in the July 14, 2005, letter from Ms. Pourhassani.) Please note that since we are using the 8 ha footprint for calculating the maximum capacity, the remaining capacity will be the maximum capacity less the waste already deposited in the entire 8 ha footprint.

If you have any questions, you may contact Nafiseh Pourhassani at 416-314-7029.

Yours truly,

Tes Gebrezghi

Tesfaye Gebrezghi
Waste Unit Supervisor

c: Helmut Pfeiffer EO, Owen Sound

Ministry of the Environment
Environmental Assessment and
Approvals Branch
Floor 12A
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Toronto ON M4V 1L5
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Telephone: (416) 314-7029

Ministère de l'Environnement
Direction des évaluations et des
autorisations environnementales
Étage 12A
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Télécopieur : (416)314-8452
Téléphone : (416) 314-7029

Ontario

August 13, 2004

Mary Rose Walden, CAO-Administrator
The Corporation of the Township of Huron-Kinloss
PO Box 130
Ripley, Ontario
N0G 2R0

Dear Ms. Walden:

Re: **Application for Approval of Waste Disposal Sites**
Amendment to CofA No. A172601: Huron Landfill Site
Huron-Kinloss Township, County of Bruce
MOE Reference Number 7335-62VSGY

We have completed our review of your application dated June 29, 2004 and the supporting documentation, as well as the letter dated May 6, 2004, from Mr. Hugh Nichol, Public Works Superintendent, requesting input on amending the service area of Huron-Kinloss Landfill site to include Village of Lucknow.

We have found the submitted application and the supporting documentation lacking in significant details. We refer to the letter dated January 26, 2004, from Ian Parrott, Supervisor, Waste Approvals, specifically indicating that "an assessment of any environmental impacts (e.g. groundwater and visual) and the results of public consultation" must accompany the application for the inquired amendment.

The following is a list of issues that were not dealt with sufficiently in the supporting documentation and must be addressed fully before we can assess your application further:

Final Contours and Capacity Calculation: The original supporting documentation package did not include any capacity calculations needed for reviewing the revised final contours. Subsequent to my telephone conversation with Mr. Bob Kearse, a capacity calculation package was submitted on August 3, 2004. This calculation has made reference to the capacity of 0,000 tonnes (calculated to be 555,600 cu. m. using 0.45 t/m3 for density) in the original plication and items referenced in the Schedule A of the certificate of approval. However ng the approved design parameters such as trench depth and width, which were developed in

the Plan of Development and Operation (PDO) of 1985, it would be simply impossible to achieve a 250,000 tonnes capacity at this site. Therefore the capacity of 250,000 tonnes is irrelevant.

The maximum theoretical capacity (air space) at this site, can be calculated using the square block method as follows:

Total Area (T1 + T2 + T3 + T4 + T5 + T6) X Depth = 4,092 sq. m. X 5 m. = 204,600 cu. m.

Furthermore, one can argue that if the site operations were to continue using the trench method and as outlined in the PDO, a 1 meter undisturbed soil at one end and a 3 meter undisturbed soil at the other end of each trench were to remain intact, the actual capacity would have been far less than the 204,000 cu. m.. Therefore 204,000 cu. m. is actually higher than the original intended site design and subsequent approval. At this point we are willing to accept the capacity of 204,600 cu. m. if the Visual Impact Study (see below) does not reveal any significant adverse impacts.

The remaining capacity is therefore calculated to be 103,490 m3 (Maximum Theoretical Capacity minus the previously filled capacity). Please provide revised final contours in accordance with this remaining capacity.

2. Visual Impact Study: Although our letter of January 24, 2004, specifically listed the "visual" impact of the change from trench method to the area method as one of the impacts to be addressed, no discussion was provided in the supporting documentation. Once the final contours have been determined using the remaining capacity of 103,490 cu. m., an assessment of the visual impact of the waste mound must be undertaken.

3. Impact on Groundwater: A reference to changes in the groundwater levels resulting in difficulty to utilize the approved trench depth has been made. However, no further information has been provided with respect to the groundwater flow conditions, present and future compliance with Reasonable Use Guideline, assessment of the adequacy of the current monitoring program including trigger parameters and contingency plans.

4. Cell preparation: There is a brief discussion on initial stripping of topsoil and overburden material from the work area and placement of 0.5 meter of ???? (it is not clear what this 0.5 meter thick material is) to form the working face of the cell. Depending on the groundwater conditions, including the leachate impact, current and future compliance with Reasonable Use Guideline, and subsurface soil conditions, there may be a need for additional cell preparation work to provide a suitable base. Information provided is inadequate for our assessment.

5. Contaminating Life Span of the Site: A recalculation of the contaminating life span of the site

using the maximum design capacity of 204,600 cu. m. and a discussion of the results must be provided.

6. Stormwater Management: There is a brief reference to stormwater runoff entering trenches, the need for a large amount of handling of flows on site and recirculation of stormwater at the site. It has also been brought to our attention by the District Office that this site has persistent stormwater management problems and that there is a need to develop and implement a comprehensive stormwater management plan including the assessment of the need for detention ponds, methods for keeping stormwater that has come in contact with waste separate from noncontaminated stormwater and developing contingency plans. It is also my understanding that there might be drainage water flowing off site into a surface water body. Please note that if there are any discharges to a surface water body then an approval under Ontario Water Resources Act is required. A separate application for approval under OWRA must be submitted to the Wastewater unit of this Branch.

If all other issues listed in this letter are addressed to our satisfaction and the amendment is issued for the change from trench method to area method, submission of a stormwater management plan within a year will be a condition of approval.

7. Litter: It is also been brought to our attention that litter is a problem at this site and included in the application package there was a complaint in writing dated June 21, 2004, from one of the neighbors during the public notification / consultation with respect to continuous litter problems at her property. There is no discussion of the litter impact and contingency plan to deal with this issue. Our letter of January 24, 2004, specifically instructed the need for an assessment of any concerns raised during public consultation.

8. In response to the letter from Mr. High Nichol requesting information with respect to addition of Village of Lucknow to the service area of Huron-Kinloss landfill site, we provide the following information: The addition of township of Kinloss to the service area of Huron-Kinloss landfill site in February 2002 constituted an increase in population to be served of approximately 18% which was less than the threshold of 25% (threshold is cumulative). The request for addition of Lucknow Village to the service area of Huron-Kinloss would exceed the cumulative threshold of 25% and is therefore subject to Section 27, Part V, EPA approval. As a minimum a public consultation for this rate change and an assessment of all environmental impacts such as increased dust, noise, litter and traffic must be undertaken.

MOE District Office has also requested that the amendment require submission of a closure report since the site is nearing its capacity. Typically closure reports are required one year prior to the closure of the site or when the site has reached 90% of its capacity.

Considering the amount of information that is required for review of this application and the fact

that the approved PDO is nearly 15 years old, you may wish to consider withdrawing your current application and submitting a complete package including an updated plan of development and operation which would also address all of the above noted issues such as a stormwater management plan, an updated environmental monitoring plan, and any potential additions to the service area. Your application fee of $1400 less $200 administration fee will be refunded to you if you wish to withdraw your application.

If you wish to continue with this application, please provide your response to my attention by August 31, 2004. If you have any questions, I can be reached at (416) 314- 7029.

Yours truly,

Nafiseh Pourhassani, P. Eng.
Senior Approvals Engineer

cc: District Manager, MOE Owen Sound
Bob Kearse, P.Eng., R.J. Burnside & Associates Limited
Hugh Nichol, Public Works Superintendent, Township of Huron-Kinloss

TOTAL PAGE.05

Ministry of the Environment
Environmental Assessment and
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2 St Clair Ave W
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Ministère de l'Environnement
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autorisations environnementales
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Toronto ON M4V 1L5
Télécopieur : (416)314-8452
Téléphone : (416) 314-8274

Ontario

RECEIVED
DEC 2 9 2008

December 22, 2008

Hugh Nichol
The Corporation of the Township of Huron-Kinloss
21 Queen St
Ripley, Ontario
N0G 2R0

Dear Sir/Madam:

Re: Application for Approval of Waste Disposal Sites
Amendment to Certificate of Approval #A272601
Huron-Kinloss Township, County of Bruce
MOE Reference Number 7021-7HJKZF

The Ministry has reviewed the report entitled "Township of Huron-Kinloss, Design and Operation Plan, Huron Landfill" dated August 2008, prepared by Pryde Schropp McComb Inc. (D & O Plan). The D & O Plan was submitted on behalf of the Corporation of the Township of Huron-Kinloss, to seek the Ministry's approval to change the landfilling operations at the Huron Landfill from the trench method to an area method.

This operational change is a result of loss of capacity in trench space due to shallow groundwater conditions existing at the site. To compensate for loss of capacity, the D & O Plan proposes above-ground landfilling with maximum capacity of 288,000 cubic metres for the site, of which 117,600 cubic metres has been used by end of 2007. The remaining capacity of 170,400 cubic metres is projected to achieve operational life of 29.7 years (page 9 of the report). The following comments are provided with respect to the hydrogeological and surface water aspects of the D & O Plan. Additional comments on other aspects of the D & O Plan will follow as soon as they become available.

Stormwater Management

Both Section 7.0 and Section 12 of the D & O Plan state that the existing stormwater management system for the trenching system will remain in place until such time that the above ground Area method is ready. The report goes on to state that at that time a stormwater management plan would be developed and submitted for Ministry's approval.
The Ministry prefers that the plan be developed now and included in this application rather than

later. Given that the site has considerable operational life, it would be prudent that this site have a surface water control system put in place that will allow run-off water from the fill area collect to a central stormwater pond before discharge off site.

Environmental Monitoring and Triggers

Section 6.0 of the D & O Plan proposes that the current environmental monitoring be carried forward, which consists of sampling from two locations (SW1 and SW2) in upstream and downstream within the South Pine River. Samples are taken in spring and fall and analysed for general chemistry, nitrogen suite, metals and Phenols. The proposed sampling and analyses are considered satisfactory. However, upon completion of a stormwater management pond, additional sampling at the pond outlet will be required, and included in the surface water monitoring program which is currently sampled twice a year at SW1 and SW2.

Section 9.0 of the D & O Plan proposes to use the Provincial Water Quality Objectives (PWQO) for trigger contingency for surface water. The Ministry concurs with the use of PWQO as trigger at SW1 and SW2. However, it is premature to consider contingency trigger values at this time, for any future sampling location to be established, until sufficient sampling history is obtained.

Groundwater

The D & O Plan does not discuss the potential for new impacts to groundwater resources due to the operational change. It does address trigger levels and contingency plans that could be put in place should non-compliance occur at the site. Some of the concerns that were identified during the Ministry's review of the 2006 Annual Monitoring Report may be enhanced by the proposed changes to site operation, and these have been discussed below:

1. The parameters to be measured in the proposed future monitoring program (Table 3) are considered appropriate. However, given the direction of ground water flow in the area around well OW11, and considering the elevated concentrations of arsenic in this area, as evidensed in OW11, we suggest that Arsenic be added to the analysis suite. It should be noted that the Ministry has flagged in its previous review that the concentration of arsenic in 2006 was 100 times the Reasonable Use Guideline. In addition, elevated concentrations of ammonia-N at well OW11 (in excess of 50 mg/L) have been observed. Therefore, we suggest that nitrate-N be included in the analysis suite.

2. Section 9.1 of the D & O Plan recommends that the RUG be used as the trigger at which contingency plans will be initiated. We suggest that values slightly less than the RUG be set as triggers, to allow sufficient time to assess the problem and select an appropriate management strategy before the site actually becomes out of compliance.

3. The "leachate contingency plans" presented in section 9.0 of the D & O Plan are considered reasonable approaches. The exact details of such a plan cannot be finalized until the scenario where a non-compliance event occurs. Some methods (eg. impermeable barrier;

leachate infiltration pond in old fill area) need to be fully considered, so that a problem is not simply redirected to a different portion of the property.

4. The placement of new waste above the old waste could impact on both groundwater flow patterns and leachate strength. This concept was not discussed in the D & O Plan and needs to be addressed. While it is likely the effect would be minimal, the additional waste could enhance the severity of some of the concerns that were identified in the review of the 2006 Annual Monitoring Report.

5. A primary concern at this site continues to be the presence of elevated leachate concentrations in liquid sampled at well OW11. This well is located in the waste, and elevated concentrations are to be expected. However, the well is positioned less than 10 m from the property boundary, and we are concerned that leachate could migrate southwestwards across the property line. Given the proximity of the South Pine River, there is also the possibility that flow is more southerly than shown by the equipotential pattern. Please, assess and clarify the impact of additional waste placement, on the groundwater/leachate flow pattern (eg. mounding).

6. The consultant should consider a new shallow well just south of well OW11. Despite the low-conductivity of the geologic material, the proximity of the waste to the property boundary is "too close for comfort". Please, assess and provide a remedial action that deals with the already existing risk for non-compliance with RUG at this location; and as well, confirm and provide appropriate remedial action plan for the effect of the additional waste loading on the non-compliance risk increase. Alternatively, could lands between the landfill and the river be acquired for contaminant attenuation purposes?

Prior to approving the proposed change from trench to area method which would involve placing additional waste over the existing waste, the Township should provide a program and schedule that addresses the foregoing concerns, including any unacceptable impacts/non-compliance at the southern property boundary.

If you have any questions regarding the above, please contact me at the above phone number or Mr Ian Mitchell at 519-371-6191.

Yours truly,

Dickson Odame-Osafo
Senior Engineer, Waste Unit

c: District Manager, MOE Owen Sound
Brad Schropp, Pryde Schropp McComb Inc.

PRYDE SCHROPP McCOMB INC.

May 29, 2009
File: 00941

BY FAX ONLY – 3 Pages

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Tel: 416-314-4075
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Email: dickson.odameosafo@ontario.ca

Attention: **Mr. Dickson Odame-Osafo, Senior Review Engineer- Waste**

Reference: **MOE Review of the Design and Operation Plan**
Amendment to Certificate of Approval No. A272601
Huron Landfill Site, Township of Huron-Kinloss
MOE Reference Number 7021-7HJKZF

We have reviewed your correspondence of December 22, 2008, which provided comments regarding the Design and Operation Plan for the Huron Landfill. The approval of the Design and Operation Plan will allow the Township to regain landfill capacity formerly lost due to shallow groundwater conditions.

Your correspondence of December 22, 2008, provided comments regarding the hydrogeological and surface water aspects of the Design and Operation Plan. It is our understanding that additional comments from the Ministry of the Environment regarding other aspects of the Design and Operation Plan will follow as soon as they become available.

Following are responses to your comments of December 22, 2008. We have organized our responses to correspond the order of your comments:

Stormwater Management

The Design and Operation Plan recommended that a Stormwater Management Plan be completed just prior to above ground landfilling. Your correspondence stated "*The Ministry prefers that the plan be developed now and included in this application rather than later.*"

We have recommended that the Township initiate the Stormwater Management Plan in 2009. The Stormwater Management Plan would assess the requirements of the site for stormwater management during and after above ground landfilling. The Plan would make recommendations for the design and construction of stormwater control facilities and subsequent monitoring.

Environmental Monitoring and Triggers

The current surface water monitoring program consists of two (2) monitoring stations: SW1 – upstream South Pine River and SW2 – downstream South Pine River. Once the stormwater facilities are completed any stormwater retention facility will be added to the surface water monitoring program

References: MOE Review of the Design and Operation Plan
Amendment to Certificate of Approval No. A272601
Huron Landfill Site, Township of Huron-Kinloss
MOE Reference Number 7021-7HJKZF

We concur with your recommendation that data from SW1 and SW2 continue to be collected as per the Annual Monitoring Report, to allow the determination of surface water triggers.

Groundwater

It was recommended that comments raised by the MOE review of the 2006 Annual Monitoring Report (prepared by Burnside and Associates Ltd.) be addressed. These comments include the following:

1. OW11 Monitoring

We would agree with the recommendation to include arsenic and nitrate to the monitoring parameters in 2009. It should be noted these two parameters were already included in 2008 monitoring.

2. Reasonable Use Guidelines (RUG) Triggers

It was recommended that the triggers for the monitoring wells be set at values slightly less than the RUG. In this way any environmental problems can be addressed before the site is in non-compliance.

We would recommend that the triggers be set for the boundary wells at "tiered" levels based on a percentage of the RUG and their distance from the site property boundary. These triggers can be included in an addendum to the Design and Operation Plan which would address the concerns of the MOE and allow the amendment of the Certificate of Approval to allow above ground landfilling.

3. Leachate Contingency Plans

We concur with the MOE comments.

4. Placement of Additional Waste on the Trenches

This issue can also be addressed in an addendum for the Design and Operation Plan. The impact of placing additional waste on the trenches will be addressed. As noted in your correspondence *"it is likely that the effect is minimal"*.

5. Mounding in the Area of OW11

There was concern raised regarding the placement of waste above grade in the area of OW11 causing mounding and possible leachate impacts migrating southward. This is also an item that can be addressed in an addendum to the Design and Operation Plan.

References: **MOE Review of the Design and Operation Plan**
Amendment to Certificate of Approval No. A272601
Huron Landfill Site, Township of Huron-Kinloss
MOE Reference Number 7021-7HJKZP

6. Remedial Action Plan in the Area of OW11

It was recommended that a remedial action plan be in place for the southern property line in the area of OW11. There was concern regarding the migration of leachate to the nearby southern property line and towards the South Pine River. Possibilities include the installation of an additional monitoring well. Using 2008 monitoring data from the 2008 Annual Monitoring Report and historical data an estimation of environmental impacts and a remedial action plan can be completed. This information can be added to the addendum to the Design and Operation Plan.

It is recommended that the preparation of the addendum to the Design and Operation Plan be postponed until the remaining comments from the Ministry of the Environment have been received. Once all comments have been, Pryde Schropp McComb Inc. will complete an addendum to the Design and Operation Plan to address all of the Ministry's concerns.

We would ask for your comments regarding the appropriateness of this response to the concerns of the Ministry. Also could you provide our office with an estimation of when we could expect the remaining MOE comments?

We look forward to hearing from the Ministry regarding this matter. If you have any questions or concerns regarding these items please do not hesitate to contact our office.

Sincerely,

PRYDE SCHROPP McCOMB, INC.

Stephen J. Cobean, P. Eng.
Associate, Project Manager

c: Mr. Hugh Nichol, Public Works Superintendent, Township of Huron-Kinloss

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PRYDE SCHROPP McCOMB INC.

August 26, 2009
File: 00941

BY FAX ONLY – 5 Pages

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Tel: 416-314-4075
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Email: dickson.odameosafo@ontario.ca

Attention: **Mr. Dickson Odame-Osafo, Senior Review Engineer- Waste**

Reference: **MOE Review of the Design and Operation Plan**
Amendment to Certificate of Approval No. A272601
Huron Landfill Site, Township of Huron-Kinloss
MOE Reference Number 7021-7HJKZF

Further to our letter of May 29, 2009 (enclosed for your reference) we are requesting on behalf of the Township of Huron-Kinloss an indication as to whether there will be further Ministry comments with regards to the Design and Operation Plan. We would like to move forward with this project as specified in our attached correspondence. The Township wishes to proceed with this matter as the currently approved site capacity is becoming limited. The approval of the Design and Operation Plan will allow the Township to regain landfill capacity formerly lost due to shallow groundwater conditions.

If there will be no further MOE comments regarding the Design and Operation Plan we will proceed with the work associated with addressing your comments of December 22, 2008, including the following:

- Stormwater Management
- Environmental Monitoring and Triggers
- Groundwater
  - OW11 Monitoring
  - Reasonable Use Guidelines (RUG) Triggers
  - Leachate Contingency Plans
  - Placement of Additional Waste on the Trenches
  - Mounding in the Area of OW11
  - Remedial Action Plan in the Area of OW11

Details regarding how the above items will be addressed are provided in our attached correspondence.

In summary we would respectfully request an indication, at your earliest convenience, as whether to proceed with the work described in the attached correspondence or wait for further MOE comments. If you have any questions or concerns regarding these items please do not hesitate to contact our office.

Reference: **MOE Review of the Design and Operation Plan**
Amendment to Certificate of Approval No. A272601
Huron Landfill Site, Township of Huron-Kinloss
MOE Reference Number 7021-7HJKZP

Sincerely,

PRYDE SCHROPP McCOMB, INC.

Stephen J. Cobean, P. Eng.
Associate, Project Manager

Enclosure

c: Mr. Hugh Nichol, Public Works Superintendent, Township of Huron-Kinloss
(by email with enclosure)

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Ontario

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FEB 0 3 2010
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January 29, 2010

Mr. Hugh McNichol
Township of Huron-Kinloss
PO Box 130
21 Queen Street
Ripley ON N0G 2R0

Dear Mr. McNichol,

RE: Huron Landfill Site, 2008 Annual Monitoring Report

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, annual Monitoring Report – 2008" dated March 2009 and prepared by Pryde Schropp McComb Inc. The submission was forwarded to our Regional Technical Support section and comments from our Regional Hydrogeologist are provided below:

Upon review of hydraulic gradient data, it is clear that the primary ground water flow direction is downward. Vertical gradients are an order of magnitude or more higher than horizontal gradients. It is likely that ground water flow is directed down across the surficial silty clay formation towards a more conductive layer at depth. Gravel and sand was detected at a depth of about 11.3 m bgs in wells OW7D and OW10D. These wells are located at opposite sides of the site, and it is reasonable to assume that the gravel and sand formation is continuous across the site. Flow is likely very slow through the silty clay, with only relatively low amounts of contaminant mass delivered to the underlying sand and gravel. This is geological setting is likely why impacts to ground water resources appear to be limited at this site.

On page 37, it is revealed that landfill gas was been detected in gas probe GP3 on two dates, at 21 and 49% methane by volume. This gas probe is shown to be located immediately adjacent to the Recycling attendant's shed, located at the southeast corner of the site. The shed does not have a gas detector. The consultant indicates that the shed's rudimentary construction allows for gaps that "potentially vent" methane. The consultant states that it is "reported that the attendant leaves the door and window open to vent gas."

These are high concentrations of methane and we are not comfortable with the statements

that gaps in the building might "potentially vent" the gas, and that mitigation relies upon a person remembering to open a door. For reasons of safety, the site owner should consider moving the recycling shed or else install a gas detection meter. Please provide a response outlining how you will be addressing this methane issue.

We have also received the revised Design and Operation Report dated January 2010 that was also submitted to our Environmental Assessment and Approvals Branch (EAAB). Comments on the D&O report will be provided from EAAB in separate correspondence; however our comments on the D&O report should be reviewed by the consultant prior to preparation of subsequent monitoring reports. The main concern about this site identified by our hydrogeologist is the lack of adequate buffer space between the waste trenches and the down-gradient (southern and some western) property boundaries. Our comments on the D&O report will provide more detailed discussion on this issue.

We will forward comments from our surface water reviewer once they have completed their review of the annual report. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,

Ian Mitchell, P.Eng.
District Engineer
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Shawn Carey, MOE, Owen Sound
Mark Harris, MOE, London
Steve Cobean, Pryde Schropp McComb, Port Elgin

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Tél:(519) 371-6191

Ontario

February 8, 2010

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Mr. Hugh McNichol
Township of Huron-Kinloss
PO Box 130
21 Queen Street
Ripley ON N0G 2R0

Dear Mr. McNichol,

RE: Huron Landfill Site, 2008 Annual Monitoring Report

Further to my letter to you dated January 29, 2010, our surface water evaluator has reviewed the 2008 Annual Monitoring Report for the Huron Waste Disposal Site, and provides the following comments:

Surface water samples collected in 2008 were taken in July and December. These periods represent dry conditions (summer due to low rainfall and winter due to frozen conditions) that are not ideal for capturing potential off site movement associated with runoff events or saturated soil conditions. Schedule "B" of the C. of A. A-272601 requires spring and fall collection. Historically the site has been sampled in spring and fall and future sampling should reflect this schedule.

Surface water sample results for SW2 (downstream of the South Pine River) do not suggest that the landfill has had an unacceptable impact upon the South Pine River for 2008.

If you have any questions concerning this letter, please contact me at (519) 371-6191

Yours truly,

Ian Mitchell

Ian Mitchell, P.Eng.
District Engineer
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Shawn Carey, MOE, Owen Sound
Hugh Geurts, MOE, London
Steve Cobean, Pryde Schropp McComb, Port Elgin

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JUN 0 4 2010
00546

June 3, 2010

Mr. Hugh McNichol
Township of Huron-Kinloss
PO Box 130
21 Queen Street
Ripley ON N0G 2R0

Dear Mr. McNichol,

RE: Huron Landfill Site, 2009 Annual Monitoring Report

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2009" dated March 2010 and prepared by Pryde Schropp McComb Inc. The submission was forwarded to our Regional Technical Support section and comments from our regional surface water specialist are provided below:

Water quality results are summarized in Table 5 of the report and in a histogram graphic (figure 9) showing leachate indicator parameters. The report asserts that SW1 (upstream) and SW2 (downstream) show similar results and having reviewed the data, our reviewer generally agrees with this. We note that SW2 would have been better located in the South Pine River where the shallow groundwater flow from the landfill would be projected to intersect the river. The present location of SW2 at the concession road west of the landfill, is approximately 250 - 300 meters downstream of the area where the shallow groundwater intersects the South Pine River. Although we acknowledge some influence of background water quality on SW2, it may be that the report's explanation for some Provincial Water Quality Objectives (PWQO) exceedances at SW2 may not always be attributable to sedimentation and other sources and could be landfill related. At this time the Ministry is not advocating a repositioning of SW2, but this would be dependent on future water quality results at the current location of SW2.

There are a number of observations on the data presentation as follows:

1. Historical data (Appendix G) only goes as far back as 2007. We are aware that monitoring data exist prior to 2007 and should be summarized. Also, PWQO exceedances should be highlighted to facilitate review.

2. Figure 9 shows the histogram graphic, comparing four leachate indicator parameters for SW1 and SW2, for each sampling season. This should be replaced with a trend through time graphic, again to facilitate review and assess any trends. It is also noted that there appears to be two typos on the Figure 9. The hardness is labelled as mg/l /10 and should be x10. For DOC, it is labelled as mg/l x10 and should be /10.

We will forward comments from our groundwater reviewer once they have completed their review of the annual report. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,

Ian Mitchell , P.Eng.
District Engineer
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Shawn Carey, MOE, Owen Sound
Jack Colonnello, MOE, London
Jim Scott, Pryde Schropp McComb, Port Elgin

101- 16942-01

RECEIVED APR 2 7 2011

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Ontario

April 15, 2011

Mr. Hugh Nichol
Township of Huron-Kinloss
PO Box 130
21 Queen Street
Ripley ON N0G 2R0

Dear Mr. Nichol,

RE: Huron Landfill Site, 2010 Annual Monitoring Report

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2010" dated March 2011 and prepared by Genivar Inc.

The 2010 report documents methane levels at 100 % of the LEL at GP3 in February 2011. GP3 is located adjacent to the recycling attendant's shed, however it is our understanding that this shed does not have a methane detector. While methane levels have fluctuated at this location in the past, monitoring results have shown the potential for dangerous levels of landfill gas. The Municipality must take steps to address this issue, such as moving the shed or installing a methane detector/alarm to ensure the safety of this shed. In my letter to you dated January 29, 2010, which was included in Appendix B of the 2010 report, I requested a response outlining how the municipality will be addressing the methane issue. I could not locate any record of a response concerning this issue and ask that you provide me with a written response by May 30, 2011 regarding this issue.

The 2010 report was forwarded to our Regional Technical Support section and comments from our regional surface water specialist are provided below:

Two surface water monitoring stations exist for this landfill site that are located on the South Pine River. SW1 is upstream and SW2 downstream. In 2010, the report and data notes that Provincial Water Quality Objective (PWQO) exceedances for unionized ammonia and chromium were due to method detection limits (MDLs). The report asserts that lowered MDLs will be used for these two parameters to properly assess values with the respective PWQOs. The PWQO for total phosphorus was exceeded at both stations and therefore the exceedance at the downstream station (SW2) is related to offsite (agricultural practices). The

report concludes that there are no obvious landfill impacts on the South Pine River. After having reviewed the historical data and trend through time graphs, our surface water reviewer concurs with this assessment.

We will forward comments from our groundwater reviewer once they have completed their review of the annual report.

I look forward to your response by **May 30, 2011** regarding the elevated methane levels measured near the recycling attendant's shed. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,

Ian Mitchell , P.Eng.
District Engineer
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Laszlo Barti, MOE, Owen Sound
Jack Colonnello, MOE, London
Neil McLean, Genivar, Hanover

GENIVAR

101-16942-00

May 30, 2011

Mr. Ian Mitchell, District Engineer
Ministry of the Environment, Southwestern Region
Owen Sound District Office
101 17th Street, 3rd Floor
OWEN SOUND, ON
N4K 0A5

Re: Methane Levels at Recycling Attendant Shed
Huron Waste Disposal Site

Dear Mr. Mitchell:

This letter follows up with your April 15, 2011 letter regarding the 2010 Huron Waste Disposal Site Annual Monitoring Report (AMR).

In your letter, you had indicated a concern regarding the elevated levels of methane detected at the recycling attendant shed at the Huron Waste Disposal Site. As indicated in the 2010 AMR, methane levels at the GP3 monitoring location, located immediately adjacent to the recycling attendant shed at the Huron Waste Disposal Site, were reported above the 100% of the lower explosive limit in air. Effectively, this has presented a dangerous situation in the vicinity of monitoring point GP3.

In order to ensure health and safety concerns are immediately met at the Huron Waste Disposal Site, the Township of Huron-Kinloss has ordered a Sensit Model HXG-2d gas detector to be used by the recycling attendant while the recyclable goods are being accepted at the Huron Waste Disposal Site. The gas detector will allow staff to continuously monitor the percentage of the lower explosive limit of methane in the air and avoid operating the recycling facilities during periods were percentage of methane gas in the air presents an unacceptable risk to staff and facility users. Use of the gas detector began on May 27, 2011.

If you have any further questions or comments, please do not hesitate to contact me at this office.

Yours truly,

GENIVAR Inc.

Neil McLean, M.Sc., P.Geo.
/nrm/dlw
cc: Mr. Hugh Nichol, Director of Public Works, Township of Huron-Kinloss

1450 1st Avenue West, Suite 101, Owen Sound, Ontario N4K 6W2
Telephone: 519.376.7812 • Fax: 519.376.8008 • www.genivar.com

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RECEIVED
JUL 23 2012

July 19, 2012

Mr. Hugh McNichol
Township of Huron-Kinloss
PO Box 130
21 Queen Street
Ripley ON N0G 2R0

Dear Mr. McNichol,

RE: Huron Landfill Site, 2011 Annual Monitoring Report

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2011" dated March 2012 and prepared by Genivar Inc.

The submission was forwarded to our Regional Technical Support section and comments from our regional surface water specialist with respect to the surface water assessment are provided below:

Water chemistry results for 2011 revealed only Provincial Water Quality Objective (PWQO) exceedances for total phosphorus at both the upstream (SW1) and downstream (SW2) stations located on the South Pine River. Having reviewed the 2011 monitoring results, historical data and trend through time graphics, our surface water reviewer agrees with the report conclusion that there are no obvious leachate impacts on the South Pine River.

We will forward comments from our groundwater reviewer once they have completed their review of the annual report. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,

Ian Mitchell, P.Eng.
District Engineer
Owen Sound District Office

File Storage Number: SI BR HK C5 610

cc. Laszlo Barti, MOE, Owen Sound
Jack Colonnello, MOE, London
Neil McLean, Genivar, Owen Sound

Ontario

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MAR 1.0 2014
TOWNSHIP OF
HURON - KINLOSS

Ministry of the Environment
Ministère de l'Environnement

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St Ripley, P.O. Box 130, Huron-Kinloss, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St Ripley, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, FAX: (519)395-4107, email: hurontwp@hurontel.on.ca Client #: 4545-4MERDZ, Client Type: Municipal Government Additional Address Info: Ripley		
Inspection Site Address:	Huron Landfill Site Address: Lot: 19 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433		
Contact Name:	Hugh Nichol	**Title:**	Public Works Superintendent
Contact Telephone:	(519)395-3735 ext	**Contact Fax:**	
Last Inspection Date:	2012/11/16		
Inspection Start Date:	2014/02/20	**Inspection Finish Date:**	2014/02/20
Region:	Southwestern		

1.0 INTRODUCTION

This facility was inspected as part of the Ministry of the Environment (MOE) 20013/2014 inspection program.
The purpose of this proactive inspection was to assess compliance of the operation of the site in relation to the terms and conditions of its Environmental Compliance Approval A272601 (ECA), any relevant control documents, MOE legislation and to confirm conformance with the MOE waste-related policies and guidelines. MOE Owen Sound District Office (OSDO) files were reviewed in preparation for this inspection.

This inspection included a visit of Huron Landfill site conducted on February 20, 2014 with the assistance of Terry Edmiston, Operator in Charge.

The Landfill is owned and operated by the Township of Huron-Kinloss. The Township consists of the former Township of Huron, the former Township of Kinloss and the former Village of Lucknow. The Landfill is located at 2087 Concession 6 East Road, on Lot 19, 20, Concession 5, in former Township of Huron, southwest of the community of Ripley.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):
-ECA A272601, issued on October 15, 1991 - requires registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposes terms/conditions of onsite burning.
- A272601 Notice No. 1, issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance.
- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of non-putricible recyclable waste
- A272601 Notice No. 3, issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.
- A272601 Notice No. 4, issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of non-putricible recyclable waste.

2.1 FINANCIAL ASSURANCE:

Specifics:
Financial Assurance is not required for this facility.

2.2 APPROVED AREA OF THE SITE:

Specifics:
The total approved area of the site specified in the ECA consists of 8.0 hectares waste fill area within a total site area of 17.7 hectares.

2.3 APPROVED CAPACITY:

Specifics:
Condition 2.4 of the Certificate states that the total waste disposal capacity of the site (waste filled by trench method and by area method), including waste, daily cover and interim cover is 288,000 cubic metres. Condition 2.3 of the Certificate states that the maximum rate at which the site shall receive waste for disposal, is limited to 100 tonnes per day, and 3,000 tonnes per calendar year. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurrence from the District Manager.

At the time of the inspection it was indicated that waste limits are known to staff and are monitored through the scale house computerized weigh scale tracking system. This tracking system allows site personnel to be able to monitor the daily waste quantity and total waste tonnage accepted onsite.

2.4 ACCESS CONTROL:

Specifics:
Access to the site is controlled by a locked gate at the main entrance and a vegetative screen and fencing along Concession 6 Road. The site is open year round for the public on Tuesday, Friday and Saturday between 10:00 a.m. to 4:00 p.m.

According to Mr. Edmiston, two staff are generally on site to supervise site activities.

2.5 COVER MATERIAL:

Specifics:
Environmental Compliance Approval A272601 Condition 3.3 of the Notice No. 2 states:

a.Daily Cover - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be

scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards.

b.Interim Cover - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minimum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.

c. Final Cover - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule "A", attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of 10-5cm/sec or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

At the time of the inspection daily cover was not observed on the open face of the waste fill area.

According to Mr. Edmiston, due to winter conditions their cover material stock is frozen and site equipment cannot apply the required material to the waste fill area. He states that the most recent proper cover material application occurred in December 2013.

*** See Section 5.0 Actions Required.**

Condition 3.7 of the ECA states that the Owner/Operator shall implement control measures for odour, litter, birds, vector and vermin, as described in Sections 3.12 and 3.13 in Item 8 in Schedule "A", attached to this Certificate. Effectiveness of the control measures shall be reviewed and monitored regularly and updated/revised, as required, based on operational experience and complaints.

Condition 3.8 of the ECA states that the Owner/Operator shall ensure that wind-blown litter originating from the waste management activities at the Site is picked up regularly along the Site perimeter roads and access roads. The Owner/Operator shall, at its own expense, remove wind-blown litter originating from the waste management activities at the Site, from adjacent neighbouring properties of the Site, a minimum once per month or more frequently when wind-blown litter from the Site becomes severe.

At the time of the inspection, a large volume of wind blow litter was observed on the east side of the work face along the access road.

According to Mr. Edmiston, usually a big site clean up is conducted in the spring and during the rest of the year the site attendants are responsible to maintain the site by manually picking/collecting the litter.

Snow fencing has been installed to address wind blown litter on the site however due to high winds the fencing has been severely damaged and is now not providing the function it was installed to provide.

The Owner shall use best efforts to contain wind blown litter within the Landfill footprint and clean the litter up frequently and on regular basis as stipulated by the ECA and supporting documents.

*** See Section 5.0 Actions Required.**

2.6 WASTE BURNING:

Specifics:

Condition 4 of the ECA states that "no waste other than segregated brush, lumber and clean wood shall be burned at this site, in an area separate from the stump waste and only under conditions that will not cause any adverse off-site impacts."
Condition 5 of the ECA states that "access to the burning area by the public and other unauthorized personnel is prohibited when burning is being carried out."
Condition 6 of the ECA states that "no burning shall be carried out unless supervision is provided by the operating authority at all times."

At the time of inspection, there was no burning taking place. According to Mr. Edmiston, no recent burning activities have taken place due to the large volume of snow located on the site.

Site personnel is reminded when further burning activities commence to ensure full compliance with Condition 4, 5 and 6.

2.7 GROUNDWATER/SURFACEWATER IMPACT:

Specifics:
Due to snow conditions only a few monitoring wells were observed. Those checked were secured and locked as required.

Surface water samples are obtained from one upstream and one downstream station on the South Pine River. All the groundwater and surface water monitoring locations are monitored on semi-annual basis, during spring and fall.

Condition 6.2 of the ECA
The groundwater quality at the site boundary shall meet the Ontario Drinking Water Quality Standards (DWQS) and the Provincial Water Quality Objectives (PWQO). The applicable parameters to meet the DWQS and PWQO, shall be selected and monitored through a recommendation in the Annual Monitoring Report, subject to the prior approval of the District Manager.

There was no evidence of groundwater or surface water impacts observed at the time of inspection.

2.8 LEACHATE CONTROL SYSTEM:

Specifics:
A Leachate Management Plan (the Plan) has been implemented to manage the leachate generated at this site. The Plan is designed to minimize the volume of leachate impacted surface water accumulation in the trench and contains procedures for managing the impacted water.

No leachate breakout was noted during the inspection.

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:
There is no methane gas collection system at this site.

Condition 6.7 of the ECA states that the Owner/Operator shall ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

The ECA approves the disposal of the following categories of waste at the Landfill: domestic, commercial and non-hazardous solid industrial wastes (limited to scrap metal, wood, miscellaneous debris and inert fill).

2.10 OTHER WASTES:

Specifics:
Condition 3.11 of the Notice No. 2 states that signs shall also be posted along internal access roads controlling vehicle speed, turning movements and to direct vehicles and/or users to the working face and other designated areas and facilities on the Site, as appropriate. All landfill signs shall be kept legible, in good repair, and cleaned when required.

Observations made at the time of the inspection indicate that all necessary signage is currently in place on the site.

Condition 4.3 of the Notice No. 2 states that the Waste Segregation/Recycling and the WEEE Facilities shall only accept scrap metals, tires, white goods, solid non-hazardous recyclable materials, including cardboards, rough fill (i.e. concrete slabs and stumps), bale-wrap, propane canisters and E-waste, which shall be segregated, stored temporary for a period not exceeding 120 days from the date of first receipt, or as needed, and transferred for off-site disposal, to ensure that the design storage capacities are not exceeded at any time. The storage of specific material beyond 120 days may be allowed, only with prior notification and written concurrence from the District Manager.

There was no evidence of wastes other than wastes approved by the ECA being landfilled or stored at the site.

The Owner shall ensure that the Landfill is in compliance with the 120 days storage limit requirement of Condition 4.3 of the Notice No. 2.

On January 31, 2013, notification was provided to the MOE indicating that bale wrap and scrap metal collected at the site for recycling was exceeding the 120 day storage limit requirement.

Mr. Edmiston is advised to ensure full compliance with Condition 4.3 related to any future 120 day storage limit exceedances.

Propane tanks are accepted at the site and are stored in proximity of the scalehouse, on wooden pallets, out of vehicular traffic and are picked up by Huronia or Lucknow District Co-operative Inc. on as needed basis.

Vehicle batteries are not accepted at the Landfill.

No vector/vermin problem was noted at this site during inspection.

There were no notable odours surrounding the facility on the day of inspection.

At the time of the inspection several un-drained/untagged refrigerators were visibly stored next to the scrap metal pile. The majority of the units were found laying on their sides. According to Mr. Edmiston, Don Thompson TV & Appliances, Ripley is called to drain and tag the refrigerators when approximately 20 units are on site.

Refrigerators containing Chlorofluorocarbons (CFC) should be stored separately from the drained/tagged ones, to avoid damage of the un-drained units. Untagged refrigerators must be handled carefully, placed separate in upright position until CFCs are removed and tagged by a licensed technician. Rough handling will result in breaking of lines and loss of CFC's to the atmosphere.

***See Section 5.0 Actions Required.**

The e-wastes collected under the WEEE program are usually stored in a cargo trailer.

The Owner shall ensure that segregated wastes are stored properly and picked up on as needed basis.

Condition 8.1 of the Notice No. 2 states that the Owner/Operator shall develop and maintain a training plan for Site operations employees and shall ensure that all site operations employees have been adequately trained and received on-going training with respect to the following, as amended:

a. terms, conditions and operating requirements of this Certificate, A272601 and Notices for the Site;
b. the operation, inspection, and maintenance of the Site with respect to the approved design and operations documents;
c. Relevant waste management legislation and regulations;
d. Environmental concerns related to waste management at the Site;
e. Occupational Health and Safety concerns related to waste management at the Site; and
f. Emergency procedures and contingency plans in case of fire, spills, off-site impacts and any other emergency situations.

At the time of the inspection Mr. Edmiston provided a copy of an agenda from a meeting held by Genivar for site staff on June 13, 2013.

Based on a review of the agenda it is determined that the content during the training meeting does not meet the requirements of Condition 8.1.

The Owner shall develop and implement a training plan to ensure that all employees and contractors involved in any aspect of the Landfill operation are trained in accordance with Condition 8.1.

See Section 5.0 Actions Required.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

1. Ensure that cover material is applied in accordance with the ECA.

Item not resolved.

2. Ensure that wind-blown litter originating from the waste management activities at the site is picked up regularly along the site perimeter roads and access roads.

Item not resolved.

3. Ensure that burning of brush, lumber and clean wood are carried out in accordance with the ECA.

Item completed.

4. Ensure that the Landfill is in compliance with the 120 days storage limit requirement of the ECA.

Item completed.

5. Ensure that signs at the Landfill are posted and maintained in accordance with the requirements of the ECA and supporting documents.

Item completed.

6. Ensure that white goods containing Chlorofluorocarbons (CFC) are handled carefully, stored in a segregated area, in upright position to avoid breaking of lines and loss of CFC's to the atmosphere.

Item not resolved.

7. Ensure that segregated wastes are stored in an environmentally responsible manner.

Item completed.

8. Ensure that during the days open for the public, landfilling occurs under the supervision of the site attendants and scavenging is not permitted.

Item completed.

9. Develop and implement a training plan to ensure that all employees and contractors involved in any aspect of the Landfill operation are trained in accordance with the ECA requirements.

Item not resolved.

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:
Not Applicable
Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?
No

Specifics:
Not Applicable
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 ?
Yes

Specifics:
1. Failure to apply cover material in accordance with the Condition 3.3 of the Notice No. 2.
2. Failure to contain and clean up wind blown litter.
3. Failure to handle and store appliances containing CFCs in an environmentally responsible manner.

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:
Not Applicable
Was there any indication of minor administrative non-compliance?
No

Specifics:
The Owner is required to develop and implement a training plan to ensure that all employees and contractors involved in any aspect of the Landfill operation are trained in accordance with the ECA requirements.

5.0 ACTION(S) REQUIRED

1. The Owner shall immediately ensure that cover material is applied in accordance with the ECA.
2. The Owner is immediately required to ensure that wind-blown litter originating from the waste management activities at the site is assessed and cleaned up regularly.
3. The Owner shall immediately ensure that white goods containing Chlorofluorocarbons (CFC) are handled carefully and in upright position to avoid breaking of lines and loss of CFC's to the atmosphere.
4. The Owner shall immediately develop and implement a training plan for employees and contractors that meets the requirments of Condition 8.
5. By no later than March 28, 2014 the Owner shall submit in writing to the undersigned details of the actions taken to address these items.

6.0 OTHER INSPECTION FINDINGS

7.0 INCIDENT REPORT

Applicable
8657-9GNRVM

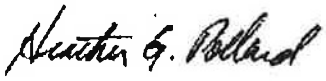
8.0 ATTACHMENTS

PREPARED BY:
Environmental Officer:
Name: **Andrew Torrie**
District Office: **Owen Sound District Office**
Date: **2014/02/25**
Signature



REVIEWED BY:
District Supervisor:
Name: **Heather Pollard**
District Office: **Owen Sound District Office**
Date: **2014/02/26**

Signature:



File Storage Number: BR HK C5 610

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"

March 28, 2014

BY EMAIL ONLY

Mr. Andrew Torrie
Ministry of the Environment
101 17th Street, 3rd Floor
Owen Sound, ON N4N 0A5

Tel: 519-371-2901
Fax: 519-371-2905
Email: Andrew.Torrie@ontario.ca

Subject: **Huron Landfill Site**
Response to MOE Site Inspection Report – February 20, 2014

Dear Mr. Torrie:

On behalf of the Township of Huron-Kinloss, we have reviewed the Ministry of the Environment's Site Inspection Report dated February 20, 2014.

Based on this review, we provide the following comments regarding each of the findings contained in Section 5.0 of the report.

1. *The Owner shall immediately ensure that cover material is applied in accordance with the ECA.*

   The Township will use their best efforts to apply daily cover material at the site during the winter months.

   There are times after the snow has melted that prevents the placement and proper compaction of cover material at the site due to the working area becoming too wet for equipment to operate in. Another problem is that the native material being used for daily cover is frost susceptible and becomes very difficult to move and compact during the winter.

   WSP and the Township will continue reviewing alternative methods to overcome the operational difficulties of applying daily cover at the site during the winter in order to meet the requirements of the ECA. One possible alternative that may be considered is to temporarily stockpile non-frost susceptible surplus material from the Township's road projects at the site during the warmer months of the year for use during the winter.

WSP Canada Inc.
101 14th Avenue
Hanover, ON N4N 3W1
T 519-364-5700
F 519-364-8937
www.wspgroup.com

2. *The Owner is immediately required to ensure that wind-blown litter originating from the waste management activities at the site is assessed and cleaned up regularly.*

   The Township will continue using their best efforts to ensure that litter pick-up is completed on a regular basis. The annual spring clean-up at the site will also be undertaken again this year which will pick up a majority of the windblown litter.

   Once the snow has melted at the site, the snow fence that was originally installed to assist with litter control at the active face will also be repaired.

3. *The Owner shall immediately ensure that white goods containing Chlorofluorocarbons (CFC) are handled carefully and are in an upright position to avoid breaking of lines and loss of CFC's to the atmosphere.*

   The landfill operator will be reminded that all white goods containing CFC's shall be stored in an upright manner to avoid loss of CFC's.

   Safe and proper handling of CFCs will be reviewed at the next training session.

4. *The Owner shall develop and implement a training plan for employees and contractors that meet the requirements of Condition 8.*

   In the absence of any formal training protocol established by the Ministry of the Environment, we are of the opinion that the training program that has currently been implemented for the Township's landfill employees does meet the requirements of Condition 8.

   WSP has held two (2) annual training sessions with landfill staff over the past two (2) years. These training sessions consist of completing an overview of the various conditions contained in the current ECA as well as reviewing the current Design and Operations Plan and the Design and Operations Manual for Recycling Facilities that was prepared for the site as well.

   It is recommended that these sessions continue to be held on an annual basis with all landfill staff in attendance. The content of the sessions are also recommended to remain focussed on the core items outlined in Condition Section 8.1 however, additional topics of discussions and possibly completing a portion of the session at the site may also prove beneficial.

5. *By no later than March 28th, 2014, the Owner shall submit in writing to the undersigned detail of the actions taken to address these items*

   The purpose of this letter is to address Item #5.

We trust that the above response is satisfactory. Should you require clarification or additional information, please contact the undersigned at 519-364-5700 ext. 224.

Yours truly,

Stephen J. Cobean, P.Eng.
Director – Municipal Infrastructure

cc: Mr. Hugh Nichol, Township of Huron-Kinloss (by email)
Mr. Neil MacLean, WSP Canada Inc. (by email)

H:\PSM\Clerical\00941 Huron Landfill Site\Correspondence\Letters\2014-03-28 le lorne site inspection response sjc 121-60020-00 docx

Ministry of the Environment
Southwestern Region
Owen Sound District Office
3rd Flr
101 17th St
Owen Sound ON N4K 0A5
Fax: (519)371-2905
Tel: (519) 371-6191

Ministère de l'Environnement
Direction régionale du Sud-Ouest
Bureau du district d'Owen Sound
101 rue 17th, 3ème étage
Owen Sound ON N4K 0A5
Télécopieur: (519)371-2905
Tél:(519) 371-6191

Ontario

May 21, 2014

Mr. Hugh McNichol
Township of Huron-Kinloss
PO Box 130
21 Queen Street
Ripley ON N0G 2R0

RECEIVED
MAY 26 2014

Dear Mr. Nichol,

RE: Huron Landfill Site, 2013 Annual Monitoring Report

We have received a copy of the report titled "Huron Waste Disposal Site, Township of Huron-Kinloss, Annual Monitoring Report – 2013" dated March 2014 and prepared by WSP Canada Inc.

The 2013 report documents methane levels at 100 % lower explosive limit (LEL) at GP3 in January 2014. This is the 4th consecutive year that measurement of GP3 has detected methane at 100% LEL indicating the potential for dangerous levels of landfill gas in this area, which is adjacent to the recycling attendant shed.

In response to my letter dated April 15, 2011 regarding the detection of elevated landfill gas at GP3 the Municipality obtained a gas detector for use by landfill staff when working in the area of the attendants shed and GP3. It is critical that the Municipality ensure appropriate health and safety measures are followed when landfill staff are working. The municipality and your consultant should consider if measures should be installed in this area to control landfill gas and should also comment on if more frequent monitoring of GP3 is warranted.

I look forward to your response to this letter. If you have any questions concerning this letter, please contact me at (519) 371-6191.

Yours truly,

Ian Mitchell, P.Eng.
District Engineer
Owen Sound District Office

File Storage Number: SI BR KB HK 610

cc. Scott Gass, MOE, Owen Sound
Stephen Cobean, WSP, Owen Sound

101-16942-00

June 19, 2014

Mr. Ian Mitchell, P. Eng., District Engineer
Ministry of the Environment
101 17th Street East, Third Floor
OWEN SOUND, ON N4K 0A5

Re: Huron Landfill Site, 2013 Annual Monitoring Report
Landfill Gas Measurements at GP3

Dear Mr. Mitchell:

This correspondence is in response to your May 21, 2014 letter to Mr. Hugh Nichol at the Township of Huron-Kinloss (Township). In your letter, you suggested that the Township review their health and safety program due to the ongoing presence of methane, an explosive, lighter than air gas, at 100% of the lower explosive limit (LEL) at monitoring point GP3, which is located adjacent to the recycling attendant's shed.

As per our letter to you dated May 30, 2011, the Township uses a Sensit Model HXG-2d gas detector instrument prior to and during entry into the recycling attendants shed. Should methane be detected at any level in the shed, then the methane level is recorded into a log book by Township staff and reported in the annual monitoring report. To date, there has not been any methane detected in or around the shed. Further to this, the Township intermittently conducts extra due diligence and uses the gas detector to test the air between GP3 and the recycling area. During this intermittent testing, methane is only detected when the casing cap is removed from GP3.

It is the opinion of WSP Canada Inc. that the Township is conducting an appropriate level of due diligence in ensuring the Health and Safety of Township employees and citizens. The gas detector instrument should remain on hand with Township staff during operation of the recycling area, and the casing cap for GP3 should be periodically examined to ensure it remains secured. However, signage in the recycling area prohibiting smoking or spark generation should be considered.

Additional monitoring at GP3 is not considered to be necessary. It is expected that the LEL for methane at this monitoring point will remain at 100% of the LEL while active landfilling is occurring in the area. Effectively, additional monitoring is not expected to provide any additional information not already known to the Township, WSP Canada Inc. or the Ministry of the Environment.

Yours truly,

WSP Canada Inc.

Neil McLean, M.Sc., P.Geo.
/nrm/dlw

cc: Mr. Hugh Nichol, Public Works Superintendent, Municipality of Huron-Kinloss
Mr. Stephen Cobean, P.Eng., WSP Canada Inc.

WSP Canada Inc.
1450 1st Ave. W.
Suite 101
Owen Sound, ON N4K 6W2

Phone: 519-376-7612
Fax: 519-376-6006
www.wspgroup.com

MEETING NOTES

JOB TITLE	Landfill Training		
PROJECT NUMBER	101-16942-00 (121-60020-13)	**DATE**	25 October 2017
TIME	1pm to 3pm	**VENUE**	Huron Landfill and Huron-Kinloss Council Chambers
SUBJECT	Huron Landfill – 2017 Training		
CLIENT	Municipality of Huron-Kinloss		

ATTENDEES			
Name	**Company**	**Phone**	**Email**
Hugh Nicol	Municipality of Huron-Kinloss		hnicol@Huron.Kinloss.ca
Ian	Municipality of Huron-Kinloss		
Samantha	Municipality of Huron-Kinloss		
Terry	Municipality of Huron-Kinloss		
Peter Brodzikowski	WSP		Peter.Brodzikowski@wsp.com
Norm Bell	WSP		Norm.Bell@wsp.com

As required by Condition 8.0 of the amended C of A for the Huron Landfill dated July 6, 2010, the Township of Huron-Kinloss is required to complete on-going landfill site training for its staff.

In order to meet this requirement, the Township has retained WSP to conduct annual training sessions. The training session for 2017 was held on Wednesday, October 25th, 2017.

This year's training session was conducted at the site followed by a PowerPoint presentation at

The training session was attended by three (3) landfill site staff members plus the Director of Public Works.

The weather was overcast with intermittent rain.

The following provides a summary of the training session:

1. A general overview of the site history was completed
2. A review of the present status of the site was completed including reviewing the volume landfilled in 2015, the estimated compaction rate, estimated site closure date and diversion percentage

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1450, 1st Avenue West
Owen Sound, ON, Canada N4K 6W2

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F: +1 519 376-8008
wsp.com

3. A review of the 2016 Annual Monitoring Report was completed including a tonnages received, diversions and estimated density. general overview of the current Certificate of Approval that governs the operation of the site
4. The session then moved outdoors where a walking tour of the site was completed. The following areas were visited and the current operations discussed:
    a. Equipment – A Caterpillar 816F (26 tonnes – 52,364.0 lbs) landfill compactor, purchased approximately 3 years ago, is being used.
    b. Active landfilling area – a review of the current landfilling practices was completed. It was emphasized that the active face of the landfill should be limited to aid in proper compaction of the waste and to limit the blowing of garbage. Maintaining a small active working area will assist in managing surface water runoff and leachate breakouts. It was noted that garbage can be landfilled directly against a previous cell without the need for fill to be placed between them. This will provide additional landfill capacity within the site. The need for daily cover and interim cover was reviewed as contained in the C of A and the Design and Operations Plan.
    c. Site signage and public access was reviewed and found to be adequate
    d. The blue box recycling and scrap metal/white goods area at the back of the site was reviewed. The current setup works well and is adequately signed.
    e. The burn area is located at the rear of the recycling area. Brush is dropped off away from the active burning area. Burning is to follow the Design and Operations Plan. Plans for a future rental of a tub grinder for 2018 were noted.
5. Emergency procedures were reviewed during the operation of the site.
6. Record keeping procedures were reviewed. The scale operator weighs and records each vehicle on entry and exit. Material to be received is noted and designated fee charged or waived. The current record keeping procedure that landfill staff follows is working well and should be maintained.
7. Acceptance of contaminated fill procedures were reviewed as they relate to O. Reg. 347. The non-hazardous waste classification of the site was noted. Only non-hazardous contaminated fill can be accepted at the site. Contaminated material brought to the site should be supported with lab analysis results demonstrating that the material is not leachate toxic per O. Reg. 558 (Schedule 4, TCLP) prior to acceptance. Slump and ignitability testing should also be completed and submitted to the Township prior to acceptance. Material is typically spread out within the licenced area and used for daily cover after a couple of weeks.
8. Asbestos waste procedures were reviewed. Contactors are to notify the site prior to disposal. Asbestos waste is to be properly sealed using poly wrapped per MOECC guidelines and buried immediately after receiving. The burial location in the landfill is to be noted and documented as part of the daily record keeping at the site.

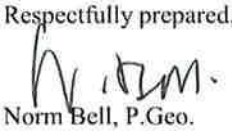
Please let me know if you have any questions regarding this year's training session.

These minutes are considered to be accurate recording of all items discussed. Written notice of discrepancies, errors or omission must be given within seven (7) days, otherwise the minutes will be accepted as written.

NEXT MEETING

An invitation will be issued for 2018 training via an additional meeting as required.

Respectfully prepared,



Norm Bell, P.Geo.

Ontario

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

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St, Post Office Box, 130, Ripley, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St Ripley, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, Extension: 130, FAX: (519)395-4107, email: hnichol@huronkinloss.com Client #: 4545-4MERDZ, Client Type: Municipal Government, NAICS: 22131 Additional Address Info: Ripley		
Inspection Site Address:	Huron Landfill Site Address: Lot: 19, 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433 Site #: 3678-5Q8L7L		
Contact Name:	Hugh Nichol	**Title:**	Public Works Superintendant
Contact Telephone:	(519)395-3735 **ext**	**Contact Fax:**	
Last Inspection Date:	2014/02/20		
Inspection Start Date:	2018/01/16	**Inspection Finish Date:**	2018/01/16
Region:	Southwestern		

1.0 INTRODUCTION

The Huron Landfill Site waste disposal facility was inspected as part of the Ministry of the Environment and Climate Change (MOECC) 2017/2018 inspection program.

The purpose of this pro-active inspection was to assess compliance of the operation of the site in relation to the terms and conditions of Environmental Compliance Approval (ECA) Number A272601, any relevant control documents, MOECC legislation and to confirm conformance with the MOECC waste-related policies and guidelines.

This inspection included an unannounced site visit conducted on January 16, 2018 to inspect the operational activities of the landfill site. At the time of inspection the landfill site was open and landfill attendants were present at the site. Mr. Terry Edmiston, operator in charge, assisted with the site inspection.

A copy of the 2016 Annual Report (AR) was previously forwarded to the Ministry's Technical Support; therefore, a detailed review of the monitoring data for the site was not conducted as part of this inspection. The 2016 Annual Report, as per Condition 11 of the ECA is required by March 31st of each year, prepared by WSP Canada Inc., dated March 2017, was reviewed as part of the inspection.

A previous MOECC inspection was conducted at this site on February 20, 2014. The landfill is owned and operated by the Township of Huron-Kinloss and services the residential and industrial, commercial and

institutional sectors located within the service area.

The landfill is located on Part Lots 19 and 20, Concession 5, in the former Township of Huron in the amalgamated Township of Huron-Kinloss, at 2087 Concession 6 East Road; southwest of the community of Ripley.

According to the AR, the Township is home to a total of approximately 7,000 residents that are serviced by the Huron Landfill. Additionally, waste from the former Township of Huron, the former Township of Kinloss and the Village of Lucknow is landfilled at the Huron Landfill.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):
Environmental Compliance Approval A272601 was issued October 15, 1991 and amended in 2007, 2010 and 2012.

-ECA A272601, issued on October 15, 1991 - requires registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposes terms/conditions of onsite burning.

- A272601 Notice No. 1, issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance.

- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of non-putricible recyclable waste

- A272601 Notice No. 3, issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.

- A272601 Notice No. 4, issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of non-putricible recyclable waste.

2.1 FINANCIAL ASSURANCE:

Specifics:
There is no financial assurance required for this landfill site as it is a municipally owned landfill.

2.2 APPROVED AREA OF THE SITE:

Specifics:
The total approved area of the site specified in the ECA consists of 8.0 hectares waste fill area within a total site area of 17.7 hectares.

At the time of inspection the Landfill footprint appeared defined by site topography and access roads. Wastes intended for landfilling were observed to be deposited into the approved area.

2.3 APPROVED CAPACITY:

Specifics:
Condition 2.4 of the ECA states that the total waste disposal capacity of the site (waste filled by trench method and by area method), including waste, daily cover and interim cover is 288,000 cubic metres.

Condition 2.3 of the Certificate states that the maximum rate at which the site shall receive waste for disposal, is limited to 100 tonnes per day, and 3,000 tonnes per calendar year. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurrence from the District Manager.

According to the AR, the average landfilled volume over the past five years is 6,605 cubic metres including waste and cover material. WSP used this average fill rate and remaining capacity determined in the Design and Operational Plan to result in a site closure date of 2035. Currently the former Village of Lucknow's waste is received by the Mid-Huron Landfill. However, this landfill was estimated to be closed in 2017. When this closure occurs the waste from the former Village of Lucknow will be landfilled at the Huron Landfill. The above estimate of reaching maximum capacity in 2035 does not account for future waste received from the former Village of Lucknow.

At the time of the inspection it was indicated that waste limits are known to staff and are monitored through the scale house computerized weigh scale tracking system. This tracking system allows site personnel to monitor daily waste quantities and total waste tonnage accepted onsite. Daily waste quantity records were observed by Environmental Officers during the inspection. Staff indicated that waste typically does not exceed 30 tonnes per day even in the peak season of summer.

2.4 ACCESS CONTROL:

Specifics:
Access to the site is controlled by a locked gate at the main entrance and a vegetative screen and fencing along Concession 6 Road. The site is open year round for the public on Tuesday, Friday and Saturday between 10:00 a.m. to 4:00 p.m.

During operating hours municipal staff are present to supervise site activities; one at the weight station and one or two at the recycling/dumping areas. At the time of inspection, the landfill site was open. A locked access gate was observed in place to restrict access to the site as required by section 11.(2) of O. Reg 347.

2.5 COVER MATERIAL:

Specifics:
Environmental Compliance Approval A272601 Condition 3.3 of the Notice No. 2 states:

a.Daily Cover - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards.

b.Interim Cover - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minimum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.

c. Final Cover - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule "A", attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of 10-5cm/sec or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

Daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA **(See Section 5.0 Action(s) Required).** Mr. Edmiston indicated that cover material stock is clay based and forms clumps making it difficult for the site equipment to apply the required material.

2.6 WASTE BURNING:

Specifics:
ECA Condition 4 permits the burning of clean wood and brush. At the time of inspection, there was no burning taking place. Materials other than clean wood and brush were not observed in the burn pile at the time of inspection.

2.7 GROUNDWATER/SURFACEWATER IMPACT:

Specifics:
There was no obvious evidence of groundwater or surface water impact at this site.

The 2016 AR identifies that groundwater and surface water sampling occur twice annually, in the spring and fall. At the time of inspection, snow conditions caused only a few monitoring wells to be observed. All monitoring wells observed appeared to be in good condition with locks to control access. However, the Annual Report detailed that Well OW2 is damaged and has been filled with bentonite and fitted with a temporary cap. As required by Section 21(3) of O. Reg. 903, the well shall be properly abandoned **(See Section 5.0 Action(s) Required).**

According to the 2016 AR, surface water monitoring samples are obtained from an upstream and downstream station on South Pine River. Surface water monitoring results have not indicated any landfill related impacts.

The District Office has forwarded a copy of the 2016 Annual Report to the Ministry's Technical Support Section for review. Any comments regarding groundwater or surface water impacts will be dealt with under a letter separate from this report.

2.8 LEACHATE CONTROL SYSTEM:

Specifics:
A Leachate Management Plan (the Plan) has been implemented to manage the leachate generated at this site. The Plan is designed to minimize the volume of leachate impacted surface water accumulation in the trench and contains procedures for managing the impacted water.

According to Mr. Edmiston, leachate has collected in a pond-like formation to the south western corner of the landfill area near to the interceptor berm. He thinks there the pond is approximately 4 feet with 2 feet of that potentially being black leachate. Mr. Edmiston explained that the area needs to be pumped out and filled and that he hopes this will occur in the spring **(See Section 5.0 Action(s) Required)**.

No leachate breakout was noted during the inspection, however, snow cover and frozen ground made it difficult to observe the site. The area to the south western corner of the landfill area did appear to be a depression in the landscape and have the presence of cattails, an aquatic vegetation.

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:
There is no methane gas collection system at this site.

Condition 6.7 of the ECA requires the Owner/Operator to ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

Testing for methane gas at this site was initiated in 2002. There are four methane monitoring locations on the site and the gas probes are monitored in the winter, when the waste disposal site is under frozen conditions.

According to the Annual Report, methane monitoring indicated no detections of methane in 2016-2017 at monitoring points GP1, GP2, GP4 and at the scale house. However, at GP3 methane was detected at 0.9 percent of its lower explosive limit. Mr. Edmiston indicated that the shed near the recycling bins has been removed from the site as per previous MOECC suggestion. In response to the detection of methane at the Landfill, the Township purchased a Sensit Model HXG-2D gas detector and trained the site attendants on the operation of the instrument. When working in the vicinity of GP3 the gas detector was reported to be utilized by staff. In 2016, there were no reports of the lower explosive limit being greater than zero.

Mr. Edmiston was not aware of any methane issues at the Landfill since the last inspection.

At the time of the inspection, no gas odours were noted on or off-site.

2.10 OTHER WASTES:

Specifics:
At the time of inspection, there was no evidence of wastes other than solid non-hazardous wastes being deposited in the fill area of the site.

According to the 2016 Annual Report, Huron Landfill accepted the following items:
- clean burnable wood,
- scrap metal,
- refrigeration units,
- e-waste,
- mattresses and,
- tires.

Recyclable Materials
A series of signed bins are located near the entrance for recyclable materials including paper, cardboard and plastic/metal containers. Solid non-hazardous waste was found in small increments in the recycling area and attendants were sorting through it at the time of inspection.

Bale Wrap
Bale wrap is no longer collected onsite Huron Landfill. The contractor, Switch Energy, now picks up the bale wrap individually and it does not enter the landfill.

Propane Cylinders
Propane cylinders were observed stored onsite. They were segregated, and the storage area was signed/labelled. Propane cylinders are stored next to a building structure, sheltered from incidental traffic accidents, in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

Tires
There were less than 5000 tire units stored at the site at the time of inspection. Less than 300 tire units were observed. The tires were segregated and the signage was legible.

Refrigeration Equipment
Refrigeration equipment was segregated for the storage of refrigerant appliances. At the time of inspection, Mr. Edmiston explained that Don Thompson TV & Appliances, Ripley was a licensed technician who removes the CFCs. Several units were observed and were not in an upright position. Refrigerators containing Chlorofluorocarbons (CFC) should be stored separately from the drained/tagged ones, to avoid damage of the un-drained units. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10. Rough handling will result in breaking of lines and loss of CFC's to the atmosphere **(See Section 5.0 Action(s) Required).**

Scrap Metal
Scrap metal is collected on-site in a separate area for recycling. Scrap metal is removed by Sullivan Salvage.

Mattresses
Mattresses are collected onsite in a separate container as of 2015 and are shipped from the landfill on a regular basis.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

1. Failure to apply cover material in accordance with the Condition 3.3 of the Notice No. 2; **Action Item incomplete**
2. Failure to contain and clean up wind blown litter; **Action Item complete**
3. Failure of the Operator of the Landfill to extinguish the burn pile upon leaving the site; **Action Item complete**
4. Failure to ensure compliance with the 120 temporary storage/transfer days limit required by Condition 4.3 of the Notice No. 2; **Action Item complete**
5. Failure to post and maintain signs at the landfill in accordance with the requirements of Condition 3.11 of the Notice No. 2; **Action Item complete**
6. Failure to handle and store appliances containing CFCs in an environmentally responsible manner; **Action Item incomplete**
7. Failure to store segregated wastes in environmentally responsible manner; **Action item complete**
8. Failure to prevent scavenging at the landfill in accordance with Section 23 O.Reg.232/98 and Section 11(19) of the O.Reg.347; **Action Item complete**
9. Failure to provide training to the employees involved with the site operation as required by Condition 8.1 of the Notice No. 2. **Action Item complete**

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 ?

Yes

Specifics:
Daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA

Well OW2 is damaged and has been filled with bentonite and fitted with a temporary cap. As required by Section 21(3) of O. Reg. 903, the well shall be properly abandoned

Leachate pond-like formation to the south western corner of the landfill area near to the interceptor berm

Several refrigeration units were observed untagged and not in an upright position. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10.

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?
No

Specifics:

5.0 ACTION(S) REQUIRED

1. The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.
2. The Owner/Operator shall properly abandon Well OW2 as per Section 21(3) of O. Reg. 903.
3. On or before March 15, 2018 the company shall provide a written response to the undersigned Provincial Officer detailing the actions to be taken to address the above listed Action Items.
4. On or before April 30, 2018 the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan to address the pond-like formation of leachate to the south western corner of the landfill area near to the interceptor berm and provide notification of completion to the undersigned Provincial Officer.

6.0 OTHER INSPECTION FINDINGS

There were no other inspection findings associated with this inspection.

7.0 INCIDENT REPORT

Applicable
3187-AVHRNS

8.0 ATTACHMENTS

IMG_20180116_135607.jpg; IMG_20180116_135645.jpg; IMG_20180116_140110.jpg; IMG_20180116_140123.jpg; IMG_20180116_140125.jpg; IMG_20180116_140200.jpg; IMG_20180116_140416.jpg; IMG_20180116_140440.jpg; IMG_20180116_140444.jpg; IMG_20180116_140511.jpg; IMG_20180116_140622.jpg; IMG_20180116_140709.jpg; IMG_20180116_140735.jpg; IMG_20180116_140908.jpg; IMG_20180116_141306.jpg; IMG_20180116_141310.jpg; IMG_20180116_141322.jpg; IMG_20180116_141942.jpg

PREPARED BY:
Environmental Officer:
Name: Natasha Munn
District Office: Southwestern Region
Date: 2018/01/25
Signature



REVIEWED BY:
District Supervisor:
Name: Andrew Barton
District Office: Owen Sound District Office
Date: 2018/01/31

Signature:



File Storage Number: BR HK C5 610

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"

March 8, 2018

Ms Natasha Munn, Inspector (Acting)
Ministry of Environment and Climate Change,
Drinking Water and Environmental Compliance Division,
Environmental Enforcement and Compliance Office,
Sector Compliance Branch,
Sector Inspections Unit
305 Milner Ave,
TORONTO, ON
M1B 3V4

Dear Ms. Munn:

Subject: **Inspection - Huron Landfill, Lot 19 and 20, Concession 5, Concession Road 6, Former Huron Township, Amalgamated Township of Huron-Kinloss, Bruce County, ON**

On behalf of the Corporation of the Township of Huron-Kinloss ('Township'), WSP responds to the Landfill Inspection completed at the Huron Landfill ('Site') by the Ministry of Environment and Climate Change (MOECC) on January 16, 2018 as detailed in the Solid Non-Hazardous Waste Disposal Site Inspection Report ('Report') dated January 31, 2018.

WSP's responses are in the order of those Section 3.0 and Section 5.0 Action(s) Required items in the January 16, 2018 report.

References are made by MOECC to the Design and Operations Plan by Pryde, Schropp McComb dated January 2010 (2010 D&O).

Regarding the 'Inspection Site Address', and such that there is not confusion and misidentification with the Township of Kinloss landfill, the Township clarifies that the landfill is in the former Township of Huron which is within the amalgamated Township of Huron-Kinloss.

SECTION 2.5 – COVER MATERIAL

MOECC states 'Daily cover was not observed on the open face of the waste fill area during the inspection.'

SECTION 2.8 – LEACHATE CONTROL SYSTEM

MOECC relies on the Site Operator's, Mr. Terry Edmiston, observations that leachate has collected in a pond-like formation to the southwestern landfill area near the interceptor berm.

The MOECC noted no leachate breakout. They state the area appeared to be a depression and had cattails, an aquatic vegetation.

SECTION 2.10 – OTHER WASTES

Under 'Refrigeration', the MOECC noted 'several units were observed and not in an upright position'.

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SECTION 3.0 - PREVIOUS NON-COMPLIANCE ISSUES

Items noted as 'Incomplete' in the report are addressed below.

1 MOECC notes failure to apply cover material adequately.
A response regarding cover material is provided below.

6 MOECC notes failure to handle and store appliances containing CFC's in an environmentally reponsible manner.
Site staff are aware of the requirements for CFC containing appliances and have been advised to handle the items correctly and to maintain the appliances in an upright position.

SECTION 4.0 – SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

The MOECC notes:

- That daily cover was not observed on the open face of the waste fill area during the inspection.
- That OW2 was 'damaged and has been filled with bentonite and fitted with a temporary cap'.

  The MOECC references the 2016 Annual Monitoring Report (AMR) in assessing OW2.

  Per Appendix F of the 2016 AMR, OW2 was drilled in 1989 to a depth of 1.52 m.
- A leachate pond-like formation in the south west corner of the landfill area near the interceptor berm.

  The clay interceptor berm was constructed 17 years ago in 2001. It is described in Section 7.2 of the 2010 D&O as being 'approximately 1 m in height'.

  Section 7.3 of the 2010 D&O describes the Surface Water Management Plan (SWMP) noting that the use of the retaining berm is to reduce the impact that of surface water runoff would have on the Site. The plan is 'expected to minimize and control leachate production and to protect the existing drainage routes from erosion while not creating other erosional areas'.

  Based on previous survey information, the area of possible pond-like formation behind the retaining berm before flowing around on either end (above the 231 mASL contour) is estimated at 424 m^2. The low area defined by the 231 mASL contour is 1,026 m^2. Based on a 1 m depth, a volume of 424 to 1,026 m^3 is calculated.
- Several refrigeration units to be untagged and not in an upright position.

For all of the above findings, the MOECC did not note any potential for environmental impairment.

SECTION 5.0 - ACTION(S) REQUIRED

The Actions required are in quotations as followed by the proposed action(s) by the Township.

1. 'The Owner/Operator shall ensure that daily cover is maintained on the open face of the waste fill area…' per Condition 3.3 of the ECA.

   Per Section 3.3 b) of the ECA, 'at the end of each working day, after deposition of waste into the working area, the entire working face shall be compacted and covered with a minimum thickness of at least 150mm of soil…'

   The operator understands the requirements of ECA Section 3.3 b) and ensures that all waste fill areas are covered adequately at the end of the working day.

2. ‘The Owner/Operator shall properly abandon Well OW2…’ in accordance with of Ontario Regulation (O. Reg.) 903.

   Per the borehole log in Appendix F of the 2016 AMR, the construction of OW2 is to a depth of 1.52 m. It was temporarily filled with bentonite. As it is less than 3 m depth, it would not be classified as a ‘well’ within O Reg 903 and would not require a licenced driller to remove.

   The Township has tentatively scheduled a backhoe to excavate the standpipe and refill and compact the excavated area. WSP will supervise the decommissioning work.

3. ‘On or before **March 15, 2018**, the company shall provide a written response…’ to the MOECC ‘…detailing the actions to be taken to address the above listed Action items’.

   This correspondence is provided in satisfaction of this requirement.

4. ‘On or before **April 30, 2018**, the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operations Plan (2010 D&O) to address the formation of leachate in the south west corner of the landfill area near the interceptor berm and provide notification of the completion…’ to MOECC.

   Section 7.3 of the D&O describes the interceptor berm, the modifications for which are detailed in Section 3.3.3 of the SWMP.

   Section 9.2 of the 2010 D&O details the Leachate Contingency Plan (LCP). The LCP is implemented if trigger levels are exceeded OR if ‘leachate outbreaks are observed’.

   The LCP is a process with different approaches being detailed in the 2010 D&O.

   The Township has requested that WSP review the 2010 D&O and the LCP to assess whether the interceptor berm is constructed per Section 3.3.3 of the SWMP and is functioning adequately.

   WSP will review the 2010 D&O Sections 7.3 and 9.2 i), and investigate and make recommendations regarding the required approach and determining which LCP options are required.

   WSP will conduct a topographic survey of the south west interceptor berm area to determine the volume of impacted water.

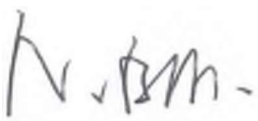
   Given the past issue with the high water table at the Site, the effect of shallow groundwater will be considered.

   WSP will collect a water quality sample(s) to characterize the quality of the surface water behind the interceptor berm.

   WSP and the Township will update the MOECC on the progress of this action item.

We trust the above to be satisfactory. Please contact the undersigned with any questions or comments.

Yours truly,



Norm Bell, P.Geo.
Senior Hydrogeologist / Project Geoscientist
/nab
Encl.
cc: Mr Andrew Barton, MOECC Owen Sound District Office
Mr Hugh Nichol, Township of Huron-Kinloss
Mr Terry Edmiston, Township of Huron-Kinloss
WSP ref.: 101-16942-00

April 30, 2018

Ms. Natasha Munn, Environmental Officer
Ministry of the Environment and Climate Change
Owen Sound District Office
101 17th Street East
OWEN SOUND, ON
N4K 0A5

Subject: **Inspection - Huron Landfill, Lot 19 and 20, Concession 5, Concession Road 6, Former Huron Township, Amalgamated Township of Huron-Kinloss, Bruce County, Ontario - Action Item 4**

Dear Ms. Munn

On behalf of the Corporation of the Township of Huron-Kinloss (Township), WSP responds to the Landfill Inspection completed at the Huron Landfill (Site) by the Ministry of the Environment and Climate Change (MOECC) on January 16, 2018 as detailed in the Solid Non-Hazardous Waste Disposal Site Inspection Report (Report) dated January 31, 2018.

EXISTING SITE CONDITIONS

WSP visited the Site on April 9, 2018 and inspected the southwest corner of the open area where surface water ponding occurs. During our visit there was minimal snow cover on the ground. Refer to attached **Figure 1** which outlines the existing site conditions at that time.

It appears that at least a portion (north side) of the impoundment is affected by leachate seeping from the uncovered, relatively small portion of the active landfilling area. The remaining part of the landfill footprint is adequately covered (interim cover). Leachate escaping the active disposal area is diluted with stormwater draining from the remaining part of the Site. Water drains westerly towards the Impoundment #1 which is created by an interceptor berm aligned along the edge of the open area. There is a gap in the berm through which water drains further west forming a separate second ponding area. This second impoundment, designated as Impoundment #2, is at a lower elevation than Impoundment #1. It was observed that there is a notch (erosion washout) in the berm holding water in Impoundment #2 through which water is trickling down towards South Pine River.

Standing water in the south part of Impoundment #1 does not visually appear to be affected by leachate, while the remaining north portion of this water body and Impoundment #2 are discoloured by leachate.

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SURFACE WATER QUALITY ASSESSMENT

Testing and sampling of water was carried out.

On April 23, 2018, three (3) unfiltered samples of surface water were obtained from the southwest portion of the Site. The samples were from the Impoundment #1 (South portion) (SW3/18) ponded surface water behind the interceptor berm. The Impoundment #1 (north portion) (SW4/18) sample was closest to landfilling and Impoundment Area #2 (SW5/18) further from active landfilling with possible dilution by overland flow from the northwest.

The field parameters measured for conductivity and pH were:

1	Impoundment #1 (SW3/18) – South portion	370 uS/cm	8.69
2	Impoundment #1 (SW4/18) – North portion	2,787 uS/cm	7.14
3	Impoundment #2 (SW5/18)	2,100 uS/cm	7.54

The Impoundment #1 (South portion) (SW3/18) sample was slightly grey and cloudy. Impoundment #1 – North (SW4/18) and Impoundment #2 (SW5/18) samples were coloured yellow to brown and yellow to orangey respectively. No sheen was observed.

SW4/18 and SW5/18 appear impacted by leachate based on visual and odour indications.

The samples were submitted to Caduceon Environmental Laboratories for analyses of the identical parameters used for the surface water samples in the annual monitoring program for the site. Analyses were compared to the Provincial Water Quality Objectives (PWQO) and the existing SW1 (upstream) and SW2 (downstream) results from Table 6 of the 2017 Annual Monitoring Report (AMR).

The SW1 (upstream) sample had a conductivity of 463 and 686 uS/cm for June and October 2017 respectively. Alkalinity was 229 to 322 mg/L. Hardness was 218 to 357 mg/L. The total phosphorus concentrations were above the PWQO for the October 2017 at 0.07 mg/L.

The laboratory results for Impoundment #1 (South portion) (SW3/18) agree well with field results and has a conductivity of 378 uS/cm and pH of 8.41 indicating slightly alkaline conditions. The conductivity, alkalinity (110 mg/L) and hardness (181 mg/L) are less than that of the South Pine River at SW1 (upstream) in 2017. Chlorides are low at 25.6 mg/L.

Impoundment #1 (South portion) (SW3/18) is above the PWQO for:

- total phosphorus (0.09 mg/L),
- aluminum (0.9 mg/L),
- chromium (0.002 mg/L),
- iron (1.34 mg/L) and
- zinc (0.04 mg/L).

Impoundment #1 (North portion) (SW4/18) indicates impacts by leachate with conductivity of 3,060 uS/cm. Impoundment #2 (SW5/18) sample appears similarly impacted but is more dilute than the SW4/18 sample with correspondingly less conductivity at 2,290 uS/cm. Chlorides are up to 6.4x higher than Impoundment #1 – South at 163 and 126 mg/L respectively. Alkalinity and hardness are also elevated.

As noted above, the concentrations measured in Impoundment #1 (North portion) are higher than in Impoundment #2 and are typically an order of magnitude (10x) higher than concentrations in Impoundment #1 (South portion).

Impoundment #1 (North portion) (SW4/18) is above the PWQO for:

- Un-ionized ammonia (0.19 mg/L),
- total phosphorus (0.98 mg/L),
- phenolics (0.105 mg/L),
- aluminum (0.34 mg/L),
- boron (4.59 mg/L),
- chromium (0.019 mg/L),
- cobalt (0.006 mg/L),
- copper (0.0054 mg/L),
- iron (7.82 mg/L),
- vanadium (0.007 mg/L) and
- zinc (0.656 mg/L).

Impoundment #2 (SW5/18) is above the PWQO for:

- Un-ionized ammonia (0.35 mg/L),
- total phosphorus (0.53 mg/L),
- phenolics (0.070 mg/L),
- aluminum (0.23 mg/L),
- boron (3.33 mg/L),
- chromium (0.014 mg/L),
- cobalt (0.0052 mg/L),
- iron (5.11 mg/L) and
- zinc (0.402 mg/L).

Impacts by leachate on SW4/18 and SW5/18, obtained in Impoundment #1 (North portion) and Impoundment #2 respectively, are indicated. The SW4/18 and SW5/18 sample concentrations are significantly elevated above the Provincial Water Quality Objectives (PWQO) for un-ionized ammonia, total phosphorus, phenolics and metals (including aluminum, boron, chromium, cobalt, copper in SW4/18, iron, vanadium in SW4/18 and zinc).

INTERPRETATION AND DISCUSSION

The above described leachate impact is a directly related to inadequate and irregular waste covering within the active landfilling area. While most of the landfill is adequately covered, contact surface water originating from this relatively small part of the landfill has impacted surface water accumulated in the southwest corner of the Site.

It appears that an unknown amount of surface water has already drained into the South Pine River.

The surface water sample analyses indicate the Impoundment #1 (South portion) (SW3/18) water has similar conductivity to the receiving water body, the South Pine River.

With on-site treatment for sediment removal (through use of a stilling basin constructed with staked straw bales), the Impoundment #1 (South portion) water would be suitable for a controlled release based on the analyses received. For assessment of ponded surface water in Impoundment #1 (South portion), we recommend the use of a 4 criteria assessment process whereby water is visually assessed for colour, odour and sheen and measured in the field for conductivity. For water having excessive discolouration, odour or sheen and a conductivity greater than 700 uS/cm (the approximate conductivity of the upstream receiving body), the water should be considered as unacceptable for release.

The sediment removal in the stilling basin may result in lowering of the concentration of several of the metal parameters which may be adsorbed onto particulates (iron, but also aluminum which, like the SW1 upstream sample, is above the PWQO). Further, a temporary soil berm is recommended to be placed between the south portion of Impoundment #1 and the north portion to prevent backflow during pump out of Impoundment #1 (South portion).

Release of the Impoundment #1 (North portion) and Impoundment #2 water would have potential environmental impacts on the receiving body, the South Pine River. Therefore, this water should not be released but should be taken off site for treatment.

REMEDIAL MEASURES

The current situation is not desirable and should be rectified.

It was determined that the existing Impoundment #1 has not been constructed in accordance with the Surface Water Management Report included as Appendix I to the Design and Operation Plan (Revised) for the Huron Landfill dated January 2010. This report has called for installation of a 150 mm diameter outlet pipe through the interceptor berm to allow for controlled release of ponded water. The outlet pipe has not been installed to date.

It is proposed to make some modifications to the existing stormwater system to rectify the above noted problems. The reader is referred to the enclosed **Figure 2** which outlines the concept of the proposed works as follows:

1. Pump out contaminated surface water in Impoundment #1 (north portion) and Impoundment #2 and truck away for treatment to a properly licenced sewage treatment plant. This should be done using a properly licensed hauler.
2. Ponded water in Impoundment #1 (South portion) which is determined as clean and not influenced by leachate (see above 4 criteria assessment) could be pumped over the interceptor berm into a stilling basin to remove sediment to drain to the receiving water body (South Pine River). Testing of water prior to release is covered above.
3. After dewatering, Impoundment #1 area should be regraded with the berm being strengthened/raised where required.
4. In addition, Impoundment #1 (South portion) area should be equipped with the pipe outlet connected with an isolation valve (normally open). This would allow for controlled release of surface water from this area through the natural channel downstream. The valve could be closed if water in the pond is affected by leachate. In such a case, water should be handled as per Item 1. In addition to flow control, the pond would treat surface water by settling of suspended solids.
5. It is also proposed to provide an emergency spillway (rip rap lined) to protect the facility against catastrophic berm failure which could occur under a rare, heavy storm event. The existing channel downstream from Impoundment #1 (South portion) shall also be reinforced with rip rap stone on geotextile.
6. Following the controlled release of the Impoundment #1 (South portion) water, the gap in the berm on the west side should be filled and the area of the existing Impoundment #2 should be returned to its natural state (regrade, topsoil and vegetate).

The proposed work plan, if approved by the MOECC, could be completed during the upcoming 2018 construction season. The conceptual design outlined herein would have to be firmed up with detail design.

Additional work, including a detailed topographical survey of the work area would be necessary to properly design various critical details including elevations (top of berm, pipe inverts, pond bottom, etc.).

Before proceeding with this task, we will await your response and approval of the proposed work plan.

Yours truly,

Norman A. Bell, P.Geo.
Senior Hydrogeologist/Geoscientist

Peter Brodzikowski, P.Eng.
Senior Environmental Engineer

PSB/NAB/dlw

cc: Mr. Hugh Nichol, Municipality of Huron-Kinloss
Encl. Caduceon analyses results (April 23/2018), Sheet 1 and 2
WSP ref.: 121-60020-13 (101-16942-00)

Table 6a
Surface Water Quality Monitoring Results
Huron Landfill - 2018

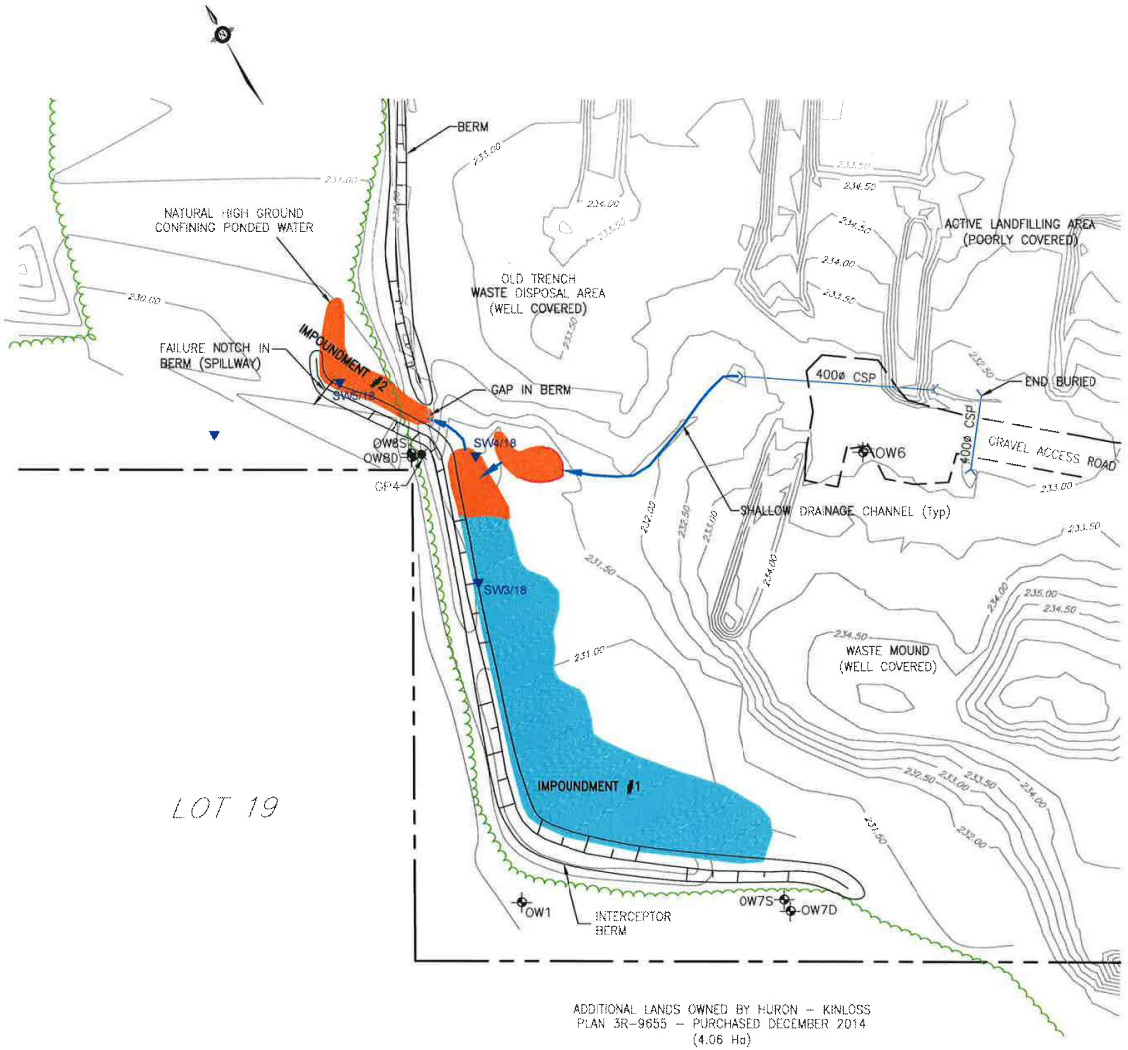
Surface Water Station			SW 1 (Upstream)	SW 1 (Upstream)	SW 2 (Downstream)	SW 2 (Downstream)	SW3/18	SW4/18	SW5/18
Date			12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
	Units	**PWQO mg/L**							
Calculated Parameters									
Hardness (CaCO3)	mg/L		218	357	262	339	181	1200	859
Inorganics									
Total Ammonia-N	mg/L		0.03	<0.01	0.04	0.02	0.16	45.5	29.6
Calculated Un-ionized Ammonia	mg/L	0.02 (10)	<0.02	<0.02	<0.02	<0.02	0.02	0.19	0.35
Conductivity	umho/cm		463	686	486	688	378	3060	2290
Total Kjeldahl Nitrogen (TKN)	mg/L		0.6	0.67	0.9	0.66	1.0	74.9	48.8
Dissolved Organic Carbon	mg/L		5.1	6.0	4.7	5.4	7.5	239.0	184.0
pH	pH	6.5 - 8.5	8.11	8.28	8.05	8.29	8.41	7.80	7.98
Phenols-4AAP	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.105	0.070
Total Phosphorus	mg/L	0.03 (9)	0.02	0.07	0.07	0.06	0.09	0.98	0.53
Dissolved Sulphate (SO4)	mg/L		13	12	13	12	23	179	151
Alkalinity (Total as CaCO3)	mg/L	(7)	229	322	220	297	110	1240	847
Dissolved Chloride (Cl)	mg/L		10.2	14.9	10.4	15.0	25.6	163.0	126.0
Nitrite (N)	mg/L		0.26	<0.05	0.20	<0.05	<0.05	<0.05	<0.05
Nitrate (N)	mg/L		3.27	9.67	3.23	9.69	0.32	0.19	0.18

Surface Water Station			SW 1 (Upstream)	SW 1 (Upstream)	SW 2 (Downstream)	SW 2 (Downstream)	SW3/18	SW4/18	SW5/18
Date			12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
	Units	**PWQO mg/L**							
Metals									
Total Aluminum (Al)	mg/L	0.075 (8)	0.09	0.15	0.12	0.13	0.90	0.34	0.23
Total Arsenic (As)	mg/L	0.100 (11)	0.0006	<0.0005	0.0006	<0.0005	0.0014	0.0113	0.0083
Total Beryllium (Be)	mg/L	1.100 (12)	<0.0001	<0.002	<0.0001	<0.002	<0.0001	<0.0001	<0.0001
Total Boron (B)	mg/L	0.200 (1)	0.008	0.012	0.023	0.014	0.190	4.57	3.33
Total Cadmium (Cd)	mg/L	0.0002 (3)	<0.000014	<0.000070	0.000033	<0.000070	0.00003	0.00011	0.00008
Total Calcium (Ca)	mg/L		51.8	96.5	64.1	91.3	56.8	319	223
Total Chromium (Cr)	mg/L	0.001 (13)	<0.001	<0.001	<0.001	<0.001	0.002	0.019	0.014
Total Cobalt (Co)	mg/L	0.0009	0.0001	<0.0005	0.0002	<0.0005	0.0008	0.0060	0.0052
Total Copper (Cu)	mg/L	0.005 (4)	0.0016	0.0009	0.0022	0.0009	0.0026	0.0054	0.0043
Total Iron (Fe)	mg/L	0.300	0.096	0.169	0.164	0.119	1.340	7.820	5.110
Total Lead (Pb)	mg/L	0.025 (5)	0.00006	<0.0001	0.00022	<0.0001	0.00190	0.00218	0.00143
Total Magnesium (Mg)	mg/L		21.5	28.2	24.9	26.9	9.52	96.90	73.40
Total Manganese (Mn)	mg/L		0.005	0.007	0.020	0.005	0.142	1.23	0.923
Total Molybdenum (Mo)	mg/L	0.040 (1)	0.0004	<0.0005	0.0004	<0.0005	0.0009	0.0041	0.0037
Total Nickel (Ni)	mg/L	0.025	0.0017	0.003	0.0019	0.003	0.0030	0.0244	0.0204
Total Potassium (K)	mg/L		1.9	2.7	2.2	2.6	5.6	84.6	62.9
Total Silver (Ag)	mg/L	0.0001	<0.00002	<0.0001	<0.00002	<0.0001	<0.00002	0.00005	0.00004
Total Sodium (Na)	mg/L		5.0	5.8	6.7	5.7	37.4	223	169
Total Vanadium (V)	mg/L	0.006 (1)	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.005
Total Zinc (Zn)	mg/L	0.030 (6)	<0.005	<0.005	0.054	<0.005	0.04	0.656	0.402

ND = Not Detected
RDL = Reportable Detection Limit
- = not done

Surface Water Station		SW 1 (Upstream)	SW 1 (Upstream)	SW 2 (Downstream)	SW 2 (Downstream)	SW3/18	SW4/18	SW5/18
Date		12-Jun-17	30-Oct-17	12-Jun-17	30-Oct-17	23-Apr-18	23-Apr-18	23-Apr-18
FIELD MEASUREMENTS	**Units**							
Temperature	Degrees C	21.2	8.8	20.0	8.8	16.4	16.7	18.0
Conductivity	µmhos	463	705	478	702	370	2787	2100
pH		7.85	8.08	7.60	8.02	8.69	7.14	7.54

NOTES:
1. PWQO indicates Provincial Water Quality Objectives.
2. (I) indicates interim PWQO
3. Cadmium: PWQO = 0.2 µg/L; Interim PWQO = 0.5 µg/L (for Hardness >100 mg/L); = 0.1 µg/L (for hardness < 100 mg/L).
4. Copper Interim PWQO = 5 µg/L(for Hardness >20 mg/L)
5. Revised Interim PWQO = 5 µg/L (for Alkalinity > 80 mg/L (as CaCO3)
6. Zinc Revised Interim PWQO = 20 µg/L
7. Alkalinity should not be decreased by more than 25 % of the natural concentration.
8. Interim PWQO = 75 ug/L for pH >6.5 to 9.0.
9. PWQO = 0.020 mg/L to avoid nuisance algae growth, PWQO = 0.010 mg/L for high level of protection
   PWQO = 0.030 mg/L for prevention of excessive plant growth
10. PWQO for un-ionized ammonia
11. Interim PWQO for arsenic is 5 ug/L
12. For hardness < 7 mg/L: PWQO = 11 µg/L; for hardness > 75 mg/L: PWQO = 1100 µg/L.
13. Chromium: PWQO - 1 µg/L for hesavalent chromium, 8.9 µg/L for trivalent chromium.
14. Unionized Ammonia Fraction (f) where $f = 1/(10^{pka - pH} + 1)$; pka = 0.09018 + 2729.92/T; T = °C +273.16
15. [ ] value exceeds PWQO.



LEGEND :

- RELATIVELY CLEAN WATER NOT SHOWING DISCOLORATION
- PONDED WATER DISCOLORED
- LANDFILL PROPERTY LINE
- EXISTING GROUND CONTOURS
- EXISTING TREELINE
- GP4 — EXISTING GAS PROBE
- OW8S — EXISTING OBSERVATION WELL
- SW3/18 — SURFACE WATER SAMPLE APRIL 23, 2018

NOTES :

1. TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE BASED ON DECEMBER 19, 2017 FIELD SURVEY BY SMC GEOMATICS (MOUNDED WASTE DISPOSAL AREA) AND VISUAL OBSERVATIONS RECORDED DURING AN APRIL 9, 2018 SITE VISIT.
2. EXISTING GROUND CONTOURS SHOWN DO NOT NECESSARILY OUTLINE EXISTING GROUND TOPOGRAPHY ACCURATELY EXCEPT MOUNDED WASTE DISPOSAL AREA.

WSP
4 HUR-SMITH STREET SOUTH, SUITE 501
HAMILTON, ONTARIO, CANADA L8N 3Z1
TEL: 905-546-1010 FAX: 905-546-1011 WWW.WSPGROUP.COM

Huron + Kinloss

EXISTING CONDITIONS - SURFACE WATER IMPOUNDMENTS

HURON LANDFILL SITE

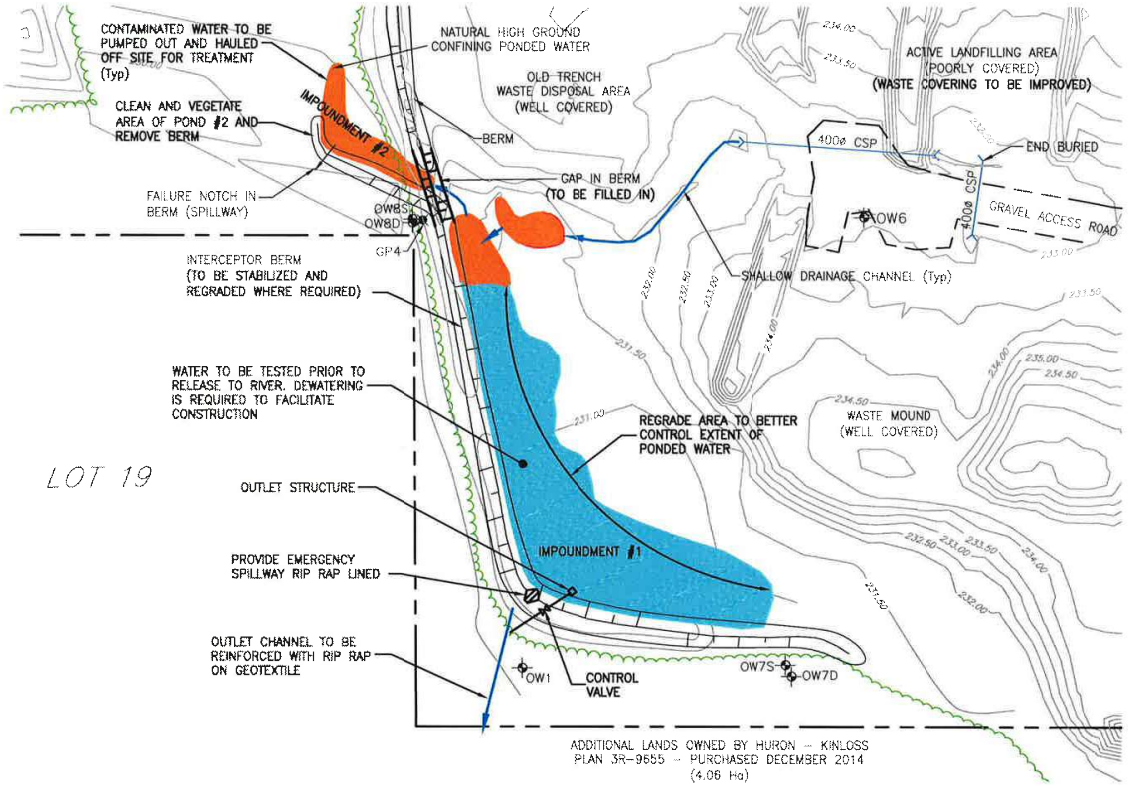
DWN BY: T.C.G.
CHK BY: P.S.B.
DATE: APRIL 27 2018
SCALE: SEE BAR SCALE

TOWNSHIP OF HURON-KINLOSS

DRAWING NO 101-16942-00 - 1

SHEET 1

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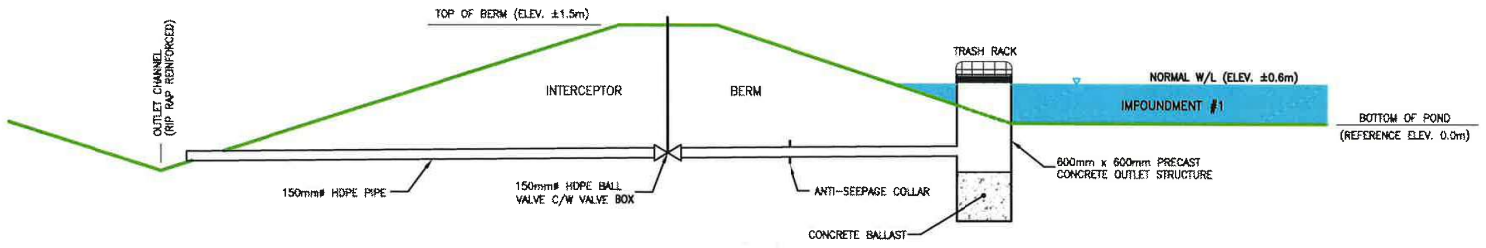
LEGEND :

- RELATIVELY CLEAN WATER NOT SHOWING DISCOLORATION
- PONDED WATER DISCOLORED
- LANDFILL PROPERTY LINE
- EXISTING GROUND CONTOURS
- EXISTING TREELINE
- GP4 EXISTING GAS PROBE
- OW8S EXISTING OBSERVATION WELL

NOTES :

1. TOPOGRAPHIC FEATURES SHOWN ON THIS PLAN ARE BASED ON DECEMBER 19, 2017 FIELD SURVEY BY SMC GEOMATICS (MOUNDED WASTE DISPOSAL AREA) AND VISUAL OBSERVATIONS RECORDED DURING AN APRIL 9, 2018 SITE VISIT.
2. EXISTING GROUND CONTOURS SHOWN DO NOT NECESSARILY OUTLINE EXISTING GROUND TOPOGRAPHY ACCURATELY EXCEPT MOUNDED WASTE DISPOSAL AREA.

SCALE : 1:1000



OUTLET SCHEMATIC

N T S

WSP

PROPOSED REMEDIATION WORK

HURON LANDFILL SITE

TOWNSHIP OF HURON-KINLOOS

DRAWING NO. 101-16942-00 - 2

SHEET 2

CADUCEON™ ENVIRONMENTAL LABORATORIES
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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67765 **REPORT No. B18-10504**

Report To:

WSP Canada Inc.
1450 1st Ave. West, Suite 101
Owen Sound ON N4K 6W2 Canada
Attention: Norm Bell

Caduceon Environmental Laboratories
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 24-Apr-18
DATE REPORTED: 25-Apr-18
SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill
P.O. NUMBER: 121.60020.05
WATERWORKS NO. 101.16942.00

Relabeled SW3/18 SW4/18 SW5/18

				Client I.D.	SW1-18	SW2-18	SW3-18	
				Sample I.D.	B18-10504-1	B18-10504-2	B18-10504-3	
				Date Collected	23-Apr-18	23-Apr-18	23-Apr-18	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	24-Apr-18/O	181	1200	859	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	25-Apr-18/O	110	1240	847	
Conductivity @25°C	µmho/cm	1	SM 2510B	25-Apr-18/O	378	3060	2290	
pH @25°C	pH Units		SM 4500H	25-Apr-18/O	8.41	7.80	7.98	
Chloride	mg/L	0.5	SM4110C	24-Apr-18/O	25.6	163	126	
Nitrate (N)	mg/L	0.05	SM4110C	24-Apr-18/O	0.32	0.19	0.18	
Nitrite (N)	mg/L	0.05	SM4110C	24-Apr-18/O	< 0.05	< 0.05	< 0.05	
Sulphate	mg/L	1	SM4110C	24-Apr-18/O	23	179	151	
Calcium	mg/L	0.02	SM 3120	24-Apr-18/O	56.8	319	223	
Magnesium	mg/L	0.02	SM 3120	24-Apr-18/O	9.52	96.9	73.4	
Sodium	mg/L	0.2	SM 3120	24-Apr-18/O	37.4	223	169	
Potassium	mg/L	0.1	SM 3120	24-Apr-18/O	5.6	84.6	62.9	
Aluminum	mg/L	0.01	SM 3120	24-Apr-18/O	0.90	0.34	0.23	
Arsenic	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0014	0.0113	0.0083	
Beryllium	mg/L	0.0001	EPA 200.8	24-Apr-18/O	< 0.0001	< 0.0001	< 0.0001	
Boron	mg/L	0.005	SM 3120	24-Apr-18/O	0.190	4.57	3.33	
Cadmium	mg/L	0.000014	EPA 200.8	24-Apr-18/O	0.000030	0.000106	0.000077	
Chromium	mg/L	0.001	EPA 200.8	24-Apr-18/O	0.002	0.019	0.014	
Cobalt	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0008	0.0060	0.0052	
Copper	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0026	0.0054	0.0043	
Iron	mg/L	0.005	SM 3120	24-Apr-18/O	1.34	7.82	5.11	
Lead	mg/L	0.00002	EPA 200.8	24-Apr-18/O	0.00190	0.00218	0.00143	
Manganese	mg/L	0.001	SM 3120	24-Apr-18/O	0.142	1.23	0.923	
Molybdenum	mg/L	0.0001	EPA 200.8	24-Apr-18/O	0.0009	0.0041	0.0037	
Nickel	mg/L	0.0002	EPA 200.8	24-Apr-18/O	0.0030	0.0244	0.0204	
Silver	mg/L	0.00002	EPA 200.8	24-Apr-18/O	< 0.00002	0.00005	0.00004	
Vanadium	mg/L	0.005	SM 3120	24-Apr-18/O	< 0.005	0.007	0.005	
Zinc	mg/L	0.005	SM 3120	24-Apr-18/O	0.040	0.656	0.402	

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

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67765 **REPORT No. B18-10504**

Report To:

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DATE RECEIVED: 24-Apr-18
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SAMPLE MATRIX: Surface Water

JOB/PROJECT NO.: Huron Landfill
P.O. NUMBER: 121.60020.05
WATERWORKS NO. 101.16942.00

			Client I.D.		SW1-18	SW2-18	SW3-18	
			Sample I.D.		B18-10504-1	B18-10504-2	B18-10504-3	
			Date Collected		23-Apr-18	23-Apr-18	23-Apr-18	
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	24-Apr-18/O	0.16	45.5	29.6	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	25-Apr-18/K	1.0	74.9	48.8	
Phosphorus-Total	mg/L	0.01	E3199A.1	25-Apr-18/K	0.09	0.98	0.53	
Phenolics	mg/L	0.001	MOEE 3179	24-Apr-18/O	< 0.001	0.105	0.070	
Dissolved Organic Carbon	mg/L	0.2	EPA 415.1	24-Apr-18/O	7.5	239	184	
Anion Sum	meq/L		Calc.	25-Apr-18/O	3.42	33.0	23.6	
Cation Sum	meq/L		Calc.	25-Apr-18/O	5.48	39.4	28.5	
% Difference	%		Calc.	25-Apr-18/O	23.2 [1]	8.80	9.34	
Ion Ratio	AS/CS		Calc.	25-Apr-18/O	0.624	0.838	0.829	
Sodium Adsorption Ratio	-		Calc.	25-Apr-18/O	1.21	2.81	2.51	
TDS(ion sum calc.)	mg/L	1	Calc.	25-Apr-18/O	225	1875	1358	
Conductivity (calc.)	µmho/cm		Calc.	25-Apr-18/O	440	2820	2160	
TDS(calc.)/EC(actual)	-		Calc.	25-Apr-18/O	0.596	0.613	0.593	
EC(calc.)/EC(actual)	-		Calc.	25-Apr-18/O	1.16	0.921	0.944	
Langelier Index(25°C)	S.I.		Calc.	25-Apr-18/O	0.773	1.88	1.74	

1 Outside of 10% Acceptance Criteria, solids present

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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

The analytical results reported herein refer to the samples as received. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.

MEMO

TO: File #101-16942-00

FROM: Kaurel Tamasauskas., Environmental Technologist

SUBJECT: **Spring Monitoring – May 23, 2018 – Huron Landfill**

DATE: **June 1, 2018**

The following notes were completed after the spring monitoring event at the Huron landfill:

- → Kaurel Tamasauskas and Nicole Collins measured water levels and collected water samples on May 23, 2018.
- → The weather was sunny, hot and a high of 28°C.
- → All groundwater monitors were purged to remove three (3) well volumes of water or were purged dry and allowed to recover prior to sampling.
- → Sampling locations included the following groundwater monitors: OW1, OW3, OW4, OW5, OW6, OW7S, OW7D, OW8S, OW8D, OW9, OW10S, OW10D and OW11.
- → Sampling locations for surface waters included: SW1 and SW2.
- → SW1 is located in an upstream location on the South Pine River at the bridge on Concession Road 6.
- → SW2 is located in a downstream location approximately 380 m west of active landfilling.
- → Duplicate samples were collected at OW7S and SW2.
- → GWC, metals, nutrients, phenols and DOC samples were collected at all groundwater and surface water locations (with the addition of total phosphorus for surface water samples only).
- → Groundwater samples for nutrients, metals and DOC were field filtered at the time of collection. Surface water samples for metals (specifically aluminum) should also be field filtered.
- → Field measurements of pH, conductivity and temperature were taken at all sampling locations.
- → The cells being actively landfilled are the southeast side of cells T3 and T2.

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- → The channel/gully beside OW1 is being eroded and the edge of it is very close to monitor OW1, as the protective casing/culvert is exposed on the bank of the gully (see photos in directory).
- → Rain water has also collected south of monitors OW8S and OW8D (west end of Cell T2). The water in this area appears to be dark grey to black in colour and a sheen is present on the surface (see photos in directory).
- → OW3 and OW9 require a 2" PVC slip-on cap.
- → No methane measurements were required during this round of sampling.
- → Field notes are in HG 120 pages 28 - 33.
- → Digital photos were taken of the site, and can be found in the project directory.

Prepared by:

Kaurel Tamasauskas
Environmental Technologist
KMT/
Encl.
cc Norm Bell. P.Geo., WSP

Ministry of the Environment and Climate Change
Southwestern Region
Owen Sound District Office
3rd Flr
101 17th St
Owen Sound ON N4K 0A5
Fax: (519) 371-2905
Tel: (519) 371-6191

Ministère de l'Environnement et de l'Action en matière de changement climatique
Direction régionale du Sud-Ouest
Bureau du district d'Owen Sound
101 rue 17th, 3ème étage
Owen Sound ON N4K 0A5
Télécopieur: (519) 371-2905
Tél:(519) 371-6191

Ontario

June 8, 2018

Mr. Hugh Nichol
Township of Huron-Kinloss
PO Box 130
21 Queen Street
Ripley, ON N0G 2R0

Via email and mail

Dear Mr. Nichol,

RE: Huron Landfill – Stormwater/Leachate Management

We have received the letter dated April 30, 2018 and prepared by WSP, responding to the MOECC's January 2018 inspection of the Huron Landfill. Leachate has been identified draining from the landfill site through a gap in a berm. The WSP letter proposes remedial measures including pumping out contaminated water, raising the berm, regrading impoundment areas, and installing a pipe outlet with an isolation valve.

On June 7, 2018, we met with you and Peter Brodzikowski (WSP) on site. Hugh Geurts, our regional surface water specialist also attended the site meeting. Based on the WSP letter and our site visit on June 7, 2018, we provide the following comments.

It is evident that there is no clear separation of on-site landfill generated leachate and stormwater. Landfill leachate must remain separate from landfill stormwater. All precipitation that comes into contact with the open face of the landfill footprint is to be treated as leachate. The Municipality must promptly take measures to prevent leachate from draining off the landfill site and to separate leachate from stormwater.

During the site visit a corrugated steel pile was observed near the toe of the open face of the landfill, draining towards the onsite bermed pond area. Flow from the active face into stormwater must the stopped, as mentioned above.

The existing stormwater collection berm does not appear to be sufficient to provide adequate water quality for discharge to the Pine River. The Municipality should review the stormwater

management collection and containment options that would allow for improved collection and management before off site discharge.

Please note that Condition 6.6 of Notice No. 2 of Environmental Compliance Approval # A272601 issued July 6, 2010 states:

> *Within one (1) year of the date of this Notice, the Owner/Operator shall submit an application with applicable fees, for approval under OWRA, copied to the District Manager, to install a stormwater management facility for the site, as described in Section 7.0 in Item 8 in Schedule "A", as amended in Item 12, in Schedule "A", attached to this Certificate, to assess the interaction between groundwater and surface water, and on-site and the South Pine River.*

We have reviewed our files and cannot locate an ECA stormwater application for this site, as required by Condition 6.6. This is non-compliance with the ECA.

The municipality must take the following actions:

- immediately take steps to prevent leachate from draining off the active landfill site area;
- immediately separate landfill leachate from landfill stormwater; and
- prepare and submit an ECA application as required by Condition 6.6 of ECA # A272601.

Please submit to this office by June 15, 2018 confirmation in writing that actions listed above are being undertaken, with details of the measures being taken

If you have any questions concerning this letter, please contact Natasha Munn at (519) 371-6582 or the undersigned at (519) 371-6191.

Yours truly,

Ian Mitchell , P.Eng.
District Engineer
Owen Sound District Office

File Storage Number: BR HK C5 610

cc. Norm Bell/Peter Brodzikowski, WSP, Owen Sound via email
Natasha Munn, MOECC, Owen Sound
Hugh Geurts, MOECC, London

MEMO

TO: File #101-16942-00

FROM: Kaurel Tamasauskas, Environmental Technologist

SUBJECT: **Fall Monitoring – October 25, 2018 – Huron Landfill**

DATE: **November 6, 2018**

The following notes were completed after the fall monitoring event at the Huron landfill:

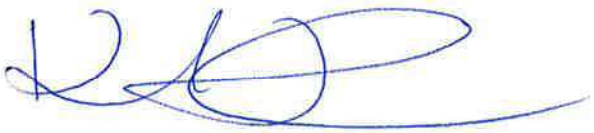
- → Kaurel Tamasauskas and Nicole Collins measured water levels and collected water samples on October 25, 2018.
- → The weather was overcast, cool and a high of 9°C.
- → All groundwater monitors were purged to remove three (3) well volumes of water or were purged dry and allowed to recover prior to sampling.
- → Sampling locations included the following groundwater monitors: OW1, OW3, OW4, OW5, OW6, OW7S, OW7D, OW8S, OW8D, OW9, OW10S, OW10D and OW11.
- → Sampling locations for surface waters included: SW1 and SW2.
- → SW1 is located in an upstream location on the South Pine River at the bridge on Concession Road 6.
- → SW2 is located in a downstream location approximately 380 m west of active landfilling.
- → Duplicate samples were collected at OW10D and SW1.
- → GWC, metals, nutrients, phenols and DOC samples were collected at all groundwater and surface water locations (with the addition of total phosphorus for surface water samples only).
- → Groundwater samples for nutrients, metals and DOC were field filtered at the time of collection. Surface water samples for metals (specifically aluminum) should also be field filtered.
- → Field measurements of pH, conductivity and temperature were taken at all sampling locations.
- → The cell that is being actively landfilled is the north east side of cell T4.

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- → The channel/gully beside OW1 is being eroded and the edge of it is very close to monitor OW1, as the protective casing/culvert is exposed on the bank of the gully (see photos in directory).
- → Rain water has collected west of monitor OW11. Many mattresses were also observed in this wet area.
- → Rain water has also collected south of monitors OW8S and OW8D (west end of Cell T2). The water in this area appears to be dark grey to black in colour and a sheen is present on the surface (see photos in directory).
- → Monitors OW4, OW7S and OW8S need new tubing next monitoring round.
- → OW3 and OW9 require a 2" PVC slip-on cap.
- → No methane measurements were required during this round of sampling.
- → Field notes are in HG 120 pages 34 - 39.
- → Digital photos were taken of the site, and can be found in the project directory.

Prepared by:



Kaurel Tamasauskas
Environmental Technologist
KMT/
Encl.
cc Norm Bell. P.Geo., WSP

Ontario

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

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St, Huron-Kinloss, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, Extension: 130, FAX: (519)395-4107, email: hnichol@huronkinloss.com Client #: 4545-4MERDZ, Client Type: Municipal Government, NAICS: 22131		
Inspection Site Address:	Huron Landfill Site Address: Lot: 19, 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433 Site #: 3678-5Q8L7L		
Contact Name:	John Yungblut	**Title:**	Public Works Superintendent
Contact Telephone:	(519)395-3735 **ext**	**Contact Fax:**	519-395-4107
Last Inspection Date:	2018/01/16		
Inspection Start Date:	2019/01/16	**Inspection Finish Date:**	2019/01/16
Region:	Southwestern		

1.0 INTRODUCTION

The Huron Landfill Site waste disposal facility was inspected as part of the Ministry of the Environment, Conservation and Parks (MECP) 2018/2019 inspection program.

The purpose of this pro-active inspection was to assess compliance of the operation of the site in relation to the terms and conditions of Environmental Compliance Approval (ECA) Number A272601, any relevant control documents, MECP legislation and to confirm conformance with the MECP waste-related policies and guidelines.

This inspection included an unannounced site visit conducted on January 16, 2019 to inspect the operational activities of the landfill site. At the time of inspection the landfill site was closed and landfill attendants were unavailable at the site.

A copy of the 2017 Annual Report (AR) was previously forwarded to the Ministry's Technical Support; therefore, a detailed review of the monitoring data for the site was not conducted as part of this inspection. The 2017 Annual Report, as per Condition 11 of the ECA is required by March 31st of each year, prepared by WSP Canada Inc., dated March 2018, was reviewed as part of the inspection.

A previous MECP inspection was conducted at this site on January 16, 2018. The landfill is owned and operated by the Township of Huron-Kinloss and services the residential and industrial, commercial and institutional sectors located within the service area.

The landfill is located on Part Lots 19 and 20, Concession 5, in the former Township of Huron in the amalgamated Township of Huron-Kinloss, at 2087 Concession 6 East Road; southwest of the community of Ripley.

According to the AR, the Township is home to a total of approximately 7,000 residents that are serviced by the Huron Landfill. Additionally, waste from the former Township of Huron, the former Township of Kinloss and the Village of Lucknow is landfilled at the Huron Landfill. The Mid-Huron Landfill was closed June 30, 2018, and therefore, as granted in the amended ECA from 2010, waste from the Village of Lucknow is now landfilled at the Huron Landfill.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):
Environmental Compliance Approval A272601 was issued October 15, 1991 and amended in 2007, 2010 and 2012.

-ECA A272601, issued on October 15, 1991 - requires registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposes terms/conditions of onsite burning.

- A272601 Notice No. 1, issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance.

- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of recyclable waste

- A272601 Notice No. 3, issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.

- A272601 Notice No. 4, issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of recyclable waste.

2.1 FINANCIAL ASSURANCE:

Specifics:
There is no financial assurance required for this landfill site as it is a municipally owned landfill.

2.2 APPROVED AREA OF THE SITE:

Specifics:
The total approved area of the site specified in the ECA consists of 8.0 hectares waste fill area within a total site area of 17.7 hectares.

At the time of inspection the Landfill footprint appeared defined by site topography and access roads. Wastes intended for landfilling were observed to be deposited into the approved area with the exception of historic waste that was filled beyond the approved limits. It is the ministry's position that the waste can likely be left where it is provided it is not causing issues and is deducted from the overall approved capacity of the site **(See Section 5.0 Action(s) Required)**.

2.3 APPROVED CAPACITY:

Specifics:
Condition 2.4 of the ECA states that the total waste disposal capacity of the site (waste filled by trench method and by area method), including waste, daily cover and interim cover is 288,000 cubic metres.

Condition 2.3 of the Certificate states that the maximum rate at which the site shall receive waste for disposal, is limited to 100 tonnes per day, and 3,000 tonnes per calendar year. The receipt of waste in excess of the daily maximum fill rate may only be allowed on a limited short-term basis, on no more than two consecutive operating days, and only with prior notification and concurrence from the District Manager.

According to the AR, the average landfilled volume over the past five years is 7,440 cubic metres including waste and cover material. The estimated landfill volume for 2017 is 10,927 cubic metres which is a historic annual maximum fill rate compared to previous years. WSP used the above average fill rate and remaining capacity determined in the Design and Operational Plan to result in a site closure date of 2031. Formerly, the former Village of Lucknow's waste

was received by the Mid-Huron Landfill. However, this landfill closed on June 30, 2018. Since this closure, waste from the former Village of Lucknow is landfilled at the Huron Landfill. The above estimate of reaching maximum capacity in 2031 does not account for waste received from the former Village of Lucknow.

2.4 ACCESS CONTROL:

Specifics:
Access to the site is controlled by a locked gate at the main entrance and a vegetative screen and fencing along Concession 6 Road. The site is open year round for the public on Tuesday, Friday and Saturday between 10:00 a.m. to 4:00 p.m.

During operating hours municipal staff are present to supervise site activities; one at the weight station and one or two at the recycling/dumping areas. At the time of inspection, the landfill site was closed. A locked access gate was observed in place to restrict access to the site as required by section 11.(2) of O. Reg 347.

2.5 COVER MATERIAL:

Specifics:
ECA A272601 Condition 3.3 of the Notice No. 2 states:

a. Daily Cover - At the end of each working day, after deposition of waste into the waste fill area, the entire working face shall be compacted and covered with a minimum thickness of 150 mm of soil cover or an approved thickness of alternative cover material such as compost, wood-chips or foundry sand. Prior to placing waste at the start of the next operating day, the existing daily cover material shall be scarified or removed to the extent practical, to ensure vertical hydraulic connection is maintained between layers of waste and to promote percolation of leachate downwards.

b. Interim Cover - In areas where landfilling ceases temporarily for a period of 6 months or more, a minimum thickness of 300 mm of soil shall be placed as interim cover. The quality of soil for use as interim cover shall, as a minimum, meet the criteria for Industrial/Commercial land use specified in Table A in the Ministry's "Guideline for Use at Contaminated Sites in Ontario", revised February 1997.

c. Final Cover - Final cover shall be applied progressively as areas of the landfill reach final waste elevations. The final soil cap shall consist of a minimum 600 mm thickness of impermeable compacted soil overlain by a minimum 150 mm topsoil and vegetative cover, as described in Section 2.3 in Item 8 in Schedule “A”, attached to this Certificate. Prior to placement of final cover, the Owner/Operator shall submit for the approval of the Director, a report detailing the specifications, including particle size distribution of the final cover soil which shall confirm the designed permeability of 10-5cm/sec or less, as well as the protocols for testing and acceptance for on-site and off-site final cover soils. All areas of final cover shall be graded and vegetated as soon as practically possible.

Cover on the landfill has been improved since the 2018 MECP inspection. Most sections of the landfill have adequate interim cover and solely one section is open for landfilling. However, daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA **(See Section 5.0 Action(s) Required)**. Landfill staff have previously indicated that cover material stock is clay based and forms clumps making it difficult for the site equipment to apply the required material. It is recommended that the municipality uses cover material that is more easily used in winter **(See Section 6.0 Other Inspection Findings)**.

2.6 WASTE BURNING:

Specifics:
ECA Condition 4 permits the burning of clean wood and brush. At the time of inspection, there was no burning taking place. Materials other than clean wood and brush were not observed in the burn pile at the time of inspection.

2.7 GROUNDWATER/SURFACEWATER IMPACT:

Specifics:
There was no obvious evidence of groundwater or surface water impact at this site.

The 2017 AR identifies that groundwater and surface water sampling occur twice annually, in the spring and fall. At the time of inspection, snow conditions caused only a few monitoring wells to be observed. All monitoring wells observed appeared to be in good condition with locks to control access. However, the Annual Report detailed that Well OW2 was damaged and has been filled with bentonite and fitted with a temporary cap. A report received by the Owen Sound District Office indicated that the well was removed on March 12, 2018 as required by Section 21(3) of O. Reg. 903, the well shall be properly abandoned.

According to the 2017 AR, surface water monitoring samples are obtained from an upstream and downstream station on South Pine River. Surface water monitoring results have not indicated any landfill related impacts.

The District Office has forwarded a copy of the 2017 Annual Report to the Ministry's Technical Support Section for

review. Any comments regarding groundwater or surface water impacts will be dealt with under a letter separate from this report.

2.8 LEACHATE CONTROL SYSTEM:

Specifics:

A Leachate Management Plan (the Plan) was implemented to manage the leachate generated at this site. The Plan was designed to minimize the volume of leachate impacted surface water accumulation in the trench and contains procedures for managing the impacted water.

However, during the previous 2018 MECP landfill inspection, it came to the attention of the Environmental Officer that leachate was ponding at the interceptor berm toward Pine River. A Leachate Contingency Plan is currently underway from consultants WSP as per Section 9.2 of the Design and Operation Plan **(See Section 5.0 Action(s) Required)**.

An additional site visit was conducted in conjunction with the MECP's district staff, MECP's Surface Water Specialist, municipal staff and WSP consultants on June 7, 2018. It was observed that a catch basin was located at the base of the berm and corrugated steel piping was located on the downhill, near the open face of the landfill. This pipe appeared to direct overland flow toward the stormwater collection berm. Leachate coloured runoff was observed to be flowing off the approved landfill footprint with no collection or containment structures. Since these observations took place, the corrugated steel pipe was reported by the municipality to have been covered over with both ends blocked. It no longer functions as a corrugated steel pipe and is unable to transmit runoff or leachate on the site.

WSP consultants reported that material was delivered to the landfill site on June 22, 2018, to fill in the gap in the interceptor berm. It was reported that the area where leachate was ponding and trickling off site has been levelled off and there was no sign of leachate.

Additionally, the operator has created two berm-like structures extending from the outside limits of the existing fill area that will direct any runoff from the waste across the access road to a small collection area where it can infiltrate into the ground. The berms are small enough to allow traffic to still cross over when accessing the pit. During the time of the inspection, the berms were observed and it was noted that they appear to be intercepting runoff.

In 2018, it came to the ministry's attention that an ECA (stormwater) failed to be submitted by the municipality as required by Condition 6.6 of ECA # A272601 **(See Section 5.0 Action(s) Required)**. WSP Consultants have proposed to develop a plan to accommodate a stormwater pond within the footprint of the landfill and submit an ECA application. Specific dates on workplan and timelines have not yet been submitted to the MECP.

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:

There is no methane gas collection system at this site.

Condition 6.7 of the ECA requires the Owner/Operator to ensure that all buildings and structures existing at the Site or to be built on-Site which at times are occupied by people, or contains electrical equipment, or a potential source of ignition, are situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to landfill gas.

Testing for methane gas at this site was initiated in 2002. There are four methane monitoring locations on the site and the gas probes are monitored in the winter, when the waste disposal site is under frozen conditions.

According to the AR, methane monitoring indicated no detections of methane in 2017-2018 at monitoring points GP1, GP2, GP4 and at the scale house. However, at GP3 methane was detected at 100 percent of its lower explosive limit. The shed in close proximity to GP3 has been removed from the site as per previous MECP suggestion. In response to the detection of methane at the Landfill, the Township purchased a Sensit Model HXG-2D gas detector and trained the site attendants on the operation of the instrument. When working in the vicinity of GP3 the gas detector was reported to be utilized by staff. In 2017, there were no reports of the lower explosive limit being greater than zero.

At the time of the inspection, no gas odours were noted on or off-site.

2.10 OTHER WASTES:

Specifics:

At the time of inspection, there was no evidence of wastes other than solid non-hazardous wastes being deposited in the fill area of the site.

According to the 2017 Annual Report, Huron Landfill accepted the following items:
- recyclable materials
- clean burnable wood,
- scrap metal,

- refrigeration units,
- e-waste,
- mattresses and,
- tires.

Recyclable Materials
A series of signed bins are located near the entrance for recyclable materials including paper, cardboard and plastic/metal containers. Recycling tonnages removed from the site have increased in recent years with 2017 diverting 429.82 tonnes from the landfill, as stated in the AR.

Bale Wrap
Bale wrap is no longer collected onsite Huron Landfill. The contractor, Switch Energy, now picks up the bale wrap individually and it does not enter the landfill.

Propane Cylinders
Propane cylinders were observed stored onsite. They were segregated, and the storage area was signed/labelled. Propane cylinders are stored next to a building structure, sheltered from incidental traffic accidents, in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

Tires
There were less than 5000 tire units stored at the site at the time of inspection. The tires were segregated and the signage was legible.

Refrigeration Equipment
Refrigeration equipment was segregated for the storage of refrigerant appliances. Several units were observed and were not in an upright position. Refrigerators containing Chlorofluorocarbons (CFC) should be stored separately from the drained/tagged units, to avoid damage of the un-drained units. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10. Rough handling will result in breaking of lines and loss of CFC's to the atmosphere **(See Section 5.0 Action(s) Required).**

Scrap Metal
Scrap metal is collected on-site in a separate area for recycling. Scrap metal is removed by AOR and Triple M Metal LP on a regular basis as needed.

Mattresses
Mattresses were collected onsite in a separate area as of 2015 and were shipped from the landfill on a regular basis. As previously noted in this inspection report, several mattresses were observed outside of the current working landfill area and were not covered by daily cover **(See Section 6.0 Other Inspection Findings)**.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

The following previous non-compliance issues were noted in the January 2018 inspection;

The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.
- daily cover remained a non-compliance issue during this site inspection

The Owner/Operator shall properly abandon Well OW2 as per Section 21(3) of O. Reg. 903.
- complete

On or before April 30, 2018 the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan to address the pond-like formation of leachate to the south western corner of the landfill area near to the interceptor berm and provide notification of completion to the undersigned Provincial Officer.
- a Leachate Contingency Plan is currently being worked on by consultants WSP. It has not been submitted to the MECP to this date.

In 2018, it came to the ministry's attention that a stormwater ECA was not submitted in contravention to Condition 6.6 of ECA # A272601.
- consultants WSP have been hired and they are currently going over different options for stormwater pond placement

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 ?
Yes

Specifics:
Historic waste deposited beyond the approved landfill limits.

Daily cover was not observed on the open face of the waste fill area during the inspection in contravention to Condition 3.3 of the ECA.

An ECA (stormwater) was not submitted by the municipality as required by Condition 6.6 of ECA # A272601.

A Leachate Contingency Plan must be completed as per Section 9.2 of the Design and Operation Plan.

Several refrigeration units were observed untagged and not in an upright position. Untagged refrigerators must be handled carefully, placed separately in upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10.

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?
No

Specifics:

5.0 ACTION(S) REQUIRED

1. The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA.

2. The Owner/Operator shall ensure refrigeration units are stored in segregated, in an upright position until CFCs are removed and tagged by a licensed technician as required by Section 41(1) of O. Reg. 463/10.

3. The Owner/Operator shall contact the MECP's Client Services and Permissions Branch to ensure that historic waste that was filled beyond the approved limits of the landfill can remain where it is provided it is not causing issues and is deducted from the overall approved capacity of the site, at Client Services and Permissions Branch 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L7, with a copy to the MECP Owen Sound District Office at 101-17th Street East, Owen Sound, Ontario, N4K 0A5.

4. On or before March 1, 2019 the owner shall provide a written response to the undersigned Provincial Officer detailing the actions to be taken to address the above listed Action Items.

5. On or before April 30, 2019, the Owner/Operator shall complete a Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan.

6. On or before April 30, 2019, the Owner/Operator shall submit an Application for ECA (stormwater) to the MECP as required by Condition 6.6 of ECA # A272601, made under the EPA, accompanied by all necessary supporting documentation and fees, to the Director of Client Services and Permissions Branch, 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L7, with a copy to the MECP Owen Sound District Office at 101-17th Street East, Owen Sound, Ontario, N4K 0A5.

6.0 OTHER INSPECTION FINDINGS

During the site inspection ponding water was observed in the open face of the landfill. It appeared that garbage was iced into the ponded areas on the site. Waste should not be placed in water and water should be diverted from the open face of the landfill.

Additionally, 2 large piles of mattresses were observed towards the south of the landfill. The mattresses were piled on top of the berm with some spilling over the berm. The ministry was concerned that these mattresses were place outside of the landfill area and were without daily cover as required by Condition 3.3 of the ECA.

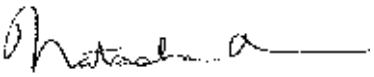
7.0 INCIDENT REPORT

Applicable
6011-B8MTVQ

8.0 ATTACHMENTS

Huron LF Jan 16 19 10.JPG; Huron LF Jan 16 19 11.JPG; Huron LF Jan 16 19 12.JPG; Huron LF Jan 16 19 13.JPG; Huron LF Jan 16 19 14.JPG; Huron LF Jan 16 19 15.JPG; Huron LF Jan 16 19 16.JPG; Huron LF Jan 16 19 1.JPG; Huron LF Jan 16 19 2.JPG; Huron LF Jan 16 19 3.JPG; Huron LF Jan 16 19 4.JPG; Huron LF Jan 16 19 5.JPG; Huron LF Jan 16 19 6.JPG; Huron LF Jan 16 19 7.JPG; Huron LF Jan 16 19 8.JPG; Huron LF Jan 16 19 9.JPG

PREPARED BY:
Environmental Officer:
Name: **Natasha Munn**
District Office: **Southwestern Region**
Date: **2019/01/28**
Signature



REVIEWED BY:
District Supervisor:
Name: **Scott Gass**
District Office: **Owen Sound District Office**
Date: **2019/01/29**

Signature:



File Storage Number: BR HK QU 610

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"

MEMO

TO: File #101-16942-00

FROM: Kaurel Tamasauskas, Environmental Technologist

SUBJECT: Methane Monitoring – March 11, 2019 – Huron Landfill

DATE: March 14, 2019

The following notes were completed after the methane monitoring event at the Huron Landfill:

→ On March 11, 2019, methane gas monitoring was completed by Kaurel Tamasauskas at the Huron Landfill. In conjunction with methane monitoring, static water level readings were obtained from all of the gas probes. Methane gas readings were taken using the Gasurveyor 3-5000 methane meter at the following locations:

Location	Methane
GP1	0.0% LEL
GP2	0.0% LEL
GP3	41.0% VOL. GAS
GP4	0.0% LEL

→ The weather was overcast with a high of -5°C.

→ Field notes are in HG 120, page 40.

Prepared by:

Kaurel Tamasauskas
Environmental Technologist
KMT/
Encl.

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1450, 1st Avenue West
Owen Sound, ON, Canada N4K 6W2

Tel.: +1 519 376-7612
Fax: +1 519 376-8008
wsp.com

MEMO

TO: File #101-16942-00 (121-60020-05)

FROM: Peter Brodzikowski, P.Eng.

SUBJECT: **Huron Landfill – Fill Beyond Approved Limit (FBAL)**

DATE: **February 21, 2019**

It was recently discovered that some waste has been landfilled outside the approved landfill limit defined by the Design and Operations Plan (D&O) prepared by Pryde Schropp McComb in January 2010. The area in question is located in the southeast corner of the waste fill area. The Ministry of the Environment, Conservation and Parks (MECP) Site Inspection Report dated January 29, 2019, requires the Township of Huron-Kinloss to assess and resolve this issue with the MECP's Client Services and Permissions Branch. This requirement constitutes Item 3 of Action(s) Required from the above noted report.

WSP has calculated that there is approximately 11,846 m^3 of waste deposited outside the approved fill limit in the above noted part of the site. This volume was determined by comparison of the existing site topography with the approved top of waste contours and assumed waste bottom outside the approved fill area. This overfill is presented graphically on attached **Figure 1**. This figure outlines the following:

- the existing site topography as of December 2018;
- approved top of waste contours as per D&O; and
- depth of waste deposit outside the approved fill limit is delineated by 0.5 m interval contours (red). These contours represent FBAL.

It is proposed to leave all material deposited outside the approved fill limit in place "as is" since there is no significant adverse effect resulting from this situation. Localized small berms/piles located within and near the FBAL area shall be flattened and spread out evenly nearby to eliminate the existing grading irregularities. Ultimately, the FBAL area shall be final covered in the same way as the remaining part of the site in accordance with the D&O requirements.

The approved top of waste contours for the entire site are shown on **Figure 2**.

In order to compensate for the FBAL we have adjusted (lowered) the approved final top of waste contours within the central part of the site. The revised final top of waste contours are presented on **Figure 3**. Top of waste contours in the central, top part of the site, sloping at approximately 5%, were lowered by 0.40 m. Volume reduction resulting from such a change is calculated as follows:

$$201 \text{ m} \times 144 \text{ m} \times 0.4 \text{ m} - 11{,}578 \text{ m}^3$$

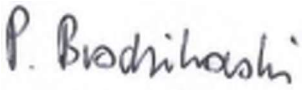
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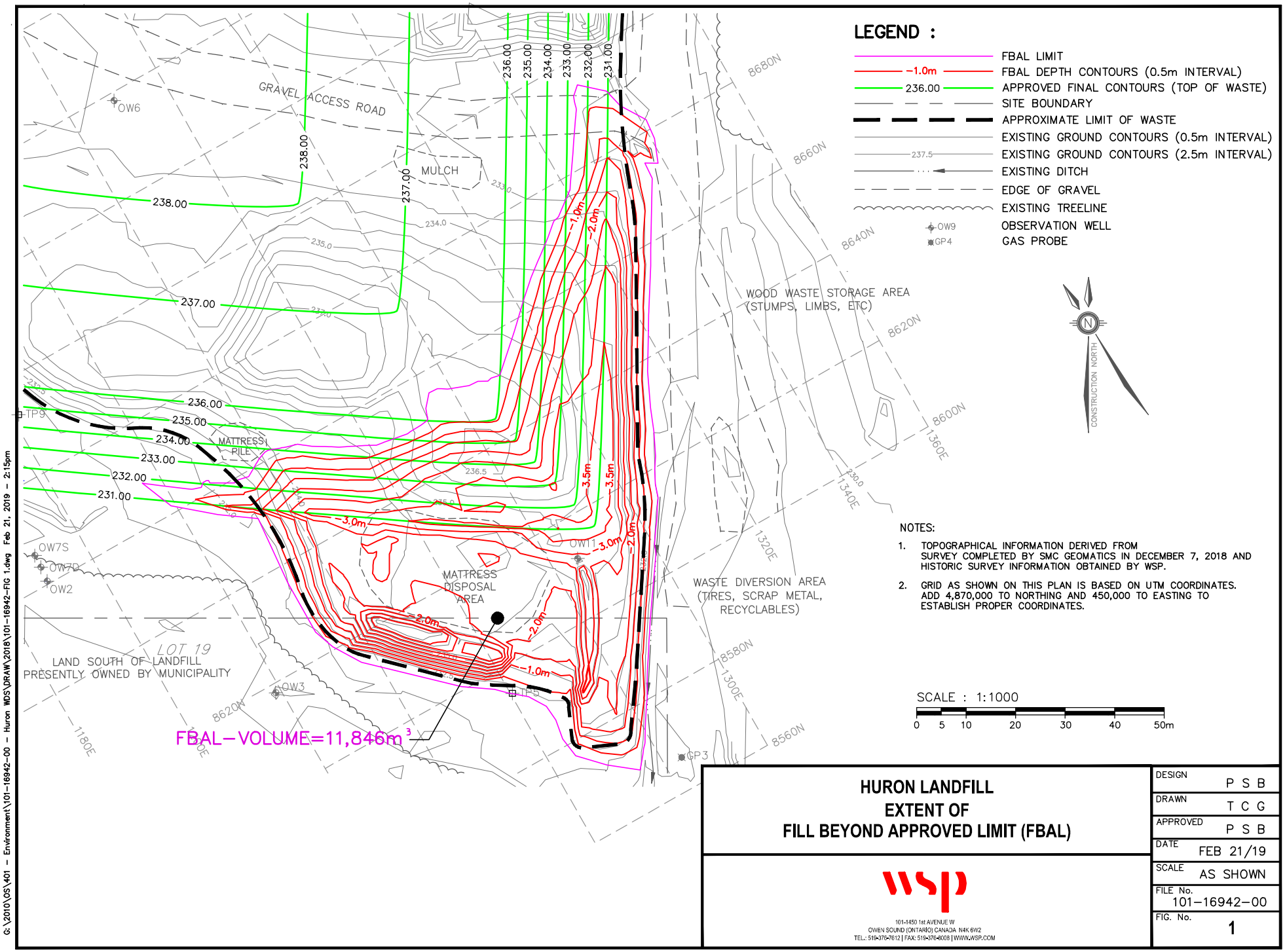
Accounting for calculations accuracy, this volume is almost the same as the overfill volume (11,846 m^3) within the FBAL area. The proposed change in the final top of waste contours is adequate to compensate for the overfill identified within the FBAL area.

In order to avoid similar problems (waste overfill), the Township will improve their grade control for landfilling operations. This is critical when landfilling takes place near exterior side slopes and close to final top grades. Grade stakes shall be planted regularly to guide the operator when placing waste in such critical areas.

Prepared by:



Peter Brodzikowski, P.Eng.
Senior Environmental Engineer
PSB/dlw
Encl.



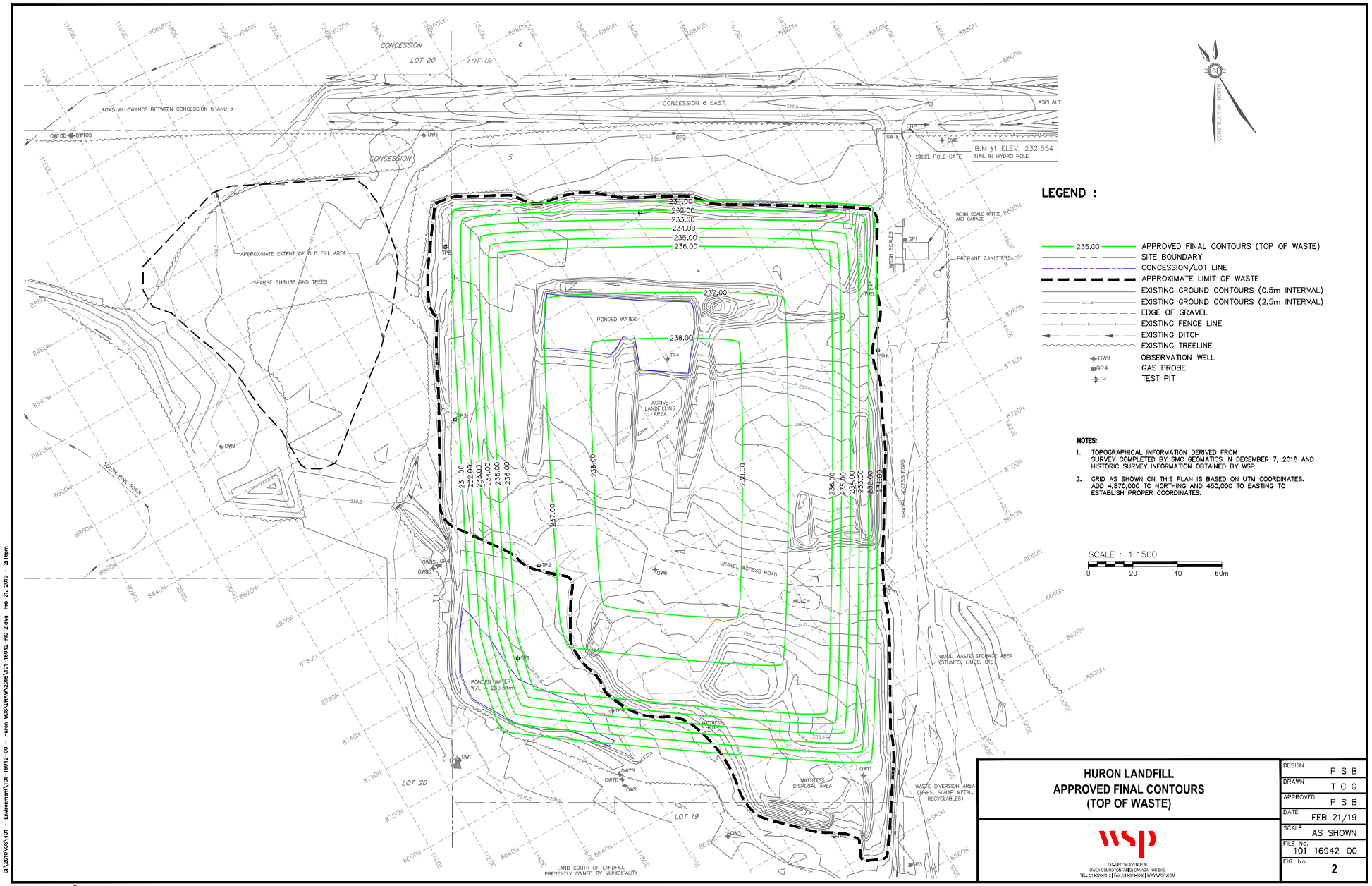
HURON LANDFILL
EXTENT OF
FILL BEYOND APPROVED LIMIT (FBAL)

DESIGN	P S B
DRAWN	T C G
APPROVED	P S B
DATE	FEB 21/19
SCALE	AS SHOWN
FILE No.	101-16942-00
FIG. No.	1

wsp
101-1450 1st AVENUE W
OWEN SOUND (ONTARIO) CANADA N4K 6W2
TEL.: 519-376-7612 | FAX: 519-376-8005 | WWW.WSP.COM

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G:\2010\OS\401 - Environment\101-16942-00 - Huron WDS\DRAW\2018\101-16942-FIG 1.dwg Feb 21, 2019 - 2:15pm



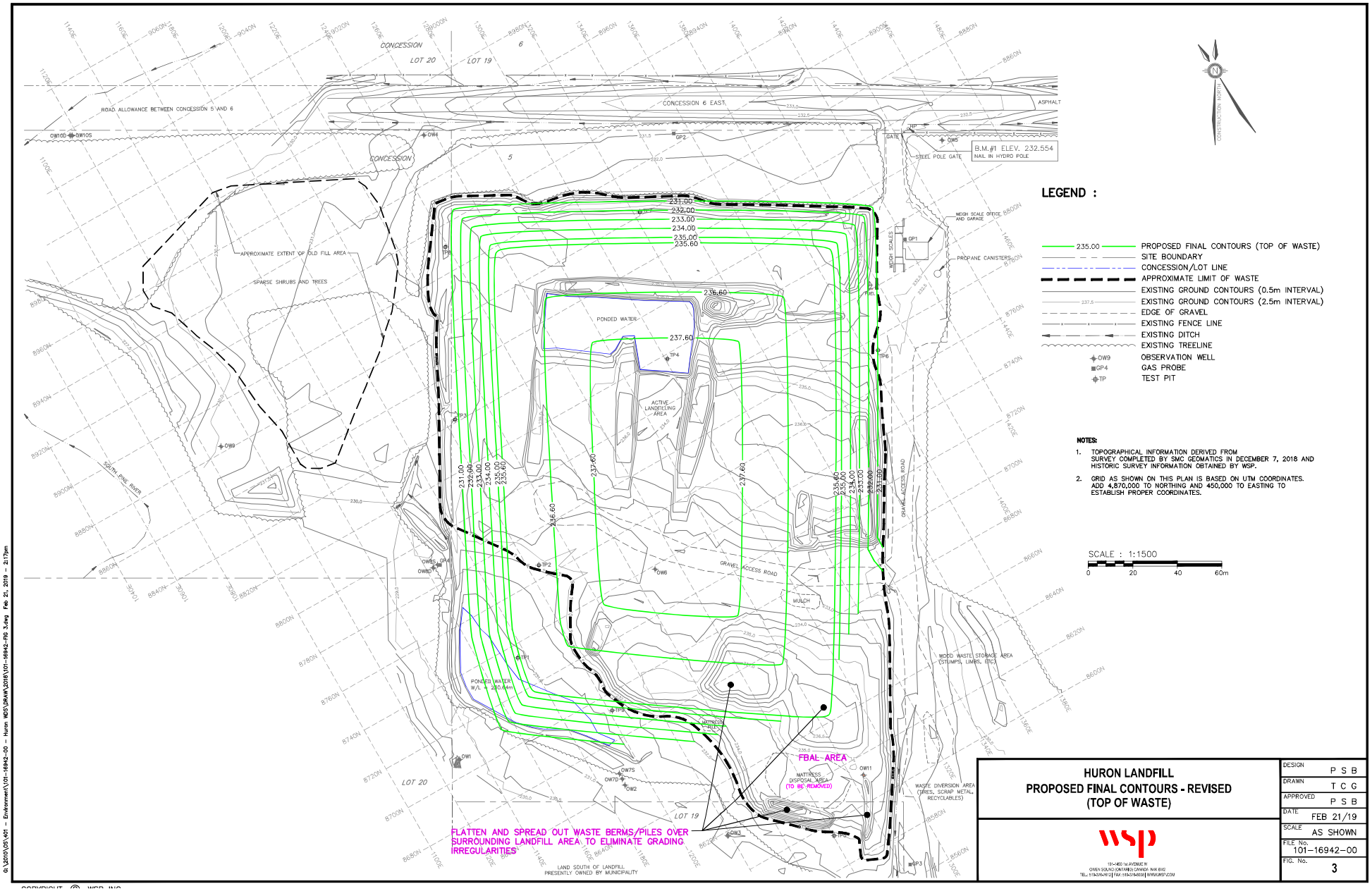
HURON LANDFILL
APPROVED FINAL CONTOURS (TOP OF WASTE)

DESIGN	P S B
DRAWN	T C G
APPROVED	P S B
DATE	FEB 21/19
SCALE	AS SHOWN
FILE No.	101-16942-00
FIG. No.	2

wsp
101-1450 1st AVENUE W
OWEN SOUND, ONTARIO, CANADA N4K 6W3
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G:\2019\GIS\101 - Environment\101-16942-00 - Huron WDS\DRAW\2018\101-16942-FIG 2.dwg Feb 21, 2019 - 2:16pm



LEGEND :

- 235.00 — PROPOSED FINAL CONTOURS (TOP OF WASTE)
- SITE BOUNDARY
- CONCESSION/LOT LINE
- APPROXIMATE LIMIT OF WASTE
- EXISTING GROUND CONTOURS (0.5m INTERVAL)
- 237.5 — EXISTING GROUND CONTOURS (2.5m INTERVAL)
- EDGE OF GRAVEL
- EXISTING FENCE LINE
- EXISTING DITCH
- EXISTING TREELINE
- OW9 — OBSERVATION WELL
- GP4 — GAS PROBE
- TP — TEST PIT

NOTES:

1. TOPOGRAPHICAL INFORMATION DERIVED FROM SURVEY COMPLETED BY SMC GEOMATICS IN DECEMBER 7, 2018 AND HISTORIC SURVEY INFORMATION OBTAINED BY WSP.
2. GRID AS SHOWN ON THIS PLAN IS BASED ON UTM COORDINATES. ADD 4,870,000 TO NORTHING AND 450,000 TO EASTING TO ESTABLISH PROPER COORDINATES.

SCALE : 1:1500

0 20 40 60m

HURON LANDFILL
PROPOSED FINAL CONTOURS - REVISED (TOP OF WASTE)

DESIGN	P S B
DRAWN	T C G
APPROVED	P S B
DATE	FEB 21/19
SCALE	AS SHOWN
FILE No.	101-16942-00
FIG. No.	3

wsp
101-1450 1st AVENUE W
OWEN SOUND, ONTARIO | CANADA N4K 6W2
TEL.: 519-376-6911 | FAX: 519-376-8659 | WWW.WSP.COM

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G:\2018\GIS\101 - Environment\101-16942-00 - Huron WDS\DRAW\2018\101-16942-FIG 3.dwg Feb 21, 2019 - 2:17pm

Ontario

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

Compliance Summary Inspection Report

Client:	The Corporation of the Township of Huron-Kinloss Mailing Address: 21 Queen St, Huron-Kinloss, Ontario, Canada, N0G 2R0 Physical Address: 21 Queen St, Huron-Kinloss, Township, County of Bruce, Ontario, Canada, N0G 2R0 Telephone: (519)395-3735, Extension: 130, FAX: (519)395-4107, email: jyungblut@huronkinloss.com Client #: 4545-4MERDZ, Client Type: Municipal Government, NAICS: 22131		
Inspection Site Address:	Huron Landfill Site Address: Lot: 19, 20, Concession: 5, Concession Road 6, Geographic Township: BRUCE, Huron-Kinloss, Township, County of Bruce, N0G 2R0 District Office: Owen Sound GeoReference: Map Datum: NAD27, Zone: 17, Accuracy Estimate: 1-10 metres eg. Good Quality GPS, Method: GPS, UTM Easting: 451457, UTM Northing: 4878824, UTM Location Description: Entrance gate., LIO GeoReference: Zone: , UTM Easting: , UTM Northing: , Latitude: 44.2708, Longitude: -81.433 Site #: 3678-5Q8L7L		
Contact Name:	John Yungblut	**Title:**	Director of Public Works
Contact Telephone:	519-395-3735 **ext**	**Contact Fax:**	
Last Inspection Date:	2019/01/16		
Inspection Start Date:	2020/08/26	**Inspection Finish Date:**	2020/08/26
Region:	Southwestern		

1.0 INTRODUCTION

The Huron Landfill Site waste disposal facility was inspected as part of the Ministry of the Environment, Conservation and Parks (MECP) 2020/2021 Regional Landfill Project. The purpose of this inspection was to assess the Huron Landfill for leachate generation, leachate controls and run-off conditions.

This inspection included an unannounced site visit conducted on August 26, 2020, to inspect stormwater and leachate management at the site and operations that may impact leachate quantity and quality. At the time of the inspection the landfill site was open and the landfill attendant was available at the site.

A previous MECP inspection was conducted at this site on January 16, 2019. The landfill is owned and operated by the Township of Huron-Kinloss and services the residential and industrial, commercial and institutional sectors located within the service area.

The landfill is located on Part Lots 19 and 20, Concession 5, in the former Township of Huron in the amalgamated Township of Huron-Kinloss, at 2087 Concession 6 East Road; southwest of the community of Ripley.

2.0 INSPECTION OBSERVATIONS

During the site inspection on August 26, 2020, there was light rain. It had been raining for about an hour before the site

visit. No leachate or stormwater was observed flowing off the site during the inspection. A ditch along the landfill access road that flows to the south had signs of significant run-off based on the eroded depth of the ditch at the south end. A very deep eroded ditch was also observed in the south-west corner of the landfill. No stormwater or leachate flow was observed at the time of the inspection at either of these locations. The landfill operator also stated that he has not observed any leachate run-off from the site.

There was a large active working face of exposed waste. In addition, there was exposed waste along the sides of the access road to the working face. Waste was poorly covered in some closed or inactive landfill areas.



Photo showing exposed waste along active area access road and large active face of landfill.

Leachate ponding was evident near exposed waste in an apparent inactive fill area.



Photo showing ponded water and leachate in waste .

There was a lack of vegetation on berms and inactive landfill areas. Litter was observed along the base of the slope to the north.



Photo showing litter.

A large number of turkey vultures and some seagulls were observed during the site visit. A large ponded area was also observed by the wood waste and metals area in the south-eastern portion of the landfill site.

Surface water and leachate flows eastward along the south side of the fill area access road. There is a tank that collects leachate near the south-west corner of the fill area access road and landfill site access road. According to the landfill operator, this tank is regularly pumped out.

2.1 AREA OF FOCUS

This inspection is being conducted under the following Ministry of Environment and Climate Change program(s) and/or activities:

Waste – Solid Non-Hazardous

Specifics:
The purpose of this inspection was to focus on stormwater and leachate management at the site and operations that may impact leachate quantity and quality.

2.2 COMPLIANCE OVERVIEW

Approval(s) and/or permit(s)
Provisional Certificate of Approval # A272601 was issued on July 31, 1989, and replaced all terms and conditions in any prior Certificate # A272601.

Environmental Compliance Approval (ECA) A272601 was issued October 15, 1991 and replaced all terms and

conditions in any prior Certificate # A272601.

-ECA A272601, issued on October 15, 1991 - required registration of the ECA on the title; submission of an annual report to the MOE, monitoring of groundwater and surface water quality and imposed terms/conditions of onsite burning.

- A272601 Notice No. 1, issued on August 14, 2007 - ECA was amended to include changes to operational plans to clarify theoretical capacity and to require a new Design and Operations Plan within one year of issuance

- A272601 Notice No. 2, issued on July 6, 2010 - ECA was amended to change the landfilling operation at the Landfill from trench method to area method, for disposal of domestic, commercial and solid non-hazardous industrial wastes and to approve the establishment and operation of waste segregation/recycling centre and WEEE program at the landfill, for acceptance, temporary storage and transfer of recyclable waste.

- A272601 Notice No. 3, issued on July 9, 2010 - ECA was amended to approve expansion of the service area of the landfill site to include the Village of Lucknow.

- A272601 Notice No. 4, issued on March 2, 2012 - ECA was amended to approve operation of a Waste Segregation/Recycling Centre and WEEE program at the Landfill, for the acceptance, temporary storage, and transfer of recyclable waste.

- Amended Environmental Compliance Approval # A272601 was issued on April 16, 2020, and revokes Approval No. A272601 issued on July 31, 1989. This amendment was to address Fill Beyond Approved Limit (FBAL).

Specifics:

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

Action was required as a result of a past inspection or incident (related)

Specifics:
The following previous non-compliance issues were noted in the January 2019 inspection;

Daily cover was a non-compliance issue during both the 2019 and 2018 site inspections. The Owner/Operator shall ensure daily cover is maintained on the open face of the waste fill area as required by Condition 3.3 of the ECA. - **See below.**

On or before April 30, 2019, the Owner/Operator shall implement the Leachate Contingency Plan as per Section 9.2 of the Design and Operation Plan to address the pond-like formation of leachate to the south western corner of the landfill area near to the interceptor berm and provide notification of completion to the undersigned Provincial Officer. The consultant responded that the Leachate Contingency Plan outlined in Section 9.2 of the Design and Operation Plan is applicable to exceedance of groundwater trigger levels. The environmental monitoring program has not detected any excessive groundwater impacts and as such, there is no need to implement any identified leachate control contingency measure in the form of an interceptor trench, toe drain or purge wells. However, surface water impacts which were observed at the site will be addressed through various operational procedures and presented in the Stormwater Management Plan Report. - **Complete**

In 2018, it came to the ministry's attention that a stormwater ECA was not submitted in contravention to Condition 6.6 of ECA # A272601. An ECA application was received by the MECP on August 9, 2019, for a stormwater management facility as per condition 6.6 of Environmental Compliance Approval No. A272601 (MECP Reference # 2988-BEVLY3). - **Complete**

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 ?

Yes

Specifics:

During the inspection it was observed that the working face of the landfill did not appear to be covered in accordance with Condition 3.3 of the ECA. The entire working face waste did not appear to be covered regularly and waste is exposed in other areas of the site. Numerous scavenging birds (including gulls and numerous turkey vultures) were present at the site and debris and litter observed outside of the active area of the landfill.

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?

No

Specifics:

5.0 ACTION(S) REQUIRED

1. By October 26, 2020, cover all exposed waste outside the active face and ensure daily cover as described in condition 3.3 of ECA # A272601
2. By October 26, 2020, collect litter from around the site and deposit in the active fill area.
3. By November 6, 2020, submit a written report to the Ministry, Owen Sound District Office, to the attention of the undersigned, that outlines the details of the actions taken to complete items 1 and 2.

6.0 OTHER INSPECTION FINDINGS

Specifics:

Every effort should be made to divert water away from the open face of the landfill. It appeared that the active, or working, face was large. Waste should be disposed of in a manner that minimizes the area of exposed waste and waste is to be covered at the end of each working day.

At the time of the inspection visit, waste coverage appeared to be inefficient, incomplete, and was not acceptable. The landfill was open at the time of the inspection and so the working face was not covered, however, it appeared the working face may not have been covered daily based on the amount of exposed waste. There is the potential for increased vermin and vector control issues with the exposed waste. In addition, more exposed waste would likely lead

to increase leachate generation. As noted in section 3.0 above, the issue of inadequate waste coverage was also raised at the time of the last inspection.

Efforts to control and collect windblown and scattered debris is an ongoing need. The consultant's recommendation in the Design and Operations Manual to install fencing to prevent wind-blown litter should be considered. The daily operator's log should include details of any litter control efforts (which may be scrutinized in a future inspection).

7.0 INCIDENT REPORT

Applicable
8534-BTGGEL

8.0 ATTACHMENTS

PREPARED BY:
Environmental Officer:
Name: **None Assigned**
District Office:
Date:
Signature

REVIEWED BY:
District Supervisor:
Name: **Ian Mitchell**
District Office: **Owen Sound District Office, P.Eng.**
Date: **2020/09/17**

Signature:



File Storage Number: SI BR HK C5 610

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.

The Corporation of the Township of Huron-Kinloss

21 Queen Street
P.O. Box 130
Ripley, Ontario
N0G 2R0

519-395-3735
Fax: 519-395-4107
info@huronkinloss.com
www.huronkinloss.com

File: 300 Huron Landfill

November 2, 2020

Mr. Ian Mitchell
Ministry of Environment, Conservation and Parks
101-17th Street East
3rd Floor
Owen Sound, ON
N4K 0A5

Dear Mr. Mitchell,

This letter is in response to the action items described in the Solid Non-Hazardous Waste Disposal Site Inspection Report, dated Sept. 17, 2020 in reference to the Huron Landfill Site. Our response is in the same order as presented in Section 5.0 Action(s) Required, of the MECP Report.

ITEM 1

"By October 26, 2020, cover all exposed waste outside the active face and ensure daily cover as described in condition 3.3 of ECA #A272601"

As shown in the photos below, the exposed waste has now been covered.



The Corporation of the Township of Huron-Kinloss

21 Queen Street
P.O. Box 130
Ripley, Ontario
N0G 2R0

519-395-3735
Fax: 519-395-4107
info@huronkinloss.com
www.huronkinloss.com

ITEM 2

"By October 26, 2020, collect litter from around the site and deposit in the active fill area."

As shown in the photo below, the litter around the site has been collected.



ITEM 3

"By November 6, 2020, submit a written report to the Ministry, Owen Sounds District Office, to the attention of the undersigned, that outlines the details of the actions taken to complete items 1 and 2."

This letter is intended to satisfy Action Item 3.

The Corporation of the Township of Huron-Kinloss

21 Queen Street
P.O. Box 130
Ripley, Ontario
N0G 2R0

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Fax: 519-395-4107
info@huronkinloss.com
www.huronkinloss.com

Yours truly,



John R. Yungblut, C.E.T.
Director of Public Works
Township of Huron-Kinloss
519-395-3735 ext. 130
jyungblut@huronkinloss.com

Appendix C GEI Landfill Inspection Reports

Site Name: Huron
File No: 2402747
Date: 2024/05/06
Inspector: JW/PQ/BTD

GAMSBY AND MANNEROW LIMITED
LANDFILL INSPECTION REPORT

		YES	NO	COMMENTS
1.	Site Open:	☒	☐	
2.	Access Control:	☒	☐	
3.	Supervisor On-Site:	☒	☐	
4.	Signs Posted:			
	Entrance	☒	☐	
	Waste Disposal Area	☒	☐	
	Tires	☒	☐	
	Brush	☒	☐	
	Appliances	☒	☐	
	Metals	☒	☐	
	Other	☐	☐	
5.	Litter:			
	On-Site	☐	☒	
	Off-Site	☒	☒	
6.	Rodent/Vector Evidence:	☐	☒	
7.	Scavenging:	☐	☒	
8.	Monitoring Wells			

NOTES:

		ACCEPTABLE	NOT ACCEPTABLE	COMMENTS
9.	Access Road Condition:	☒	☐	
10.	Screening from Public View:	☒	☐	
11.	Working Face:			
	Compaction	☒	☐	
	Daily Cover	☒	☐	
12.	Segregation of Wastes:	☑	☐	
13.	Finished Areas:			
	Final Cover	☒	☐	
	Seeding	☒	☐	
14.	Burning:			
	Burn Pile Size	☐	☐	
	Wood Wastes Only	☐	☐	
	Ashes Removed	☐	☐	
15.	Leachate Management:	☒	☐	
16.	Recycleables:			
	Tires	☒	☐	
	Appliances	☒	☐	
	Metals	☒	☐	
	Blue Box	☒	☐	
	Other	☒	☐	

NOTES: _____

Site Name: Huron
File No: 2402747
Date: 2024/11/27
Inspector: BTD/GK/PQ.

GAMSBY AND MANNEROW LIMITED
LANDFILL INSPECTION REPORT

		YES	NO	COMMENTS
1.	Site Open:	☒	☐	
2.	Access Control:	☒	☐	
3.	Supervisor On-Site:	☒	☐	
4.	Signs Posted:			
	Entrance	☒	☐	
	Waste Disposal Area	☒	☐	
	Tires	☒	☐	
	Brush	☒	☐	
	Appliances	☒	☐	
	Metals	☒	☐	
	Other	☒	☐	
5.	Litter:			
	On-Site	☐	☒	
	Off-Site	☒	☒	
6.	Rodent/Vector Evidence:	☐	☒	
7.	Scavenging:	☐	☒	
8.	Monitoring Wells			

NOTES:

		ACCEPTABLE	NOT ACCEPTABLE	COMMENTS
9.	Access Road Condition:	☒	☐	
10.	Screening from Public View:	☒	☐	
11.	Working Face:			
	Compaction	☒	☐	
	Daily Cover	☒	☐	
12.	Segregation of Wastes:	☒	☐	
13.	Finished Areas:			
	Final Cover	☒	☐	
	Seeding	☒	☐	
14.	Burning:			
	Burn Pile Size	☐	☐	
	Wood Wastes Only	☐	☐	
	Ashes Removed	☐	☐	
15.	Leachate Management:	☒	☐	
16.	Recycleables:			
	Tires	☒	☐	
	Appliances	☒	☐	
	Metals	☒	☐	
	Blue Box	☒	☐	
	Other	☒	☐	

NOTES: _____

Appendix D Monitoring Well Installation Details

TABLE 2
SUMMARY OF MONITORING WELL DETAILS

Well ID	Year Installed	Well Condition\Status	Stick Up Elevation (masl)	ELEVATION				WELL SCREEN DETAILS					DEPTH TO BEDROCK		Depth Interval of Each Unit				Description of Unit Encountered
				Ground	ToPVC	BH Btm		Top		Bottom		Diameter			From	To	From	To	
				masl	masl	mbgs	masl	mbgs	masl	mbgs	masl	inches	mbgs	masl	mbgs		masl		
MONITORING LOCATIONS																			
OW1	1989	Monitored	0.70	229.43	230.13	6.1	223.33	4.49	224.94	5.99	223.44	-	Overburden Well		0.00	0.20	229.43	229.23	Topsoil
															0.20	0.91	229.23	228.52	Brown, dry silty sand
															0.91	1.07	228.52	228.36	Brown, dry gravel and sand with traces of silt
															1.07	1.83	228.36	227.60	Brown, dry sandy silt
															1.83	2.29	227.60	227.14	Brown, moist sandy silt with some clay
															2.29	3.35	227.14	226.08	Grey, moist silt with some clay and traces of sand
															3.35	6.10	226.08	223.33	Grey, dense silt with some sand and clay with some stones
OW2	*1989*	*Decommissioned*	-	-	-	-	-	-	-	-	-	-	*Overburden Well*		*0.00*	*0.91*	-	-	*Brown, dry silty sand*
															0.9	*1.52*	-	-	*Brown, dry silt with some clay and sand*
OW3	1989	Monitored	1.76	231.87	233.63	6.1	225.77	4.29	227.58	5.79	226.08	-	Overburden Well		0.00	1.37	231.87	230.50	Brown, dry fine sand
															1.37	1.83	230.50	230.04	Grey silt with some sand and clay
															1.83	3.66	230.04	228.21	Grey, dense silt with some clay and traces of sand
															3.66	6.10	228.21	225.77	Grey, dense silt with some sand and clay
OW4	1989	Monitored	0.80	230.08	230.88	4.27	225.81	2.52	0.0	4.02	226.06	-	Overburden Well		0.00	0.13	230.08	229.95	Topsoil
															0.13	1.07	229.95	229.01	Brown, dry gravel and sand with traces of silt
															1.07	1.52	229.01	228.56	Brown, dry fine sand with some silt and traces of clay
															1.52	4.27	228.56	225.81	Grey, dry, dense silt with some sand and clay
OW5	1989	Monitored	1.07	231.81	232.88	6.1	225.71	3.22	228.59	4.72	227.09	-	Overburden Well		0.00	0.20	231.81	231.61	Topsoil
															0.20	0.61	231.61	231.20	Brown, dry fine sand with some silt
															0.61	3.66	231.20	228.15	Grey, dense silt with some sand and clay with traces of stones
															3.66	6.10	228.15	225.71	Grey, dense silt with some sand and clay
OW6	1997	Monitored	2.36	232.88	235.24	9.76	223.12	7.67	225.21	9.17	223.71	2	Overburden Well		0.00	0.61	232.88	232.27	Fill - silt, sand and clay, brown, dense, damp, no apparent colour
															0.61	8.23	232.27	224.65	Fill - garbage, grey, wet to saturated, strong putrid odour
															8.23	9.76	224.65	223.12	Silt - some sand and clay, grey, dense, cohesive, slight putrid odour
OW7S	1997	Monitored	0.93	230.98	231.91	9.14	221.84	7.39	223.59	9.14	221.84	2	Overburden Well		0.00	0.30	230.98	230.68	Topsoil - organics, silt dark brown, dense, dry, no apparent odour
															0.30	9.14	230.68	221.84	Silt - trace of clay, occasional coarse grained sand, brown, dense, damp, no apparent odour
OW7D	1997	Monitored	0.3	230.92	231.22	13.7	217.22	12.1	218.79	13.7	217.22	2	Overburden Well		0.00	0.30	230.92	230.62	Sand (topsoil), fine grained sand, little silt, poorly graded, black, dry
															0.30	11.27	230.62	219.65	Sand, fine grained sand, little to trace silt, poorly graded, brown, moist
															11.27	12.03	219.65	218.89	Clay, clay and silt lense, brown, moist
															12.03	13.70	218.89	217.22	Sand, coarse to medium grained sand, trace silt, moderately graded, gray, saturated, occasional pebble/stone
OW8S	1997	Monitored	0.61	230.08	230.69	8.8	221.28	5.3	224.8	8.8	221.28	2	Overburden Well		0.00	0.20	230.08	229.88	Topsoil - organics, silt, dark brown, compact, dry, no apparent odour
															0.20	6.40	229.88	223.68	Silt to silty clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour
															6.40	7.92	223.68	222.16	Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour
															7.92	8.50	222.16	221.58	Silt and clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour
OW8D	1997	Monitored	0.6	230.11	230.71	13.71	216.4	12.0	218.11	13.71	216.4	2	Overburden Well		0.00	0.20	230.11	229.91	Topsoil - organics, silt, dark brown, compact, dry, no apparent odour
															0.20	6.40	229.91	223.51	Silt to silt clay - scattered sand and gravel, fine to coarse grained, light brown, dense, dry, no apparent odour
															6.40	7.92	223.51	222.19	Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent odour
															7.92	11.40	222.19	218.71	Silt and clay - scattered sand and gravel, brown, mottled grey, moist to wet, no apparent odour
															11.40	13.71	218.71	216.40	Silt - trace of clay, scattered sand and gravel, brown, mottled grey, dense, damp to moist, no apparent oour
OW9	1997	Monitored	0.84	230.06	230.9	18.28	211.78	15.0	215.06	18.28	211.78	2	Overburden Well		0.00	0.30	230.06	229.76	Fill - topsoil, organics, dark brown, dry, dense, no apparent colour
															0.30	1.52	229.76	228.54	Fill - silt and small amount of debris, porcelain plate, wood, ashes, dry, brown, no apparent odour
															1.52	17.06	228.54	213.00	Silt - some clay, occasional sand and gravel, fine grained, cohesive, dense, damp to moist, no apparent odour
															17.06	18.28	213.00	211.78	Clayey silt - occasional sand and gravel sizes, light brown, mottled gray, saturated, compact to dense, no apparent odour
OW10S	2003	Monitored	0.93	224.55	225.48	5.64	218.91	2.6	221.95	5.64	218.9	2	Overburden Well		0.00	0.05	224.55	224.50	Topsoil - black, organics and moist
															0.05	3.05	224.05	221.50	Clay - brown, dense, with some gravel and sand & dry
															3.05	4.57	221.50	219.98	Clay - grey, dense, with soeme gravel and sand, moist
															4.57	5.64	219.98	218.91	Clay - grey, dense, with some gravel and sand, wet
OW10D	2003	Monitored	0.72	224.5	225.22	13.41	211.09	11.9	212.6	13.41	211.1	2	Overburden Well		0.00	0.05	224.50	224.45	Topsoil - black, organics , moist
															0.05	3.05	224.45	221.45	Clay - brown, dense, with some gravel and sand & dry
															3.05	4.57	221.45	219.93	Clay - grey, dense, with some gravel and sand, moist
															4.57	7.92	219.93	216.58	Clay - grey, dense, with some gravel and sand, wet
															7.92	10.97	216.58	213.53	Clay - grey, dense, with some gravel and sand, dry
															10.97	11.78	213.53	212.72	Clay - grey, dense, with some gravel and sand, moist
															11.78	13.41	212.72	211.09	Gravel & Sand - some some clay and silt, sample is saturated
OW11	2003	Monitored	3.28	234.58	237.86	5.79	228.79	3.8	230.78	5.79	228.8	2	Overburden Well		0.00	1.52	234.58	233.06	Clay fill - dense, brown, dry
															1.52	4.72	233.06	229.86	Waste fill - black, strong odour, plastic in cuttings, wet
															4.72	5.79	229.86	228.79	Clay - native, grey, with some fine gravel and sand, dense, wet
GP1	2006	Monitored	-	-	-	2.45	-	0.5	-	2.0	-	1	Overburden Well		0.00	0.40	-	-	Light brown gravelly fine to medium sand; massive, compact, moist
															0.40	1.10	-	-	Medium grey silt, some clay, trace sand, trace gravel, weathered to 0.7 m, stiff, moist
															1.10	1.20	-	-	Black sand, partly organic, moist
															1.20	1.50	-	-	Medium brown fine sand, massive, loose, saturated
															1.50	1.80	-	-	Medium grey fine sand, some silt, massive, compact, saturated
															1.80	2.40	-	-	Medium grey silt, some clay, occasional 2 to 5 cm thick seams of silty fine sand, stiff, saturated
															2.40	2.45	-	-	Medium grey silt, some clay, trace sand, trace gravel, very still, moist
GP2	2006	Monitored	-	-	-	2.45	-	0.6	-	2.1	-	1	Overburden Well		0.00	0.20	-	-	Dark brown silt, some sand, partly organic, loost, moist (topsoil)
															0.20	0.40	-	-	Light red-brown fine sand, trace silt, loose, moist
															0.40	0.70	-	-	Light grey-brown silt, some clay, trace fine sand, red iron staining, weathered, very stiff, moist
															0.70	0.95	-	-	Light grey-brown silt, some very fine sand, non-plastic, red iron staining, saturated seams
															0.95	1.20	-	-	Light grey-brown silt, trace clay, trace sand, trace gravel , very stiff, wet
															1.20	1.30	-	-	Medium red-brown silty fine sand, loose, moist
															1.30	2.45	-	-	Medium grey-brown clayey silt, trace sand, trace gravel, very stiff, moist
GP3	2006	Monitored	-	-	-	2.45	-	0.9	-	2.4	-	1	Overburden Well		0.00	0.15	-	-	Light brown silty fine sand, some gravel, trace organic matter, loose, dry
															0.15	0.35	-	-	Medium brown silt, some clay, some sand, some gravel, wood fragments, stiff, moist (fill)
															0.35	0.45	-	-	Light brown silty fine sand, layered with layers of dark brown partly organic silt, moist (fill)
															0.45	1.00	-	-	Medium grey-brown silt, some clay, some sand, some gravel, weathered to 0.68m, very stiff, moist
															1.00	1.35	-	-	Dark brown to black silt, some clay, some sand, some gravel, sandy seams, stiff, moist (fill)
															1.35	1.55	-	-	Dark brown to medium grey-brown silty sand, some gravel, loose, saturated
															1.55	2.45	-	-	Medium grey-brown silt, some clay, some sand, some gravel, grading to medium brown then medium red-brown, firm becomining very stiff below 2.0m, moist, wet becoming moist below 2.0m.
GP4	2006	Monitored	-	-	-	2.45	-	0.9	-	2.4	-	1	Overburden Well		0.00	0.35	-	-	Medium brown to red-brown silty fine sand, some organic matter, layered, loose, moist
															0.35	0.65	-	-	Light red-brown sandy silt, layered, firm, wet
															0.65	1.20	-	-	Light red-brown silt, some clay, trace fine sand, weathered to 0.75m, grey discolouration along fractures, firm, moist
															1.20	1.80	-	-	Medium brown silt, trace clay, trace sand, trace gravel, layered wit saturated fine sand seams, firm, moist
															1.80	2.45	-	-	Medium brown clayey silt, trace sand, trace gravel, very stiff, moist

Note - Information presented within this table has been obtained from Borehole logs prepared by others (WSP Annual Reports) and Table 4-1 in WSP 2020 AMR.
- HSA = Hollow Stem Auger

Appendix E Historic Summary of Water Level Elevations

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	Nov-89	Nov-90	May-91	Sep-91	May-92	Oct-92	May-93
Monitoring Location			Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID									
OW1	50.24	--	45.02	48.46	48.24	47.03	48.20	48.37	48.09
OW3	51.76	--	45.13	50.08	49.69	47.50	49.77	49.72	49.63
OW4	51.60	--	--	50.38	49.74	48.30	49.83	49.69	49.65
OW5	52.12	--	45.82	51.21	50.99	49.61	50.92	50.12	51.00
OW6	51.95	*53.47*	--	--	--	--	--	--	--
OW7S	50.77	--	--	--	--	--	--	--	--
OW7D	50.81	--	--	--	--	--	--	--	--
OW8S	50.21	--	--	--	--	--	--	--	--
OW8D	50.40	--	--	--	--	--	--	--	--
OW9	51.73	--	--	--	--	--	--	--	--
OW10S	44.76	--	--	--	--	--	--	--	--
OW10D	44.50	--	--	--	--	--	--	--	--
OW11	52.61	*55.06*	--	--	--	--	--	--	--

Notes:

1. Water levels are in meters (compared to generated site datum); mbTOC = meters below top of casing.
2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly
3. NI = Not Installed; NM = Not monitored.
4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	Sep-93	May-94	Oct-94	May-95	Sep-95	May-96	Sep-96
Monitoring Location			Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID									
OW1	50.24	--	48.37	48.67	48.11	48.24	47.35	48.44	47.26
OW3	51.76	--	49.52	50.13	49.62	49.96	48.85	49.91	48.41
OW4	51.60	--	49.54	50.27	49.57	49.77	48.84	50.08	48.67
OW5	52.12	--	51.46	51.15	50.97	50.95	50.21	51.10	51.11
OW6	51.95	*53.47*	--	--	--	--	--	--	--
OW7S	50.77	--	--	--	--	--	--	--	--
OW7D	50.81	--	--	--	--	--	--	--	--
OW8S	50.21	--	--	--	--	--	--	--	--
OW8D	50.40	--	--	--	--	--	--	--	--
OW9	51.73	--	--	--	--	--	--	--	--
OW10S	44.76	--	--	--	--	--	--	--	--
OW10D	44.50	--	--	--	--	--	--	--	--
OW11	52.61	*55.06*	--	--	--	--	--	--	--

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	May-97	Sep-97	May-98	Sep-98	May-99	Sep-99	May-00
Monitoring Location			Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID									
OW1	50.24	--	48.28	47.98	48.24	46.88	48.21	46.75	48.32
OW3	51.76	--	49.96	48.84	49.76	47.73	49.69	47.82	49.76
OW4	51.60	--	50.10	48.99	49.51	48.04	49.46	48.21	49.56
OW5	52.12	--	51.13	50.64	50.67	49.75	50.56	49.25	50.84
OW6	51.95	*53.47*	--	49.95	48.21	46.00	47.39	45.82	47.25
OW7S	50.77	--	--	47.28	48.08	47.19	47.81	47.01	47.98
OW7D	50.81	--	--	--	43.72	41.34	43.12	41.43	42.54
OW8S	50.21	--	--	46.54	48.42	47.74	48.16	47.54	48.39
OW8D	50.40	--	--	--	44.36	38.09	40.90	37.62	40.93
OW9	51.73	--	--	38.63	40.69	37.76	39.22	37.01	40.11
OW10S	44.76	--	--	--	--	--	--	--	--
OW10D	44.50	--	--	--	--	--	--	--	--
OW11	52.61	*55.06*	--	--	--	--	--	--	--

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	Sep-00	May-01	Sep-01	May-02	Sep-02	May-03	Oct-03
Monitoring Location			Water Level Elevation	Water Level Elevation	Water Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID									
OW1	50.24	--	48.60	48.55	48.08	48.68	46.98	48.75	48.66
OW3	51.76	--	49.83	49.72	47.64	49.89	47.82	50.09	49.95
OW4	51.60	--	50.09	49.86	48.08	49.90	48.13	50.20	49.73
OW5	52.12	--	51.13	51.16	50.12	51.14	48.49	51.18	51.05
OW6	51.95	*53.47*	46.57	47.93	45.86	48.09	46.25	47.11	47.28
OW7S	50.77	--	47.70	48.02	46.95	48.17	47.09	47.51	47.30
OW7D	50.81	--	41.35	44.23	40.52	44.24	41.17	42.30	41.53
OW8S	50.21	--	48.67	48.30	47.54	48.57	47.31	48.34	48.46
OW8D	50.40	--	39.15	42.44	37.55	42.72	38.64	40.24	39.42
OW9	51.73	--	39.79	39.85	37.80	40.98	37.55	41.21	40.64
OW10S	44.76	--	--	--	--	--	--	--	39.44
OW10D	44.50	--	--	--	--	--	--	--	41.17
OW11	52.61	*55.06*	--	--	--	--	--	--	50.61

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date / Monitoring Location	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	May-04 Level Elevation	Sep-04 Level Elevation	May-05 Level Elevation	Sep-05 Level Elevation	Apr-06 Level Elevation	Oct-06 Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID								
OW1	50.24	--	48.84	47.94	48.28	48.52	48.64	48.63
OW3	51.76	--	50.16	49.06	49.74	47.48	49.99	48.07
OW4	51.60	--	50.20	49.14	49.54	47.88	50.12	48.27
OW5	52.12	--	50.92	50.19	50.73	47.72	51.12	50.41
OW6	51.95	*53.47*	47.85	47.11	47.80	46.51	47.90	46.92
OW7S	50.77	--	47.97	47.39	47.96	47.08	48.19	47.17
OW7D	50.81	--	43.51	42.43	43.73	41.25	42.97	42.09
OW8S	50.21	--	48.51	48.13	48.29	46.81	48.59	47.21
OW8D	50.40	--	42.00	40.69	42.12	39.45	41.52	39.17
OW9	51.73	--	41.30	38.55	40.70	37.11	42.11	37.12
OW10S	44.76	--	41.96	41.69	42.67	40.72	42.32	41.85
OW10D	44.50	--	42.30	38.60	40.49	37.37	42.74	37.60
OW11	52.61	*55.06*	50.81	50.17	50.79	49.79	51.18	49.78

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Mar-10	Dec-10
Monitoring Location			Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID									
OW1	50.24	--	47.40	48.43	47.78	48.78	48.05	48.61	48.67
OW3	51.76	--	48.64	47.54	49.16	49.95	49.46	50.08	50.14
OW4	51.60	--	47.91	47.46	49.21	50.26	49.33	50.12	49.88
OW5	52.12	--	49.32	49.73	49.98	51.16	50.51	51.18	51.15
OW6	51.95	*53.47*	47.17	46.67	47.69	48.08	48.20	47.75	47.69
OW7S	50.77	--	47.01	46.13	47.75	48.15	48.01	48.04	47.82
OW7D	50.81	--	43.20	41.31	44.05	43.49	44.89	43.46	43.41
OW8S	50.21	--	47.33	46.27	47.83	48.86	48.15	48.51	48.48
OW8D	50.40	--	41.69	39.85	42.62	41.85	43.24	41.69	41.46
OW9	51.73	--	37.75	36.22	40.81	42.81	40.09	41.42	41.90
OW10S	44.76	--	42.03	41.56	42.58	43.13	42.80	42.66	42.88
OW10D	44.50	--	37.85	36.47	40.42	41.39	40.12	42.17	42.61
OW11	52.61	*55.06*	49.20	49.54	50.54	51.33	50.47	51.27	51.24

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date / Monitoring Location	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	Jun-11 Level Elevation	Oct-11 Level Elevation	Jun-12 Level Elevation	Oct-12 Level Elevation	Jun-13 Level Elevation	Nov-13 Level Elevation	Jul-14 Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID									
OW1	50.24	--	48.33	48.41	47.90	48.55	48.51	48.59	47.99
OW3	51.76	--	49.90	48.39	49.23	48.07	49.77	50.15	49.27
OW4	51.60	--	49.62	47.92	48.97	47.17	49.61	50.24	49.00
OW5	52.12	--	50.98	50.96	50.09	50.98	50.84	51.21	49.88
OW6	51.95	*53.47*	48.21	46.72	48.16	47.62	49.05	49.50	49.83
OW7S	50.77	--	48.27	47.23	47.82	46.90	48.32	48.38	48.06
OW7D	50.81	--	43.25	40.05	43.27	39.52	43.65	41.61	43.90
OW8S	50.21	--	48.46	47.41	47.89	47.17	48.27	48.44	47.90
OW8D	50.40	--	42.34	37.32	41.24	37.08	41.62	38.51	41.74
OW9	51.73	--	41.81	38.91	38.23	37.42	40.99	42.46	39.30
OW10S	44.76	--	42.66	40.56	42.17	40.54	42.74	41.98	42.38
OW10D	44.50	--	41.91	41.02	38.55	38.50	41.05	43.04	39.40
OW11	52.61	*55.06*	51.04	50.36	50.38	50.80	50.92	50.51	51.75

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	Nov-14	May-15	Oct-15	Jun-16	Nov-16	Jun-17	Oct-17
Monitoring Location			Level Elevation	Water Level Elevation	Water Level Elevation	Water Level Elevation	Level Elevation	Level Elevation	Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID									
OW1	50.24	--	48.56	48.27	48.10	48.32	48.50	48.39	48.60
OW3	51.76	--	50.25	49.73	48.91	49.66	48.56	49.70	49.08
OW4	51.60	--	50.00	49.56	48.22	49.56	47.20	49.61	48.45
OW5	52.12	--	51.21	50.76	49.48	50.80	49.12	50.83	50.76
OW6	51.95	*53.47*	49.65	49.37	50.12	50.56	50.38	51.10	50.90
OW7S	50.77	--	48.31	48.22	47.41	48.38	47.94	48.55	48.19
OW7D	50.81	--	41.17	43.38	41.01	43.89	40.58	43.77	40.91
OW8S	50.21	--	48.49	48.22	47.13	48.29	46.56	48.39	47.31
OW8D	50.40	--	40.41	41.98	39.61	42.80	37.82	42.36	39.97
OW9	51.73	--	42.66	38.83	37.20	40.60	37.07	41.40	39.88
OW10S	44.76	--	42.55	41.46	41.68	42.71	40.86	42.95	42.18
OW10D	44.50	--	43.07	39.66	37.46	41.05	37.35	41.16	40.11
OW11	52.61	*55.06*	52.04	51.93	50.86	51.10	50.57	50.75	50.48

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21
Monitoring Location			Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation	Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)	(masl)
Well ID										
OW1	50.24	--	48.41	48.53	48.42	48.51	48.26	48.41	48.11	48.55
OW3	51.76	--	49.88	49.48	49.86	50.21	49.43	49.77	49.52	50.46
OW4	51.60	--	49.80	48.70	49.64	47.46	49.23	49.13	49.35	50.57
OW5	52.12	--	51.18	49.99	50.04	51.12	50.10	50.92	50.36	51.22
OW6	51.95	*53.47*	50.60	50.84	51.12	50.71	51.37	50.54	50.93	51.00
OW7S	50.77	--	48.29	48.27	48.50	48.28	48.24	48.27	48.11	48.49
OW7D	50.81	--	43.64	42.45	44.84	42.43	44.52	42.00	44.06	43.23
OW8S	50.21	--	48.31	47.85	48.53	47.04	48.04	46.95	48.04	47.74
OW8D	50.40	--	41.71	38.67	42.63	38.89	41.97	38.88	41.01	40.65
OW9	51.73	--	41.23	38.08	42.08	40.43	39.99	38.44	38.97	42.43
OW10S	44.76	--	42.59	42.24	43.03	41.15	42.71	41.36	42.58	43.13
OW10D	44.50	--	41.09	38.36	42.43	42.35	39.97	39.19	39.15	43.67
OW11	52.61	*55.06*	50.31	50.22	50.55	50.15	50.72	50.28	50.40	50.35

Notes:

1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

SUMMARY OF WATER LEVEL ELEVATIONS
HURON LANDFILL SITE

Date	Top of Casing Elevation	Top of Casing Elevation (Resurveyed 2015)	May-22	Nov-22	May-23	Sep-23	May-24		Nov-24	
Monitoring Location			Level Elevation	Level Elevation	Level Elevation	Level Elevation	Depth to Water	Level Elevation	Depth to Water	Level Elevation
Unit	(m)	(m)	(masl)	(masl)	(masl)	(masl)	(mbTOC)	(masl)	(mbTOC)	(masl)
Well ID										
OW1	50.24	--	48.27	48.42	48.30	48.09	1.90	48.34	3.18	47.06
OW3	51.76	--	49.64	49.75	49.81	48.92	1.90	49.86		51.76
OW4	51.60	--	49.54	49.75	49.72	49.02	1.84	49.76	14.80	36.80
OW5	52.12	--	50.78	51.07	51.11	50.15	0.92	51.20	2.15	49.97
OW6	51.95	*53.47*	51.13	50.84	51.20	50.87	2.12	49.83	2.90	49.05
OW7S	50.77	--	48.35	48.24	48.49	48.04	2.23	48.54	3.65	47.12
OW7D	50.81	--	44.61	42.74	44.24	42.62	5.89	44.92	7.55	43.26
OW8S	50.21	--	48.32	46.72	48.45	47.06	1.63	48.58	5.36	44.85
OW8D	50.40	--	42.77	40.09	42.30	40.23	7.30	43.10	9.72	40.68
OW9	51.73	--	40.72	38.66	41.91	37.94	9.92	41.81	4.53	47.20
OW10S	44.76	--	42.82	41.91	42.99	42.51	1.63	43.13	3.65	41.11
OW10D	44.50	--	40.62	38.60	41.93	38.24	2.90	41.60	7.38	37.12
OW11	52.61	*55.06*	50.53	50.20	50.84	50.22	4.25	48.36	5.20	47.41

Notes:

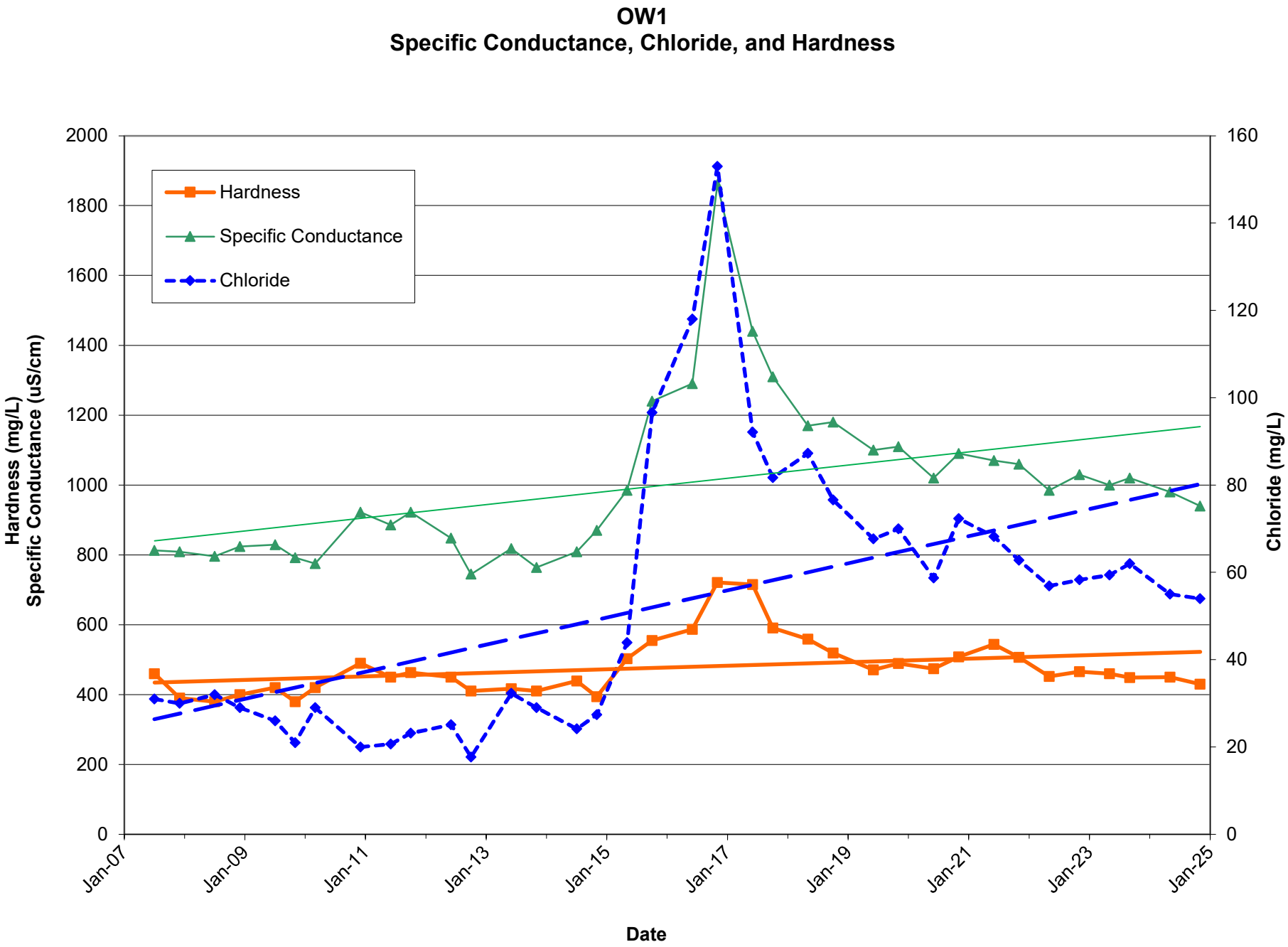
1. Water levels are in meters (compared to generated site datum); m

2. *OW-6 - 1.52 m and OW11 - 2.45 m of pipe added on November 18, 2015 , water level elevations were adjusted accordingly

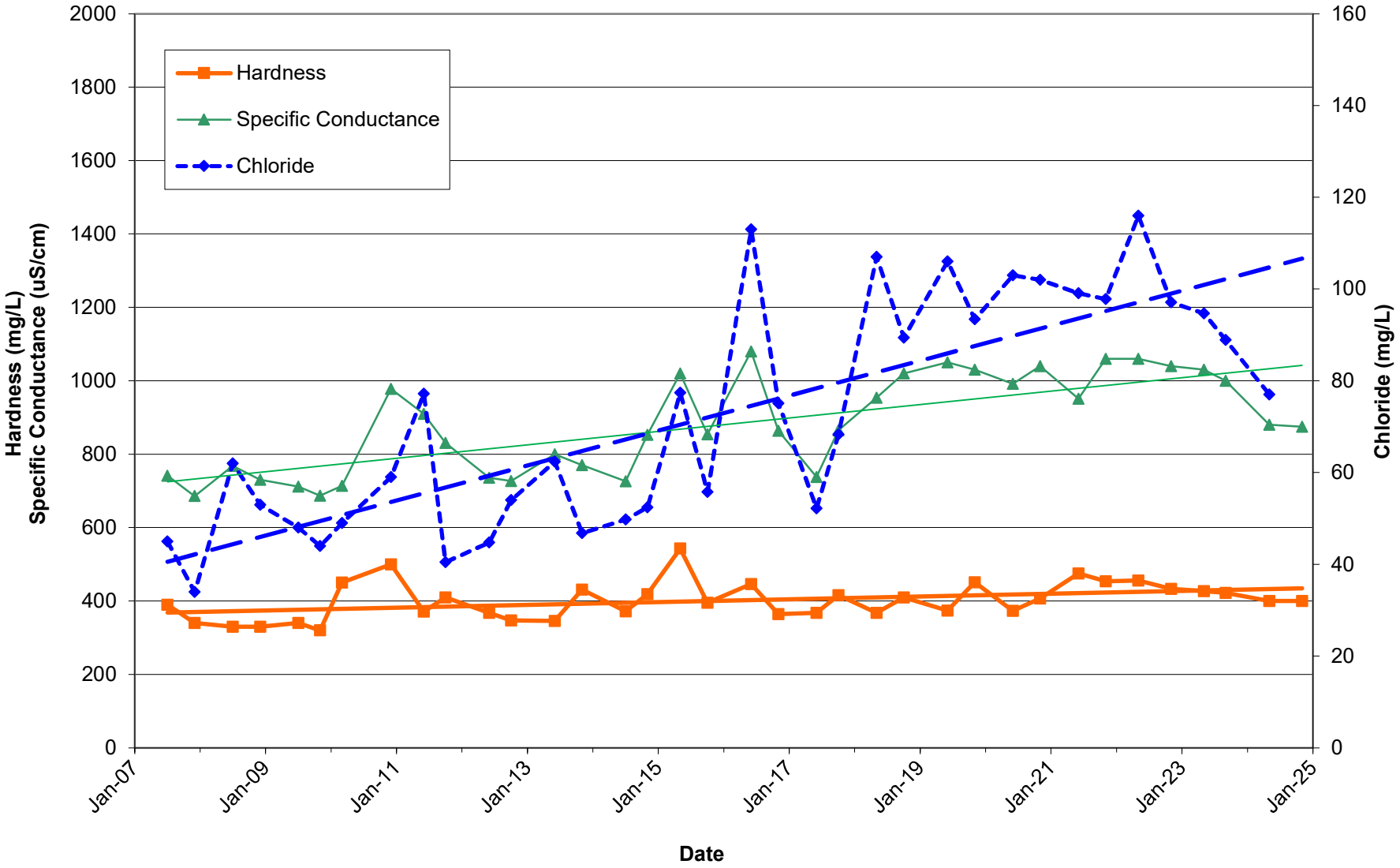
3. NI = Not Installed; NM = Not monitored.

4. Top of Casing Elevation Status:

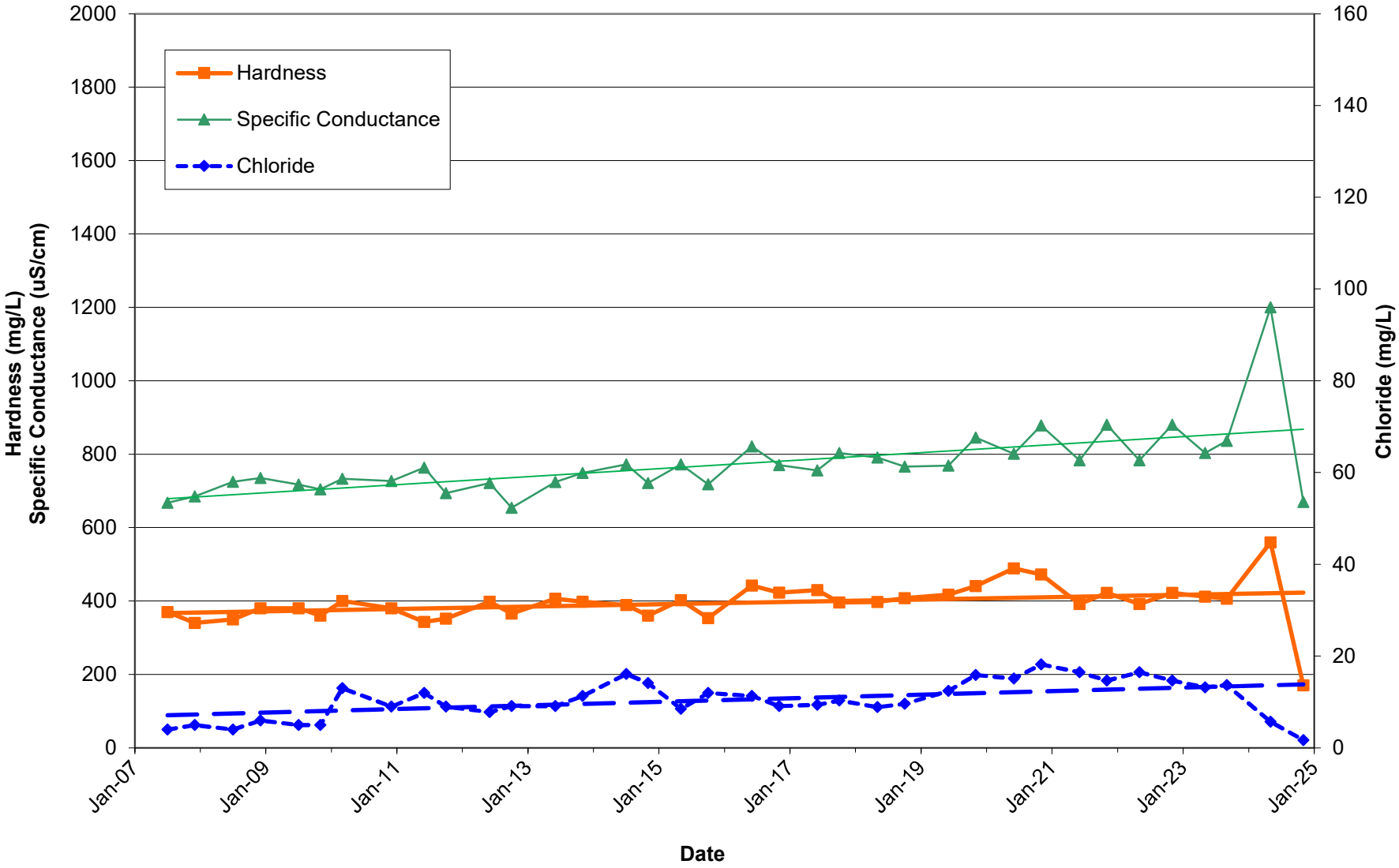
Appendix F Historic Groundwater Quality Results


OW1
Specific Conductance, Chloride, and Hardness
Hardness
Specific Conductance
Chloride
Hardness (mg/L)
Specific Conductance (uS/cm)
Chloride (mg/L)
Date
2000
1800
1600
1400
1200
1000
800
600
400
200
0
160
140
120
100
80
60
40
20
0
Jan-07
Jan-09
Jan-11
Jan-13
Jan-15
Jan-17
Jan-19
Jan-21
Jan-23
Jan-25

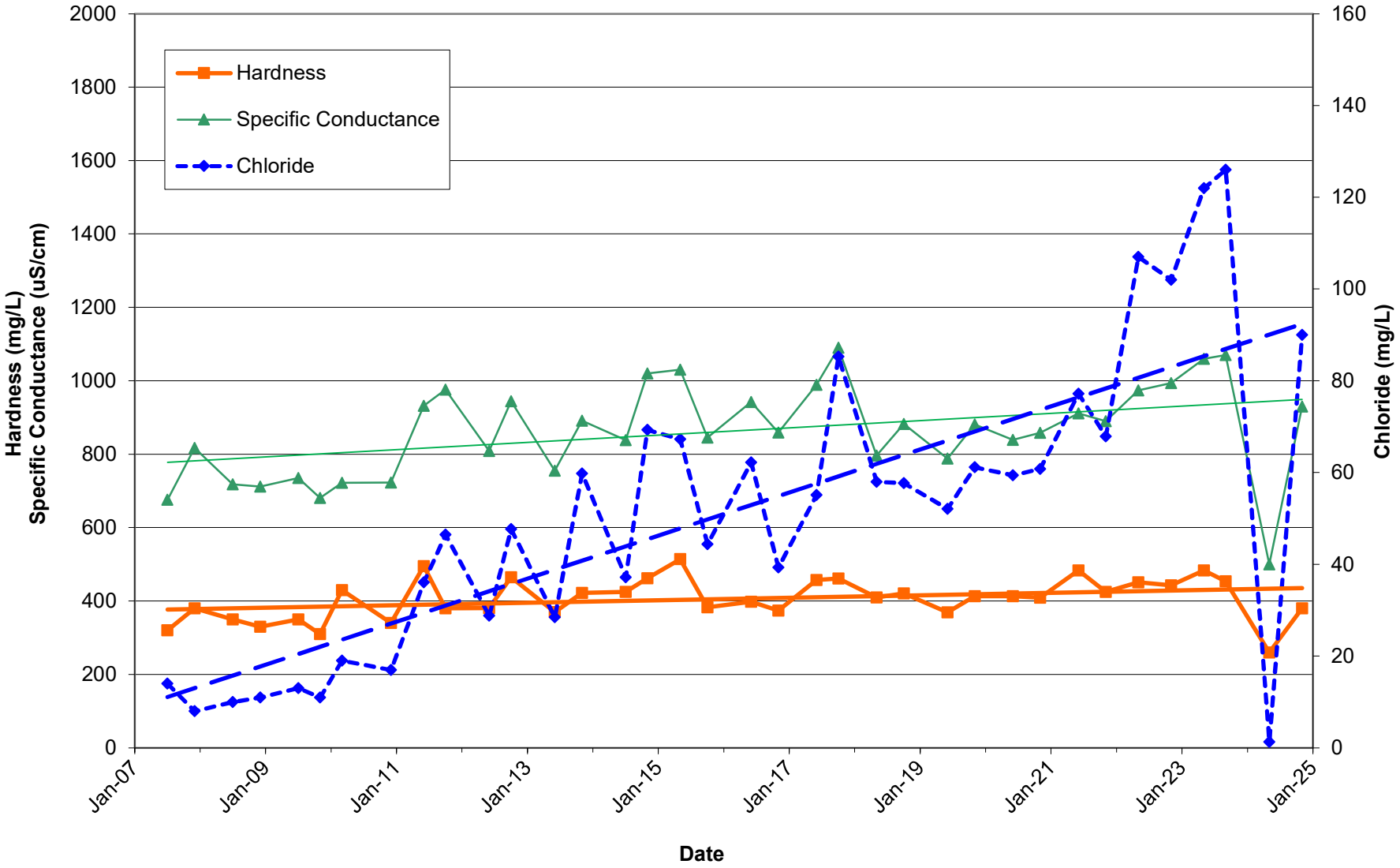
OW3
Specific Conductance, Chloride, and Hardness



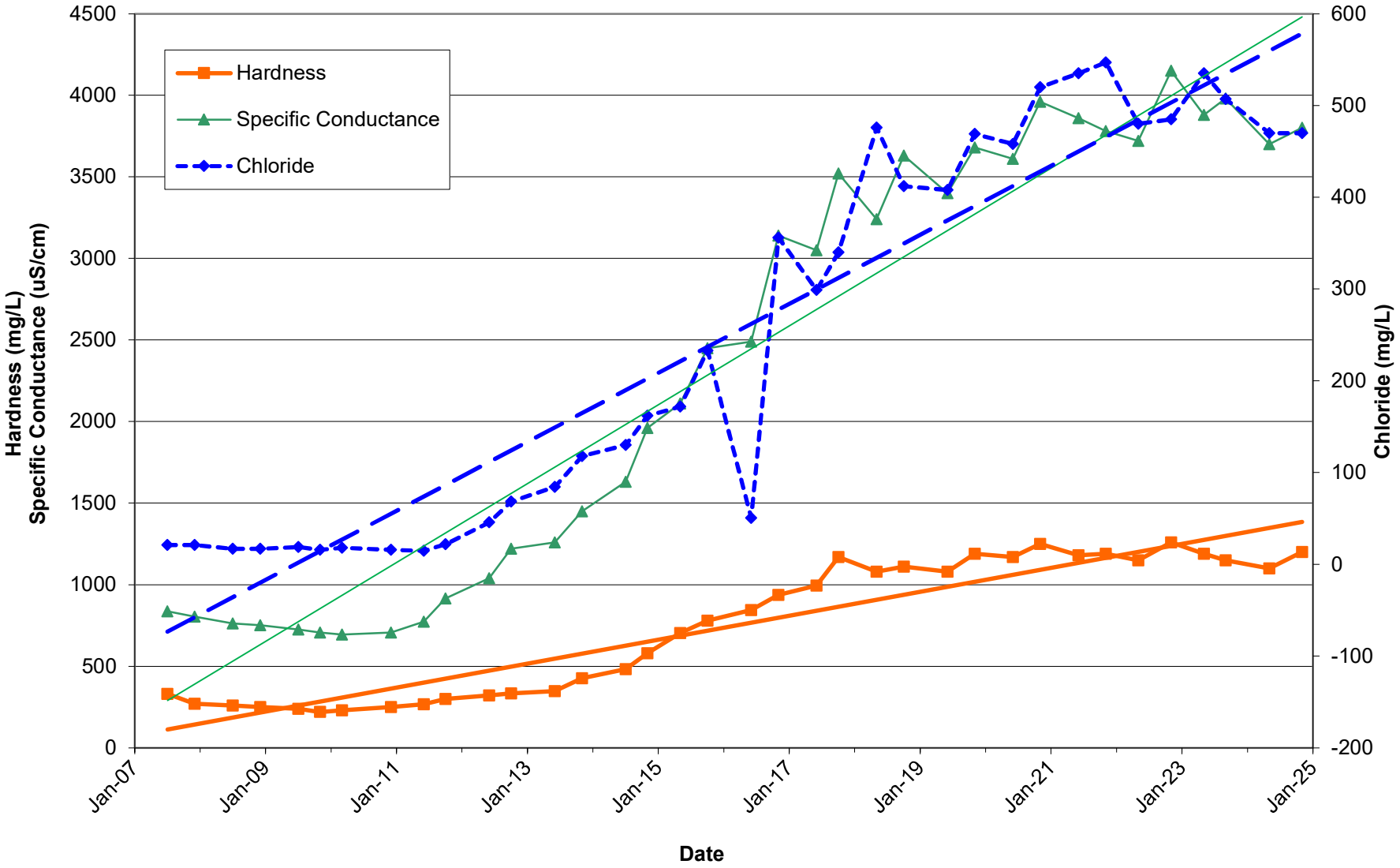
OW4
Specific Conductance, Chloride, and Hardness



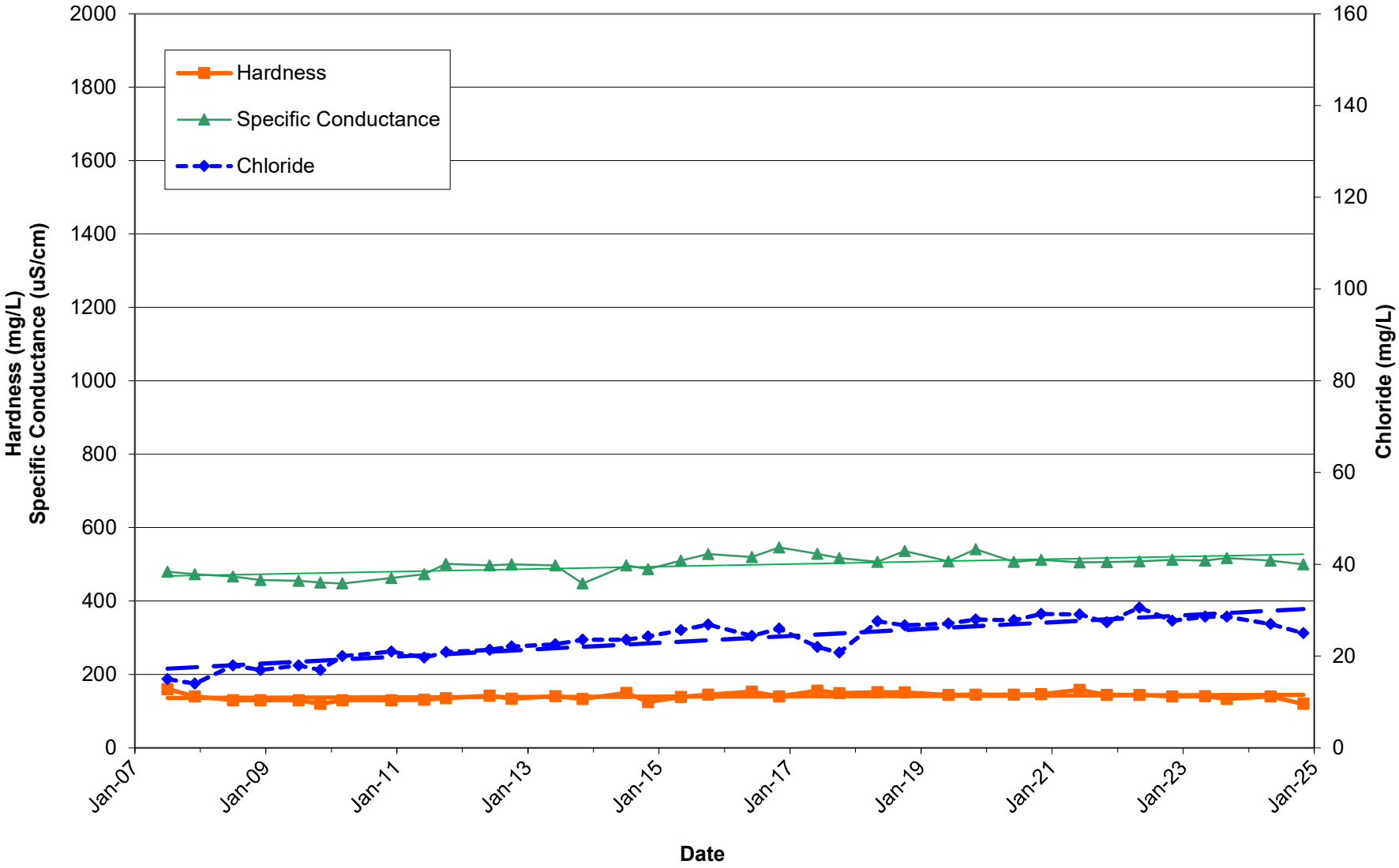
OW5
Specific Conductance, Chloride, and Hardness



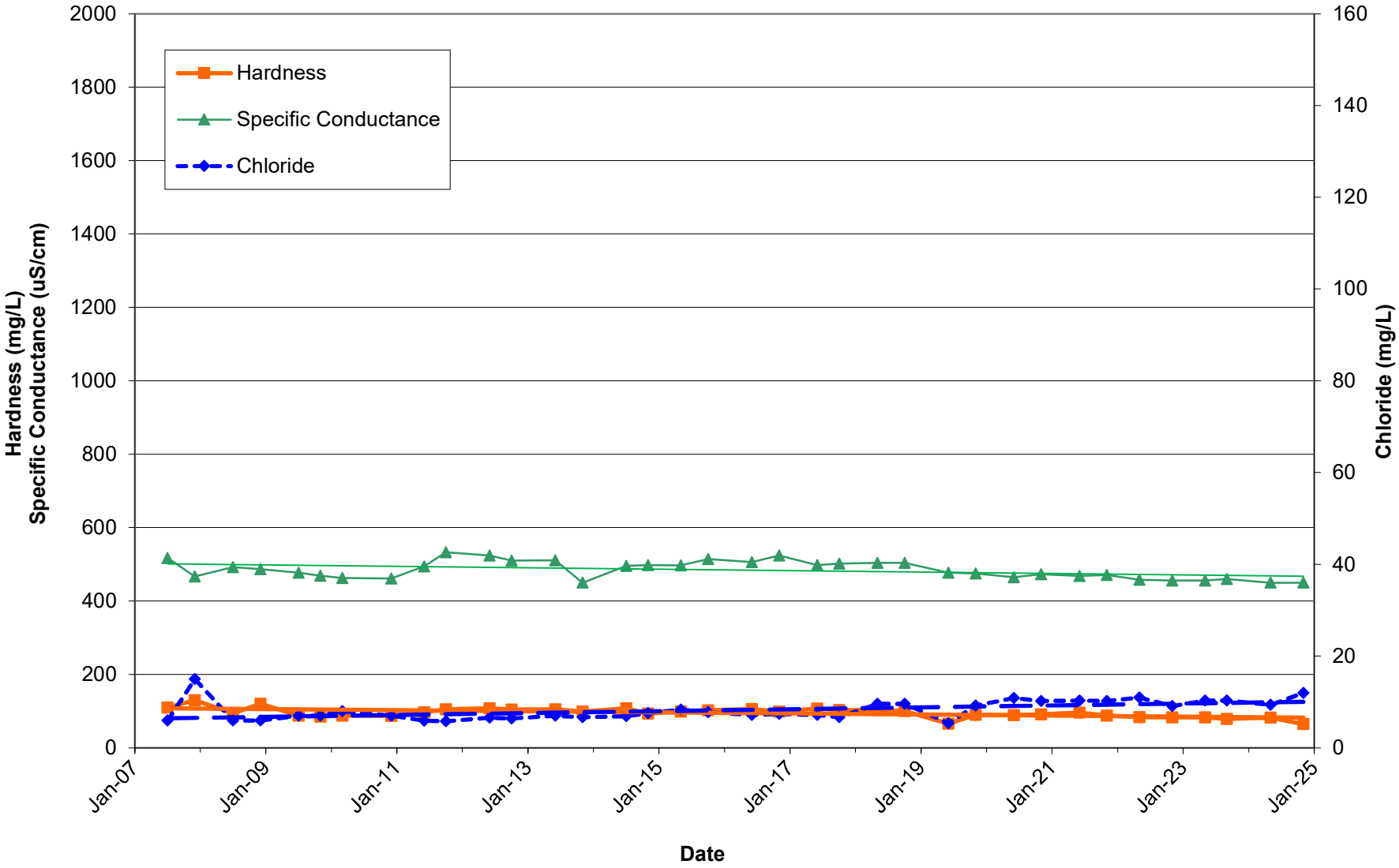
OW6
Specific Conductance, Chloride, and Hardness



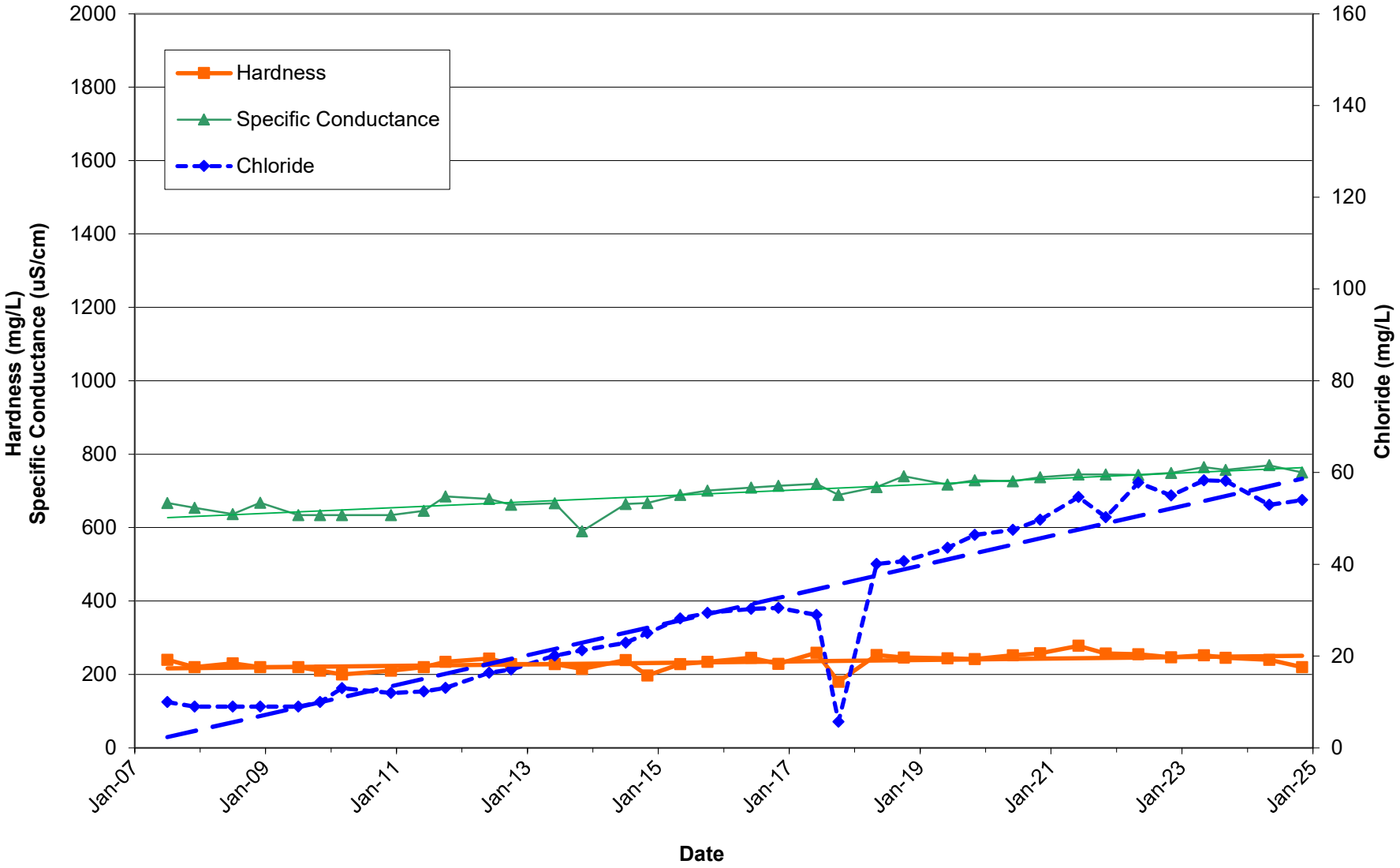
OW7S
Specific Conductance, Chloride, and Hardness



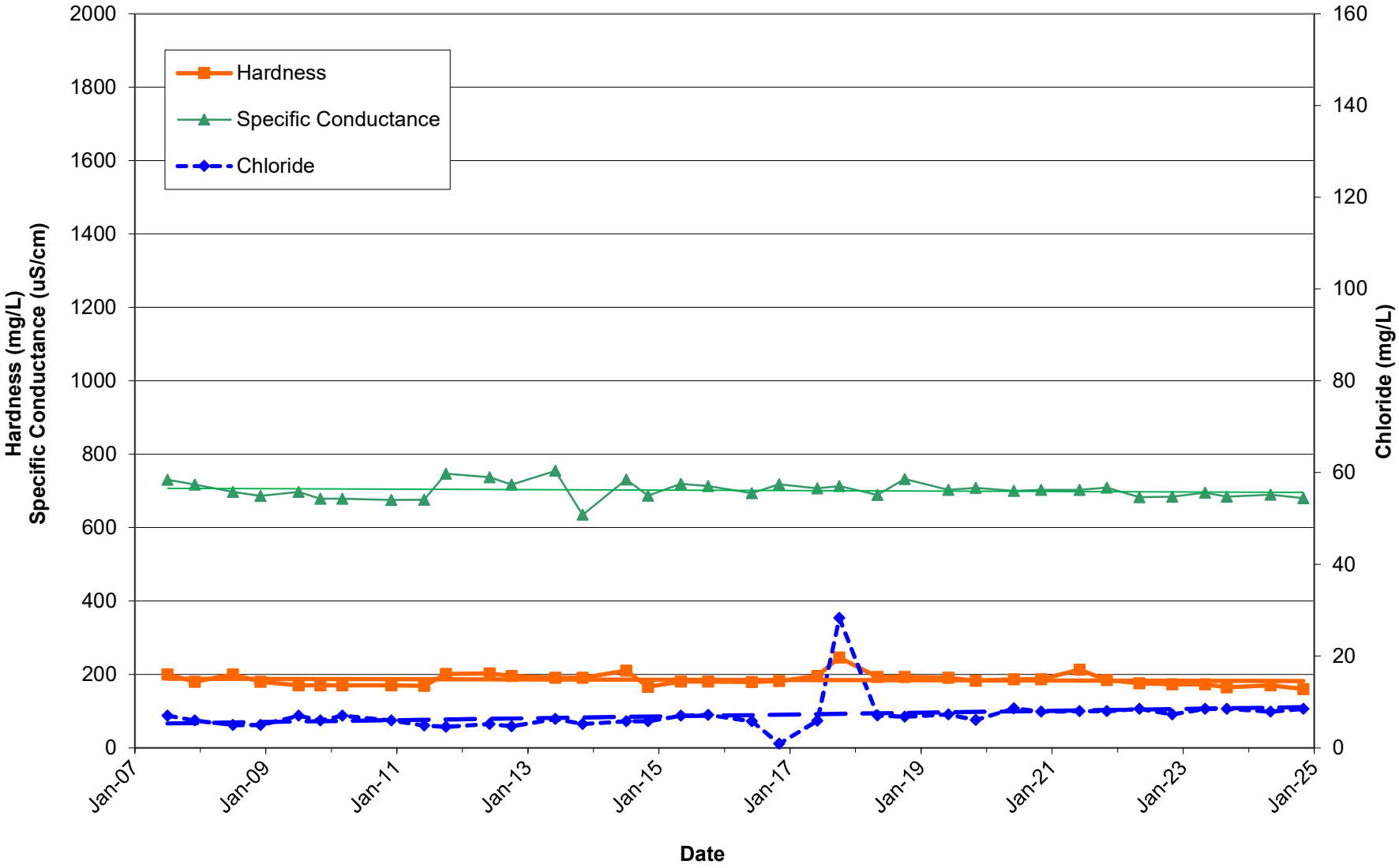
OW7D
Specific Conductance, Chloride, and Hardness



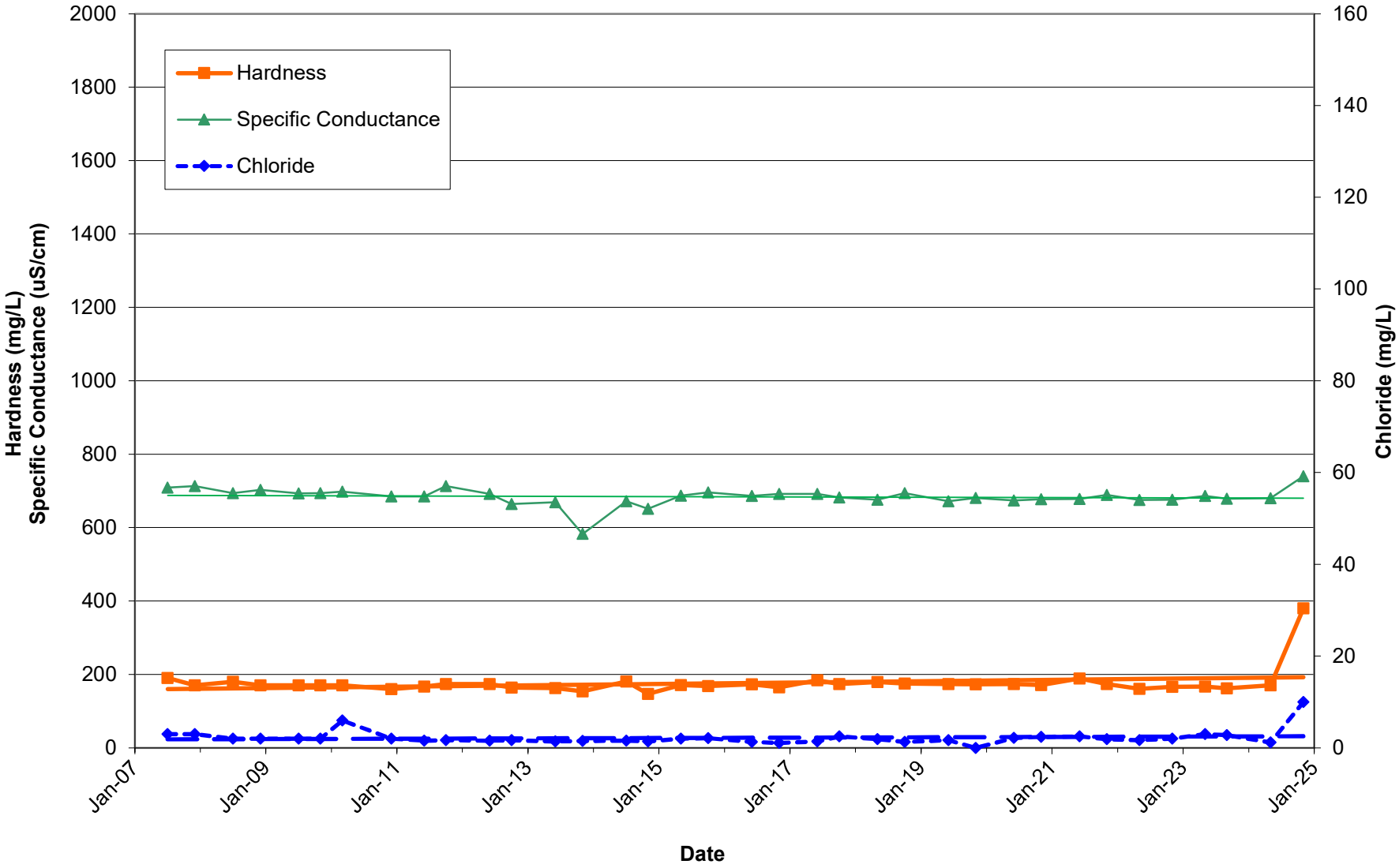
OW8S
Specific Conductance, Chloride, and Hardness



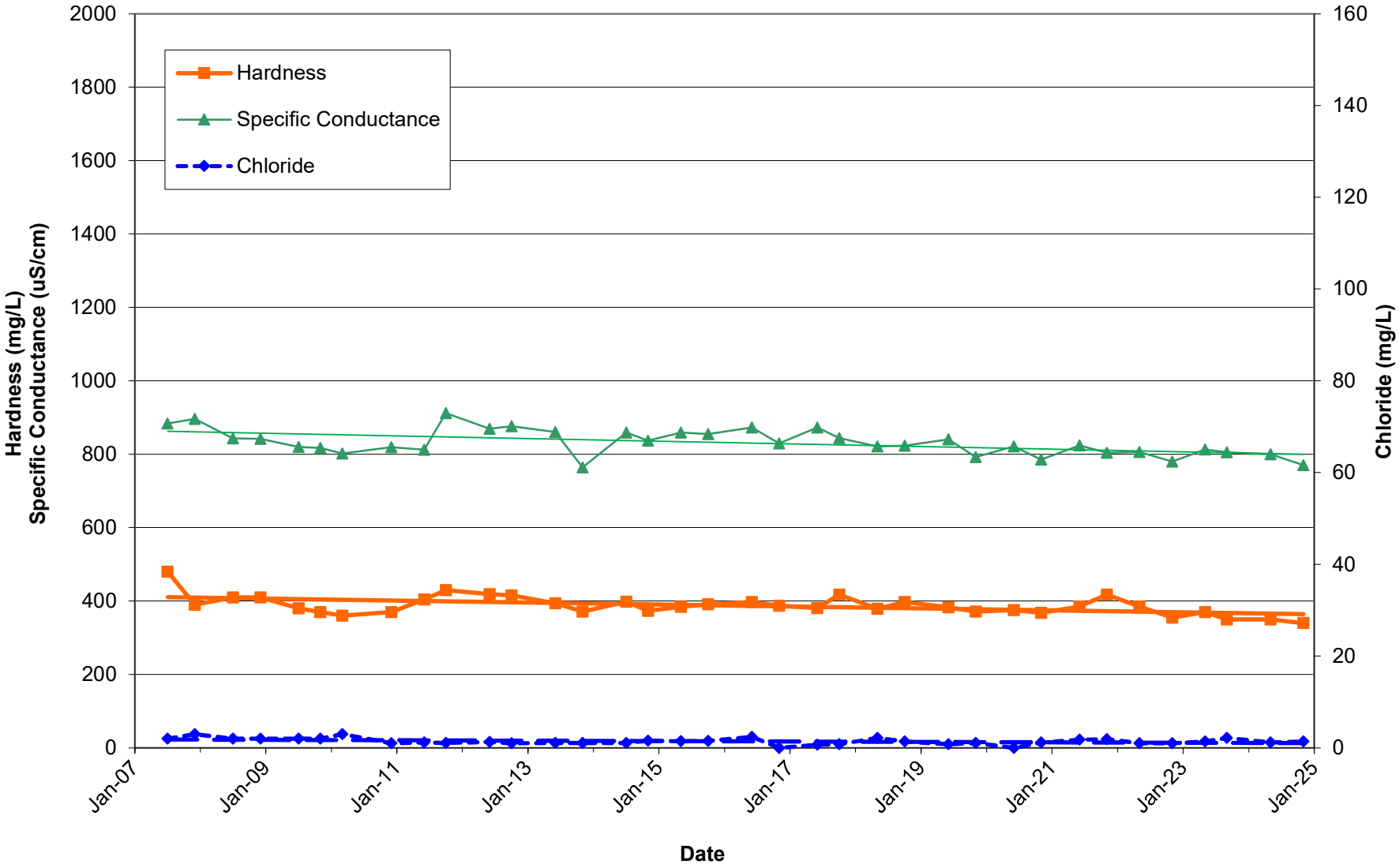
OW8D
Specific Conductance, Chloride, and Hardness



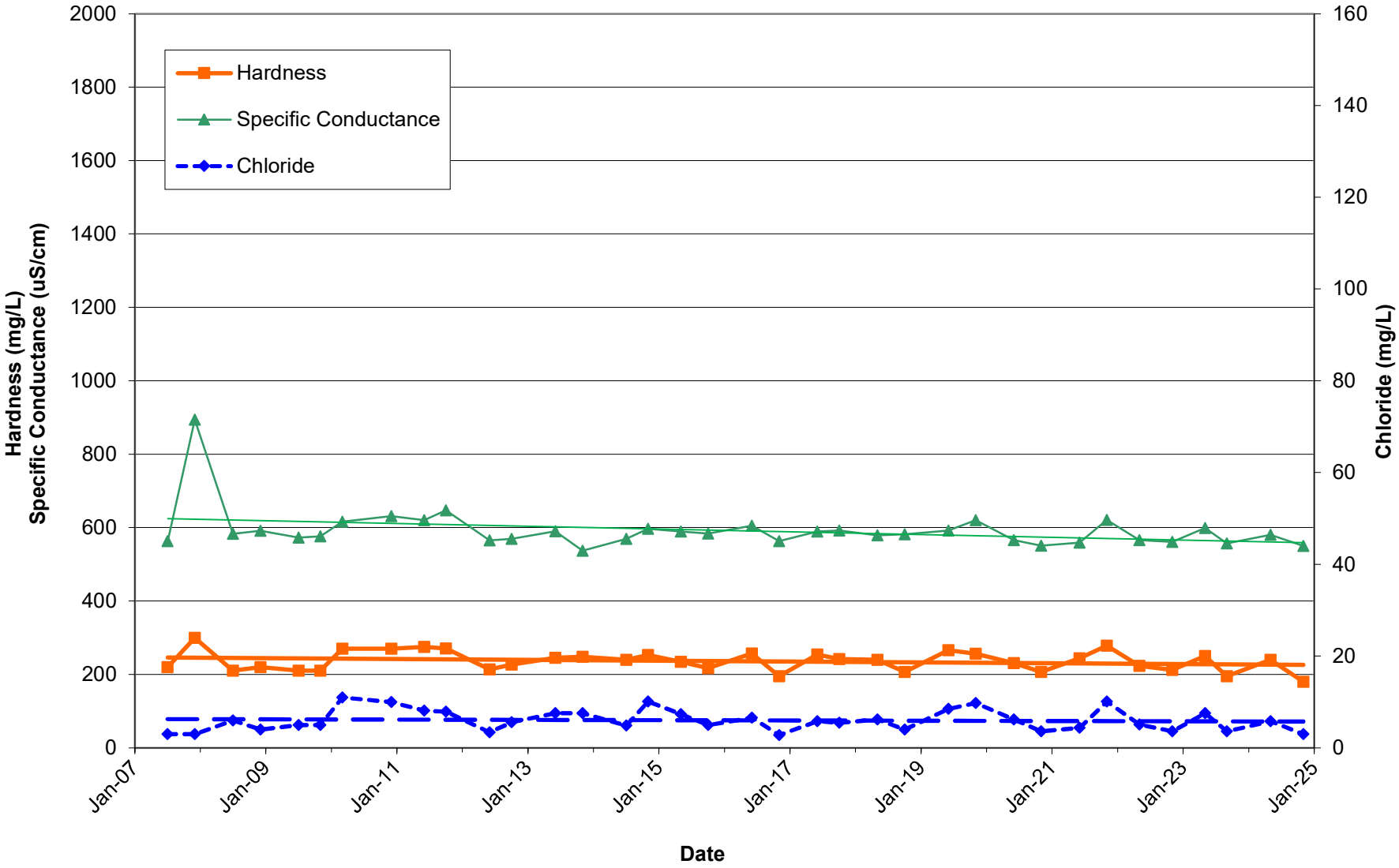
OW9
Specific Conductance, Chloride, and Hardness



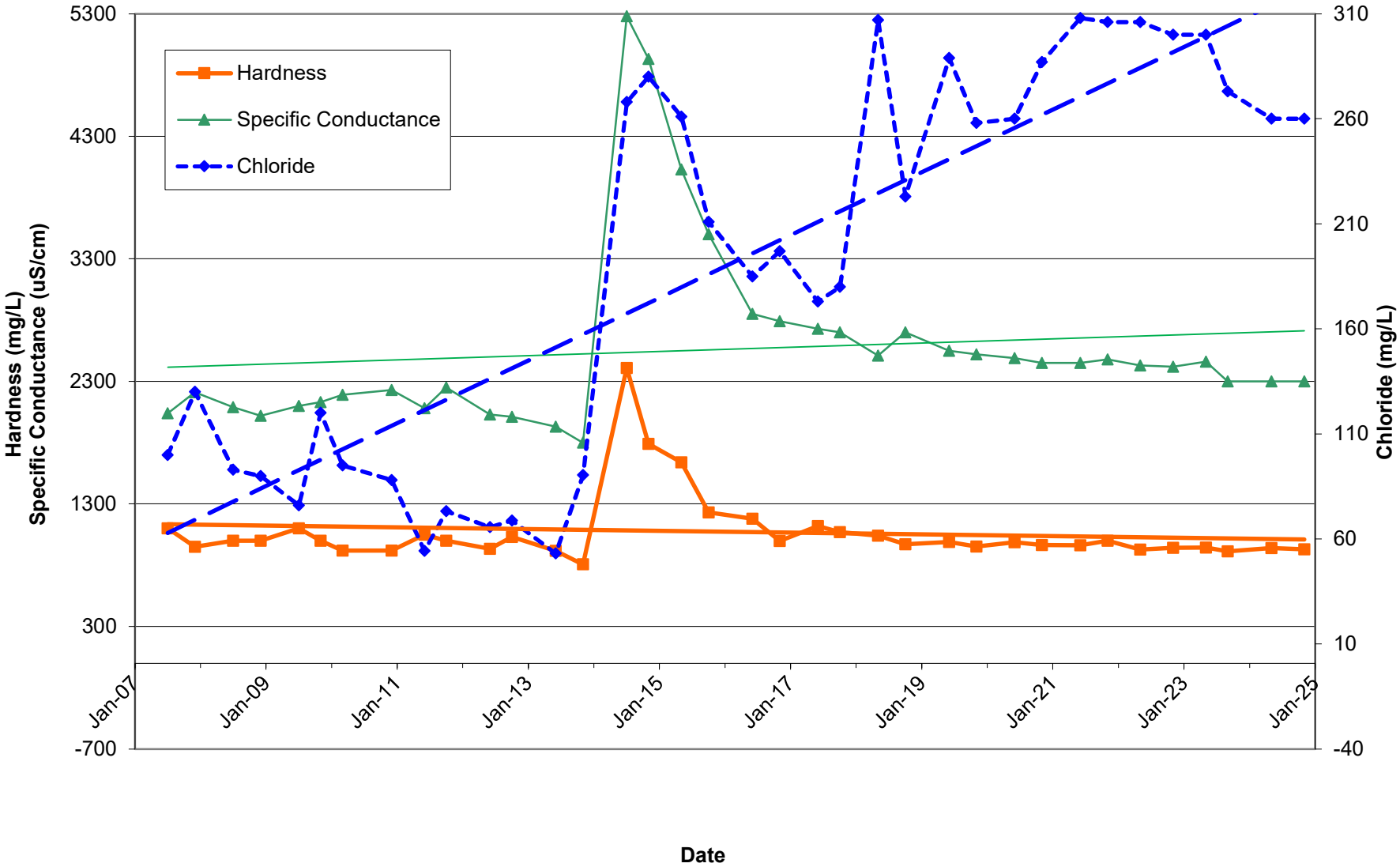
OW10S
Specific Conductance, Chloride, and Hardness



OW10D
Specific Conductance, Chloride, and Hardness



OW11
Specific Conductance, Chloride, and Hardness



HISTORICAL GROUNDWATER QUALITY DATA
OW-3

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	292	274	268	283	271	266	272	412	381	367	307	313	329	413	295	417	421	366
Chloride	250	149	mg/L	45	34	62	53	48	44	49	59	77	41	45	54	62	47	50	52	77	56
Nitrate	10	2.58	mg/L	0.30	0.10	0.10	0.20	0.20	0.10	0.10	0.30	<0.1	<0.1	0.40	<0.1	0.20	0.10	0.40	<0.25	<0.25	0.1
Nitrite	1	0.28	mg/L	--	--	--	--	--	--	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25	<0.1
Ammonia	NV	NV	mg/L	0.06	0.10		0.06	--	--	<0.05	<0.05	<0.01	0.01	0.04	<0.01	0.02	0.03	0.01	0.07	<0.02	0.06
TKN	NV	NV	mg/L	0.3	0.4	0.5	1.0	1.4	0.8	0.5	0.4	9.8	1.0	0.3	1.0	2.2	0.5	0.6	0.5	0.3	0.5
Phenols	NV	NV	mg/L	--	--	--	--	--	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	1.7	1.9	1.8	1.8	1.6	2.1	2.2	2.6	2.6	2.3	2.1	2.3	4.7	5.6	4.2	5.8	4.2	3.9
Conductivity	NV	NV	uS/cm	741	686	768	730	712	687	714	978	910	831	736	727	800	770	726	853	1020	854
pH	6.5-8.5	NV	Unitless	8.20	8.10	8.00	8.10	8.00	7.90	8.00	7.74	7.58	7.64	7.95	9.00	7.63	7.73	7.96	7.70	8.11	7.97
Sulphate	500	277	mg/L	51	42	39	40		33	31	20	19	16	26	21	26	16	17	16	17	20
Hardness	80-100	407	mg/L	390	340	330	330	340	320	450	500	371	410	368	347	346	431	372	419	543	395
Aluminum	0.1	0.07	mg/L	--	--	--	--	--	--	<0.005	<0.005	0.02	0.04	0.02	0.03	0.03	0.04	0.02	0.03	0.013	<0.004
Arsenic	0.025	0.001	mg/L	0.001	0.001			0.001	0.001	<0.001	0.001	0.002	0.003	0.001	0.003	0.001	0.003	0.002	0.001	<0.003	0.003
Barium	1.0	0.32	mg/L	0.08	0.07	0.07	0.07	0.06	0.09	0.09	0.09	0.07	0.08	0.09	0.07	0.08	0.08	0.08	0.07	0.11	0.10
Boron	5.0	1.32	mg/L	0.08	0.07	0.07	0.07	0.07	0.07	0.04	0.05	0.08	0.04	0.08	0.06	0.07	0.08	0.08	0.064	0.05	0.07
Cadmium	0.005	0.002	mg/L	0.00008	0.00008	0.0002	0.0001	0.0005	0.068	0.0004	0.0002	0.0004	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Calcium	NV	NV	mg/L	77	70	67	68	72	68	110	120	72	92	77	74	72	101	80	98	133	88
Chromium	0.05	0.01	mg/L	--	--	--	--	--	--	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Copper	1.0	0.5	mg/L	0.001		0.001	0.001	0.001	0.001	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.001	<0.002	0.0004	<0.002	<0.003	<0.003
Iron	0.3	0.17	mg/L	--	--	--	--	--	--	<0.100	<0.100	0.01	0.06	<0.005	0.07	<0.005	0.02	0.01	0.05	0.10	<0.010
Lead	0.01	0.003	mg/L	--	--	--	--	--	--	<0.0005	<0.0005	0.0005	0.0002	0.0003	0.0003	0.0003	<0.0002	<0.0002	<0.002	<0.002	<0.0002
Magnesium	NV	NV	mg/L	48	36	38	38	39	36	43	48	46	44	43	39	40	44	42	42	51	43
Manganese	0.05	0.04	mg/L	--	0.015	--	--	--	0.02	0.05	0.10	0.02	0.09	0.00	0.04	0.004	0.02	0.02	0.05	0.10	0.08
Potassium	NV	NV	mg/L	1.9	1.7	3.1	1.8	1.6	1.7	1.7	1.9	1.5	1.8	1.8	1.5	1.5	1.8	1.6	1.6	1.9	1.8
Sodium	200	116	mg/L	26	23	24	23	23	22	22	22	25	25	23	22	24	22	24	21	23	26
Zinc	5.0	2.5	mg/L	--	--	--	0.006	--	--	--	0.006	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-3

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	415	355	280	324	347	378	374	400	359	359	341	390	397	387	384	395	320	345.41	51.96
Chloride	250	149	mg/L	113	75	52	68	107	89	106	93	103	102	99	98	116	97	95	89	77	71.08	25.21
Nitrate	10	2.58	mg/L	0.40	0.06	0.1	<0.05	0.12	0.12	0.09	<0.05	0.42	0.20	0.25	<0.05	0.20	<0.05	<0.5	0.06	<0.010	0.16	0.13
Nitrite	1	0.28	mg/L	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.5	<0.05	<0.10	0.03	0.04
Ammonia	NV	NV	mg/L	0.44	0.04	<0.01	0.04	0.11	0.17	0.140	0.11	0.08	0.04	0.03	0.13	<0.01	0.11	0.03	0.14	<0.050	0.07	0.09
TKN	NV	NV	mg/L	0.3	0.4	0.2	0.4	2.0	1.1	0.9	0.5	0.5	0.5	0.5	0.6	0.4	0.4	0.5	0.5	0.2	0.96	1.67
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.002	<0.002	<0.002	<0.002	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	2.7	2.9	2.4	4.2	2.9	3.7	4.2	3.8	2.6	3.1	2.8	2.9	2.3	1.3	0.4	3.2	2.3	2.98	1.14
Conductivity	NV	NV	uS/cm	1080	864	738	865	954	1020	1050	1030	992	1040	951	1060	1060	1040	1030	1000	880	874.59	136.20
pH	6.5-8.5	NV	Unitless	7.78	7.94	8.09	7.90	7.88	7.80	7.95	7.79	7.84	7.64	8.04	7.53	7.88	7.67	7.9	7.81	8.08	7.91	0.26
Sulphate	500	277	mg/L	32	24	19	20	23	20	19	16	18	18	17	15	14	13	22	16	13	23.15	9.38
Hardness	80-100	407	mg/L	446	364	368	416	368	410	374	451	373	407	475	454	456	433	427	422	400	399.91	53.55
Aluminum	0.1	0.07	mg/L	0.03	0.03	0.02	0.06	0.05	0.05	0.05	0.07	0.05	0.05	0.06	0.03	0.03	0.04	0.06	0.05	-	0.03	0.02
Arsenic	0.025	0.001	mg/L	0.001	0.002	0.001	0.003	0.001	0.002	0.001	0.002	0.002	0.002	0.001	0.002	0.001	0.002	0.001	0.003	-	0.00	0.00
Barium	1.0	0.32	mg/L	0.10	0.09	0.09	0.10	0.09	0.10	0.09	0.10	0.10	0.09	0.12	0.10	0.11	0.10	0.10	0.10	0.09	0.09	0.01
Boron	5.0	1.32	mg/L	0.06	0.07	0.08	0.09	0.09	0.10	0.10	0.07	0.12	0.11	0.13	0.11	0.12	0.11	0.11	0.06	0.11	0.08	0.02
Cadmium	0.005	0.002	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.000015	<0.000028	<0.000015	0.000078	0.000016	<0.000015	<0.00001	<0.00001	-	0.00	0.01
Calcium	NV	NV	mg/L	97	77	72	81	70	90	72	96	74	87	102	96	97	91	92	92	81	85.68	16.20
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	-	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0008	<0.002	<0.002	0.0092	0.006	<0.002	<0.002	0.0003	0.004	0.0006	-	0.00	0.00
Iron	0.3	0.17	mg/L	0.04	0.04	0.01	0.18	0.01	0.03	<0.005	0.03	0.02	0.01	<0.005	0.11	<0.005	0.10	<0.005	0.22	<0.100	0.04	0.04
Lead	0.01	0.003	mg/L	<0.0002	<0.0002	0.00008	0.00004	0.00003	0.00006	<0.0002	0.0003	0.00007	0.00012	0.00008	0.00006	0.00008	0.00004	0.00002	<0.00002	-	0.00	0.00
Magnesium	NV	NV	mg/L	49	42	46	46	47	45	47	51	46	46	54	52	52	50	48	47	48	44.79	4.84
Manganese	0.05	0.04	mg/L	0.04	0.06	0.01	0.06	0.003	0.05	0.003	0.06	0.002	0.02	0.01	0.10	0.01	0.12	0.02	0.09	<0.002	0.04	0.04
Potassium	NV	NV	mg/L	1.7	1.7	1.6	1.8	1.7	1.8	1.6	1.7	1.9	2.0	2.0	2.0	1.9	1.8	1.9	1.6	1.6	1.79	0.28
Sodium	200	116	mg/L	32	27	31	34	36	40	40	38	40	36	45	38	44	38	42	40	38	29.28	7.70
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	0.00	0.00

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-1

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	366	327	324	365	375	353	339	449	441	402	375	320	355	397	359	429	446	524
Chloride	250	149	mg/L	31.0	30.0	32.0	29.0	26.0	21.0	29.0	20.0	21	23.2	25	18	32.3	29	24.2	27.4	43.9	96.6
Nitrate	10	2.58	mg/L	0.40	1.40	0.10	0.40	0.20	0.50	0.20	0.90	0.10	1.50	0.50	0.70	0.20	<0.1	0.2	1.2	<0.25	<0.25
Nitrite	1	0.28	mg/L	--	--	--	--	--	--	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25
Ammonia	NV	NV	mg/L	0.14	0.07	0.07	--	0.12	--	<0.05	0.06	<0.01	0.01	0.06	<0.01	0.03	0.08	0.05	0.09	<0.02	0.08
TKN	NV	NV	mg/L	0.30	0.50	0.50	0.30	1.20	1.00	1.00	0.90	0.53	1.31	0.25	1.24	1.32	0.67	0.54	0.70	0.33	3.80
Phenols	NV	NV	mg/L	--	--	--	--	0.004	--	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.03
DOC	5	3.90	mg/L	2.60	2.80	2.30	2.40	2.50	2.50	2.40	2.60	2.90	2.90	2.90	2.00	10.1	10.0	4.50	7.60	5.30	74.5
Conductivity	NV	NV	uS/cm	813	809	796	824	829	792	775	922	886	922	848	745	818	764	809	870	985	1240
pH	6.5-8.5	NV	Unitless	8.10	8.20	8.10	8.10	7.70	7.90	8.00	7.66	7.40	7.56	7.92	7.81	7.65	7.81	7.94	7.75	8.17	8.05
Sulphate	500	277	mg/L	48	73	59	56	--	49	47	34	33	59	67	88	65	56	61	49	37	23
Hardness	80-100	407	mg/L	460	390	380	400	420	380	420	490	450	463	450	410	417	410	439	394	503	555
Aluminum	0.1	0.07	mg/L	--	--	--	--	--	--	<0.005	<0.005	0.03	0.04	0.03	0.04	0.04	0.04	0.03	0.03	<0.004	0.004
Arsenic	0.025	0.001	mg/L	--	--	--	--	--	--	<0.001	<0.001	0.001	0.001	0.007	0.007	0.002	0.003	0.001	0.003	<0.003	0.004
Barium	1.0	0.32	mg/L	0.08	0.01	0.08	0.08	0.09	0.08	0.07	0.09	0.09	0.10	0.10	0.09	0.07	0.08	0.08	0.09	0.10	0.10
Boron	5.0	1.32	mg/L	0.11	0.10	0.08	0.10	0.11	0.11	0.08	0.11	0.10	0.10	0.13	0.10	0.13	0.01	0.16	0.11	0.14	0.19
Cadmium	0.005	0.002	mg/L	0.0001	0.001	0.001	0.005	0.006	0.0002	0.002	<0.001	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	<0.0002
Calcium	NV	NV	mg/L	100	96	94	97	100	91	110	120	109	113	105	98.4	103	94.1	98.9	86	124	129
Chromium	0.05	0.01	mg/L	--	--	--	--	--	--	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	0.008	<0.002
Copper	1.0	0.5	mg/L	0.001	0.002	0.003	0.002	0.002	0.002	0.002	<0.005	<0.002	<0.002	<0.002	<0.002	0.001	<0.002	0.004	<0.002	<0.002	<0.002
Iron	0.3	0.17	mg/L	--	--	--	--	--	--	<0.1	<0.1	0.01	0.05	0.006	<0.005	0.009	0.14	0.06	0.16	0.27	2.52
Lead	0.01	0.003	mg/L	--	--	--	--	--	--	<0.005	<0.005	0.0004	<0.00002	<0.00002	0.00002	0.00003	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Magnesium	NV	NV	mg/L	49.0	36.0	35.0	40.0	42.0	36.0	36.0	44.0	43.0	44.0	45.6	39.3	38.8	42.4	46.7	43.7	46.9	56.5
Manganese	0.05	0.04	mg/L	0.01	--	--	--	--	--	0.01	0.02	0.03	0.03	0.01	0.01	0.03	0.06	0.05	0.05	0.16	0.13
Potassium	NV	NV	mg/L	2.4	2.2	3.5	4	2.2	2	2.3	2.5	2.3	2.5	2.7	2.1	2.2	2	2.3	2.0	2.13	2.49
Sodium	200	116	mg/L	27	24	25	27	24	20	25	26	22.3	24	24.7	20.5	24.4	26.1	28.4	24	25.5	59.1
Zinc	5.0	2.5	mg/L	0.047	0.088	0.092	0.052	0.073	0.057	0.076	0.06	0.06	0.011	0.034	0.01	0.036	<0.005	0.006	0.008	0.051	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-1

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	505	472	449	486	435	437	418	400	383	373	385	385	390	397	381	402	360	360	399.00	49.92
Chloride	250	149	mg/L	118.0	153	92.1	81.7	87.3	76.6	67.7	70	58.7	72.3	68.2	62.8	56.9	58.3	59.4	62	55	54	53.11	30.98
Nitrate	10	2.58	mg/L	0.1	<0.1	<0.05	0.1	0.14	<0.05	0.06	<0.05	0.19	0.22	0.17	0.12	0.4	<0.05	<0.5	0.05	<0.010	0.21	0.30	0.38
Nitrite	1	0.28	mg/L	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01	<0.05	<0.5	<0.05	0.17	<0.010	0.05	0.04
Ammonia	NV	NV	mg/L	0.13	0.35	0.13	0.20	0.11	0.24	0.220	0.26	0.15	0.04	0.03	0.28	0.02	0.19	0.04	<0.05	<0.050	0.071	0.10	0.09
TKN	NV	NV	mg/L	2.49	1.97	1	0.92	0.9	0.7	0.8	0.7	0.5	1	0.6	1.2	0.5	1.4	0.4	0.4	0.32	0.35	0.90	0.69
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.002	<0.002	<0.002	<0.002	0.006	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0010	<0.0010	0.00	0.01
DOC	5	3.90	mg/L	22.00	10.7	7.6	9.1	6.3	6.1	10	6.3	5.0	4.9	5.4	4.3	4.1	3.7	3.0	4.3	3.2	3.5	7.29	12.14
Conductivity	NV	NV	uS/cm	1290	1860	1440	1310	1170	1180	1100	1110	1020	1090	1070	1060	985	1030	1000	1020	980	940	1002.83	226.75
pH	6.5-8.5	NV	Unitless	7.95	7.7	7.79	7.66	7.86	7.75	7.92	7.8	7.82	7.77	8.03	8	7.99	7.7	7.9	7.89	8.12	8.17	7.88	0.19
Sulphate	500	277	mg/L	55	402	174	90	104	85	78	87	105	96	100	85	80	82	76	79	75	78	80.97	62.23
Hardness	80-100	407	mg/L	587	721	715	591	559	519	471	489	474	508	544	507	452	466	460	449	450	430	478.42	80.99
Aluminum	0.1	0.07	mg/L	0.04	0.05	0.07	0.07	0.08	0.07	0.06	0.07	0.04	0.06	0.08	0.03	0.03	0.03	0.06	0.06	-	-	0.04	0.02
Arsenic	0.025	0.001	mg/L	0.005	0.0054	0.0011	0.0041	0.0012	0.0034	0.0006	0.004	0.001	0.0008	0.009	0.0021	0.001	0.0013	0.0009	0.002	-	-	0.00	0.00
Barium	1.0	0.32	mg/L	0.14	0.179	0.147	0.139	0.114	0.117	0.095	0.112	0.102	0.106	0.119	0.11	0.094	0.009	0.099	0.09	0.097	0.091	0.10	0.03
Boron	5.0	1.32	mg/L	1.05	0.961	0.706	0.67	0.522	0.475	0.473	0.382	0.407	0.442	0.44	0.411	0.393	0.358	0.384	0.315	0.36	0.31	0.31	0.25
Cadmium	0.005	0.002	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.00003	0.00004	0.00001	<0.00002	0.00005	<0.00001	<0.00015	<0.000015	-	-	0.00	0.00
Calcium	NV	NV	mg/L	122	159	162	129	123	118	101	105	101	113	121	107	95.4	98	100	97.6	95	89	108.46	17.21
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.001	<0.001	-	-	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	0.0006	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.003	<0.002	<0.002	0.0006	0.0026	0.0009	-	-	0.00	0.00
Iron	0.3	0.17	mg/L	1.80	2	2.33	1.23	0.247	1.29	<0.005	0.475	0.041	0.011	0.015	0.257	0.005	0.035	0.006	0.402	<0.100	<0.100	0.47	0.77
Lead	0.01	0.003	mg/L	<0.00002	0.0004	0.00013	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00005	0.00008	0.00007	0.00004	0.00001	0.00002	0.00004	<0.00002	-	-	0.00	0.00
Magnesium	NV	NV	mg/L	68.4	78.3	75.2	65.3	61.2	54.6	53.2	55.1	53.8	54.9	58.7	58.3	51.8	53.8	51	49.8	52	52	50.34	10.58
Manganese	0.05	0.04	mg/L	0.07	0.115	0.159	0.149	0.024	0.177	0.003	0.117	0.04	0.004	0.005	0.059	<0.001	0.018	0.004	0.212	<0.002	0.32	0.07	0.08
Potassium	NV	NV	mg/L	2.8	3.6	3.6	3.8	3.5	3	2.8	2.7	3.0	3.0	2.9	3.0	2.7	2.7	2.6	2.3	2.4	2.3	2.68	0.54
Sodium	200	116	mg/L	74.2	79.3	74.8	71.3	73.1	62.4	57.9	48.1	50.1	51.3	53.2	47.9	42.1	40.8	42.1	40.3	40.0	39.0	40.69	18.38
Zinc	5.0	2.5	mg/L	<0.005	<0.005	0.005	<0.005	0.01	<0.005	0.017	<0.005	0.013	0.011	0.019	0.009	0.02	0.008	0.018	0.009	-	-	0.03	0.03

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-4

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	262	271	287	306	289	277	298	333	330	292	291	363	288	316	315	296	318	309
Chloride	250	149	mg/L	4.0	5.0	4.0	6.0	5.0	5.0	13.0	9.0	12	9.0	7.8	9.1	9.1	11.3	16.1	14.1	8.5	12
Nitrate	10	2.58	mg/L	nd	nd	nd	nd	0.10	0.10	0.20	<0.10	<0.10	0.20	<0.10	<0.10	0.10	0.10	<0.25	<0.25	0.10	0.20
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.25	<0.25	<0.10	<0.10
Ammonia	NV	NV	mg/L	0.05	0.07	0.08	0.05	0.06	nd	<0.05	<0.05	<0.01	<0.01	0.03	<0.01	<0.01	0.06	<0.02	<0.02	<0.01	<0.01
TKN	NV	NV	mg/L	0.20	0.40	0.50	nd	1.80	2.00	1.20	0.40	0.27	0.51	0.16	0.56	0.58	0.20	0.17	0.14	0.18	0.23
Phenols	NV	NV	mg/L	nd	IS	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	1.6	1.6	1.3	1.5	1.8	1.9	2.0	2.4	2.0	8.7	2.6	6.2	3.7	3.2	2.4	2.5	1.8	4.2
Conductivity	NV	NV	uS/cm	668	685	725	735	717	704	733	727	763	694	721	654	724	749	772	721	772	718
pH	6.5-8.5	NV	Unitless	7.90	8.20	8.10	8.10	7.90	7.90	8.00	7.73	7.64	7.85	7.83	7.69	7.90	7.98	8.16	7.95	7.90	8.02
Sulphate	500	277	mg/L	106	100	110	101	-	100	96	49	86	70	100	60	101	104	82	86.7	120	82
Hardness	80-100	407	mg/L	370	340	350	380	380	360	400	380	343	352	398	366	406	398	389	360	402	353
Aluminum	0.1	0.07	mg/L	nd	nd	nd	0.005	nd	nd	<0.005	<0.005	0.020	0.040	0.020	0.040	0.030	0.030	<0.004	<0.004	0.040	0.030
Arsenic	0.025	0.001	mg/L	nd	0.001	nd	nd	nd	nd	<0.001	0.001	0.0019	0.0027	0.0009	0.0009	0.0007	0.0007	<0.003	<0.003	0.0011	0.0011
Barium	1.0	0.32	mg/L	0.07	0.07	0.07	0.07	0.07	0.07	0.06	0.07	0.07	0.06	0.08	0.07	0.07	0.08	0.06	0.06	0.08	0.07
Boron	5.0	1.32	mg/L	0.05	0.07	0.04	0.05	0.05	0.05	0.03	0.04	0.05	0.02	0.04	0.04	0.04	0.04	0.02	0.06	0.05	0.05
Cadmium	0.005	0.002	mg/L	0.0014	0.0005	0.0009	0.0003	0.0006	nd	0.0003	<0.0001	0.00016	0.00027	0.00003	<0.00002	0.00005	<0.00002	<0.001	<0.001	<0.00002	<0.00002
Calcium	NV	NV	mg/L	80	76	82	88	85	83	97	90	77.4	81.5	92	87.2	96	93.9	95.4	84.5	90.4	81.9
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003	<0.002	<0.002
Copper	1.0	0.5	mg/L	nd	nd	0.002	0.001	0.001	0.002	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0009	0.0008	<0.003	<0.003	<0.002	0.0003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	<0.005	<0.005	0.014	0.009	<0.005	<0.010	<0.010	0.017	0.012
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00003	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002	<0.00002	<0.00002
Magnesium	NV	NV	mg/L	40	38	36	39	41	37	38	39	36.3	36.1	40.9	36.1	40.4	39.8	36.5	36.1	42.9	36
Manganese	0.05	0.04	mg/L	nd	0.002	nd	nd	nd	nd	<0.002	0.026	0.005	0.019	0.009	0.033	0.003	0.01	0.003	0.016	0.011	0.039
Potassium	NV	NV	mg/L	1.5	1.5	2.8	1.6	1.6	1.5	1.4	1.3	1.3	1.5	1.5	1.3	1.4	1.4	1.26	1.46	1.4	1.3
Sodium	200	116	mg/L	13	15	15	13	14	13	13	12	14.1	16.2	13.9	15.2	14.3	15.1	14.1	17.6	19.6	18.9
Zinc	5.0	2.5	mg/L	nd	nd	0.007	nd	0.009	nd	0.006	<0.005	0.006	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-4

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	363	341	318	318	293	282	294	296	299	325	320	338	320	338	318	336	640	100	313.33	70.13
Chloride	250	149	mg/L	11.3	9.1	9.4	10.3	8.9	9.6	12.4	15.9	15.1	18.2	16.5	14.7	16.5	14.7	13.2	13.7	5.7	1.7	10.47	4.20
Nitrate	10	2.58	mg/L	<0.05	0.10	<0.05	<0.05	0.05	0.06	0.16	0.08	0.08	0.12	0.20	<0.05	0.2	<0.05	0.06	0.07	<0.010	<0.10	0.09	0.06
Nitrite	1	0.28	mg/L	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.1	<0.05	<0.05	<0.05	<0.10	<0.010	0.03	0.02
Ammonia	NV	NV	mg/L	<0.01	0.02	0.06	0.06	0.10	0.20	0.060	0.03	0.07	0.03	0.02	<0.01	0.02	<0.01	0.02	<0.05	15	<0.050	0.47	2.53
TKN	NV	NV	mg/L	0.20	0.43	0.40	0.30	0.40	0.80	0.20	0.20	0.70	0.50	0.80	0.70	0.8	0.7	0.7	0.8	16	<0.10	0.98	2.65
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	3.2	5.5	2.0	3.7	5.0	4.6	4.2	3.0	4.2	2.8	3.3	2.9	3.3	2.9	2.5	3.6	5.4	1.1	3.18	1.58
Conductivity	NV	NV	uS/cm	821	770	756	803	791	766	769	845	801	878	783	880	783	880	803	836	1200	670	772.69	93.78
pH	6.5-8.5	NV	Unitless	7.82	7.96	7.95	7.78	8.07	7.88	7.88	7.71	8.06	7.64	7.97	7.65	7.97	7.65	8.01	7.77	7.68	8.15	7.90	0.16
Sulphate	500	277	mg/L	62	64	112	105	126	106	124	130	121	125	99	132	99	132	109	118	12	220	101.42	33.16
Hardness	80-100	407	mg/L	442	423	430	396	397	408	417	441	489	472	392	422	392	422	412	406	560	170	394.94	57.99
Aluminum	0.1	0.07	mg/L	0.030	0.06	0.06	0.05	0.05	0.06	0.04	0.06	0.08	0.06	0.03	0.05	0.03	0.05	0.06	0.05	-	-	0.04	0.02
Arsenic	0.025	0.001	mg/L	<0.0007	0.0019	<0.0001	0.0005	0.0003	0.0011	0.0005	0.0006	0.0004	0.0004	0.0003	0.0004	0.0003	0.0004	0.0004	0.0005	-	-	0.00	0.00
Barium	1.0	0.32	mg/L	0.10	0.09	0.08	0.07	0.07	0.08	0.09	0.09	0.09	0.09	0.07	0.08	0.06	0.08	0.07	0.07	0.096	0.022	0.07	0.01
Boron	5.0	1.32	mg/L	0.04	0.06	0.05	0.04	0.04	0.02	0.05	0.06	0.05	0.05	0.04	0.05	0.03	0.05	0.04	0.006	0.37	0.45	0.06	0.09
Cadmium	0.005	0.002	mg/L	<0.0001	<0.000014	0.000035	0.000025	<0.000015	<0.000015	0.000074	0.000041	0.000019	0.00002	<0.000015	<0.000015	<0.00001	<0.00001	<0.00001	<0.00001	-	-	0.00	0.00
Calcium	NV	NV	mg/L	103	98.6	97.9	90.2	88.1	89.9	92.6	101	114	108	89.7	94.8	89.7	94.8	92.8	92.5	180	37	92.11	19.31
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.001	<0.001	<0.001	-	-	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	<0.002	<0.002	<0.002	0.0019	<0.002	<0.002	0.0033	0.003	0.003	<0.002	0.0028	<0.002	0.002	0.001	0.001	-	-	0.00	0.00
Iron	0.3	0.17	mg/L	<0.005	0.246	0.005	0.043	<0.005	0.038	<0.005	0.005	0.02	0.029	<0.005	0.029	<0.005	0.02	<0.005	<0.005	0.67	<0.100	0.05	0.13
Lead	0.01	0.003	mg/L	<0.00005	<0.00002	<0.00002	0.00011	0.00008	0.00003	0.00006	0.00006	0.00007	0.00009	0.00005	0.00009	0.00005	0.00009	0.00002	<0.00002	-	-	0.00	0.00
Magnesium	NV	NV	mg/L	45.2	43	45.1	41.5	43.1	44.5	45.2	45.9	49.6	49.3	40.8	45	40.8	45	43.8	42.5	29	18	40.18	5.72
Manganese	0.05	0.04	mg/L	0.023	0.128	0.001	0.032	<0.001	0.096	<0.001	0.006	0.002	0.006	<0.001	0.004	<0.001	0.004	<0.001	0.002	0.68	<0.002	0.04	0.12
Potassium	NV	NV	mg/L	1.6	1.7	1.6	1.5	1.4	1.6	1.7	1.7	1.6	1.8	1.4	1.7	1.4	1.7	1.5	1.3	1.3	1.1	1.52	0.27
Sodium	200	116	mg/L	20.9	19.2	18.2	17.9	17.1	19.1	18	19	20.2	18.8	16.9	17.4	16.9	17.4	18.0	17.2	14.0	75.0	18.01	10.06
Zinc	5.0	2.5	mg/L	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	0.006	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	0.00	0.00

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-5

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	320	340	310	324	333	313	323	336	441	386	357	393	329	416	347	430	425	368
Chloride	250	149	mg/L	14	8	10	11	13	11	19	17	36.1	46.5	28.8	47.7	28.5	59.8	37.2	69.3	67.3	44.4
Nitrate	10	2.58	mg/L	0.20	nd	0.10	0.20	0.10	0.30	0.30	0.10	0.10	<0.1	0.10	<0.1	0.20	<0.1	<0.1	0.10	<0.25	<0.25
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	<0.01	0.02	0.10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.25
Ammonia	NV	NV	mg/L	0.15	0.15	nd	0.08	0.17	nd	<0.05	0.10	0.04	0.06	0.18	0.04	0.06	0.09	0.10	0.12	0.04	0.08
TKN	NV	NV	mg/L	0.30	0.30	0.30	0.60	1.40	1.10	0.40	0.60	0.67	0.51	0.19	0.18	0.45	0.26	0.28	0.20	0.18	0.22
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	0.00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	2.40	2.20	1.90	2.10	nd	2.20	2.00	2.20	2.20	6.50	3.30	2.30	7.30	5,9	3.70	4.30	2.30	3,6
Conductivity	NV	NV	uS/cm	676	817	718	712	735	681	722	723	932	976	809	944	755	891	838	1020	1030	845
pH	6.5-8.5	NV	Unitless	8.20	8.10	8.10	8.10	8.00	8.00	8.00	7.94	7.55	7.52	7.84	7.66	7.79	7.67	7.85	7.72	8.07	8.02
Sulphate	500	277	mg/L	41	106	79	62	-	45	42	38	37	63	49	85	60	67	50	46	37	41
Hardness	80-100	407	mg/L	320	380	350	330	350	310	430	340	495	380	381	465	370	422	425	462	514	383
Aluminum	0.1	0.07	mg/L	nd	nd	nd	nd	0.01	nd	<0.005	<0.005	0.03	0.04	0.02	0.04	0.03	0.04	0.03	0.03	0.01	<0.004
Arsenic	0.025	0.001	mg/L	0.0050	0.0050	0.0030	0.0040	0.0030	0.0030	0.0020	0.0040	0.0032	0.0035	0.0032	0.0043	0.0045	0.0038	0.0034	0.0028	<0.003	0.0040
Barium	1.0	0.32	mg/L	0.08	0.09	0.09	0.08	0.08	0.07	0.10	0.08	0.11	0.08	0.09	0.11	0.09	0.10	0.10	0.08	0.12	0.09
Boron	5.0	1.32	mg/L	0.12	0.14	0.12	0.12	0.14	0.13	0.07	0.13	0.06	0.06	0.11	0.07	0.10	0.08	0.10	0.06	0.06	0.09
Cadmium	0.005	0.002	mg/L	0.0012	0.0005	0.0029	0.0024	0.0020	0.0014	0.0019	<0.0001	0.00038	0.00013	0.00016	0.00008	0.00014	0.00010	0.00007	0.00025	<0.001	<0.001
Calcium	NV	NV	mg/L	63	76	70	65	70	63	95	66	113	80	79	107	76	94	92	108	118	81
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	0.00
Copper	1.0	0.5	mg/L	0.0010	nd	0.0020	0.0020	0.0020	0.0020	0.0020	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0009	<0.002	0.0004	0.0005	<0.003	<0.003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.08	<0.005	<0.005	0.15	<0.005	0.07	0.01	<0.005	0.19	0.10
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	<0.00002	<0.00002	0.00003	0.00003	<0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	40	47	42	40	42	38	47	42	52	44	45	48	44	46	48	47	53	44
Manganese	0.05	0.04	mg/L	0.002	0.05	nd	0.01	nd	nd	0.07	0.01	0.07	0.01	<0.001	0.03	0.003	0.03	0.03	0.06	0.07	0.04
Potassium	NV	NV	mg/L	1.6	1.7	3.0	1.8	2.0	1.7	1.5	1.6	1.6	1.6	1.7	1.7	1.5	1.5	1.5	1.5	1.6	1.6
Sodium	200	116	mg/L	30	30	31	29	32	29	23	31	23	30	32	27	32	30	30	32	31	33
Zinc	5.0	2.5	mg/L	nd	nd	0.01	0.01	0.03	0.01	0.01	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-5

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	392	367	370	380	311	351	301	317	320	298	320	314	333	325	346	357	250	330	349.69	39.99
Chloride	250	149	mg/L	62.2	39.3	55	85	58	58	52	61	59	61	77	68	107	102	122	126	1.3	90	47.31	26.63
Nitrate	10	2.58	mg/L	0.10	<0.1	<0.05	<0.1	0.06	<0.05	0.12	<0.05	0.16	0.09	0.10	0.10	0.20	<0.05	0.15	<0.05	<0.010	<0.10	0.11	0.07
Nitrite	1	0.28	mg/L	<0.1	<0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	<0.10	0.012	0.05	0.03
Ammonia	NV	NV	mg/L	0.08	0.12	<0.01	0.07	0.07	0.09	0.10	0.13	0.05	0.05	0.05	0.03	<0.01	0.03	<0.01	<0.05	<0.050	0.12	0.08	0.05
TKN	NV	NV	mg/L	0.25	0.23	0.20	0.25	0,3	0.40	0.40	0,3	0.20	0.20	2.00	0.40	0.70	0.40	0.20	0.20	0.17	0.24	0.46	0.40
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	0.00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	5,0	2.70	2.2	3.8	2.0	3.3	6.9	3.3	3.8	2.5	2.7	2.2	2.7	0.70	<0.2	2.3	0.49	2.2	2.81	1.46
Conductivity	NV	NV	uS/cm	942	859	989	1090	796	882	788	881	839	858	911	890	974	994	1060	1070	500	930	859.91	110.73
pH	6.5-8.5	NV	Unitless	7.88	7.96	7.91	7.76	8.14	7.94	8.21	8.01	8.08	7.95	8.08	7.84	8.14	7.93	7.98	7.94	8.16	8.13	7.94	0.18
Sulphate	500	277	mg/L	47	52	62	55	53	49	43	49	57	55	59	50	46	41	37	36	18	29	53.74	14.96
Hardness	80-100	407	mg/L	398	374	457	461	410	421	369	413	413	409	483	425	451	443	483	454	260	380	407.31	51.52
Aluminum	0.1	0.07	mg/L	0.03	0.03	0.04	0.07	0.06	0.05	0.05	0.06	0.04	0.05	0.07	0.02	0.04	0.02	0.07	0.06	-	-	0.03	0.02
Arsenic	0.025	0.001	mg/L	0.0013	0.0019	0.0015	0.0016	0.0012	0.0019	0.0020	0.0024	0.002	0.0020	0.002	0.002	0.002	0.002	0.00	0.00	-	-	0.00	0.00
Barium	1.0	0.32	mg/L	0.09	0.09	0.11	0.11	0.10	0.10	0.09	0.09	0.10	0.10	0.12	0.10	0.11	0.11	0.12	0.11	0.09	0.10	0.09	0.01
Boron	5.0	1.32	mg/L	0.11	0.10	0.10	0.10	0.10	0.09	0.10	0.06	0.10	0.11	0.11	0.12	0.11	0.11	0.11	0.07	0.02	0.13	0.10	0.02
Cadmium	0.005	0.002	mg/L	0.00005	<0.00002	<0.0001	0.00002	0.00003	0.00006	0.00003	0.00003	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002	<0.00001	0.00	-	-	0.00	0.00
Calcium	NV	NV	mg/L	80.4	76	97	101	88	90	77	86	86	88	105	87	96	93	105	96	60	77	86.41	14.66
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	-	-	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	0.00	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.01	0.01	<0.002	<0.002	0.001	0.001	0.001	-	-	0.00	0.00
Iron	0.3	0.17	mg/L	<0.005	0.01	0.02	0.01	0.01	0.01	<0.005	0.03	<0.005	0.01	0.01	0.01	0.01	<0.005	<0.005	<0.005	<0.100	<0.100	0.03	0.05
Lead	0.01	0.003	mg/L	<0.00002	<0.00002	0.00009	<0.00002	0.00004	0.00003	0.00010	<0.00002	0.00003	0.00005	0.00009	0.00003	0.00007	0.00005	0.00	<0.00002	-	-	0.00	0.00
Magnesium	NV	NV	mg/L	48	45	52	51	46	48	43	48	48	46	54	50	52	52	54	52	26	45	46.55	4.05
Manganese	0.05	0.04	mg/L	0.14	0.06	0.03	0.10	0.002	0.01	0.001	0.03	<0.001	0.01	0.001	0.002	<0.001	0.00	<0.001	<0.001	0.01	0.19	0.03	0.04
Potassium	NV	NV	mg/L	1.6	1.5	1.6	1.7	1.5	1.5	1.4	1.4	1.7	1.5	1.8	1.8	1.8	1.7	1.8	1.5	0.73	1.5	1.66	0.28
Sodium	200	116	mg/L	37	34	35	35	36	35	33	33	34	34	38	36	37	37	40	38	6.8	37	32.08	3.68
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	<0.005	<0.005	<0.005	0.01	<0.005	-	-	0.00	0.01

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-6

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	369	353	338	346	327	321	322	317	343	370	416	491	510	697	653	893	890	1050
Chloride	250	149	mg/L	21	21	17	17	19	16	18	16	15	21.9	46	68	84.3	118	130	162	172	233
Nitrate	10	2.58	mg/L	0.2	nd	0.2	0.2	0.2	0.3	<0.1	0.4	0.2	0.3	<0.1	0.1	0.1	<0.1	<0.1	<0.1	<0.5	<1.0
Nitrite	1	0.28	mg/L	nd	nd	0.01	0.08	nd	0.03	0.03	0.03	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<1.0
Ammonia	NV	NV	mg/L	0.10	0.40	0.09	0.29	0.06	0.19	0.36	0.43	<0.01	<0.01	0.24	<0.01	0.40	0.56	0.81	1.28	1.19	1.37
TKN	NV	NV	mg/L	0.3	0.7	0.7	0.7	1.2	1.2	2.0	1.1	1.7	3.5	0.86	2.3	2.6	4.0	4.9	6.9	7	10
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002
DOC	5	3.90	mg/L	1.4	1.6	1.4	1.3	1.3	1.3	1.5	1.6	1.5	2.5	4.4	7.5	16	22	19	26	38	60
Conductivity	NV	NV	uS/cm	837	805	762	751	726	706	695	707	774	915	1040	1220	1260	1450	1630	1960	2110	2450
pH	6.5-8.5	NV	Unitless	8.2	8.2	8.1	8.1	8.0	7.9	8.1	8.1	7.8	7.8	8.1	7.9	7.7	7.8	7.8	7.7	8.1	7.9
Sulphate	500	277	mg/L	79	61	49	48	-	38	36	42	67	90	92	106	94	91	75	68	52	36
Hardness	80-100	407	mg/L	330	270	260	250	240	220	230	250	267	299	322	333	347	426	483	580	703	780
Aluminum	0.1	0.07	mg/L	0.33	0.014	nd	nd	nd	nd	<0.005	<0.005	0.02	0.03	0.02	0.03	0.02	0.04	0.03	0.03	0.005	<0.004
Arsenic	0.025	####	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0008	0.0004	0.0012	0.0009	0.001	0.0032	0.0111	0.0091	<0.003	0.005
Barium	1.0	0.32	mg/L	0.09	0.09	0.10	0.09	0.09	0.08	0.09	0.09	0.10	0.10	0.13	0.14	0.14	0.17	0.18	0.22	0.25	0.23
Boron	5.0	1.32	mg/L	0.37	0.33	0.34	0.31	0.36	0.33	0.33	0.35	0.36	0.31	0.37	0.32	0.35	0.35	0.39	0.36	0.41	0.41
Cadmium	0.005	####	mg/L	0.0001	0.0001	0.0002	0.0002	0.0003	nd	0.0002	<0.0001	0.00003	<0.00002	<0.00002	0.00004	0.00008	0.00004	<0.00002	0.00041	<0.001	<0.001
Calcium	NV	NV	mg/L	60	49	47	46	43	40	41	45	48.3	54.9	57.6	59.9	61.4	77.2	87.1	103	129	136
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.006	0.01
Copper	1.0	0.5	mg/L	0.002	nd	0.002	0.002	0.002	0.007	0.002	<0.0005	<0.002	<0.002	<0.002	0.004	0.0037	0.002	0.0029	<0.002	<0.003	<0.003
Iron	0.3	0.17	mg/L	0.22	0.12	nd	nd	nd	0.1	<0.10	<0.10	0.033	<0.005	0.08	<0.005	<0.005	0.251	3.9	6.4	2.1	4.6
Lead	0.01	####	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00002	<0.00002	<0.00002	0.00006	0.00007	0.00004	0.0001	0.00005	<0.002	<0.002
Magnesium	NV	NV	mg/L	44	36	34	32	31	28	30	33	36	40	43	45	47	57	65	79	93	107
Manganese	0.05	0.04	mg/L	0.02	0.09	nd	0.05	nd	0.03	0.02	0.04	0.02	0.03	0.04	0.04	0.08	0.10	0.09	0.13	0.13	0.12
Potassium	NV	NV	mg/L	4.3	3.8	4.8	3.5	3.4	3.1	3.1	3.3	3.4	3.6	4	3.9	3.9	4.4	4.9	4.9	6.0	7.5
Sodium	200	116	mg/L	93	83	76	76	74	74	71	71	73.3	95.4	127	176	166	205	219	209	238	284
Zinc	5.0	2.5	mg/L	nd	nd	0.007	nd	nd	0.005	0.005	0.006	<0.005	0.015	<0.005	<0.005	<0.005	<0.005	0.006	0.015	<0.005	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-6

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	1350	1460	1110	1440	1330	1360	1280	1380	1410	1430	1430	1430	1470	1570	1420	1210	1400	1400	941.28	481.54
Chloride	250	149	mg/L	50.5	356	299	340	476	412	408	469	458	520	535	547	480	485	535	507	470	470	250.35	209.43
Nitrate	10	2.58	mg/L	<0.1	<0.5	<0.5	<1.0	<0.5	<0.5	<0.05	<0.5	0.7	<0.5	<0.5	<0.05	<1.0	<0.5	<0.5	<0.05	<0.010	<0.10	0.21	0.17
Nitrite	1	0.28	mg/L	<0.1	<0.5	<0.5	<1.0	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.05	<1.0	<0.5	<0.5	<0.05	<0.10	<0.010	0.14	0.15
Ammonia	NV	NV	mg/L	3.57	7.02	9.26	14.3	15	17	17.9	21	25	28	30	24	41	43	32	36	29	30	12.66	14.20
TKN	NV	NV	mg/L	15	19.1	23	29.2	33	32	29	35	47	53	42	33	<0.1	57	41	53	41	41	19.27	19.07
Phenols	NV	NV	mg/L	<0.001	0.002	0.001	0.004	0.003	0.02	0.004	0.004	<0.002	0.004	0.017	0.002	0.002	<0.001	<0.001	<0.001	0.007	0.006	0.00	0.00
DOC	5	3.90	mg/L	65	23	106.0	26.2	115	22	110	29	107	82	22	83	17	81	49	18	130	130	39.58	42.42
Conductivity	NV	NV	uS/cm	2490	3140	3050	3520	3240	3630	3400	3680	3610	3960	3860	3780	3720	4150	3880	3980	3700	3800	2371.89	1321.66
pH	6.5-8.5	NV	Unitless	7.7	7.6	7.78	7.52	7.56	7.5	7.6	7.6	7.4	7.3	7.3	7.2	7.6	7.2	7.5	7.4	7.7	7.8	7.74	0.28
Sulphate	500	277	mg/L	3.0	<5.0	<10	13	<10	<10	<1.0	<10	<10	<10	<10	1.0	<10	<10	11	4	<1.0	<1.0	33.29	36.15
Hardness	80-100	407	mg/L	845	937	995	1170	1080	1110	1080	1190	1170	1250	1180	1190	1150	1260	1190	1150	1100	1200	745.47	408.73
Aluminum	0.1	0.07	mg/L	0.04	0.05	0.05	0.05	0.08	0.08	0.07	0.09	0.07	0.08	0.1	0.06	0.06	0.13	0.09	0.08	-		0.06	0.06
Arsenic	0.025	####	mg/L	0.008	0.006	0.015	0.005	0.017	0.010	0.009	0.004	0.007	0.005	0.004	0.012	0.011	0.011	0.01	0.01	-		0.01	0.00
Barium	1.0	0.32	mg/L	0.29	0.34	0.51	0.53	0.51	0.64	0.59	0.60	0.75	0.77	0.82	0.79	0.75	0.92	0.93	0.94	0.75	0.7	0.40	0.31
Boron	5.0	1.32	mg/L	0.43	0.45	0.51	0.60	0.55	0.56	0.57	0.56	0.61	0.64	0.64	0.64	0.64	0.66	0.66	0.61	0.63	0.57	0.47	0.13
Cadmium	0.005	####	mg/L	<0.00002	<0.00002	<0.0001	0.000036	<0.000015	<0.000015	0.000016	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.00007	<0.00003	-		0.00	0.00
Calcium	NV	NV	mg/L	136	141	141	163	151	155	143	154	152	165	151	149	144	157	152	147	150	140	107.68	47.43
Chromium	0.05	0.01	mg/L	<0.002	0.003	0.003	0.004	0.003	0.003	0.003	0.004	0.003	0.004	0.004	0.002	<0.002	0.004	0.003	0.003	-		0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	0.0017	0.007	<0.002	<0.002	<0.002	0.0029	<0.002	<0.002	0.0019	<0.002	<0.002	<0.002	0.001	0.0015	0.003	-		0.00	0.00
Iron	0.3	0.17	mg/L	6.3	4.6	2.9	2.2	6.7	6.7	5.4	3.3	3.0	3.1	7.7	8.5	5.0	8.0	7.9	7.0	0.25	0.27	3.55	2.98
Lead	0.01	####	mg/L	<0.00002	0.00005	0.00008	0.00002	<0.00002	0.00007	0.0001	<0.0001	0.0002	0.00017	0.0001	0.00011	0.00021	0.00018	<0.0001	<0.00009	-		0.00	0.00
Magnesium	NV	NV	mg/L	123	142	156	185	172	175	175	196	191	203	196	200	192	212	197	190	180	190	115.35	71.13
Manganese	0.05	0.04	mg/L	0.06	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.03	0.02	0.03	0.02	0.02	0.026	0.02	0.02	0.018	0.019	0.04	0.03
Potassium	NV	NV	mg/L	8.6	11	16	19	17	19	19	20	22	26	24	24	22	27	27	26	25	26	12.56	9.27
Sodium	200	116	mg/L	297	337	369	430	414	430	408	420	414	445	439	416	407	442	443	412	420	440	272.05	151.00
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-		0.00	0.00

Notes: Provided on Page 1 of Appendix

HISTORICAL GROUNDWATER QUALITY DATA
OW-7S

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	187	176	172	174	169	167	167	168	174	172	175	177	177	178	169	184	176	177
Chloride	250	149	mg/L	15	14	18	17	18	17	20	21	20	20.9	21	22	22.6	23.6	23.6	24.3	25.7	26.9
Nitrate	10	2.58	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.1	<0.10	<0.10	0.10	0.10	0.10	<0.10	0.10	<0.25	<0.10
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.25	<0.10
Ammonia	NV	NV	mg/L	nd	0.07	nd	nd	0.26	nd	<0.05	<0.05	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	0.05	<0.02	<0.02
TKN	NV	NV	mg/L	0.2	0.3	0.2	0.20	0.3	1.0	0.50	<0.5	0.13	0.43	0.08	0.19	0.21	0.13	0.07	0.10	<0.10	<0.10
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	0.6	0.8	0.6	0.8	0.7	0.6	0.8	0.9	0.7	3.9	1.4	8.3	8.5	3.8	1.8	4.1	1.5	1.3
Conductivity	NV	NV	uS/cm	480	473	467	457	455	450	448	463	473	501	497	500	497	448	497	487	510	528
pH	6.5-8.5	NV	Unitless	8.20	8.20	8.20	8.20	8.00	8.00	8.10	8.21	7.97	8.00	8.10	7.99	7.96	8.12	8.07	8.01	8.32	7.51
Sulphate	500	277	mg/L	47	48	45	41	-	37	36	37	40	43	46	52	52	54	51	52	51	58
Hardness	80-100	407	mg/L	160	140	130	130	130	120	130	130	131	135	142	134	141	133	150	125	139	145
Aluminum	0.1	0.07	mg/L	nd	0.015	nd	nd	nd	nd	<0.005	<0.005	0.07	0.02	<0.01	0.02	0.02	0.02	0.01	<0.01	<0.004	<0.004
Arsenic	0.025	0.001	mg/L	nd	nd	nd	0.0010	nd	nd	<0.001	0.0010	0.0014	0.0016	0.0018	0.0016	0.0014	0.0021	0.0016	0.0013	<0.003	<0.003
Barium	1.0	0.32	mg/L	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.03
Boron	5.0	1.32	mg/L	0.31	0.30	0.28	0.28	0.29	0.29	0.29	0.30	0.30	0.26	0.31	0.27	0.29	0.27	0.31	0.24	0.25	0.28
Cadmium	0.005	0.002	mg/L	0.001	0.0017	0.0004	0.0017	0.0005	0.0003	0.0004	0.0002	0.00017	0.00009	0.0001	0.00014	0.00011	0.0003	0.00008	0.00009	<0.001	<0.001
Calcium	NV	NV	mg/L	31	28	26	27	26	25	26	27	27	28	29	28	29	27	31	26	30	30
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003
Copper	1.0	0.5	mg/L	nd	nd	nd	0.001	nd	0.001	0.002	<0.0005	0.003	<0.002	<0.002	<0.002	0.0006	<0.002	0.0005	<0.002	<0.003	<0.003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	<0.00002	0.00003	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	19	16	16	16	15	14	15	15	16	16	17	16	17	16	17	15	16	17
Manganese	0.05	0.04	mg/L	nd	0.004	nd	nd	nd	0.007	<0.002	0.012	0.002	0.001	<0.001	0.002	<0.001	0.004	0.006	0.002	<0.002	<0.002
Potassium	NV	NV	mg/L	1.2	1.1	0.97	1.1	1.0	1.0	1.1	0.97	1.0	0.9	1.0	1.0	0.9	0.9	1.0	0.8	0.97	1.06
Sodium	200	116	mg/L	59	53	51	51	52	49	53	52	53	58	55	53	56	53	57	48	53	58
Zinc	5.0	2.5	mg/L	nd	nd	nd	nd	nd	nd	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-7S

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	181	181	179	173	168	174	166	161	168	155	164	166	176	167	178	180	180	170	172.94	6.73
Chloride	250	149	mg/L	24.4	26	22	20.8	27.6	26.7	27.1	28	28	29	29	27	31	28	29	29	27	25	23.73	4.40
Nitrate	10	2.58	mg/L	0.10	0.10	<0.05	0.10	0.09	<0.05	0.07	<0.05	0.13	<0.05	0.15	<0.05	0.3	<0.05	0.17	0.09	<0.010	<0.10	0.10	0.10
Nitrite	1	0.28	mg/L	<0.10	<0.10	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	0.15	<0.010	0.04	0.03
Ammonia	NV	NV	mg/L	<0.01	<0.01	<0.01	<0.01	0.09	0.12	0.12	0.01	0.02	0.01	0.07	0.02	0.17	0.15	0.15	0.1	<0.050	<0.050	0.05	0.06
TKN	NV	NV	mg/L	0.13	0.05	0.20	0.07	0.30	0.20	0.20	0.40	<0.1	<0.1	0.20	0.10	<0.1	0.10	0.25	<0.1	0.14	<0.10	0.21	0.19
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	0.003	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	0.4	1.5	2.0	3.5	2.1	3.2	5.6	2.4	3.6	2.5	3.4	1.7	17	1.7	1.0	4.2	0.48	0.62	2.71	3.10
Conductivity	NV	NV	uS/cm	520	546	529	517	507	536	508	541	507	512	505	506	508	512	510	517	510	500	497.83	26.56
pH	6.5-8.5	NV	Unitless	8.10	8.04	8.13	8.06	8.22	7.84	7.92	7.73	8.01	8.03	8.15	7.93	7.95	8.00	7.92	7.72	8.24	8.29	8.04	0.17
Sulphate	500	277	mg/L	54	60	45	42	54	54	50	49	50	51	48	46	47	46	46	46	42	38	47.39	5.92
Hardness	80-100	407	mg/L	153	140	156	149	152	151	144	145	145	146	158	144	144	140	141	133	140	120	140.14	10.18
Aluminum	0.1	0.07	mg/L	<0.01	0.01	<0.01	0.03	0.02	0.03	0.02	0.03	0.02	0.01	0.03	<0.01	<0.01	<0.01	0.02	0.02	-	-	0.02	0.01
Arsenic	0.025	0.001	mg/L	0.0008	0.0008	0.0008	0.0009	<0.0001	0.0011	0.0005	0.0007	0.0006	0.0008	0.0007	0.0007	0.0007	0.0007	0.0007	0.0007	-	-	0.00	0.00
Barium	1.0	0.32	mg/L	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.04	0.03	0.04	0.00
Boron	5.0	1.32	mg/L	0.28	0.26	0.31	0.31	0.27	0.29	0.29	0.25	0.29	0.30	0.32	0.31	0.30	0.30	0.3	0.25	0.29	0.28	0.29	0.02
Cadmium	0.005	0.002	mg/L	0.00009	0.00008	<0.0001	0.00007	0.00007	0.00005	0.00003	0.00005	0.00004	0.00005	0.00003	0.00004	0.00003	0.00004	0.00002	0.00002	-	-	0.00	0.00
Calcium	NV	NV	mg/L	31	29	32	31	31	32	29	29	29	30	32	28	29	28	29	27	28	25	28.56	1.98
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	-	-	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	0.0006	<0.002	<0.002	<0.002	<0.002	0.0022	0.002	<0.002	0.0031	<0.002	<0.002	<0.002	0.0003	0.001	0.0007	-	-	0.00	0.00
Iron	0.3	0.17	mg/L	0.012	0.006	<0.005	0.008	0.012	0.011	0.016	<0.005	<0.005	0.011	<0.005	0.005	<0.005	<0.005	<0.005	0.009	<0.100	<0.100	0.04	0.13
Lead	0.01	0.003	mg/L	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	0.00004	0.0001	<0.00002	0.00006	0.00006	0.00002	0.00003	0.00004	0.0005	0.00003	<0.00002	-	-	0.00	0.00
Magnesium	NV	NV	mg/L	18	17	19	18	18	17	17	18	18	17	19	18	18	17	17	16	16	15	16.62	1.24
Manganese	0.05	0.04	mg/L	<0.001	<0.001	0.002	0.001	<0.001	0.002	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.01	<0.002	<0.002	0.00	0.00
Potassium	NV	NV	mg/L	1.0	0.9	1.0	1.0	0.9	0.9	0.9	0.9	1.1	1.0	1.1	1.1	1.1	1.1	1.0	0.8	0.9	0.88	0.99	0.09
Sodium	200	116	mg/L	59	54	62	61	62	61	59	57	58	56	64	57	59	56	59	55	56	52	55.71	3.81
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	0.00	0.00

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-7D

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	176	177	169	173	169	164	167	166	173	182	176	178	178	179	166	179	172	174
Chloride	250	149	mg/L	6.0	15	6.0	6.0	7.0	7.0	8.0	7.0	5.9	5.8	6.6	6.4	7.0	6.7	6.9	7.6	8.3	7.8
Nitrate	10	2.58	mg/L	0.10	nd	0.20	0.10	nd	nd	<0.10	0.10	0.20	0.20	0.20	0.20	0.20	0.30	0.30	0.30	<0.25	0.18
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	0.01	<0.01	<0.10	<0.10	<0.10	<0.10	<0.10	0.20	<0.10	<0.10	<0.25	<0.10
Ammonia	NV	NV	mg/L	0.05	0.07	nd	nd	nd	nd	<0.05	<0.05	<0.01	<0.01	0.01	0.09	<0.01	<0.01	<0.01	0.02	<0.02	<0.02
TKN	NV	NV	mg/L	0.20	0.30	0.30	0.20	0.40	0.20	0.70	<0.02	0.27	0.46	0.07	0.11	0.19	0.06	0.19	0.10	<0.10	<0.10
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	1.3	0.7	0.9	0.8	0.8	0.9	1.0	1.1	0.9	1.2	1.6	4.1	5.3	2.7	2.3	5.8	1.7	1.0
Conductivity	NV	NV	uS/cm	517	467	492	487	477	469	463	461	494	533	524	510	511	450	496	498	497	514
pH	6.5-8.5	NV	Unitless	8.20	8.30	8.20	8.1	8.00	8.00	8.10	8.14	7.94	8.00	8.16	8.07	8.02	8.10	8.07	8.09	8.31	7.90
Sulphate	500	277	mg/L	87	41	73	66	-	59	56	55	75	84	83	87	82	81	78	82	69	78
Hardness	80-100	407	mg/L	110	130	94	120	88	85	88	87	97	105	108	104	105	99	108	93	99	102
Aluminum	0.1	0.07	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.01	0.06	<0.01	0.02	0.02	0.02	0.02	<0.01	<0.004	<0.004
Arsenic	0.025	0.001	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0006	0.0003	0.0005	0.0006	0.001	0.0005	0.0004	0.0004	<0.003	<0.003
Barium	1.0	0.32	mg/L	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04
Boron	5.0	1.32	mg/L	0.48	0.29	0.42	0.35	0.45	0.42	0.44	0.42	0.46	0.45	0.48	0.42	0.44	0.43	0.48	0.38	0.38	0.44
Cadmium	0.005	0.002	mg/L	0.0007	0.0005	0.0007	0.001	0.001	0.0005	0.0003	<0.0001	0.0003	0.0006	0.0001	0.0002	0.0002	0.0002	0.00023	0.0003	<0.001	<0.001
Calcium	NV	NV	mg/L	26	27	22	24	20	20	21	21	23	25	25	24	24	23	25	22	23	24
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003
Copper	1.0	0.5	mg/L	nd	nd	0.002	0.003	0.001	0.002	0.002	<0.0005	<0.0020	<0.0020	<0.0020	<0.0020	0.002	<0.0020	0.001	<0.0020	<0.0030	<0.0030
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	0.02	<0.005	<0.005	<0.005	<0.005	0.014	<0.005	<0.010	<0.010
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	<0.00002	0.00009	<0.00002	0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	12	16	9.7	13	9.0	8.6	8.9	8.6	10	11	11	11	11	10	11	10	10	11
Manganese	0.05	0.04	mg/L	0.005	0.002	nd	nd	nd	nd	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.002	<0.002
Potassium	NV	NV	mg/L	1.3	1.1	2.5	1.0	1.0	1.0	1.0	0.9	1.0	1.1	1.1	1.0	1.0	0.9	1.0	0.9	1.0	1.1
Sodium	200	116	mg/L	87	52	74	60	73	70	73	69	71	73	76	72	76	70	77	65	70	74
Zinc	5.0	2.5	mg/L	nd	nd	0.006	nd	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-7D

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	180	197	171	170	164	169	158	153	165	151	157	155	166	158	162	176	160	160	169.17	9.54
Chloride	250	149	mg/L	7.2	7.4	7.2	6.7	9.6	9.6	5.4	9.2	11	10	10	10.2	11	9.1	10	10	9.4	12	8.25	2.13
Nitrate	10	2.58	mg/L	0.30	0.3	0.21	0.30	0.29	0.27	0.15	0.13	0.34	0.31	0.29	0.21	0.40	0.25	0.26	0.25	<0.010	<0.10	0.23	0.10
Nitrite	1	0.28	mg/L	<0.10	0.3	<0.05	<0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.10	<0.05	<0.05	<0.05	0.16	<0.010	0.05	0.04
Ammonia	NV	NV	mg/L	<0.01	<0.01	<0.01	<0.01	0.06	0.03	0.12	<0.01	0.01	0.03	0.02	0.02	<0.01	<0.01	<0.01	<0.05	<0.050	<0.050	0.02	0.03
TKN	NV	NV	mg/L	0.07	<0.05	<0.10	0.12	0.30	0.20	0.20	<0.10	0.10	0.10	0.20	0.10	0.20	<0.10	<0.1	<0.1	<0.10	<0.10	0.21	0.17
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	0.6	1.6	1.6	2.1	1.5	2.4	5.3	2.9	2.3	3.4	1.6	1.7	2.0	0.7	1.7	2.8	0.68	0.85	1.94	1.36
Conductivity	NV	NV	uS/cm	506	524	498	502	504	504	477	475	465	473	468	471	458	456	456	460	450	450	484.92	24.09
pH	6.5-8.5	NV	Unitless	8.12	8.07	8.21	8.13	8.21	7.96	8.08	7.94	8.08	8.09	8.23	7.49	8.12	8.02	7.94	7.43	8.18	8.28	8.06	0.18
Sulphate	500	277	mg/L	77	82	60	59	74	68	34	58	60	61	60	57	54	54	55	55	54	45	65.82	13.80
Hardness	80-100	407	mg/L	106	99	107	103	103	100	66	90	89	91	96	88	84	83	83	78.6	82	65	95.43	13.30
Aluminum	0.1	0.07	mg/L	<0.01	<0.01	0.01	0.03	0.02	0.02	0.02	0.03	<0.01	0.02	0.03	<0.01	<0.01	<0.01	0.02	0.01	-	-	0.01	0.01
Arsenic	0.025	0.001	mg/L	0.000	0.0003	<0.0007	0.0004	<0.0001	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0004	0.0004	0.0005	-	-	0.00	0.00
Barium	1.0	0.32	mg/L	0.04	0.04	0.04	0.04	0.04	0.04	0.02	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.03	0.04	0.03	0.04	0.01
Boron	5.0	1.32	mg/L	0.44	0.40	0.47	0.47	0.43	0.44	0.48	0.41	0.45	0.47	0.49	0.46	0.47	0.47	0.46	0.43	0.46	0.43	0.44	0.04
Cadmium	0.005	0.002	mg/L	0.00016	0.00011	0.0002	0.00017	0.000376	0.000251	0.000261	0.000177	0.000108	0.000117	0.00008	0.000082	0.000153	0.000087	0.0001	0.00008	-	-	0.00	0.00
Calcium	NV	NV	mg/L	24	22	24	24	24	23	14	20	20	21	22	20	19	18	19	18	19	15	21.80	2.94
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	-	-	0.00	0.00
Copper	1.0	0.5	mg/L	<0.0020	0.013	<0.0020	<0.0020	<0.0020	<0.0020	0.003	0.004	<0.002	0.001	0.002	<0.0020	<0.0020	0.001	0.0006	0.001	-	-	0.00	0.00
Iron	0.3	0.17	mg/L	<0.005	<0.005	<0.005	0.007	0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.100	<0.100	0.04	0.13
Lead	0.01	0.003	mg/L	0.00325	0.00002	<0.00005	<0.00002	<0.00002	0.00012	0.00088	<0.00002	0.00007	0.00002	0.00003	<0.00002	0.00003	0.00006	0.00002	<0.00002	-	-	0.00	0.00
Magnesium	NV	NV	mg/L	11	10	11	11	11	10	7.8	10	10	9.4	10	10	9.0	8.9	8.5	8.2	8.3	6.7	9.99	1.60
Manganese	0.05	0.04	mg/L	<0.001	<0.001	<0.001	<0.001	0.004	0.008	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	0.001	<0.002	<0.002	0.00	0.00
Potassium	NV	NV	mg/L	1.0	0.9	0.9	1.0	1.0	0.90	0.90	0.90	1.0	0.90	1.0	1.1	1.0	1.0	0.90	0.70	0.89	0.87	1.02	0.27
Sodium	200	116	mg/L	77	70	80	78	81	80	81	73	74	71	79	72	71	70	69	67	71	61	72.39	6.50
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	0.00	0.00

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-8S

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	244	238	233	246	233	230	231	226	231	233	233	237	234	235	220	236	223	228
Chloride	250	149	mg/L	10	9	9	9	9	10	13	12	12	13	16	17	20	21	23	25	28	29
Nitrate	10	2.58	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.1	0.10	<0.25	<0.10
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.10	<0.25	<0.10
Ammonia	NV	NV	mg/L	0.07	0.10	nd	nd	0.06	0.06	<0.05	0.09	<0.01	<0.01	0.02	<0.01	0.01	0.01	0.02	0.04	0.02	<0.02
TKN	NV	NV	mg/L	0.2	0.3	0.2	nd	0.7	0.20	0.30	<0.5	0.59	0.31	0.08	0.13	0.1	0.06	0.11	<0.10	<0.10	<0.10
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	0.8	0.6	0.5	0.7	0.5	0.6	0.6	0.8	0.6	1.1	1.3	1.7	3.5	4.8	1.9	2.3	1.5	0.9
Conductivity	NV	NV	uS/cm	667	654	637	668	634	634	634	634	646	685	678	662	666	590	664	667	689	701
pH	6.5-8.5	NV	Unitless	8.20	8.20	8.20	8.10	8.00	8.00	8.10	8.07	7.86	7.95	8.20	8.04	7.99	8.06	8.08	8.03	8.34	8.07
Sulphate	500	277	mg/L	102	97	100	101	-	88	89	83	100	106	106	109	104	103	101	104	97	103
Hardness	80-100	407	mg/L	240	220	230	220	220	210	200	210	220	234	243	228	228	215	239	197	228	234
Aluminum	0.1	0.07	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.04	0.03	0.02	0.02	0.02	0.02	0.01	0.01	<0.004	<0.004
Arsenic	0.025	0.001	mg/L	0.001	0.002	0.002	0.001	nd	0.002	<0.001	0.003	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.001	<0.003	<0.003
Barium	1.0	0.32	mg/L	0.05	0.05	0.05	0.04	0.04	0.04	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.05	0.05	0.04	0.05	0.05
Boron	5.0	1.32	mg/L	0.40	0.41	0.41	0.40	0.39	0.40	0.39	0.42	0.42	0.39	0.44	0.38	0.40	0.39	0.42	0.33	0.40	0.38
Cadmium	0.005	0.002	mg/L	0..0006	0.0001	0.0004	0.0003	0.0004	0.0002	0.0002	<0.0001	0.00011	0.00013	0.00013	0.00009	0.00008	0.00003	0.00006	0.00003	<0.001	<0.001
Calcium	NV	NV	mg/L	42	38	38	37	37	36	35	37	38	40	42	40	39	37	42	34	41	42
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003
Copper	1.0	0.5	mg/L	nd	nd	0.001	0.001	nd	0.001	0.002	<0.0005	0.008	<0.002	<0.002	<0.002	0.001	<0.002	0.0006	<0.002	<0.003	<0.003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.014	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00007	<0.00002	0.00003	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	34	30	32	30	31	29	28	29	30.7	33	34	31	32	30	32	27	31	32
Manganese	0.05	0.04	mg/L	0.004	0.04	nd	nd	0.00	0.03	<0.002	0.02	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	<0.002	0.01
Potassium	NV	NV	mg/L	1.6	1.5	3.2	1.5	1.6	1.5	1.4	1.4	1.4	1.5	1.6	1.5	1.3	1.3	1.4	1.2	1.4	1.5
Sodium	200	116	mg/L	64	57	65	60	61	57	58	59	61	63	63	59	63	57	63	52	60	64
Zinc	5.0	2.5	mg/L	nd	nd	3.2	nd	0.007	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-8S

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	256	232	225	149	215	222	235	206	216	199	214	212	222	210	218	230	220	220	224.78	17.38
Chloride	250	149	mg/L	30	31	29	6	40	41	44	46	48	50	55	50	58	55	58	58	53	54	30.32	18.09
Nitrate	10	2.58	mg/L	0.10	<0.10	<0.05	0.20	<0.05	<0.05	<0.05	<0.05	0.10	<0.05	0.12	<0.05	0.20	<0.05	0.1	0.05	<0.010	<0.10	0.07	0.05
Nitrite	1	0.28	mg/L	<0.10	<0.10	<0.05	0.10	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	0.11	<0.010	0.04	0.03
Ammonia	NV	NV	mg/L	<0.01	<0.01	<0.01	<0.01	0.04	0.03	0.050	0.02	0.03	0.02	0.02	0.03	<0.01	<0.01	<0.01	<0.05	<0.050	<0.050	0.03	0.02
TKN	NV	NV	mg/L	<0.05	0.11	<0.10	0.25	0.20	0.20	0.20	0.10	0.10	0.10	0.20	0.20	0.10	0.10	<0.1	<0.1	<0.10	<0.10	0.22	0.17
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	<0.2	1.4	0.9	2.2	1	1.3	4.3	2.2	1.2	0.7	1.8	1	0.7	<0.2	<0.2	1.9	0.76	0.47	1.30	1.08
Conductivity	NV	NV	uS/cm	709	714	719	689	710	740	717	729	726	737	745	745	743	749	765	757	770	750	695.11	46.11
pH	6.5-8.5	NV	Unitless	8.16	8.10	8.15	8.20	8.17	8.00	8.14	8.04	8.07	8.06	8.17	7.90	8.11	8.01	8.06	7.67	8.18	8.27	8.08	0.12
Sulphate	500	277	mg/L	103	108	86	164	100	99		94	98	99	99	93	93	96	95	94	87	83	99.54	13.27
Hardness	80-100	407	mg/L	245	229	259	180	253	246	244	242	252	258	278	257	255	247	252	245	240	220	233.83	20.07
Aluminum	0.1	0.07	mg/L	0.01	0.01	0.01	0.04	0.03	0.03	0.03	0.04	0.02	0.03	0.04	<0.01	0.02	0.03	0.04	0.03	-	-	0.02	0.01
Arsenic	0.025	0.001	mg/L	0.001	0.001	0.001	0.000	<0.0001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.0007	0.0009	-	-	0.00	0.00
Barium	1.0	0.32	mg/L	0.05	0.05	0.05	0.03	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.05	0.05	0.05	0.053	0.05	0.048	0.043	0.05	0.00
Boron	5.0	1.32	mg/L	0.39	0.38	0.43	0.52	0.39	0.40	0.39	0.36	0.40	0.43	0.46	0.43	0.42	0.42	0.426	0.39	0.41	0.39	0.41	0.03
Cadmium	0.005	0.002	mg/L	0.00008	0.00004	<0.0001	0.000113	0.000052	0.000025	0.000025	0.000034	0.00003	0.000023	0.000026	0.000028	0.000025	0.000029	0.00002	0.00002	-	-	0.00	0.00
Calcium	NV	NV	mg/L	42	39	45	39	44	43	42	40	42	45	48	42	42	41	44	42	41	37	40.31	3.02
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	-	-	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	0.0005	<0.002	<0.002	<0.002	0.002	0.002	<0.002	<0.002	0.0021	<0.002	<0.002	0.01	0.001	0.0004	0.0009	-	-	0.00	0.00
Iron	0.3	0.17	mg/L	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	0.005	0.006	<0.005	<0.005	0.008	0.013	<0.005	<0.005	<0.100	<0.100	0.04	0.13
Lead	0.01	0.003	mg/L	<0.00002	<0.00002	0.00006	<0.00002	<0.00002	<0.00002	0.00018	0.00003	0.00004	0.00008	0.00002	0.00003	0.00081	0.00005	<0.00002	<0.00002	-	-	0.00	0.00
Magnesium	NV	NV	mg/L	34	32	36	20	35	34	34	35	36	36	39	37	36	35	35	34	34	30	32.34	3.35
Manganese	0.05	0.04	mg/L	<0.001	0.01	<0.001	0.00	<0.001	0.00	<0.001	0.00	<0.001	0.00	<0.001	0.01	<0.001	0.00	<0.001	<0.01	<0.002	<0.002	0.01	0.01
Potassium	NV	NV	mg/L	1.4	1.3	1.4	1.3	1.4	1.4	1.3	1.3	1.6	1.5	1.6	1.7	1.5	1.6	1.5	1.3	1.3	1.3	1.49	0.32
Sodium	200	116	mg/L	65	61	69	88	70	69	66	64	67	65	74	67	67	65	67	64	64	60	63.83	5.91
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	0.11	0.58

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-8D

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	160	153	149	165	151	145	145	143	147	157	159	164	161	167	156	162	153	154
Chloride	250	149	mg/L	7.0	6.0	5.0	5.0	7.0	6.0	7.0	6.0	4.9	4.6	5.2	4.7	6.3	5.2	5.8	5.8	7	7.2
Nitrate	10	2.58	mg/L	nd	nd	0.20	0.10	nd	nd	<0.1	0.20	0.20	0.20	0.10	0.20	0.20	0.30	0.20	0.20	<0.25	0.17
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	0.20	<0.1	<0.1	<0.25	<0.10
Ammonia	NV	NV	mg/L	nd	0.07	nd	nd	nd	nd	<0.05	<0.05	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	0.02	0.02	<0.02
TKN	NV	NV	mg/L	0.20	0.30	0.20	0.20	0.30	0.20	0.40	0.40	0.22	0.31	<0.05	0.25	0.07	0.28	0.12	0.10	<0.10	<0.10
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	<0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	0.8	1.0	0.8	0.8	1.0	0.9	2.1	1.2	0.8	1.4	1.2	1.4	4.7	3.4	2.0	5.6	1.4	1.9
Conductivity	NV	NV	uS/cm	730	717	697	686	697	679	679	675	676	747	737	717	755	635	731	687	719	713
pH	6.5-8.5	NV	Unitless	8.20	8.20	8.20	8.20	8.00	8.00	8.10	8.07	7.90	7.95	8.07	8.02	8.09	8.08	8.09	8.04	8.28	8.06
Sulphate	500	277	mg/L	195	180	178	183	-	190	190	170	187	204	203	207	206	209	207	203	196	198
Hardness	80-100	407	mg/L	200	180	200	180	170	170	170	170	169	201	203	196	191	191	210	166	181	181
Aluminum	0.1	0.07	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	0.24	0.03	0.01	0.03	0.07	0.03	0.02	0.01	<0.004	<0.004
Arsenic	0.025	0.001	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0005	0.0004	0.0003	0.0005	0.000	0.0004	0.0002	0.0003	<0.003	<0.003
Barium	1.0	0.32	mg/L	0.028	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Boron	5.0	1.32	mg/L	0.49	0.49	0.49	0.48	0.51	0.49	0.5	0.51	0.51	0.49	0.54	0.47	0.48	0.48	0.54	0.42	0.49	0.48
Cadmium	0.005	0.002	mg/L	0.0004	0.0009	0.0005	0.0008	nd	0.0003	0.0003	<0.0001	0.0002	<0.00002	0.0001	0.0002	0.0002	0.00008	0.0003	0.0002	<0.001	<0.001
Calcium	NV	NV	mg/L	43	39	43	36	38	37	38	38	37	45	45	43	42	42	47	36	41	40
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003
Copper	1.0	0.5	mg/L	nd	nd	0.001	0.002	nd	0.002	0.003	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0014	<0.002	0.0013	<0.002	<0.003	<0.003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.089	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	<0.00002	<0.00002	<0.00002	0.00002	<0.00002	0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	22	21	22	22	19	18	18	19	18.6	21.8	22.3	21.3	20.9	20.8	22.5	18.4	19.3	19.9
Manganese	0.05	0.04	mg/L	nd	0.002	nd	nd	0.006	nd	<0.002	0.009	0.014	0.007	0.002	0.003	<0.001	0.006	<0.001	<0.001	<0.002	<0.002
Potassium	NV	NV	mg/L	1.5	1.4	3.4	1.5	1.5	1.4	1.6	1.3	1.3	1.4	1.5	1.3	1.3	1.3	1.5	1.2	1.39	1.44
Sodium	200	116	mg/L	89	84	92	77	84	79	82	80	77.8	86	86.9	80.5	80.9	78.4	88.2	70	79.6	83.4
Zinc	5.0	2.5	mg/L	nd	nd	0.006	0.007	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-8D

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	155	159	154	220	148	156	150	145	152	140	149	148	154	145	150	150	150	150	155.19	13.63
Chloride	250	149	mg/L	5.8	0.9	5.9	28.3	7.1	6.8	7.3	6.1	8.6	7.9	8.0	8.0	8.5	7.3	8.5	8.5	7.9	8.5	6.94	4.17
Nitrate	10	2.58	mg/L	0.20	0.40	0.21	<0.1	0.17	0.23	0.13	0.11	0.28	0.24	0.36	0.14	0.30	0.16	0.18	0.18	<0.010	0.21	0.19	0.07
Nitrite	1	0.28	mg/L	<0.1	0.30	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	0.14	<0.010	0.06	0.06
Ammonia	NV	NV	mg/L	<0.01	<0.01	<0.01	<0.01	0.04	0.02	0.06	<0.01	0.01	0.01	<0.01	0.11	<0.01	<0.01	<0.01	<0.01	<0.050	<0.050	0.02	0.02
TKN	NV	NV	mg/L	0.09	<0.05	0.10	0.20	0.20	0.20	0.20	0.10	0.10	0.10	<0.1	0.20	0.20	<0.1	<0.1	<0.1	0.13	0.15	0.17	0.10
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	0.4	1.1	1.1	2.3	1.3	2.5	4.2	3.3	4.0	0.90	1.6	1.0	1.9	0.80	0.80	2.6	0.64	0.82	1.84	1.30
Conductivity	NV	NV	uS/cm	694	718	707	713	689	732	703	708	700	703	703	709	683	684	695	684	690	680	703.84	24.25
pH	6.5-8.5	NV	Unitless	8.09	8.03	8.14	8.15	8.19	7.91	8.02	7.94	8.09	8.07	8.16	7.88	8.03	8.02	8	7.4	8.17	8.21	8.07	0.10
Sulphate	500	277	mg/L	191	202	165	83	197	198	199	189	194	192	200	191	182	188	189	187	180	170	189.58	22.47
Hardness	80-100	407	mg/L	179	182	196	246	193	193	191	183	187	187	213	185	176	173	173	165	170	160	187.91	16.31
Aluminum	0.1	0.07	mg/L	0.01	0.02	0.02	0.04	0.03	0.03	0.03	0.04	0.02	0.02	0.04	<0.01	<0.01	<0.01	0.03	0.02	--	--	0.03	0.05
Arsenic	0.025	0.001	mg/L	0.000	0.0002	<0.0007	0.0012	<0.0001	0.0002	0.0002	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	--	--	0.00	0.00
Barium	1.0	0.32	mg/L	0.03	0.03	0.03	0.05	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.02	0.03	0.00
Boron	5.0	1.32	mg/L	0.47	0.47	0.53	0.43	0.48	0.49	0.51	0.45	0.52	0.52	0.56	0.53	0.53	0.52	0.53	0.487	0.51	0.47	0.50	0.03
Cadmium	0.005	0.002	mg/L	0.0001	0.0001	0.0003	0.0001	0.000152	0.0001	0.0001	0.000238	0.0001	0.0001	0.000214	0.000164	0.000318	0.000179	0.0001	0.0001	--	--	0.00	0.00
Calcium	NV	NV	mg/L	39	40	43	42	43	43	41	39	40	41	47	39	37	37	38	36	39	36	40.56	3.03
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	--	--	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	0.0007	<0.002	<0.002	<0.002	<0.002	0.0007	<0.002	<0.002	0.0025	0.006	<0.002	<0.002	0.0012	0.0005	0.002	--	--	0.00	0.00
Iron	0.3	0.17	mg/L	<0.005	<0.005	0.007	0.023	<0.005	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.100	<0.100	0.01	0.02
Lead	0.01	0.003	mg/L	<0.00002	<0.00002	<0.00005	0.00005	<0.00002	<0.00002	<0.00002	0.00002	<0.00002	0.00005	0.00005	<0.00002	0.00003	0.00003	<0.00002	0.0001	--	--	0.00	0.00
Magnesium	NV	NV	mg/L	19.9	20.2	21.7	34.5	21	21	21.3	21.2	21.3	20.6	23.1	21.5	20.2	19.8	19.1	18.3	19	18	21.07	2.79
Manganese	0.05	0.04	mg/L	0.002	0.002	0.003	0.006	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	0.00	0.00
Potassium	NV	NV	mg/L	1.2	1.2	1.3	1.5	1.3	1.3	1.3	1.2	1.5	1.3	1.4	1.5	1.4	1.4	1.3	1.1	1.3	1.2	1.44	0.37
Sodium	200	116	mg/L	83	78.6	90.2	68.1	88.8	89.9	87.3	81.7	85.2	82.3	91.1	84.4	81	79.5	83.0	78.3	83.0	82.0	82.81	5.55
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	0.052	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	0.00	0.01

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-9

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	111	107	106	111	108	113	106	103	105	103	103	105	102	104	100	103	98	103
Chloride	250	149	mg/L	3.0	3.0	2.0	2.0	2.0	2.0	6.0	2.0	1.6	1.7	1.6	1.7	1.4	1.5	1.6	1.4	2.0	2.1
Nitrate	10	2.58	mg/L	nd	nd	nd	0.1	nd	0.2	<0.1	<0.1	0.10	0.20	0.10	0.10	0.10	<0.1	0.10	0.10	<0.25	<0.10
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	0.09	0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.1	<0.1	<0.25	<0.10
Ammonia	NV	NV	mg/L	0.14	0.07	nd	nd	0.06	0.44	<0.05	<0.05	0.06	<0.01	0.11	0.02	0.15	0.46	0.07	0.19	0.06	0.10
TKN	NV	NV	mg/L	0.5	0.3	0.5	0.2	0.5	0.7	0.5	0.2	0.2	0.26	0.22	0.47	0.24	0.87	0.25	0.30	0.14	0.14
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	1.1	1.2	1.1	1.1	2	1.3	1.2	1.3	1.0	1.3	1.4	1.0	6.7	3.3	1.8	4.1	1.6	1.6
Conductivity	NV	NV	uS/cm	709	713	694	703	693	694	698	685	685	713	692	664	669	583	672	651	687	696
pH	6.5-8.5	NV	Unitless	8.10	8.20	8.10	8.10	7.90	7.80	8.00	8.01	7.86	7.92	8.06	8.02	8.00	8.03	8.06	8.06	8.15	7.81
Sulphate	500	277	mg/L	230	212	235	246	-	230	240	220	222	228	222	220	219	221	224	224	236	253
Hardness	80-100	407	mg/L	190	170	180	170	170	170	170	160	167	174	174	164	163	154	181	147	171	168
Aluminum	0.1	0.07	mg/L	0.008	nd	nd	nd	nd	nd	<0.005	<0.005	0.02	0.03	0.01	0.03	0.02	0.02	0.02	0.01	<0.004	<0.004
Arsenic	0.025	0.001	mg/L	0.005	0.003	0.003	0.003	0.003	0.005	0.004	0.004	0.006	0.005	0.005	0.004	0.009	0.009	0.005	0.005	0.004	0.005
Barium	1.0	0.32	mg/L	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.02	0.02
Boron	5.0	1.32	mg/L	0.48	0.48	0.47	0.47	0.05	0.47	0.45	0.44	0.49	0.45	0.50	0.44	0.46	0.43	0.50	0.39	0.45	0.46
Cadmium	0.005	0.002	mg/L	0.0002	nd	0.0002	0.0002	0.0001	nd	0.0003	<0.0001	0.00009	<0.00002	0.00005	0.00008	0.00009	0.00004	0.00009	0.00006	<0.001	<0.001
Calcium	NV	NV	mg/L	41	37	39	37	37	37	37	36	36	38	38	36	35	33	40	32	38	37
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003
Copper	1.0	0.5	mg/L	nd	nd	0.001	nd	nd	nd	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0007	<0.002	0.0006	<0.002	<0.003	<0.003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.024	<0.005	<0.005	<0.005	0.028	0.025	0.007	<0.005	<0.010	<0.010
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	0.0006	<0.0005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	21	19	20	19	19	18	19	18	19	19	19	18	18	17	20	16	19	19
Manganese	0.05	0.04	mg/L	0.018	0.013	nd	nd	nd	0.02	0.05	0.01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.01	0.02
Potassium	NV	NV	mg/L	1.3	1.2	3.0	28	1.3	1.3	1.3	1.1	1.1	1.1	1.2	1.1	1.0	1.0	1.2	0.9	1.2	1.22
Sodium	200	116	mg/L	82	74	85	82	78	75	77	75	74	80	78	75	76	69	80	65	77	79
Zinc	5.0	2.5	mg/L	nd	nd	nd	0.008	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-9

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	106	105	106	102	97	122	97	94	101	90	98	100	102	99	107	107	100	290	108.72	31.59
Chloride	250	149	mg/L	1.3	1.1	1.4	2.5	1.9	1.3	1.7	<0.5	2.2	2.4	2.5	1.9	1.7	2	3	2.8	1.2	10	2.22	1.61
Nitrate	10	2.58	mg/L	<0.1	0.1	<0.05	0.10	0.08	0.17	<0.05	<0.05	0.27	0.09	0.17	0.12	0.30	0.09	0.12	0.10	<0.010	0.18	0.11	0.07
Nitrite	1	0.28	mg/L	<0.1	0.1	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	0.1	<0.010	0.05	0.03
Ammonia	NV	NV	mg/L	0.11	0.08	<0.01	0.08	0.19	0.15	0.210	0.09	0.1	0.05	0.01	0.06	0.05	0.05	<0.01	<0.05	<0.050	0.067	0.10	0.11
TKN	NV	NV	mg/L	0.15	0.27	0.2	0.22	0.4	0.3	0.4	0.3	0.3	0.2	0.1	0.4	0.2	0.1	<0.1	<0.1	<0.10	0.24	0.31	0.17
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	0.0018	0.00	0.00
DOC	5	3.90	mg/L	0.50	1.5	1.3	2.0	2.7	1.6	11.9	2.5	1.7	1.1	1.5	1.3	2.3	1	1.5	2.3	0.9	1.8	2.04	2.02
Conductivity	NV	NV	uS/cm	686	692	692	682	676	694	672	681	674	677	678	689	675	676	686	679	680	740	684.17	23.55
pH	6.5-8.5	NV	Unitless	8.02	7.95	8.10	8.06	8.18	7.86	7.94	7.83	8.05	8.05	8.13	7.59	7.98	7.91	7.59	7.08	8.11	8.12	7.96	0.21
Sulphate	500	277	mg/L	227	231	200	201	236	231	239	230	234	228	246	240	229	233	243	255	220	110	226.14	23.58
Hardness	80-100	407	mg/L	173	165	184	174	179	175	174	173	174	171	189	174	161	166	167	162	170	380	176.50	35.92
Aluminum	0.1	0.07	mg/L	0.02	0.03	0.01	0.03	0.04	0.04	0.03	0.03	0.01	0.02	0.03	<0.01	<0.01	<0.01	0.03	0.02	--	--	0.02	0.01
Arsenic	0.025	0.001	mg/L	0.005	0.003	0.004	0.004	0.004	0.004	0.005	0.003	0.004	0.005	0.003	0.004	0.007	0.004	0.003	0.004	--	--	0.00	0.00
Barium	1.0	0.32	mg/L	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.08	0.03	0.01
Boron	5.0	1.32	mg/L	0.44	0.43	0.49	0.49	0.45	0.46	0.47	0.44	0.49	0.49	0.52	0.49	0.49	0.49	0.50	0.47	0.5	0.07	0.45	0.10
Cadmium	0.005	0.002	mg/L	0.0001	0.00009	0.0001	0.000101	0.000104	0.000023	0.000052	0.000099	0.000063	0.00008	0.000069	0.00009	0.000081	0.000067	0.00005	0.00004	--	--	0.00	0.00
Calcium	NV	NV	mg/L	37	36	40	37	39	39	37	36	37	37	41	37	34	35	37	35	38	81	38.30	7.58
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	--	--	0.00	0.00
Copper	1.0	0.5	mg/L	<0.002	0.0004	<0.002	<0.002	<0.002	<0.002	0.0012	<0.002	<0.002	0.0008	0.008	<0.002	<0.002	0.0008	0.003	0.0005	--	--	0.00	0.00
Iron	0.3	0.17	mg/L	<0.005	<0.005	<0.005	0.006	0.023	0.024	<0.005	<0.005	<0.005	0.01	0.006	0.016	<0.005	<0.005	<0.005	<0.005	<0.100	<0.100	0.01	0.01
Lead	0.01	0.003	mg/L	<0.00002	<0.00002	<0.00005	<0.00002	0.00004	0.00005	0.00003	0.00004	<0.00002	0.00003	0.00007	<0.00002	0.00007	0.00002	0.00002	<0.00002	--	--	0.00	0.00
Magnesium	NV	NV	mg/L	19	18	21	20	20	19	20	20	20	19	21	20	19	19	19	18	18	42	19.61	3.95
Manganese	0.05	0.04	mg/L	0.01	0.01	0.02	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.00	0.00	<0.002	0.12	0.02	0.02
Potassium	NV	NV	mg/L	1.1	1.0	1.1	1.1	1.0	1.0	1.0	1.1	1.3	1.1	1.2	1.3	1.1	1.2	1.2	0.9	1.1	1.5	1.94	4.48
Sodium	200	116	mg/L	76	73	83	80	81	81	80	78	78	75	83	78	73	75	77	73	78	19	75.68	10.49
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	0.00	0.00

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-10S

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	275	281	267	275	266	270	267	269	258	262	259	264	256	261	247	254	242	246
Chloride	250	149	mg/L	2.0	3.0	2.0	2.0	2.0	2.0	3.0	1.0	1.2	1.1	1.3	1.0	1.1	1.1	1.1	1.6	1.5	1.5
Nitrate	10	2.58	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	0.10	0.10	0.10	0.10	0.30	0.10	0.30	0.10	<0.25	0.25
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.25	<0.25
Ammonia	NV	NV	mg/L	0.08	0.09	0.05	0.05	0.06	nd	<0.05	<0.05	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	0.06	<0.02	<0.02
TKN	NV	NV	mg/L	0.2	0.4	0.4	0.50	0.4	1.00	0.70	<0.5	0.22	0.38	0.07	0.20	0.22	0.37	0.12	<0.10	0.11	0.13
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	1.1	1.1	1.0	1.0	0.9	1.4	1.0	1.0	0.9	1.2	0.8	2.2	8.6	3.4	2.2	3.3	1.8	1.2
Conductivity	NV	NV	uS/cm	884	896	843	842	820	817	802	819	812	912	869	876	860	764	859	837	859	855
pH	6.5-8.5	NV	Unitless	8.20	8.20	8.00	8.00	8.00	7.90	8.00	8.00	7.72	7.74	8.08	7.95	7.83	8.07	7.99	8.06	8.34	8.46
Sulphate	500	277	mg/L	218	199	175	202	-	180	180	170	195	218	214	245	219	220	221	206	228	228
Hardness	80-100	407	mg/L	480	390	410	410	380	370	360	370	404	430	419	415	394	371	398	373	384	391
Aluminum	0.1	0.07	mg/L	0.009	nd	nd	nd	nd	nd	<0.005	<0.005	0.03	0.05	0.02	0.04	0.03	0.04	0.02	0.02	<0.004	<0.004
Arsenic	0.025	0.001	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0007	0.0006	0.0005	0.0007	0.001	0.0006	0.0003	0.0004	<0.003	<0.003
Barium	1.0	0.32	mg/L	0.028	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03
Boron	5.0	1.32	mg/L	0.35	0.36	0.32	0.36	0.31	0.35	0.31	0.35	0.33	0.37	0.35	0.36	0.32	0.37	0.33	0.36	0.32	0.30
Cadmium	0.005	0.002	mg/L	0.001	0.001	0.002	0.0005	0.0003	nd	<0.0001	<0.0001	0.00006	<0.00002	<0.00002	0.00008	0.00008	0.00003	<0.00002	<0.00002	<0.001	<0.001
Calcium	NV	NV	mg/L	96	82	83	83	78	78	74	75	82	89	86	86	81	76	81	77	79	81
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.003	<0.003
Copper	1.0	0.5	mg/L	nd	nd	nd	0.001	nd	0.001	0.002	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0008	<0.002	0.0005	0.0002	<0.003	<0.003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	<0.00002	<0.00002	<0.00002	0.00003	0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	58	46	49	48	46	44	42	43	48	51	50	49	47	44	48	44	45	46
Manganese	0.05	0.04	mg/L	0.10	0.06	nd	nd	0.10	0.02	0.00	0.01	0.00	0.01	0.00	0.00	<0.001	0.01	<0.001	0.00	<0.002	<0.002
Potassium	NV	NV	mg/L	2.3	2.1	2.0	3.6	1.9	1.9	1.7	1.8	1.8	2.1	1.9	2.1	1.6	1.7	1.8	1.7	1.7	1.8
Sodium	200	116	mg/L	47	37	41	44	40	38	40	38	42	45	42	43	42	41	42	42	39	40
Zinc	5.0	2.5	mg/L	nd	nd	nd	0.01	nd	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-10S

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	260	255	260	255	251	241	249	234	238	245	237	244	250	253	257	276	260	270	257.06	11.90
Chloride	250	149	mg/L	2.4	<0.5	0.7	0.8	2.2	1.4	0.8	1.1	<0.5	1.2	1.8	1.9	1.0	1.0	1.4	2.2	1.2	1.4	1.46	0.65
Nitrate	10	2.58	mg/L	<0.25	0.30	0.30	0.25	0.20	0.27	0.15	0.25	0.11	0.30	0.26	0.32	0.12	0.50	0.22	0.18	<0.010	<0.10	0.19	0.11
Nitrite	1	0.28	mg/L	<0.25	<0.1	0.3	<0.05	0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	0.21	<0.010	0.06	0.07
Ammonia	NV	NV	mg/L	<0.02	<0.01	<0.01	<0.01	<0.01	0.05	0.030	0.04	0.01	0.07	0.02	0.03	0.04	<0.01	<0.01	<0.05	<0.050	<0.050	0.03	0.02
TKN	NV	NV	mg/L	<0.10	0.17	0.09	<0.1	0.16	0.30	0.20	0.20	0.10	<0.1	<0.1	0.40	1.50	0.20	0.20	0.2	<0.10	<0.10	0.27	0.29
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	1.2	<0.2	1.2	0.8	2.3	2.2	1.5	2.4	3.2	1.3	1.6	1.8	1.2	3.0	0.7	2.1	0.41	0.54	1.71	1.44
Conductivity	NV	NV	uS/cm	873	829	873	844	821	823	840	792	821	785	824	804	806	780	813	805	800	770	831.36	35.40
pH	6.5-8.5	NV	Unitless	8.09	8.14	8.04	8.09	8.14	8.13	8.05	8.12	8.01	8.01	7.93	8.12	7.74	8.08	7.92	7.71	8.11	8.19	8.03	0.16
Sulphate	500	277	mg/L	237	206	219	177	175	205	197	198	195	192	197	198	184	178	189	183	160	160	199.09	21.29
Hardness	80-100	407	mg/L	397	387	381	417	379	397	383	371	375	368	385	417	385	355	370	350	350	340	387.67	26.62
Aluminum	0.1	0.07	mg/L	<0.004	0.02	0.02	0.03	0.06	0.06	0.06	0.05	0.06	0.04	0.05	0.06	0.03	0.05	0.03	0.03	--	--	0.03	0.02
Arsenic	0.025	0.001	mg/L	<0.003	0.0003	0.0003	<0.0007	0.0004	<0.0001	0.0004	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0004	0.0003	0.0002	--	--	0.00	0.00
Barium	1.0	0.32	mg/L	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.00
Boron	5.0	1.32	mg/L	0.47	0.31	0.36	0.33	0.40	0.30	0.38	0.32	0.32	0.33	0.38	0.34	0.39	0.34	0.38	0.36	0.33	0.36	0.35	0.03
Cadmium	0.005	0.002	mg/L	<0.001	0.00005	0.00004	<0.0001	0.000027	0.000019	0.000029	0.000019	<0.000015	0.000017	0.00002	<0.000015	0.000016	0.000024	0.000016	<0.000015	--	--	0.00	0.00
Calcium	NV	NV	mg/L	82	78	77	85	75	81	78	74	74	72	79	85	76	69	73	71	74	70	78.88	5.64
Chromium	0.05	0.01	mg/L	<0.003	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	--	--	0.00	0.00
Copper	1.0	0.5	mg/L	<0.003	<0.002	0.0008	<0.002	<0.002	<0.002	<0.002	0.0015	0.002	<0.002	0.0009	0.011	<0.002	<0.002	0.0006	0.0005	--	--	0.00	0.00
Iron	0.3	0.17	mg/L	<0.010	<0.005	<0.005	<0.005	<0.005	0.043	0.036	<0.005	<0.005	0.014	0.01	0.008	0.007	0.045	0.019	<0.005	<0.100	<0.100	0.01	0.02
Lead	0.01	0.003	mg/L	<0.002	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	0.00003	0.00004	<0.00002	0.00003	0.00004	0.00009	0.00005	0.00011	0.00003	<0.00002	--	--	0.00	0.00
Magnesium	NV	NV	mg/L	47	47	46	50	47	47	46	45	47	46	46	50	47	44	46	42	41	41	46.36	3.14
Manganese	0.05	0.04	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	0.002	0.001	<0.001	<0.002	0.01	0.01	0.02
Potassium	NV	NV	mg/L	2.1	1.6	1.8	1.8	1.9	1.7	1.9	1.6	1.8	1.8	1.9	1.9	2.2	1.7	2	1.6	1.5	1.7	1.89	0.35
Sodium	200	116	mg/L	43	43	42	45	45	44	45	43	40	42	40	44	42	40	40	39	39	39	41.58	2.36
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	0.00	0.00

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-10D

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	193	280	202	204	205	204	235	245	255	238	193	215	229	237	229	237	211	202
Chloride	250	149	mg/L	3.0	3.0	6.0	4.0	5.0	5.0	11	10	8.1	7.9	3.4	5.6	7.6	7.6	4.9	10.1	7.3	5.0
Nitrate	10	2.58	mg/L	nd	nd	0.3	0.3	0.1	0.5	2.4	3	2	2.4	0.3	1.3	1.6	2.2	0.8	2.5	1.4	0.7
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	0.02	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.25	<0.10
Ammonia	NV	NV	mg/L	nd	0.07	0.09	nd	0.09	nd	<0.05	<0.05	<0.01	<0.01	0.08	<0.01	<0.01	<0.01	<0.01	0.03	<0.02	<0.02
TKN	NV	NV	mg/L	0.20	0.60	0.20	0.30	1.2	1.00	0.40	<0.5	0.26	0.17	0.09	0.07	0.10	0.08	0.22	<0.1	<0.10	<0.10
Phenols	NV	NV	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DOC	5	3.90	mg/L	0.5	1.0	0.5	0.5	7.9	0.5	0.7	0.8	0.5	1.2	0.7	1.2	4.7	2.7	2.2	1.8	1.5	1.0
Conductivity	NV	NV	uS/cm	563	894	583	591	573	576	616	631	620	647	565	569	590	537	569	597	589	584
pH	6.5-8.5	NV	Unitless	8.20	8.20	8.10	8.20	8.00	8.00	8.00	8.00	7.73	6.90	8.06	7.99	7.80	7.99	8.04	8.01	8.41	7.99
Sulphate	500	277	mg/L	98	203	94	105	-	90	74	63	79	78	106	91	81	77	95	84	84	101
Hardness	80-100	407	mg/L	220	300	210	220	210	210	270	270	275	271	214	227	245	248	240	253	234	217
Aluminum	0.1	0.07	mg/L	0.04	nd	nd	nd	nd	nd	<0.005	<0.005	0.03	0.04	0.02	0.03	0.03	0.04	0.02	0.03	0.008	<0.004
Arsenic	0.025	0.001	mg/L	nd	nd	nd	nd	nd	nd	<0.001	<0.001	0.0005	0.0002	0.0003	0.0004	0.001	0.0003	0.0003	<0.0001	<0.003	<0.003
Barium	1.0	0.32	mg/L	0.11	0.07	0.11	0.09	0.10	0.10	0.12	0.12	0.13	0.12	0.11	0.11	0.12	0.12	0.11	0.12	0.10	0.09
Boron	5.0	1.32	mg/L	0.16	0.25	0.14	0.17	0.14	0.13	0.09	0.05	0.10	0.05	0.16	0.11	0.09	0.07	0.14	0.07	0.11	0.15
Cadmium	0.005	0.002	mg/L	0.0005	0.0002	0.0001	0.0005	0.0006	nd	<0.0001	<0.0001	0.00004	<0.00002	<0.00002	0.00002	0.00006	<0.00002	<0.00002	<0.00002	<0.001	<0.001
Calcium	NV	NV	mg/L	48	61	49	47	47	46	63	67	65	63	47	51	57	59	56	60	55	49
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.003
Copper	1.0	0.5	mg/L	nd	nd	0.001	0.001	nd	0.001	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0005	<0.002	0.0003	0.0001	<0.003	<0.003
Iron	0.3	0.17	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010	<0.010
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.002	<0.002
Magnesium	NV	NV	mg/L	24	35	22	24	23	23	26	26	28	27	24	24	25	25	25	25	24	23
Manganese	0.05	0.04	mg/L	0.01	0.05	0.004	nd	0.01	0.043	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.06
Potassium	NV	NV	mg/L	1.4	1.7	1.4	1.4	1.4	1.3	1.4	1.3	1.4	1.3	1.2	1.2	1.2	1.1	1.2	1.1	1.28	1.32
Sodium	200	116	mg/L	31	38	25	30	27	24	17	13	19	17	25	21	17	14	23	14	19	25
Zinc	5.0	2.5	mg/L	nd	nd	nd	nd	0.001	nd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.009	<0.005

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-10D

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	231	187	216	215	199	191	214	226	200	165	183	231	201	185	218	193	210	180	212.75	23.50
Chloride	250	149	mg/L	6.6	2.8	5.8	5.5	6.2	4.0	8.5	9.8	6.2	3.6	4.4	10	5.1	3.6	7.6	3.6	5.8	3.0	6.02	2.33
Nitrate	10	2.58	mg/L	1.4	0.2	1.1	1.4	0.8	0.5	1.7	2.8	0.8	<0.05	0.2	2.6	0.4	0.2	1.2	<0.05	0.016	<0.10	1.10	0.98
Nitrite	1	0.28	mg/L	<0.1	0.2	<0.05	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<0.05	0.69	<0.010	0.06	0.12
Ammonia	NV	NV	mg/L	<0.01	<0.01	<0.01	<0.01	0.05	0.03	0.040	<0.01	0.03	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.05	<0.050	<0.050	0.02	0.03
TKN	NV	NV	mg/L	0.07	<0.05	0.20	0.27	0.20	<0.1	0.10	<0.1	<0.1	<0.1	0.20	0.20	0.10	<0.1	<0.1	<0.1	0.1	<0.10	0.20	0.25
Phenols	NV	NV	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0010	<0.0010	0.00	0.00
DOC	5	3.90	mg/L	<0.2	1.0	0.8	1.8	0.9	1.3	1.3	2.3	1.5	1.4	3.1	1.3	1.3	0.4	0.6	2.8	0.48	0.61	1.47	1.44
Conductivity	NV	NV	uS/cm	605	563	589	592	579	582	592	620	566	551	559	621	566	561	599	557	580	550	592.39	57.26
pH	6.5-8.5	NV	Unitless	8.07	8.06	8.11	8.08	8.15	7.94	8.11	7.92	8.01	8.08	8.10	8.06	8.06	7.98	8.06	7.55	8.22	8.25	8.01	0.24
Sulphate	500	277	mg/L	85	112	70	69	88	98	76	65	91	108	103	70	94	104	89	108	80	100	91.80	23.52
Hardness	80-100	407	mg/L	257	195	254	242	240	207	266	256	231	207	244	278	223	212	250	195	240	180	236.42	27.39
Aluminum	0.1	0.07	mg/L	0.02	0.02	0.02	0.04	0.04	0.04	0.04	0.05	0.01	0.03	0.03	0.02	0.01	0.01	0.03	0.03	--	--	0.03	0.01
Arsenic	0.025	0.001	mg/L	0.000	0.0003	<0.0007	0.0003	<0.0001	0.0004	0.0003	0.0003	0.0003	0.0005	0.0004	0.0003	0.0004	0.0004	0.0004	0.0004	--	--	0.00	0.00
Barium	1.0	0.32	mg/L	0.12	0.10	0.12	0.12	0.11	0.10	0.12	0.11	0.12	0.10	0.11	0.13	0.10	0.10	0.11	0.10	0.11	0.08	0.11	0.01
Boron	5.0	1.32	mg/L	0.09	0.16	0.11	0.12	0.12	0.16	0.08	0.05	0.14	0.18	0.18	0.08	0.15	0.18	0.11	0.16	0.12	0.18	0.13	0.04
Cadmium	0.005	0.002	mg/L	0.00004	0.00002	<0.0001	0.000018	<0.000015	<0.000015	<0.000015	<0.000015	<0.000015	0.000018	0.000066	0.000015	<0.000015	<0.000015	<0.000001	0.00001	--	--	0.00	0.00
Calcium	NV	NV	mg/L	60	41	58	54	55	45	63	58	51	44	54	64	48	44	57	41	55	37	53.31	7.69
Chromium	0.05	0.01	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.01	--	--	0.00	0.01
Copper	1.0	0.5	mg/L	<0.002	0.0003	<0.002	<0.002	0.002	<0.002	0.0005	<0.002	<0.002	0.0006	<0.002	<0.002	<0.002	0.0006	0.001	0.00006	--	--	0.00	0.00
Iron	0.3	0.17	mg/L	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.100	<0.100	0.01	0.02
Lead	0.01	0.003	mg/L	<0.00002	<0.00002	<0.00005	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00003	<0.00002	0.00003	0.00005	0.00003	<0.00002	<0.0002	--	--	0.00	0.00
Magnesium	NV	NV	mg/L	26	23	26	26	25	23	27	27	25	24	27	29	25	25	26	22	25	21	25.04	2.41
Manganese	0.05	0.04	mg/L	0.01	0.02	0.03	0.03	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.009	0.02	0.01
Potassium	NV	NV	mg/L	1.2	1.1	1.3	1.2	1.3	1.1	1.2	1.1	1.4	1.1	1.3	1.5	1.4	1.3	1.4	1.0	1.2	1.1	1.27	0.14
Sodium	200	116	mg/L	20.7	27	22	21	24	28	16	16	22	28	29	14	24	26	19	27	19	27	22.48	5.63
Zinc	5.0	2.5	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	0.00	0.00

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-11

Parameter	ODWS	RUC	UNITS	Jul-07	Dec-07	Jul-08	Dec-08	Jul-09	Nov-09	Mar-10	Dec-10	Jun-11	Oct-11	Jun-12	Oct-12	Jun-13	Nov-13	Jul-14	Nov-14	May-15	Oct-15
Alkalinity	500	425	mg/L	1010	1090	967	1010	844	986	1070	1080	961	1170	1050	1120	1070	1080	2170	2370	1960	1740
Chloride	250	149	mg/L	100	130	93	90	76	120	95	88	54	73	66	69	53	90.4	268	280	261	211
Nitrate	10	2.58	mg/L	nd	nd	nd	nd	nd	nd	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<2.5	<1.0
Nitrite	1	0.28	mg/L	nd	nd	nd	nd	nd	nd	<0.01	<0.01	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<1	<0.1	<2.5	<1.0
Ammonia	NV	NV	mg/L	28	53	26	22	16	21	31	44	27	46	33	38	27	39	89	106	92	67
TKN	NV	NV	mg/L	24	46	22	20	18	23	35	43	34	46	40	51	30	44	107	111	110	71
Phenols	NV	NV	mg/L	0.006	0.007	0.005	0.001	0.008	0.007	0.003	0.01	0.008	0.011	0.007	0.01	0.005	0.005	0.721	0.583	0.168	0.012
DOC	5	3.90	mg/L	12	21	11	11	114	12	13	17	13	15	14	18	24	28	650	230	90	49
Conductivity	NV	NV	uS/cm	2040	2210	2090	2020	2100	2130	2190	2230	2080	2250	2030	2010	1930	1800	5280	4930	4030	3500
pH	6.5-8.5	NV	Unitless	7.70	7.50	7.30	7.5	7.40	7.30	7.30	7.15	7.00	7.84	7.15	7.17	7.00	7.14	7.18	7.27	7.65	7.80
Sulphate	500	277	mg/L	109	2.0	123	82	-	58	59	39	102	8.0	31	9.0	69	21	171	<1	<5.0	9.2
Hardness	80-100	407	mg/L	1100	950	1000	1000	1100	1000	920	920	1050	1000	933	1030	918	807	2410	1790	1640	1230
Aluminum	0.1	0.07	mg/L	0.007	0.009	0.006	nd	0.006	nd	0.006	0.008	0.05	0.06	0.05	0.06	0.05	0.06	0.12	0.11	0.041	0.011
Arsenic	0.025	0.001	mg/L	0.02	0.10	0.02	0.01	0.01	0.01	0.36	0.39	0.67	0.77	0.42	0.30	0.25	0.22	0.12	<0.1	0.03	0.04
Barium	1.0	0.32	mg/L	0.23	0.22	0.25	0.2	0.25	0.28	0.21	0.17	0.16	0.17	0.15	0.17	0.17	0.14	0.41	0.20	0.28	0.18
Boron	5.0	1.32	mg/L	0.26	0.45	0.21	0.22	0.17	0.29	0.32	0.4	0.32	0.40	0.32	0.37	0.29	0.37	2.6	2.2	1.9	1.4
Cadmium	0.005	0.002	mg/L	0.0025	nd	nd	nd	nd	nd	0.0003	<0.0001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00026	<0.00002	<0.001	<0.001
Calcium	NV	NV	mg/L	220	170	210	210	240	190	180	170	183	182	163	202	175	149	691	505	435	289
Chromium	0.05	0.01	mg/L	nd	nd	nd	nd	nd	nd	<0.005	<0.005	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.017	0.009	0.016	0.01
Copper	1.0	0.5	mg/L	nd	nd	nd	nd	nd	nd	0.001	<0.0005	<0.002	<0.002	<0.002	<0.002	0.0006	<0.002	0.0032	<0.002	<0.003	<0.003
Iron	0.3	0.17	mg/L	17	31	12	4.4	14	8.1	3.3	31	33	32	30	35	29	33	10	8.5	24	30
Lead	0.01	0.003	mg/L	nd	nd	nd	nd	nd	nd	<0.0005	<0.0005	0.00008	0.00006	0.00007	0.00006	0.00004	0.00004	0.00121	0.00042	<0.002	<0.002
Magnesium	NV	NV	mg/L	140	130	120	120	130	120	120	120	145	134	128	127	117	106	166	129	135	123
Manganese	0.05	0.04	mg/L	0.24	0.16	0.27	0.25	0.31	0.18	0.19	0.14	0.19	0.15	0.17	0.14	0.17	0.14	1.09	0.61	0.61	0.37
Potassium	NV	NV	mg/L	20	30	17	16	13	18	19	23	21	25	19	21	15	17	144	125	116	90
Sodium	200	116	mg/L	68	92	62	66	49	69	78	87	76.8	85.4	61.9	70	60.3	74.3	308	257	259	196
Zinc	5.0	2.5	mg/L	nd	nd	0.006	0.007	0.008	0.001	0.006	0.007	<0.005	0.008	0.009	0.007	<0.005	<0.005	0.013	0.008	0.024	0.01

Notes: Provided on Page 1 of Appendix F

HISTORICAL GROUNDWATER QUALITY DATA
OW-11

Parameter	ODWS	RUC	UNITS	Jun-16	Nov-16	Jun-17	Oct-17	May-18	Oct-18	Jun-19	Nov-19	Jun-20	Nov-20	Jun-21	Nov-21	May-22	Nov-22	May-23	Sep-23	May-24	Nov-24	Average	Std. Dev.
Alkalinity	500	425	mg/L	1630	1410	1120	1220	1130	1080	987	982	991	858	859	917	916	894	876	869	860	880	1145.19	372.00
Chloride	250	149	mg/L	185	197	173	180	307	223	289	258	260	287	308	306	306	300	300	273	260	260	190.68	92.55
Nitrate	10	2.58	mg/L	0.10	0.10	0.08	<0.1	<0.5	<0.05	<0.05	<0.05	0.07	<0.05	0.21	<0.05	<1	<0.5	<0.05	<0.05	<0.010	<0.10	0.11	0.06
Nitrite	1	0.28	mg/L	<0.1	<0.1	<0.05	<0.1	<0.5	0.10	<0.05	<0.05	0.16	<0.05	<0.05	<0.05	<1	<0.5	<0.05	<0.05	<0.10	<0.010	0.13	0.04
Ammonia	NV	NV	mg/L	46	50	52	45	59	58	55	52	56	31	45	33	49	40	35.3	28.5	23	23	44.02	20.30
TKN	NV	NV	mg/L	59	52	57	53	59	63	50	52	66	40	43	48	54	46	36.5	36	24	25	48.24	23.06
Phenols	NV	NV	mg/L	0.008	0.006	0.009	0.009	0.009	0.03	0.007	0.009	0.003	<0.002	0.002	0.002	0.002	<0.001	<0.001	<0.001	0.002	0.002	0.05	0.16
DOC	5	3.90	mg/L	17	15	17	21	20	17	16	11	15	15	11	7.6	8.2	5.1	1.8	8.4	16	16	43.87	111.73
Conductivity	NV	NV	uS/cm	2850	2790	2730	2700	2510	2700	2550	2520	2490	2450	2450	2480	2430	2420	2460	2300	2300	2300	2563.33	755.66
pH	6.5-8.5	NV	Unitless	7.43	7.48	7.40	8.26	7.39	7.47	7.46	7.41	7.25	7.27	7.55	7.52	7.45	7.31	7.54	7.37	7.62	7.69	7.42	0.25
Sulphate	500	277	mg/L	8.0	4.0	2.0	2.0	<10	<1	2.0	3.0	2.0	2.0	3.0	2.0	<10	<10	5	11	1.3	<1.0	33.55	45.90
Hardness	80-100	407	mg/L	1180	998	1120	1070	1040	970	989	953	988	965	962	999	928	942	943	914	940	930	1073.03	295.53
Aluminum	0.1	0.07	mg/L	0.06	0.06	0.07	0.11	0.11	0.09	0.09	0.09	0.22	0.09	0.11	0.06	0.06	0.05	0.09	0.09	--	--	0.07	0.05
Arsenic	0.025	0.001	mg/L	0.04	0.03	0.03	0.03	0.04	0.02	0.01	0.02	0.01	0.01	0.001	0.003	0.003	0.002	0.002	0.002	--	--	0.12	0.20
Barium	1.0	0.32	mg/L	0.16	0.17	0.17	0.22	0.21	0.20	0.20	0.23	0.23	0.29	0.25	0.34	0.24	0.26	0.266	0.257	0.26	0.25	0.22	0.06
Boron	5.0	1.32	mg/L	0.98	0.88	0.97	0.98	0.84	0.83	0.73	0.78	0.73	0.57	0.56	0.55	0.55	0.51	0.52	0.42	0.41	0.43	0.69	0.55
Cadmium	0.005	0.002	mg/L	<0.00002	<0.00002	<0.0001	<0.000014	<0.000015	<0.000015	<0.000015	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.000070	<0.00007	<0.00001	--	--	0.00	0.00
Calcium	NV	NV	mg/L	251	203	222	208	195	184	182	169	177	179	176	177	165	174	175	175	180	170	220.17	107.38
Chromium	0.05	0.01	mg/L	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0.001	<0.001	<0.001	--	--	0.01	0.01
Copper	1.0	0.5	mg/L	<0.002	0.0008	<0.002	<0.002	<0.002	<0.002	0.0012	0.011	<0.002	0.0019	<0.002	<0.002	<0.002	0.0007	0.0006	0.001	--	--	0.00	0.00
Iron	0.3	0.17	mg/L	46	34	45	36	36	36	30	30	35	0.04	13	12	15	12	11	8.1	<0.100	<0.100	23.41	12.91
Lead	0.01	0.003	mg/L	0.00003	<0.00002	0.00009	<0.00002	0.00003	0.00003	0.00004	<0.0001	0.00081	0.0038	<0.0001	<0.0001	0.00023	<0.0001	<0.0001	<0.00004	--	--	0.00	0.00
Magnesium	NV	NV	mg/L	135	119	137	133	134	124	130	129	133	126	127	135	125	123	123	116	120	120	127.75	10.17
Manganese	0.05	0.04	mg/L	0.32	0.25	0.31	0.37	0.29	0.22	0.24	0.21	0.24	0.18	0.26	0.20	0.23	0.24	0.23	0.23	0.17	0.13	0.27	0.18
Potassium	NV	NV	mg/L	56	50	53	55	51	49	43	46	43	28	29	27	30	27	27	22	20	20	39.57	31.83
Sodium	200	116	mg/L	128	111	131	131	137	129	122	116	111	111	117	113	111	106	121	96	110	110	114.75	57.35
Zinc	5.0	2.5	mg/L	<0.005	<0.005	0.011	0.014	0.008	<0.005	0.005	<0.005	0.007	0.016	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	--	--	0.01	0.00

Notes: Provided on Page 1 of Appendix F

Notes:

1. ODWS= Ontario Drinking Water Standards (June 2003, Revised June 2006)
2. NM = Not Measured; NV = No Value; NR = Not Required
3. ND = Not Detected; NA = Not Applicable
4. * indicates outlier interpreted as sample or lab error.
5. Data prior to 2024 from Annual Monitoring Report (2023), WSP Canada Inc.
6. Values reported as less than detection limits used as 1/2 detection limit for calculation of averages and plotting.
7. Values in bold represent results greater than the ODWS
8. Shaded values represent results greater than the Reasonable Use Criteria (RUC).
9. Results presented in mg/L unless otherwise specified; conductivity in µS/cm = microsiemens per centimeter; pH = Unitless.

Appendix G Historic Surface Water Quality Results

SUMMARY OF HISTORICAL SURFACE WATER QUALITY RESULTS

PARAMETER / SAMPLE DATE	Units	PWQO	SW1 Jul-07	SW1 Dec-07	SW1 Jul-08	SW1 Dec-08	SW1 Jul-09	SW1 Nov-09	SW1 Mar-10	SW1 Dec-10	SW1 Jun-11	SW1 Oct-11	SW1 Jun-12	SW1 Oct-12	SW1 Jun-13	SW-1 Nov-13	SW-1 Jul-14	SW-1 Nov-14	SW-1 May-15	SW-1 Oct-15	SW-1 Jun-16	SW-1 Nov-16	SW-1 Jun-17	SW-1 Oct-17	SW-1 May-18	SW-1 Oct-18	SW-1 Jun-19	SW-1 Nov-19	SW-1 Jun-20	SW-1 Nov-20	SW-1 Jun-21	SW-1 Nov-21	SW-1 May-22	SW-1 Nov-22	SW-1 May-24	SW-1 Nov-24
Alkalinity	mg/L	See Notes	188	223	228	267	234	255	255	271	278	249	212	235	222	254	193	244	227	252	250	254	229	322	231	269	243	220	203	273	236	181	246	217	250	240
Chloride	mg/L	NV	14.0	36.0	12.0	9.00	11.0	18.0	11.0	13.0	9.3	20.1	11.4	23.6	10.7	11.0	9.5	11.1	11.4	17.4	14.9	20.8	10.2	14.9	15.1	20.3	14.4	17.8	18.8	23.0	14.7	11.1	13.9	3.40	2.80	17.00
Nitrate	mg/L	NV	-	11.0	0.80	3.2	0.80	4.60	4.10	5.50	5.60	7.80	0.50	12.9	4.60	4.90	1.00	5.90	1.38	<0.10	13.2	0.10	3.27	9.67	4.76	1.57	9.73	14.2	4.69	7.53	1.04	6.81	1.84	0.11	<0.10	0.43
Nitrite	mg/L	NV	-	-	0.02	0.01	-	0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.20	<0.1	<0.1	<0.1	<0.1	<0.25	<0.10	<0.1	<0.1	0.26	<0.05	0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.09	<0.05	0.05	<0.05	<0.010	<0.010
Ammonia	mg/L	NV	0.08	0.08	0.06	-	0.06	-	-	<0.05	<0.01	<0.01	0.07	<0.01	0.03	0.02	0.05	0.03	<0.02	<0.02	0.02	<0.01	0.03	<0.01	0.10	0.03	0.11	0.05	0.09	0.04	0.04	0.04	0.06	0.18	<0.050	<0.050
Unionized Ammonia	mg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0005	0.0002
TKN	mg/L	NV	0.70	-	-	0.50	0.60	0.70	0.70	0.50	0.49	0.73	0.61	0.64	0.51	0.58	0.49	0.80	0.47	0.31	0.83	0.47	0.60	0.67	0.60	0.50	0.60	0.70	0.70	0.50	0.50	1.10	0.70	0.40	0.26	0.58
Phosphorus (Total)	mg/L	0.02 (I)	-	-	-	0.03	0.02	0.02	0.02	0.03	0.03	0.05	0.03	0.01	0.01	0.04	0.03	0.11	0.01	<0.01	0.02	0.01	0.02	0.07	0.04	0.02	0.04	0.06	0.04	0.02	0.03	0.34	0.04	0.03	<0.020	0.04
Phenols	mg/L	0.005 (I)	0.00	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.00	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0010	<0.0010
Dissolved Organic Carbon	mg/L	NV	4.50	5.50	3.90	3.00	4.20	3.90	3.90	3.10	3.50	5.20	4.90	5.30	5.90	6.10	5.70	6.70	4.00	5.00	3.90	7.70	5.10	6.00	5.20	7.10	5.50	5.30	4.70	4.00	5.60	5.60	7.10	9.80	4.80	6.90
Conductivity	uS/cm	NV	425	673	488	548	491	578	578	595	591	640	459	635	484	507	429	504	491	541	598	555	463	686	504	625	587	626	495	684	491	424	519	421	450.00	520.00
pH	unitless	6.5 to 8.5	8.20	8.20	8.20	8.20	8.10	8.10	8.10	8.19	8.13	8.10	8.15	8.25	8.08	8.18	8.14	8.16	8.47	7.98	8.27	8.08	8.11	8.28	8.35	8.32	8.26	8.29	8.15	8.29	8.32	8.09	8.17	7.85	8.39	8.26
Sulphate	mg/L	NV	21.0	40.0	18.0	13.0		17.0	17.0	14.0	14.0	18.0	14.0	21.0	13.0	13.0	13.0	11.0	13.7	18.6	14.0	16.0	13.0	12.0	12.0	17.0	13.0	16.0	16.0	17.0	15.0	8.00	13.0	2.00	2.40	11.00
Hardness (as CaCO3)	mg/L	NV	200	310	250	280	240	300	300	300	352	314	238	383	231	263	257	276	253	262	294	296	218	357	258	338	328	307	270	350	271	236	279	230	280.00	270.00
Boron	mg/L	0.2 (I)	0.03	0.01	0.01	-	0.02	0.02	0.02	<0.01	0.02	0.12	0.02	0.01	0.01	0.01	0.02	<0.005	0.02	0.03	0.02	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.01	0.01	<0.001	0.02
Calcium	mg/L	NV	50.0	85.0	60.0	79.0	62.0	77.0	77.0	84.0	94.4	86.4	53.9	106	56.8	71.6	61.0	75.9	62.2	65.5	79.1	74.9	51.8	96.5	66.3	87.6	87.6	82.2	60.3	95.3	60.5	63.8	69.5	62.6	70.00	67.00
Iron	mg/L	0.3	0.61	0.11	0.16	0.20	0.23	-	-	0.17	0.42	0.23	0.18	0.06	0.11	0.34	0.26	0.53	0.11	0.07	0.07	0.09	0.10	0.17	0.20	0.11	0.09	0.21	0.14	0.10	0.16	2.06	0.13	0.33	<0.10	0.44
Magnesium	mg/L	NV	26.0	25.0	25.0	23.0	23.0	21.0	21.0	25.0	28.3	23.8	25.2	28.6	21.7	20.3	25.4	21.1	23.8	23.8	23.5	26.4	21.5	28.2	22.4	28.9	26.6	24.8	29.0	27.3	29.2	18.6	25.5	17.9	19.00	24.00
Manganese	mg/L	NV	0.06	0.004	0.01	0.02	0.02	0.01	0.01	0.01	0.02	0.01	0.03	0.00	0.01	0.03	0.02	0.05	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.05	0.02	0.33	0.02	0.02
Potassium	mg/L	NV	3.00	5.90	2.10	1.60	1.80	2.10	2.10	1.90	2.30	3.30	2.70	4.60	1.30	1.90	2.60	2.90	1.82	6.02	2.00	8.20	1.90	2.70	2.50	4.80	2.00	2.90	2.50	2.10	3.30	4.40	2.10	0.50	0.44	6.40
Sodium	mg/L	NV	9.80	12.00	7.10	4.10	6.70	7.70	7.70	4.60	5.20	10.80	6.90	8.70	4.70	6.20	5.90	6.40	5.10	9.56	4.40	10.10	5.00	5.80	6.70	9.80	5.10	5.80	6.00	6.60	6.70	3.50	6.20	1.60	1.60	6.80
Field Measurements																																				
Temperature (field)	°C	NV					20.1	6.7	8.2		18.9	10.8	23.6	12.3	17	4.6	19.5	3.9	15.2	9.9	15.2	10	21.2	88	16.6	6.6	17.8	4.8	21.8	7.5	12.1	5.7	23.1	3.6	14.5	6.0
Conductivity (field)							160	180	490		540	592	413	587	535	468	430	562	470	488	602	507	463	705	494	524	650	636	471	561	496	431	499	578	602	640
pH (field)							7.97	7.89	8.77		8.7	8.32	7.99	8.45	8.38	8.24	8.13	8.45	8.28	7.66	8.34	7.88	7.85	8.08	7.85	7.94	8.14	8.27	8.43	8.16	8	7.35	7.42	8.31	8.1	8.2

Notes: Refer to last page of Appendix.

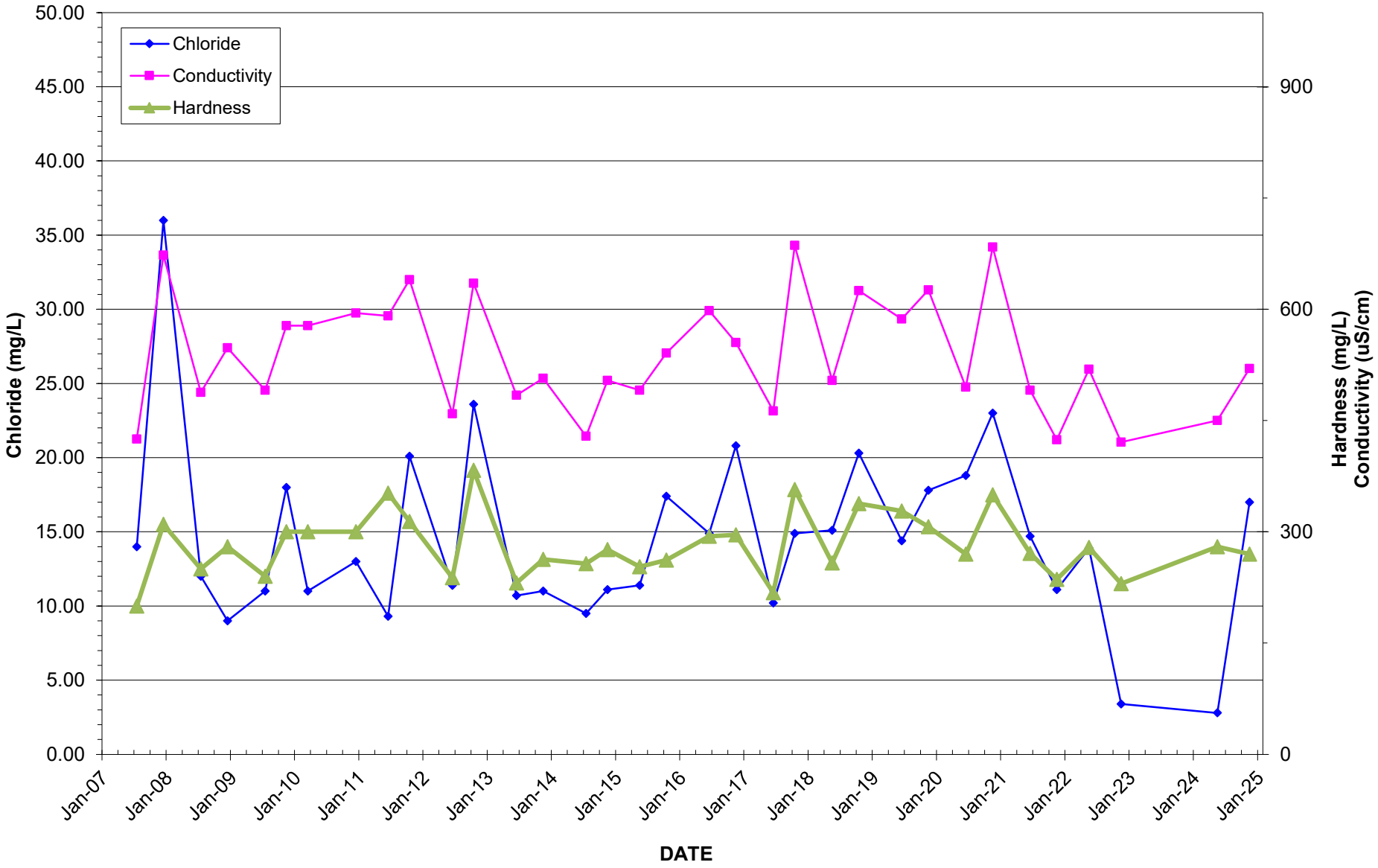
SUMMARY OF HISTORICAL SURFACE WATER QUALITY RESULTS

PARAMETER / SAMPLE DATE	Units	PWQO	SW2 Jul-07	SW2 Dec-07	SW2 Jul-08	SW2 Dec-08	SW2 Jul-09	SW2 Nov-09	SW2 Mar-10	SW2 Dec-10	SW2 Jun-11	SW2 Oct-11	SW2 Jun-12	SW2 Oct-12	SW2 Jun-13	SW2 Nov-13	SW2 Jul-14	SW2 Nov-14	SW2 May-15	SW2 Oct-15	SW2 Jun-16	SW2 Nov-16	SW2 Jun-17	SW2 Oct-17	SW2 May-18	SW2 Oct-18	SW2 Jun-19	SW2 Nov-19	SW2 Jun-20	SW2 Nov-20	SW2 Jun-21	SW2 Nov-21	SW2 May-22	SW2 Nov-22	SW2 May-24	SW2 Nov-24
Alkalinity	mg/L	See Notes	190	227	232	272	232	254	250	270	287	250	211	233	219	255	191	255	240	231	247	234	220	297	228	262	239	219	213	271	231	149	247	269	250	240
Chloride	mg/L	NV	13.0	37.0	11.0	14.0	12.0	22.0	11.0	13.0	9.4	19.4	10.0	22.4	10.6	11.1	9.7	11.7	11.4	18.7	16.2	17.5	10.4	15.0	13.1	19.6	14.9	18.6	20.0	24.0	15.5	9.0	14.10	5.40	12.0	18.0
Nitrate	mg/L	NV	-	10.00	0.01	3.20	0.60	4.70	4.50	5.50	5.50	8.10	0.20	11.80	4.40	5.10	1.00	5.90	1.16	<0.10	14.10	<0.1	3.23	9.69	3.82	1.05	9.93	14.30	5.85	7.81	0.81	4.88	1.95	0.15	2.92	0.26
Nitrite	mg/L	NV	-	-	0.50	0.01	0.01	0.02	-	<0.01	<0.1	<0.1	<0.1	0.20	<0.1	<0.1	<0.1	<0.1	<0.25	<0.10	0.20	<0.1	0.20	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	0.09	<0.05	<0.05	<0.05	0.03	<0.10
Ammonia	mg/L	NV	0.08	0.09	0.12	0.07	0.07	-	-	<0.05	<0.01	<0.01	0.23	<0.01	0.01	<0.01	0.04	0.09	<0.02	<0.02	0.02	<0.01	0.04	0.02	0.08	0.05	0.22	0.03	0.08	0.02	0.05	0.10	0.07	0.02	<0.050	<0.050
Unionized Ammonia	mg/L	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.0004	0.0001
TKN	mg/L	NV	0.70	-	-	0.40	0.70	0.80	0.50	0.50	0.54	0.71	0.65	0.81	0.48	0.49	0.53	0.90	0.44	0.93	0.81	0.57	0.90	0.66	0.50	0.50	0.70	0.60	0.60	0.50	0.70	1.80	0.70	0.20	0.44	0.49
Phosphorus (Total)	mg/L	0.02 (I)	-	-	-	0.02	0.05	0.04	0.01	0.04	0.04	0.04	0.05	0.02	0.01	0.03	0.04	0.09	0.02	0.08	0.02	0.03	0.07	0.06	0.03	0.03	0.04	0.05	0.03	0.02	0.04	0.59	0.04	0.03	<0.020	0.04
Phenols	mg/L	0.005 (I)	0.00	-	-	-	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.01	<0.001	<0.001	<0.001	<0.001	<0.001	0.00	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0010	<0.0010
Dissolved Organic Carbon	mg/L	NV	5.20	5.80	4.50	3.00	4.40	4.00	3.00	3.30	3.20	5.30	4.80	5.40	6.00	6.10	4.90	6.00	4.10	10.4	4.20	9.90	4.70	5.40	4.50	7.70	4.30	5.30	4.60	3.90	6.00	6.60	6.00	5.80	3.90	5.40
Conductivity	uS/cm	NV	407	687	488	554	489	590	534	598	603	636	446	618	478	493	429	509	497	498	588	514	486	688	510	602	584	630	517	678	495	345	525	513	540	540
pH	unitless	6.5 to 8.5	8.20	8.20	8.30	8.20	8.10	8.20	8.20	8.28	8.00	8.10	8.09	8.21	8.01	8.19	8.15	8.18	8.45	7.97	8.24	7.94	8.05	8.29	8.37	8.22	8.21	8.26	8.21	8.31	8.18	8.06	8.10	8.06	8.31	8.26
Sulphate	mg/L	NV	16.00	44.0	19.0	14.0	17.0	17.0	19.0	14.0	15.0	18.0	12.0	21.0	14.0	13.0	13.0	11.0	14.3	7.1	15.0	16.0	13.0	12.0	12.0	17.0	14.0	16.0	17.0	17.0	15.0	6.00	14.0	7.00	14.0	20.0
Hardness (as CaCO3)	mg/L	NV	200.00	310	230	290	230	290	270	280	392	356	224	353	231	252	238	284	255	228	295	267	262	339	265	335	316	323	273	369	255	220	271	285	320	290
Boron	mg/L	0.2 (I)	0.03	0.01	0.02	-	0.02	0.02	0.01	<0.01	0.02	0.13	0.02	0.01	0.01	0.01	0.02	<0.005	0.01	0.04	0.02	0.02	0.02	0.01	0.01	0.02	0.01	0.01	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.02
Calcium	mg/L	NV	47.0	91.0	64.0	80.0	61.0	77.0	79.0	85.0	106	98.1	50.6	97.8	56.4	68.7	56.1	78.1	62.4	55.6	79.7	66.7	64.1	91.3	67.6	86.4	83.7	86.3	62.8	99.9	56.5	59.1	67.5	76.2	70.0	70.0
Iron	mg/L	0.3	0.59	0.11	0.22	0.18	0.35	0.27	0.21	0.14	0.27	0.25	0.24	0.07	0.14	0.19	0.30	0.51	0.07	1.07	0.08	0.24	0.16	0.12	0.15	0.14	0.11	0.20	0.10	0.14	0.17	5.01	0.18	0.03	0.19	0.23
Magnesium	mg/L	NV	23.0	26.0	26.0	24.0	23.0	21.0	24.0	25.0	30.7	27.0	23.8	26.5	22.0	19.4	23.7	21.6	24.0	21.6	23.4	24.4	24.9	26.9	23.4	29.0	25.9	26.1	28.1	28.9	27.7	17.6	24.8	23.0	25.0	25.0
Manganese	mg/L	NV	0.04	0.003	0.04	0.02	0.04	0.01	0.01	0.01	0.01	0.01	0.05	0.004	0.01	0.02	0.03	0.04	0.02	0.82	0.01	0.07	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.03	0.12	0.03	0.02	0.02	0.02
Potassium	mg/L	NV	2.50	5.90	2.40	1.70	1.90	2.30	1.90	2.00	2.60	3.70	2.70	4.4	1.5	1.8	2.7	3.2	1.89	8.29	2.1	7.90	2.2	2.60	2.0	5.30	2.20	3.10	2.60	2.30	3.20	5.40	2.00	1.30	2.10	5.00
Sodium	mg/L	NV	6.60	13.0	6.60	4.20	6.80	7.70	4.60	4.60	5.90	11.5	5.60	8.10	4.90	5.70	5.20	6.10	5.32	9.26	4.40	10.00	6.70	5.70	6.20	10.40	5.10	6.20	6.00	7.00	6.60	3.10	5.90	3.20	5.70	8.10
Field Measurements																																				
Temperature (field)	°C	NV					22	6.9	7		16.8	10.92	24.5	12.8	18	4.2	18.9	4.1	15.2	12	14.6	11	20.0	8.8	16.2	6.9	17.5	4.5	22.8	7	14.1	6.3	21.1	2.5	15.1	5.4
Conductivity (field)							150	200	490		560	597	397	567	530	468	432	566	479	438	609	473	478	702	481	512	650	652	488	563	490	363	497	653	1137	610
pH (field)							7.91	8.12	8.86		8.5	8.23	7.98	8.34	8.24	8.30	8.09	8.30	8.18	7.63	8.31	7.7	7.6	8.02	7.63	8.4	8.22	8.08	8.42	8.13	7.78	7.32	7.4	8.26	7.9	8.03

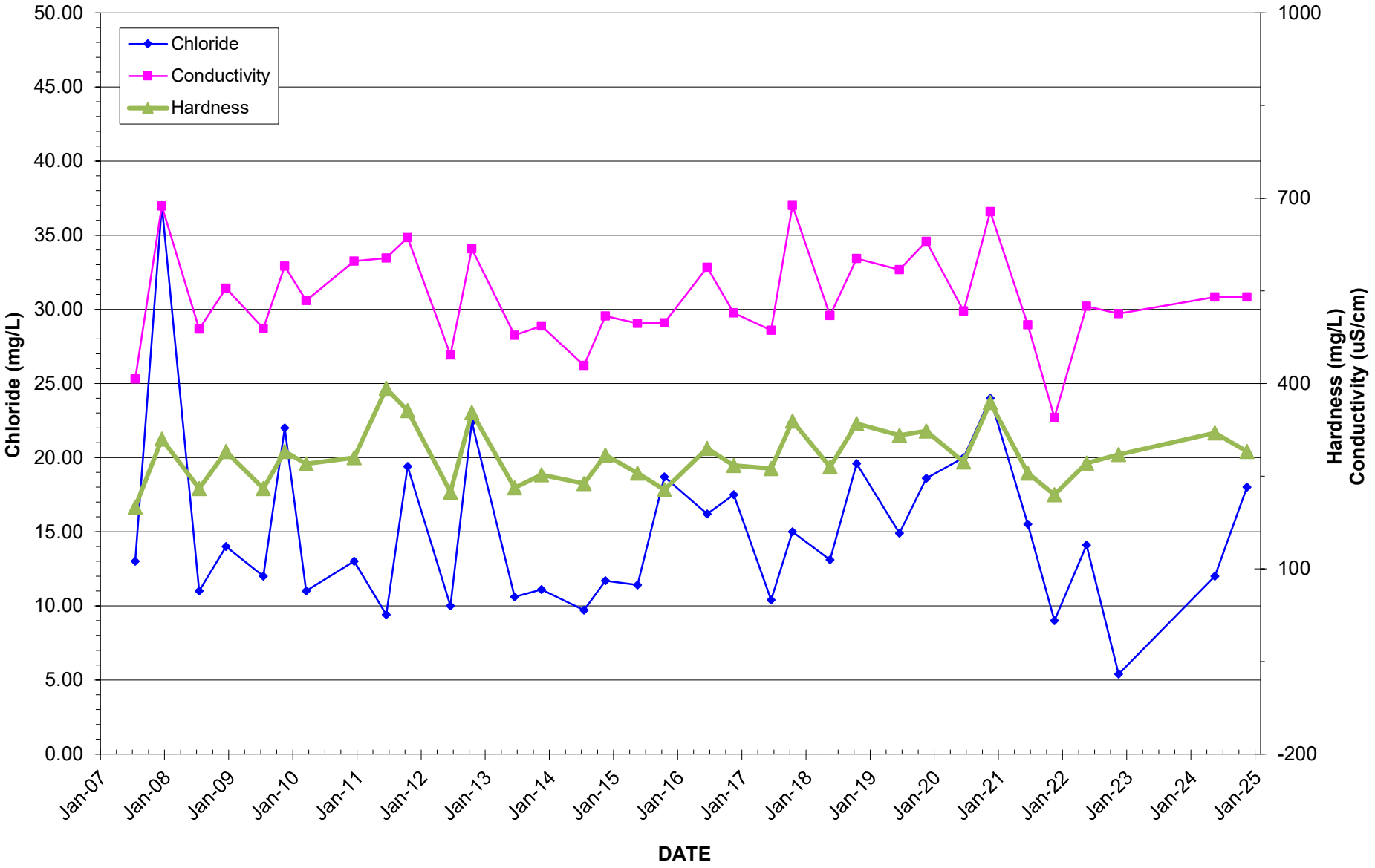
SUMMARY OF HISTORICAL SURFACE WATER QUALITY RESULTS

PARAMETER / SAMPLE DATE	Units	PWQO	SW3 Nov-19	SW3 Jun-20	SW3 Nov-20	SW3 May-22	SW3 Nov-22	SW3 May-23	SW3 Sep-23	SW3 May-24	SW3 Nov-24
Alkalinity	mg/L	See Notes	172	176	174	205	262	296		380	
Chloride	mg/L	NV	56	102	82	77	138	85		140.0	
Nitrate	mg/L	NV	<0.05	<0.05	0.08	<0.05	<0.05	<0.05		<0.10	
Nitrite	mg/L	NV	0.68	0.06	0.36	<0.05	0.10	<0.05		0.01	
Ammonia	mg/L	NV	3.74	0.13	1.90	0.07	0.48	0.13		6.50	
Unionized Ammonia	mg/L	0.02	<0.002	0.11	0.03	0.002	0.01	0.002			
TKN	mg/L	NV	5.10	4.60	3.20	2.80	1.90	1.80		9.90	
Phosphorus (Total)	mg/L	0.02 (I)	0.10	0.16	0.06	0.13	0.06	0.05		0.07	
Phenols	mg/L	0.005 (I)	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001		0.001	
Dissolved Organic Carbon	mg/L	NV	12	39	12	37	10	11		39	
Conductivity	uS/cm	NV	636	689	756	645	1010	883	ISW	1200	ISW
pH	unitless	6.5 to 8.5	8.05	10	7.95	8.85	7.94	8.00		8.00	
Sulphate	mg/L	NV	55	7	74	17	57	33		14.0	
Hardness (as CaCO3)	mg/L	NV	191	100	228	167	298	247		280	
Boron	mg/L	0.2 (I)	0.33	1.5	0.48	0.96	0.51	0.83		1.1	
Calcium	mg/L	NV	52	12	62	34	81	62		58	
Iron	mg/L	0.3	0.84	1.1	0.85	2.06	0.19	0.72		0.3	
Magnesium	mg/L	NV	15	17	18	20	23	22		31	
Manganese	mg/L	NV	0.05	0.08	0.120	0.16	0.03	0.13		0.084	
Potassium	mg/L	NV	11	23	18	12	21	17		44	
Sodium	mg/L	NV	45	106	54	77	84	73		110	
Field Measurements											
Temperature (field)	°C	NV	2.6	32	8.2	24.9	5.8	15.5		15.1	
Conductivity (field)			635	666	925	640	1127	781		1137	
pH (field)			7.51	10	8.08	7.59	7.92	7.74		7.9	

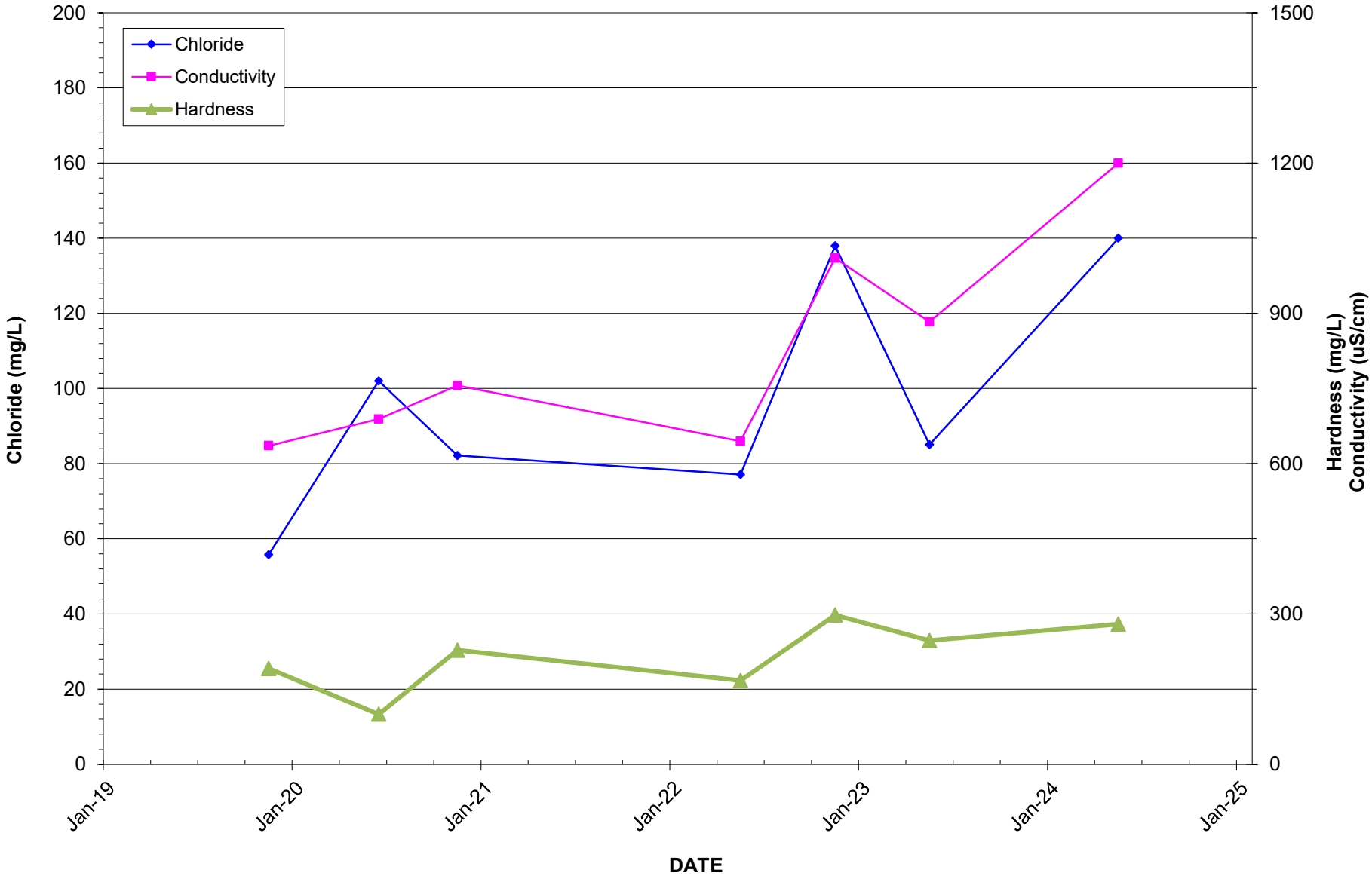
HISTORICAL SURFACE WATER QUALITY TRENDS
SURFACE WATER SAMPLING LOCATION - SW1



HISTORICAL SURFACE WATER QUALITY TRENDS
SURFACE WATER SAMPLING LOCATION - SW2



HISTORICAL SURFACE WATER QUALITY TRENDS
SURFACE WATER SAMPLING LOCATION - SW3



Appendix H Laboratory Certificate of Analysis

Your Project #: Huron (224058)
Your C.O.C. #: C#987609-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2024/05/16
Report #: R8152284
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4D9484
Received: 2024/05/09, 09:35

Sample Matrix: Water
Samples Received: 16

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	2	N/A	2024/05/14	CAM SOP-00448	SM 24 2320 B m
Alkalinity	14	N/A	2024/05/15	CAM SOP-00448	SM 24 2320 B m
Chloride by Automated Colourimetry	9	N/A	2024/05/13	CAM SOP-00463	SM 24 4500-Cl E m
Chloride by Automated Colourimetry	6	N/A	2024/05/14	CAM SOP-00463	SM 24 4500-Cl E m
Chloride by Automated Colourimetry	1	N/A	2024/05/16	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	2	N/A	2024/05/14	CAM SOP-00414	SM 24 2510 m
Conductivity	14	N/A	2024/05/15	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	16	N/A	2024/05/10	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	13	N/A	2024/05/13	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	3	N/A	2024/05/14	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals by ICPMS	13	2024/05/10	2024/05/13	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	3	2024/05/14	2024/05/14	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	16	N/A	2024/05/14	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	16	N/A	2024/05/11	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (3)	2	2024/05/10	2024/05/14	CAM SOP-00413	SM 24th - 4500H+ B
pH (3)	14	2024/05/10	2024/05/15	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP)	16	N/A	2024/05/13	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	9	N/A	2024/05/13	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphate by Automated Turbidimetry	6	N/A	2024/05/14	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphate by Automated Turbidimetry	1	N/A	2024/05/16	CAM SOP-00464	SM 24 4500-SO42- E m
Total Kjeldahl Nitrogen in Water	8	2024/05/10	2024/05/13	CAM SOP-00938	OMOE E3516 m
Total Kjeldahl Nitrogen in Water	7	2024/05/10	2024/05/14	CAM SOP-00938	OMOE E3516 m
Total Kjeldahl Nitrogen in Water	1	2024/05/13	2024/05/14	CAM SOP-00938	OMOE E3516 m
Total Phosphorus (Colourimetric)	3	2024/05/10	2024/05/15	CAM SOP-00407	SM 24 4500-P I

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Your Project #: Huron (224058)
Your C.O.C. #: C#987609-01-01

Attention: Reporting Contacts

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2024/05/16
Report #: R8152284
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4D9484

Received: 2024/05/09, 09:35

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

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This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZCX946			ZCX946			ZCX947		
Sampling Date		2024/05/08			2024/05/08			2024/05/08		
COC Number		C#987609-01-01			C#987609-01-01			C#987609-01-01		
	UNITS	OW1	RDL	QC Batch	OW1 Lab-Dup	RDL	QC Batch	OW3	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	450	1.0	9384627				400	1.0	9384627
Inorganics										
Total Ammonia-N	mg/L	<0.050	0.050	9389524				<0.050	0.050	9389524
Conductivity	umho/cm	980	1.0	9386472				880	1.0	9386472
Total Kjeldahl Nitrogen (TKN)	mg/L	0.32	0.10	9386464	0.34	0.10	9386464	0.19	0.10	9386464
Dissolved Organic Carbon	mg/L	3.2	0.40	9386621				2.3	0.40	9386621
pH	pH	8.12		9386473				8.08		9386473
Phenols-4AAP	mg/L	<0.0010	0.0010	9389418	<0.0010	0.0010	9389418	<0.0010	0.0010	9389418
Dissolved Sulphate (SO4)	mg/L	75	1.0	9387510				13	1.0	9387166
Alkalinity (Total as CaCO3)	mg/L	360	1.0	9386463				320	1.0	9386463
Dissolved Chloride (Cl-)	mg/L	55	1.0	9387507				77	1.0	9387160
Nitrite (N)	mg/L	<0.010	0.010	9387129				<0.010	0.010	9387129
Nitrate (N)	mg/L	0.17	0.10	9387129				<0.10	0.10	9387129
Nitrate + Nitrite (N)	mg/L	0.17	0.10	9387129				<0.10	0.10	9387129

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZCX947			ZCX948		ZCX949		
Sampling Date		2024/05/08			2024/05/08		2024/05/08		
COC Number		C#987609-01-01			C#987609-01-01		C#987609-01-01		
	UNITS	OW3 Lab-Dup	RDL	QC Batch	OW4	RDL	OW5	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L				560	1.0	260	1.0	9384627
Inorganics									
Total Ammonia-N	mg/L				15	0.050	<0.050	0.050	9389524
Conductivity	umho/cm				1200	1.0	500	1.0	9386472
Total Kjeldahl Nitrogen (TKN)	mg/L				16	1.0	0.17	0.10	9386464
Dissolved Organic Carbon	mg/L	2.3	0.40	9386621	5.4	0.40	0.49	0.40	9386621
pH	pH				7.68		8.16		9386473
Phenols-4AAP	mg/L				<0.0010	0.0010	<0.0010	0.0010	9389418
Dissolved Sulphate (SO4)	mg/L				12	1.0	18	1.0	9387166
Alkalinity (Total as CaCO3)	mg/L				640	1.0	250	1.0	9386463
Dissolved Chloride (Cl-)	mg/L				5.7	1.0	1.3	1.0	9387160
Nitrite (N)	mg/L				<0.010	0.010	<0.010	0.010	9387097
Nitrate (N)	mg/L				<0.10	0.10	<0.10	0.10	9387097
Nitrate + Nitrite (N)	mg/L				<0.10	0.10	<0.10	0.10	9387097

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZCX950		ZCX951		ZCX952	ZCX953		
Sampling Date		2024/05/08		2024/05/08		2024/05/08	2024/05/08		
COC Number		C#987609-01-01		C#987609-01-01		C#987609-01-01	C#987609-01-01		
	UNITS	OW6	RDL	OW7S	QC Batch	OW7D	OW8S	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	1100	1.0	140	9384627	82	240	1.0	9384627
Inorganics									
Total Ammonia-N	mg/L	29	0.050	<0.050	9389524	<0.050	<0.050	0.050	9389524
Conductivity	umho/cm	3700	1.0	510	9386472	450	770	1.0	9386472
Total Kjeldahl Nitrogen (TKN)	mg/L	41	2.0	0.14	9386464	<0.10	<0.10	0.10	9386464
Dissolved Organic Carbon	mg/L	130	0.40	0.48	9386621	0.68	0.76	0.40	9386621
pH	pH	7.66		8.24	9386473	8.18	8.18		9386473
Phenols-4AAP	mg/L	0.0070	0.0010	<0.0010	9389418	<0.0010	<0.0010	0.0010	9389418
Dissolved Sulphate (SO4)	mg/L	<1.0	1.0	42	9387166	54	87	1.0	9387510
Alkalinity (Total as CaCO3)	mg/L	1400	1.0	180	9386463	160	220	1.0	9386463
Dissolved Chloride (Cl-)	mg/L	470	5.0	27	9387160	9.4	53	1.0	9387507
Nitrite (N)	mg/L	<0.010	0.010	<0.010	9387097	<0.010	<0.010	0.010	9387129
Nitrate (N)	mg/L	<0.10	0.10	0.15	9387097	0.16	0.11	0.10	9387129
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	0.15	9387097	0.16	0.11	0.10	9387129

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZCX953			ZCX954		ZCX955		
Sampling Date		2024/05/08			2024/05/08		2024/05/08		
COC Number		C#987609-01-01			C#987609-01-01		C#987609-01-01		
	UNITS	OW8S Lab-Dup	RDL	QC Batch	OW8D	QC Batch	OW9	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L				170	9384627	170	1.0	9384627
Inorganics									
Total Ammonia-N	mg/L				<0.050	9389524	<0.050	0.050	9389524
Conductivity	umho/cm				690	9386472	680	1.0	9386472
Total Kjeldahl Nitrogen (TKN)	mg/L				0.13	9389083	<0.10	0.10	9386464
Dissolved Organic Carbon	mg/L				0.64	9386621	0.90	0.40	9386621
pH	pH				8.17	9386473	8.11		9386473
Phenols-4AAP	mg/L				<0.0010	9389418	<0.0010	0.0010	9389418
Dissolved Sulphate (SO4)	mg/L	85	1.0	9387510	180	9387510	220	1.0	9387510
Alkalinity (Total as CaCO3)	mg/L				150	9386463	100	1.0	9386463
Dissolved Chloride (Cl-)	mg/L	54	1.0	9387507	7.9	9387507	1.2	1.0	9387507
Nitrite (N)	mg/L	<0.010	0.010	9387129	<0.010	9387129	<0.010	0.010	9387129
Nitrate (N)	mg/L	0.11	0.10	9387129	0.14	9387129	0.10	0.10	9387129
Nitrate + Nitrite (N)	mg/L	0.11	0.10	9387129	0.14	9387129	0.10	0.10	9387129

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZCX956	ZCX957		ZCX958		
Sampling Date		2024/05/08	2024/05/08		2024/05/08		
COC Number		C#987609-01-01	C#987609-01-01		C#987609-01-01		
	UNITS	OW10S	OW10D	RDL	OW11	RDL	QC Batch
Calculated Parameters							
Hardness (CaCO3)	mg/L	350	240	1.0	940	1.0	9384627
Inorganics							
Total Ammonia-N	mg/L	<0.050	<0.050	0.050	23	0.050	9389524
Conductivity	umho/cm	800	580	1.0	2300	1.0	9386472
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.10	0.10	0.10	24	1.0	9386464
Dissolved Organic Carbon	mg/L	0.41	0.48	0.40	16	0.40	9386621
pH	pH	8.11	8.22		7.62		9386473
Phenols-4AAP	mg/L	<0.0010	<0.0010	0.0010	0.0024	0.0010	9389418
Dissolved Sulphate (SO4)	mg/L	160	80	1.0	1.3	1.0	9387166
Alkalinity (Total as CaCO3)	mg/L	260	210	1.0	860	1.0	9386463
Dissolved Chloride (Cl-)	mg/L	1.2	5.8	1.0	260	2.0	9387160
Nitrite (N)	mg/L	<0.010	0.016	0.010	<0.010	0.010	9387097
Nitrate (N)	mg/L	0.21	0.69	0.10	<0.10	0.10	9387097
Nitrate + Nitrite (N)	mg/L	0.21	0.71	0.10	<0.10	0.10	9387097

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4D9484
Report Date: 2024/05/16

GM BluePlan Engineering Limited
Client Project #: Huron (224058)

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZCX959		ZCX960			ZCX960		
Sampling Date		2024/05/08		2024/05/08			2024/05/08		
COC Number		C#987609-01-01		C#987609-01-01			C#987609-01-01		
	UNITS	SW1	QC Batch	SW2	RDL	QC Batch	SW2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	280	9384627	320	1.0	9384627			
Inorganics									
Total Ammonia-N	mg/L	<0.050	9389524	<0.050	0.050	9389524			
Conductivity	umho/cm	450	9387406	540	1.0	9387406	530	1.0	9387406
Total Kjeldahl Nitrogen (TKN)	mg/L	0.26	9386464	0.44	0.10	9386464			
Dissolved Organic Carbon	mg/L	4.8	9386621	3.9	0.40	9386621			
pH	pH	8.39	9387412	8.31		9387412	8.36		9387412
Phenols-4AAP	mg/L	<0.0010	9389418	<0.0010	0.0010	9389418			
Total Phosphorus	mg/L	<0.020	9386609	<0.020	0.020	9386609			
Dissolved Sulphate (SO4)	mg/L	2.4	9387252	14	1.0	9387510			
Alkalinity (Total as CaCO3)	mg/L	250	9387402	250	1.0	9387402	260	1.0	9387402
Dissolved Chloride (Cl-)	mg/L	2.8	9387242	12	1.0	9387507			
Nitrite (N)	mg/L	<0.010	9387121	0.034	0.010	9387121			
Nitrate (N)	mg/L	<0.10	9387121	2.92	0.10	9387121			
Nitrate + Nitrite (N)	mg/L	<0.10	9387121	2.95	0.10	9387121			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ZCX961		
Sampling Date		2024/05/08		
COC Number		C#987609-01-01		
	UNITS	SW3	RDL	QC Batch
Calculated Parameters				
Hardness (CaCO3)	mg/L	280	1.0	9384627
Inorganics				
Total Ammonia-N	mg/L	6.5	0.050	9389524
Conductivity	umho/cm	1200	1.0	9386472
Total Kjeldahl Nitrogen (TKN)	mg/L	9.9	0.50	9386464
Dissolved Organic Carbon	mg/L	39	0.40	9386621
pH	pH	8.00		9386473
Phenols-4AAP	mg/L	0.0011	0.0010	9389418
Total Phosphorus	mg/L	0.074	0.020	9386609
Dissolved Sulphate (SO4)	mg/L	14	1.0	9387166
Alkalinity (Total as CaCO3)	mg/L	380	1.0	9386463
Dissolved Chloride (Cl-)	mg/L	140	1.0	9387160
Nitrite (N)	mg/L	0.010	0.010	9387097
Nitrate (N)	mg/L	<0.10	0.10	9387097
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	9387097

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ZCX946	ZCX947	ZCX948		ZCX949		
Sampling Date		2024/05/08	2024/05/08	2024/05/08		2024/05/08		
COC Number		C#987609-01-01	C#987609-01-01	C#987609-01-01		C#987609-01-01		
	UNITS	OW1	OW3	OW4	RDL	OW5	RDL	QC Batch
Metals								
Dissolved Barium (Ba)	ug/L	97	85	96	2.0	88	2.0	9386332
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	<1.0	1.0	<1.0	1.0	9386332
Dissolved Boron (B)	ug/L	360	110	370	10	15	10	9386332
Dissolved Calcium (Ca)	ug/L	95000	81000	180000	200	60000	400	9386332
Dissolved Iron (Fe)	ug/L	<100	<100	670	100	<100	100	9386332
Dissolved Magnesium (Mg)	ug/L	52000	48000	29000	50	26000	50	9386332
Dissolved Manganese (Mn)	ug/L	<2.0	<2.0	680	2.0	5.3	2.0	9386332
Dissolved Phosphorus (P)	ug/L	<100	<100	<100	100	<100	100	9386332
Dissolved Potassium (K)	ug/L	2400	1600	13000	200	730	200	9386332
Dissolved Sodium (Na)	ug/L	40000	38000	14000	100	6800	100	9386332

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas ID		ZCX950	ZCX950		ZCX951	ZCX952	ZCX953		
Sampling Date		2024/05/08	2024/05/08		2024/05/08	2024/05/08	2024/05/08		
COC Number		C#987609-01-01	C#987609-01-01		C#987609-01-01	C#987609-01-01	C#987609-01-01		
	UNITS	OW6	OW6 Lab-Dup	RDL	OW7S	OW7D	OW8S	RDL	QC Batch
Metals									
Dissolved Barium (Ba)	ug/L	750	730	2.0	35	38	48	2.0	9386332
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	1.0	9386332
Dissolved Boron (B)	ug/L	630	640	10	290	460	410	10	9386332
Dissolved Calcium (Ca)	ug/L	150000	140000	1000	28000	19000	41000	200	9386332
Dissolved Iron (Fe)	ug/L	250	260	100	<100	<100	<100	100	9386332
Dissolved Magnesium (Mg)	ug/L	180000	190000	50	16000	8300	34000	50	9386332
Dissolved Manganese (Mn)	ug/L	18	17	2.0	<2.0	<2.0	<2.0	2.0	9386332
Dissolved Phosphorus (P)	ug/L	<100	<100	100	<100	<100	<100	100	9386332
Dissolved Potassium (K)	ug/L	25000	24000	200	930	890	1300	200	9386332
Dissolved Sodium (Na)	ug/L	420000	420000	100	56000	71000	64000	100	9386332

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ZCX954		ZCX955		ZCX956		ZCX957		
Sampling Date		2024/05/08		2024/05/08		2024/05/08		2024/05/08		
COC Number		C#987609-01-01		C#987609-01-01		C#987609-01-01		C#987609-01-01		
	UNITS	OW8D	RDL	OW9	RDL	OW10S	RDL	OW10D	RDL	QC Batch
Metals										
Dissolved Barium (Ba)	ug/L	27	2.0	23	2.0	25	2.0	110	2.0	9386332
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9386332
Dissolved Boron (B)	ug/L	510	10	500	10	330	10	120	10	9386332
Dissolved Calcium (Ca)	ug/L	39000	400	38000	1000	74000	400	55000	1000	9386332
Dissolved Iron (Fe)	ug/L	<100	100	<100	100	<100	100	<100	100	9386332
Dissolved Magnesium (Mg)	ug/L	19000	50	18000	50	41000	50	25000	50	9386332
Dissolved Manganese (Mn)	ug/L	<2.0	2.0	<2.0	2.0	<2.0	2.0	14	2.0	9386332
Dissolved Phosphorus (P)	ug/L	<100	100	<100	100	<100	100	<100	100	9386332
Dissolved Potassium (K)	ug/L	1300	200	1100	200	1500	200	1200	200	9386332
Dissolved Sodium (Na)	ug/L	83000	100	78000	100	39000	100	19000	100	9386332

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ZCX958			ZCX959	ZCX960	ZCX961		
Sampling Date		2024/05/08			2024/05/08	2024/05/08	2024/05/08		
COC Number		C#987609-01-01			C#987609-01-01	C#987609-01-01	C#987609-01-01		
	UNITS	OW11	RDL	QC Batch	SW1	SW2	SW3	RDL	QC Batch
Metals									
Dissolved Barium (Ba)	ug/L	260	2.0	9386332					
Total Barium (Ba)	ug/L				18	26	38	2.0	9391144
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	9386332					
Total Bismuth (Bi)	ug/L				<1.0	<1.0	<1.0	1.0	9391144
Dissolved Boron (B)	ug/L	410	10	9386332					
Total Boron (B)	ug/L				<10	15	1100	10	9391144
Dissolved Calcium (Ca)	ug/L	180000	200	9386332					
Total Calcium (Ca)	ug/L				70000	70000	58000	200	9391144
Dissolved Iron (Fe)	ug/L	<100	100	9386332					
Total Iron (Fe)	ug/L				<100	190	300	100	9391144
Dissolved Magnesium (Mg)	ug/L	120000	50	9386332					
Total Magnesium (Mg)	ug/L				19000	25000	31000	50	9391144
Dissolved Manganese (Mn)	ug/L	170	2.0	9386332					
Total Manganese (Mn)	ug/L				22	17	84	2.0	9391144
Dissolved Phosphorus (P)	ug/L	<100	100	9386332					
Total Phosphorus (P)	ug/L				<100	<100	200	100	9391144
Dissolved Potassium (K)	ug/L	20000	200	9386332					
Total Potassium (K)	ug/L				440	2100	44000	200	9391144
Dissolved Sodium (Na)	ug/L	110000	100	9386332					
Total Sodium (Na)	ug/L				1600	5700	110000	100	9391144

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: ZCX946
Sample ID: OW1
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387507	N/A	2024/05/14	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387129	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387510	N/A	2024/05/14	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

Bureau Veritas ID: ZCX946 Dup
Sample ID: OW1
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

Bureau Veritas ID: ZCX947
Sample ID: OW3
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387129	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

Bureau Veritas ID: ZCX947 Dup
Sample ID: OW3
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: ZCX948
Sample ID: OW4
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/14	Rajni Tyagi

Bureau Veritas ID: ZCX949
Sample ID: OW5
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/14	Rajni Tyagi

Bureau Veritas ID: ZCX950
Sample ID: OW6
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: ZCX950
Sample ID: OW6
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/14	Rajni Tyagi

Bureau Veritas ID: ZCX950 Dup
Sample ID: OW6
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen

Bureau Veritas ID: ZCX951
Sample ID: OW7S
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/14	Rajni Tyagi

Bureau Veritas ID: ZCX952
Sample ID: OW7D
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387507	N/A	2024/05/14	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387129	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387510	N/A	2024/05/14	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: ZCX953
Sample ID: OW8S
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387507	N/A	2024/05/14	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387129	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387510	N/A	2024/05/14	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

Bureau Veritas ID: ZCX953 Dup
Sample ID: OW8S
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9387507	N/A	2024/05/14	Alina Dobreanu
Nitrate & Nitrite as Nitrogen in Water	LACH	9387129	N/A	2024/05/11	Jinal Chavda
Sulphate by Automated Turbidimetry	SKAL	9387510	N/A	2024/05/14	Alina Dobreanu

Bureau Veritas ID: ZCX954
Sample ID: OW8D
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387507	N/A	2024/05/14	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387129	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387510	N/A	2024/05/14	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9389083	2024/05/13	2024/05/14	Kruti Jitesh Patel

Bureau Veritas ID: ZCX955
Sample ID: OW9
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: ZCX955
Sample ID: OW9
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9387507	N/A	2024/05/14	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387129	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387510	N/A	2024/05/14	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

Bureau Veritas ID: ZCX956
Sample ID: OW10S
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

Bureau Veritas ID: ZCX957
Sample ID: OW10D
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: ZCX957
Sample ID: OW10D
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi

Bureau Veritas ID: ZCX958
Sample ID: OW11
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/13	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9386332	2024/05/10	2024/05/13	Thuy Linh Nguyen
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/14	Rajni Tyagi

Bureau Veritas ID: ZCX959
Sample ID: SW1
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9387402	N/A	2024/05/14	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9387242	N/A	2024/05/16	Geetee Noorzaad
Conductivity	AT	9387406	N/A	2024/05/14	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/14	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9391144	2024/05/14	2024/05/14	Nan Raykha
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387121	N/A	2024/05/11	Jinal Chavda
pH	AT	9387412	2024/05/10	2024/05/14	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387252	N/A	2024/05/16	Geetee Noorzaad
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/14	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9386609	2024/05/10	2024/05/15	Muskan

Bureau Veritas ID: ZCX960
Sample ID: SW2
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9387402	N/A	2024/05/14	Surinder Rai
Chloride by Automated Colourimetry	SKAL	9387507	N/A	2024/05/14	Alina Dobreanu

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: ZCX960
Sample ID: SW2
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	9387406	N/A	2024/05/14	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/14	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9391144	2024/05/14	2024/05/14	Nan Raykha
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387121	N/A	2024/05/11	Jinal Chavda
pH	AT	9387412	2024/05/10	2024/05/14	Surinder Rai
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387510	N/A	2024/05/14	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/13	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9386609	2024/05/10	2024/05/15	Muskan

Bureau Veritas ID: ZCX960 Dup
Sample ID: SW2
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9387402	N/A	2024/05/14	Surinder Rai
Conductivity	AT	9387406	N/A	2024/05/14	Surinder Rai
pH	AT	9387412	2024/05/10	2024/05/14	Surinder Rai

Bureau Veritas ID: ZCX961
Sample ID: SW3
Matrix: Water

Collected: 2024/05/08
Shipped:
Received: 2024/05/09

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9386463	N/A	2024/05/15	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9387160	N/A	2024/05/13	Alina Dobreanu
Conductivity	AT	9386472	N/A	2024/05/15	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9386621	N/A	2024/05/10	Gyulshen Idriz
Hardness (calculated as CaCO3)		9384627	N/A	2024/05/14	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9391144	2024/05/14	2024/05/14	Nan Raykha
Total Ammonia-N	LACH/NH4	9389524	N/A	2024/05/14	Quratulain Khan
Nitrate & Nitrite as Nitrogen in Water	LACH	9387097	N/A	2024/05/11	Jinal Chavda
pH	AT	9386473	2024/05/10	2024/05/15	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9389418	N/A	2024/05/13	Chandra Nandlal
Sulphate by Automated Turbidimetry	SKAL	9387166	N/A	2024/05/13	Alina Dobreanu
Total Kjeldahl Nitrogen in Water	SKAL	9386464	2024/05/10	2024/05/14	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9386609	2024/05/10	2024/05/15	Muskan

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.3°C
Package 2	6.3°C
Package 3	4.7°C
Package 4	4.7°C

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9386332	Dissolved Barium (Ba)	2024/05/13	NC	80 - 120	101	80 - 120	<2.0	ug/L	2.1	20		
9386332	Dissolved Bismuth (Bi)	2024/05/13	95	80 - 120	97	80 - 120	<1.0	ug/L	NC	20		
9386332	Dissolved Boron (B)	2024/05/13	NC	80 - 120	101	80 - 120	<10	ug/L	2.0	20		
9386332	Dissolved Calcium (Ca)	2024/05/13	NC	80 - 120	101	80 - 120	<200	ug/L	7.3	20		
9386332	Dissolved Iron (Fe)	2024/05/13	105	80 - 120	101	80 - 120	<100	ug/L	1.7	20		
9386332	Dissolved Magnesium (Mg)	2024/05/13	NC	80 - 120	98	80 - 120	<50	ug/L	1.0	20		
9386332	Dissolved Manganese (Mn)	2024/05/13	99	80 - 120	95	80 - 120	<2.0	ug/L	1.6	20		
9386332	Dissolved Phosphorus (P)	2024/05/13	113	80 - 120	101	80 - 120	<100	ug/L	NC	20		
9386332	Dissolved Potassium (K)	2024/05/13	NC	80 - 120	99	80 - 120	<200	ug/L	3.4	20		
9386332	Dissolved Sodium (Na)	2024/05/13	NC	80 - 120	101	80 - 120	<100	ug/L	0.45	20		
9386463	Alkalinity (Total as CaCO3)	2024/05/15			95	85 - 115	<1.0	mg/L	1.4	20		
9386464	Total Kjeldahl Nitrogen (TKN)	2024/05/13	104	80 - 120	100	80 - 120	<0.10	mg/L	6.1	20	98	80 - 120
9386472	Conductivity	2024/05/15			101	85 - 115	<1.0	umho/cm	0.34	10		
9386473	pH	2024/05/15			102	98 - 103			0.80	N/A		
9386609	Total Phosphorus	2024/05/15	NC	80 - 120	100	80 - 120	<0.020	mg/L	0.96	20	98	80 - 120
9386621	Dissolved Organic Carbon	2024/05/10	90	80 - 120	94	80 - 120	<0.40	mg/L	0.81	20		
9387097	Nitrate (N)	2024/05/11	91	80 - 120	97	80 - 120	<0.10	mg/L	0.82	20		
9387097	Nitrite (N)	2024/05/11	99	80 - 120	100	80 - 120	<0.010	mg/L	NC	20		
9387121	Nitrate (N)	2024/05/11	95	80 - 120	98	80 - 120	<0.10	mg/L	4.0	20		
9387121	Nitrite (N)	2024/05/11	99	80 - 120	100	80 - 120	<0.010	mg/L	NC	20		
9387129	Nitrate (N)	2024/05/11	93	80 - 120	96	80 - 120	<0.10	mg/L	2.9	20		
9387129	Nitrite (N)	2024/05/11	99	80 - 120	99	80 - 120	<0.010	mg/L	NC	20		
9387160	Dissolved Chloride (Cl-)	2024/05/13	103	80 - 120	101	80 - 120	<1.0	mg/L	3.3	20		
9387166	Dissolved Sulphate (SO4)	2024/05/13	100	75 - 125	99	80 - 120	<1.0	mg/L	8.6	20		
9387242	Dissolved Chloride (Cl-)	2024/05/16	NC	80 - 120	93	80 - 120	<1.0	mg/L	2.6	20		
9387252	Dissolved Sulphate (SO4)	2024/05/16	NC	75 - 125	94	80 - 120	<1.0	mg/L	0.48	20		
9387402	Alkalinity (Total as CaCO3)	2024/05/14			98	85 - 115	<1.0	mg/L	2.8	20		
9387406	Conductivity	2024/05/14			101	85 - 115	<1.0	umho/cm	0.38	10		
9387412	pH	2024/05/14			102	98 - 103			0.66	N/A		
9387507	Dissolved Chloride (Cl-)	2024/05/14	NC	80 - 120	100	80 - 120	<1.0	mg/L	1.6	20		

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9387510	Dissolved Sulphate (SO4)	2024/05/14	NC	75 - 125	91	80 - 120	<1.0	mg/L	2.1	20		
9389083	Total Kjeldahl Nitrogen (TKN)	2024/05/14	102	80 - 120	97	80 - 120	<0.10	mg/L	NC	20	101	80 - 120
9389418	Phenols-4AAP	2024/05/13	104	80 - 120	100	80 - 120	<0.0010	mg/L	NC	20		
9389524	Total Ammonia-N	2024/05/14	96	75 - 125	100	80 - 120	<0.050	mg/L	2.4	20		
9391144	Total Barium (Ba)	2024/05/14	97	80 - 120	97	80 - 120	<2.0	ug/L	6.2	20		
9391144	Total Bismuth (Bi)	2024/05/14	96	80 - 120	96	80 - 120	<1.0	ug/L	NC	20		
9391144	Total Boron (B)	2024/05/14	99	80 - 120	98	80 - 120	<10	ug/L	0.25	20		
9391144	Total Calcium (Ca)	2024/05/14	98	80 - 120	99	80 - 120	<200	ug/L	1.9	20		
9391144	Total Iron (Fe)	2024/05/14	100	80 - 120	96	80 - 120	<100	ug/L	NC	20		
9391144	Total Magnesium (Mg)	2024/05/14	100	80 - 120	99	80 - 120	<50	ug/L	2.2	20		
9391144	Total Manganese (Mn)	2024/05/14	99	80 - 120	96	80 - 120	<2.0	ug/L	4.2	20		
9391144	Total Phosphorus (P)	2024/05/14	101	80 - 120	94	80 - 120	<100	ug/L	1.3	20		
9391144	Total Potassium (K)	2024/05/14	103	80 - 120	98	80 - 120	<200	ug/L	1.0	20		
9391144	Total Sodium (Na)	2024/05/14	NC	80 - 120	98	80 - 120	<100	ug/L	1.2	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

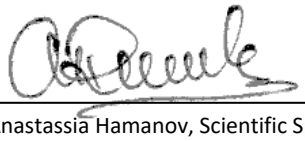
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Your Project #: HURON (224058)
Your C.O.C. #: 1018425-01-01

Attention: Reporting Contacts

GEI Consultants
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

Report Date: 2024/12/06
Report #: R8435334
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4AQ170
Received: 2024/11/29, 09:35

Sample Matrix: Ground Water
Samples Received: 12

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	12	N/A	2024/12/04	CAM SOP-00448	SM 24 2320 B m
Chloride by Automated Colourimetry	12	N/A	2024/12/03	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	12	N/A	2024/12/04	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	4	N/A	2024/12/02	CAM SOP-00446	SM 24 5310 B m
Dissolved Organic Carbon (DOC) (1)	8	N/A	2024/12/03	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	12	N/A	2024/12/02	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals by ICPMS	12	2024/11/30	2024/12/02	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	12	N/A	2024/12/04	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	12	N/A	2024/12/02	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (3)	12	2024/12/02	2024/12/04	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP)	12	N/A	2024/12/05	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	12	N/A	2024/12/03	CAM SOP-00464	SM 24 4500-SO42- E m
Total Kjeldahl Nitrogen in Water	8	2024/12/02	2024/12/03	CAM SOP-00938	SM 4500-N B m
Total Kjeldahl Nitrogen in Water	4	2024/12/02	2024/12/04	CAM SOP-00938	SM 4500-N B m

Sample Matrix: Surface Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2024/12/04	CAM SOP-00448	SM 24 2320 B m
Alkalinity	1	N/A	2024/12/06	CAM SOP-00448	SM 24 2320 B m
Chloride by Automated Colourimetry	2	N/A	2024/12/03	CAM SOP-00463	SM 24 4500-Cl E m
Conductivity	1	N/A	2024/12/04	CAM SOP-00414	SM 24 2510 m
Conductivity	1	N/A	2024/12/06	CAM SOP-00414	SM 24 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/12/02	CAM SOP-00446	SM 24 5310 B m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2024/12/03	CAM SOP-00446	SM 24 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2024/12/03	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	1	N/A	2024/12/06	CAM SOP 00102/00408/00447	SM 2340 B

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Your Project #: HURON (224058)
Your C.O.C. #: 1018425-01-01

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Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4AQ170
Received: 2024/11/29, 09:35

Sample Matrix: Surface Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Metals Analysis by ICPMS	2	2024/12/04	2024/12/04	CAM SOP-00447	EPA 6020B m
Total Ammonia-N	2	N/A	2024/12/04	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	2	N/A	2024/12/02	CAM SOP-00440	SM 24 4500-NO3I/NO2B
pH (3)	1	2024/12/02	2024/12/04	CAM SOP-00413	SM 24th - 4500H+ B
pH (3)	1	2024/12/02	2024/12/06	CAM SOP-00413	SM 24th - 4500H+ B
Phenols (4AAP)	2	N/A	2024/12/05	CAM SOP-00444	OMOE E3179 m
Sulphate by Automated Turbidimetry	2	N/A	2024/12/03	CAM SOP-00464	SM 24 4500-SO42- E m
Total Kjeldahl Nitrogen in Water	2	2024/12/02	2024/12/03	CAM SOP-00938	SM 4500-N B m
Total Phosphorus (Colourimetric)	1	2024/12/02	2024/12/03	CAM SOP-00407	SM 24 4500-P I
Total Phosphorus (Colourimetric)	1	2024/12/03	2024/12/04	CAM SOP-00407	SM 24 4500-P I

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
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Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.

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Your C.O.C. #: 1018425-01-01

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Report Date: 2024/12/06
Report #: R8435334
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4AQ170

Received: 2024/11/29, 09:35

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.

(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

(3) "The CCME method and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) requires pH to be analyzed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME and Analytical Protocol (O. Reg 153/04, O. Reg. 406/19) holding time. Bureau Veritas endeavors to analyze samples as soon as possible after receipt."

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Ashton Gibson, Project Manager
Email: ashton.gibson@bureauveritas.com
Phone# (905)817-5765

==========

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Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AKHU90		AKHU91		AKHU92		
Sampling Date		2024/11/27 11:05		2024/11/27 11:10		2024/11/27 11:15		
COC Number		1018425-01-01		1018425-01-01		1018425-01-01		
	UNITS	OW1	QC Batch	OW4	QC Batch	OW5	RDL	QC Batch
Calculated Parameters								
Hardness (CaCO3)	mg/L	430	9797216	170	9797216	380	1.0	9797216
Inorganics								
Total Ammonia-N	mg/L	0.071	9800305	<0.050	9800305	0.12	0.050	9800305
Conductivity	umho/cm	940	9799871	670	9799871	930	1.0	9799871
Total Kjeldahl Nitrogen (TKN)	mg/L	0.35	9800102	<0.10	9800102	0.24	0.10	9800102
Dissolved Organic Carbon	mg/L	3.5	9798990	1.1	9799204	2.2	0.40	9799190
pH	pH	8.17	9799872	8.15	9799872	8.13		9799872
Phenols-4AAP	mg/L	<0.0010	9809402	<0.0010	9809402	<0.0010	0.0010	9809402
Dissolved Sulphate (SO4)	mg/L	78	9800518	220	9800518	29	1.0	9800518
Alkalinity (Total as CaCO3)	mg/L	360	9799867	100	9799867	330	1.0	9799867
Dissolved Chloride (Cl-)	mg/L	54	9800512	1.7	9800512	90	1.0	9800512
Nitrite (N)	mg/L	<0.010	9799880	<0.010	9799880	0.012	0.010	9799880
Nitrate (N)	mg/L	0.21	9799880	<0.10	9799880	<0.10	0.10	9799880
Nitrate + Nitrite (N)	mg/L	0.21	9799880	<0.10	9799880	<0.10	0.10	9799880

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AKHU93		AKHU94			AKHU94		
Sampling Date		2024/11/27 11:20		2024/11/27 11:25			2024/11/27 11:25		
COC Number		1018425-01-01		1018425-01-01			1018425-01-01		
	UNITS	OW6	RDL	OW7S	RDL	QC Batch	OW7S Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	1200	1.0	120	1.0	9797216			
Inorganics									
Total Ammonia-N	mg/L	30	0.25	<0.050	0.050	9800305			
Conductivity	umho/cm	3800	1.0	500	1.0	9799871			
Total Kjeldahl Nitrogen (TKN)	mg/L	41	5.0	<0.10	0.10	9800102			
Dissolved Organic Carbon	mg/L	130	0.40	0.62	0.40	9798990			
pH	pH	7.80		8.29		9799872			
Phenols-4AAP	mg/L	0.0057	0.0010	<0.0010	0.0010	9809402	<0.0010	0.0010	9809402
Dissolved Sulphate (SO4)	mg/L	<1.0	1.0	38	1.0	9800518			
Alkalinity (Total as CaCO3)	mg/L	1400	1.0	170	1.0	9799867			
Dissolved Chloride (Cl-)	mg/L	470	5.0	25	1.0	9800512			
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	9799880			
Nitrate (N)	mg/L	<0.10	0.10	<0.10	0.10	9799880			
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	<0.10	0.10	9799880			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AKHU95			AKHU95			AKHU96		
Sampling Date		2024/11/27 11:30			2024/11/27 11:30			2024/11/27 11:35		
COC Number		1018425-01-01			1018425-01-01			1018425-01-01		
	UNITS	OW7D	RDL	QC Batch	OW7D Lab-Dup	RDL	QC Batch	OW8S	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L	65	1.0	9797216				220	1.0	9797216
Inorganics										
Total Ammonia-N	mg/L	<0.050	0.050	9800305				<0.050	0.050	9800305
Conductivity	umho/cm	450	1.0	9799871	450	1.0	9799871	750	1.0	9799871
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.10	0.10	9800102				<0.10	0.10	9800102
Dissolved Organic Carbon	mg/L	0.85	0.40	9798990				0.47	0.40	9798990
pH	pH	8.28		9799872	8.28		9799872	8.27		9799872
Phenols-4AAP	mg/L	<0.0010	0.0010	9808861				<0.0010	0.0010	9809402
Dissolved Sulphate (SO4)	mg/L	45	1.0	9800518	45	1.0	9800518	83	1.0	9800518
Alkalinity (Total as CaCO3)	mg/L	160	1.0	9799867	160	1.0	9799867	220	1.0	9799867
Dissolved Chloride (Cl-)	mg/L	12	1.0	9800512	11	1.0	9800512	54	1.0	9800512
Nitrite (N)	mg/L	<0.010	0.010	9799880				<0.010	0.010	9799880
Nitrate (N)	mg/L	<0.10	0.10	9799880				<0.10	0.10	9799880
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	9799880				<0.10	0.10	9799880

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AKHU96			AKHU97			AKHU97		
Sampling Date		2024/11/27 11:35			2024/11/27 11:40			2024/11/27 11:40		
COC Number		1018425-01-01			1018425-01-01			1018425-01-01		
	UNITS	OW8S Lab-Dup	RDL	QC Batch	OW8D	RDL	QC Batch	OW8D Lab-Dup	RDL	QC Batch
Calculated Parameters										
Hardness (CaCO3)	mg/L				160	1.0	9797216			
Inorganics										
Total Ammonia-N	mg/L				<0.050	0.050	9800305	<0.050	0.050	9800305
Conductivity	umho/cm				680	1.0	9799871			
Total Kjeldahl Nitrogen (TKN)	mg/L	0.27	0.10	9800102	0.15	0.10	9800102			
Dissolved Organic Carbon	mg/L				0.82	0.40	9799190			
pH	pH				8.21		9799872			
Phenols-4AAP	mg/L				<0.0010	0.0010	9809402			
Dissolved Sulphate (SO4)	mg/L				170	1.0	9800518			
Alkalinity (Total as CaCO3)	mg/L				150	1.0	9799867			
Dissolved Chloride (Cl-)	mg/L				8.5	1.0	9800512			
Nitrite (N)	mg/L				<0.010	0.010	9799880			
Nitrate (N)	mg/L				0.21	0.10	9799880			
Nitrate + Nitrite (N)	mg/L				0.21	0.10	9799880			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AKHU98		AKHU99			AKHU99		
Sampling Date		2024/11/27 11:45		2024/11/27 11:50			2024/11/27 11:50		
COC Number		1018425-01-01		1018425-01-01			1018425-01-01		
	UNITS	OW9	QC Batch	OW10S	RDL	QC Batch	OW10S Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	380	9797216	340	1.0	9797216			
Inorganics									
Total Ammonia-N	mg/L	0.067	9800305	<0.050	0.050	9800305			
Conductivity	umho/cm	740	9799871	770	1.0	9799871			
Total Kjeldahl Nitrogen (TKN)	mg/L	0.24	9800102	<0.10	0.10	9800163	<0.10	0.10	9800163
Dissolved Organic Carbon	mg/L	1.8	9798990	0.54	0.40	9799190			
pH	pH	8.12	9799872	8.19		9799872			
Phenols-4AAP	mg/L	0.0018	9809402	<0.0010	0.0010	9809402			
Dissolved Sulphate (SO4)	mg/L	110	9800518	160	1.0	9800518			
Alkalinity (Total as CaCO3)	mg/L	290	9799867	270	1.0	9799867			
Dissolved Chloride (Cl-)	mg/L	10	9800512	1.4	1.0	9800512			
Nitrite (N)	mg/L	<0.010	9799880	<0.010	0.010	9799880			
Nitrate (N)	mg/L	0.18	9799880	<0.10	0.10	9799880			
Nitrate + Nitrite (N)	mg/L	0.18	9799880	<0.10	0.10	9799880			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		AKHV00		AKHV01		
Sampling Date		2024/11/27 11:55		2024/11/27 12:00		
COC Number		1018425-01-01		1018425-01-01		
	UNITS	OW10D	RDL	OW11	RDL	QC Batch
Calculated Parameters						
Hardness (CaCO3)	mg/L	180	1.0	930	1.0	9797216
Inorganics						
Total Ammonia-N	mg/L	<0.050	0.050	23	0.10	9800305
Conductivity	umho/cm	550	1.0	2300	1.0	9799871
Total Kjeldahl Nitrogen (TKN)	mg/L	<0.10	0.10	25	2.0	9800102
Dissolved Organic Carbon	mg/L	0.61	0.40	16	0.40	9798990
pH	pH	8.25		7.69		9799872
Phenols-4AAP	mg/L	<0.0010	0.0010	0.0015	0.0010	9809402
Dissolved Sulphate (SO4)	mg/L	100	1.0	<1.0	1.0	9800518
Alkalinity (Total as CaCO3)	mg/L	180	1.0	880	1.0	9799867
Dissolved Chloride (Cl-)	mg/L	3.0	1.0	260	2.0	9800512
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	9799880
Nitrate (N)	mg/L	<0.10	0.10	<0.10	0.10	9799880
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	<0.10	0.10	9799880

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

Bureau Veritas ID		AKHU90	AKHU90		AKHU91		AKHU92		
Sampling Date		2024/11/27 11:05	2024/11/27 11:05		2024/11/27 11:10		2024/11/27 11:15		
COC Number		1018425-01-01	1018425-01-01		1018425-01-01		1018425-01-01		
	UNITS	OW1	OW1 Lab-Dup	RDL	OW4	RDL	OW5	RDL	QC Batch
Metals									
Dissolved Barium (Ba)	ug/L	91	88	2.0	22	2.0	96	2.0	9798796
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9798796
Dissolved Boron (B)	ug/L	310	320	10	450	10	130	10	9798796
Dissolved Calcium (Ca)	ug/L	89000	86000	200	37000	1000	77000	200	9798796
Dissolved Iron (Fe)	ug/L	<100	<100	100	<100	100	<100	100	9798796
Dissolved Magnesium (Mg)	ug/L	52000	50000	50	18000	50	45000	50	9798796
Dissolved Manganese (Mn)	ug/L	32	31	2.0	<2.0	2.0	190	2.0	9798796
Dissolved Phosphorus (P)	ug/L	<100	<100	100	<100	100	<100	100	9798796
Dissolved Potassium (K)	ug/L	2300	2200	200	1100	200	1500	200	9798796
Dissolved Sodium (Na)	ug/L	39000	38000	100	75000	100	37000	100	9798796

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

Bureau Veritas ID		AKHU93		AKHU94	AKHU95	AKHU96		AKHU97		
Sampling Date		2024/11/27 11:20		2024/11/27 11:25	2024/11/27 11:30	2024/11/27 11:35		2024/11/27 11:40		
COC Number		1018425-01-01		1018425-01-01	1018425-01-01	1018425-01-01		1018425-01-01		
	UNITS	OW6	RDL	OW7S	OW7D	OW8S	RDL	OW8D	RDL	QC Batch
Metals										
Dissolved Barium (Ba)	ug/L	700	2.0	30	27	43	2.0	24	2.0	9798796
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	<1.0	<1.0	<1.0	1.0	<1.0	1.0	9798796
Dissolved Boron (B)	ug/L	570	10	280	430	390	10	470	10	9798796
Dissolved Calcium (Ca)	ug/L	140000	1000	25000	15000	37000	200	36000	400	9798796
Dissolved Iron (Fe)	ug/L	270	100	<100	<100	<100	100	<100	100	9798796
Dissolved Magnesium (Mg)	ug/L	190000	50	15000	6700	30000	50	18000	50	9798796
Dissolved Manganese (Mn)	ug/L	19	2.0	<2.0	<2.0	<2.0	2.0	<2.0	2.0	9798796
Dissolved Phosphorus (P)	ug/L	<100	100	<100	<100	<100	100	<100	100	9798796
Dissolved Potassium (K)	ug/L	26000	200	880	870	1300	200	1200	200	9798796
Dissolved Sodium (Na)	ug/L	440000	100	52000	61000	60000	100	82000	100	9798796

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

Bureau Veritas ID		AKHU98	AKHU99		AKHV00		AKHV01		
Sampling Date		2024/11/27 11:45	2024/11/27 11:50		2024/11/27 11:55		2024/11/27 12:00		
COC Number		1018425-01-01	1018425-01-01		1018425-01-01		1018425-01-01		
	UNITS	OW9	OW10S	RDL	OW10D	RDL	OW11	RDL	QC Batch
Metals									
Dissolved Barium (Ba)	ug/L	77	26	2.0	78	2.0	250	2.0	9798796
Dissolved Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	<1.0	1.0	<1.0	1.0	9798796
Dissolved Boron (B)	ug/L	70	360	10	180	10	430	10	9798796
Dissolved Calcium (Ca)	ug/L	81000	70000	200	37000	1000	170000	200	9798796
Dissolved Iron (Fe)	ug/L	<100	<100	100	<100	100	<100	100	9798796
Dissolved Magnesium (Mg)	ug/L	42000	41000	50	21000	50	120000	50	9798796
Dissolved Manganese (Mn)	ug/L	120	5.5	2.0	8.8	2.0	130	2.0	9798796
Dissolved Phosphorus (P)	ug/L	<100	<100	100	<100	100	<100	100	9798796
Dissolved Potassium (K)	ug/L	1500	1700	200	1100	200	20000	200	9798796
Dissolved Sodium (Na)	ug/L	19000	39000	100	27000	100	110000	100	9798796

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

RESULTS OF ANALYSES OF SURFACE WATER

Bureau Veritas ID		AKHV02		AKHV03			AKHV03		
Sampling Date		2024/11/27 12:05		2024/11/27 12:10			2024/11/27 12:10		
COC Number		1018425-01-01		1018425-01-01			1018425-01-01		
	UNITS	SW1	QC Batch	SW2	RDL	QC Batch	SW2 Lab-Dup	RDL	QC Batch
Calculated Parameters									
Hardness (CaCO3)	mg/L	270	9797216	290	1.0	9797216			
Inorganics									
Total Ammonia-N	mg/L	<0.050	9800305	<0.050	0.050	9800305			
Conductivity	umho/cm	520	9800535	540	1.0	9799871			
Total Kjeldahl Nitrogen (TKN)	mg/L	0.58	9800102	0.49	0.10	9800102			
Dissolved Organic Carbon	mg/L	6.9	9798990	5.4	0.40	9799190	5.3	0.40	9799190
pH	pH	8.26	9800539	8.26		9799872			
Phenols-4AAP	mg/L	<0.0010	9808861	<0.0010	0.0010	9809402			
Total Phosphorus	mg/L	0.036	9800219	0.035	0.020	9803242			
Dissolved Sulphate (SO4)	mg/L	11	9800518	20	1.0	9800518			
Alkalinity (Total as CaCO3)	mg/L	240	9800532	240	1.0	9799867			
Dissolved Chloride (Cl-)	mg/L	17	9800512	18	1.0	9800512			
Nitrite (N)	mg/L	<0.010	9800548	<0.010	0.010	9799880			
Nitrate (N)	mg/L	0.43	9800548	0.26	0.10	9799880			
Nitrate + Nitrite (N)	mg/L	0.43	9800548	0.26	0.10	9799880			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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ELEMENTS BY ATOMIC SPECTROSCOPY (SURFACE WATER)

Bureau Veritas ID		AKHV02	AKHV03		
Sampling Date		2024/11/27 12:05	2024/11/27 12:10		
COC Number		1018425-01-01	1018425-01-01		
	UNITS	SW1	SW2	RDL	QC Batch
Metals					
Total Barium (Ba)	ug/L	35	27	2.0	9805447
Total Bismuth (Bi)	ug/L	<1.0	<1.0	1.0	9805447
Total Boron (B)	ug/L	21	23	10	9805447
Total Calcium (Ca)	ug/L	67000	70000	200	9805447
Total Iron (Fe)	ug/L	440	230	100	9805447
Total Magnesium (Mg)	ug/L	24000	25000	50	9805447
Total Manganese (Mn)	ug/L	18	24	2.0	9805447
Total Phosphorus (P)	ug/L	<100	<100	100	9805447
Total Potassium (K)	ug/L	6400	5000	200	9805447
Total Sodium (Na)	ug/L	6800	8100	100	9805447

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: AKHU90 **Collected:** 2024/11/27
Sample ID: OW1 **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU90 Dup **Collected:** 2024/11/27
Sample ID: OW1 **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha

Bureau Veritas ID: AKHU91 **Collected:** 2024/11/27
Sample ID: OW4 **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9799204	N/A	2024/12/02	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU92 **Collected:** 2024/11/27
Sample ID: OW5 **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan

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TEST SUMMARY

Bureau Veritas ID: AKHU92 **Collected:** 2024/11/27
Sample ID: OW5 **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9799190	N/A	2024/12/02	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU93 **Collected:** 2024/11/27
Sample ID: OW6 **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/04	Rajni Tyagi

Bureau Veritas ID: AKHU94 **Collected:** 2024/11/27
Sample ID: OW7S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: AKHU94 **Collected:** 2024/11/27
Sample ID: OW7S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU94 Dup **Collected:** 2024/11/27
Sample ID: OW7S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani

Bureau Veritas ID: AKHU95 **Collected:** 2024/11/27
Sample ID: OW7D **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9808861	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/04	Rajni Tyagi

Bureau Veritas ID: AKHU95 Dup **Collected:** 2024/11/27
Sample ID: OW7D **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan

Bureau Veritas ID: AKHU96 **Collected:** 2024/11/27
Sample ID: OW8S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: AKHU96 **Collected:** 2024/11/27
Sample ID: OW8S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU96 Dup **Collected:** 2024/11/27
Sample ID: OW8S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU97 **Collected:** 2024/11/27
Sample ID: OW8D **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9799190	N/A	2024/12/02	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/04	Rajni Tyagi

Bureau Veritas ID: AKHU97 Dup **Collected:** 2024/11/27
Sample ID: OW8D **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

TEST SUMMARY

Bureau Veritas ID: AKHU98 **Collected:** 2024/11/27
Sample ID: OW9 **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU99 **Collected:** 2024/11/27
Sample ID: OW10S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9799190	N/A	2024/12/02	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800163	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHU99 Dup **Collected:** 2024/11/27
Sample ID: OW10S **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	9800163	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHV00 **Collected:** 2024/11/27
Sample ID: OW10D **Shipped:**
Matrix: Ground Water **Received:** 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

TEST SUMMARY

Bureau Veritas ID: AKHV00
Sample ID: OW10D
Matrix: Ground Water

Collected: 2024/11/27
Shipped:
Received: 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi

Bureau Veritas ID: AKHV01
Sample ID: OW11
Matrix: Ground Water

Collected: 2024/11/27
Shipped:
Received: 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/02	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	9798796	2024/11/30	2024/12/02	Nan Raykha
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/04	Rajni Tyagi

Bureau Veritas ID: AKHV02
Sample ID: SW1
Matrix: Surface Water

Collected: 2024/11/27
Shipped:
Received: 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9800532	N/A	2024/12/06	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9800535	N/A	2024/12/06	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9798990	N/A	2024/12/03	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/03	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9805447	2024/12/04	2024/12/04	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9800548	N/A	2024/12/02	Chandra Nandlal
pH	AT	9800539	2024/12/02	2024/12/06	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9808861	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C4AQ170
Report Date: 2024/12/06

GEI Consultants
Client Project #: HURON (224058)
Sampler Initials: GK

TEST SUMMARY

Bureau Veritas ID: AKHV02
Sample ID: SW1
Matrix: Surface Water

Collected: 2024/11/27
Shipped:
Received: 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9800219	2024/12/02	2024/12/03	Sachi Patel

Bureau Veritas ID: AKHV03
Sample ID: SW2
Matrix: Surface Water

Collected: 2024/11/27
Shipped:
Received: 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9799867	N/A	2024/12/04	Nachiketa Gohil
Chloride by Automated Colourimetry	SKAL	9800512	N/A	2024/12/03	Massarat Jan
Conductivity	AT	9799871	N/A	2024/12/04	Nachiketa Gohil
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9799190	N/A	2024/12/02	Gyulshen Idriz
Hardness (calculated as CaCO3)		9797216	N/A	2024/12/06	Automated Statchk
Total Metals Analysis by ICPMS	ICP/MS	9805447	2024/12/04	2024/12/04	Azita Fazaeli
Total Ammonia-N	SKAL/NH4	9800305	N/A	2024/12/04	Jinal Chavda
Nitrate & Nitrite as Nitrogen in Water	LACH	9799880	N/A	2024/12/02	Chandra Nandlal
pH	AT	9799872	2024/12/02	2024/12/04	Nachiketa Gohil
Phenols (4AAP)	TECH/PHEN	9809402	N/A	2024/12/05	Madhav Somani
Sulphate by Automated Turbidimetry	SKAL	9800518	N/A	2024/12/03	Massarat Jan
Total Kjeldahl Nitrogen in Water	SKAL	9800102	2024/12/02	2024/12/03	Rajni Tyagi
Total Phosphorus (Colourimetric)	SKAL/P	9803242	2024/12/03	2024/12/04	Sachi Patel

Bureau Veritas ID: AKHV03 Dup
Sample ID: SW2
Matrix: Surface Water

Collected: 2024/11/27
Shipped:
Received: 2024/11/29

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	9799190	N/A	2024/12/02	Gyulshen Idriz

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C
Package 2	4.3°C

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9798796	Dissolved Barium (Ba)	2024/12/02	97	80 - 120	99	80 - 120	<2.0	ug/L	3.2	20		
9798796	Dissolved Bismuth (Bi)	2024/12/02	96	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
9798796	Dissolved Boron (B)	2024/12/02	91	80 - 120	94	80 - 120	<10	ug/L	4.7	20		
9798796	Dissolved Calcium (Ca)	2024/12/02	NC	80 - 120	98	80 - 120	<200	ug/L	2.8	20		
9798796	Dissolved Iron (Fe)	2024/12/02	98	80 - 120	100	80 - 120	<100	ug/L	NC	20		
9798796	Dissolved Magnesium (Mg)	2024/12/02	NC	80 - 120	98	80 - 120	<50	ug/L	3.2	20		
9798796	Dissolved Manganese (Mn)	2024/12/02	96	80 - 120	98	80 - 120	<2.0	ug/L	3.5	20		
9798796	Dissolved Phosphorus (P)	2024/12/02	108	80 - 120	102	80 - 120	<100	ug/L	NC	20		
9798796	Dissolved Potassium (K)	2024/12/02	98	80 - 120	100	80 - 120	<200	ug/L	3.1	20		
9798796	Dissolved Sodium (Na)	2024/12/02	NC	80 - 120	100	80 - 120	<100	ug/L	2.4	20		
9798990	Dissolved Organic Carbon	2024/12/03	93	80 - 120	96	80 - 120	<0.40	mg/L	11	20		
9799190	Dissolved Organic Carbon	2024/12/02	93	80 - 120	95	80 - 120	<0.40	mg/L	1.6	20		
9799204	Dissolved Organic Carbon	2024/12/02	93	80 - 120	94	80 - 120	<0.40	mg/L	4.6	20		
9799867	Alkalinity (Total as CaCO3)	2024/12/04			93	85 - 115	<1.0	mg/L	1.1	20		
9799871	Conductivity	2024/12/04			99	85 - 115	<1.0	umho/cm	0.44	10		
9799872	pH	2024/12/04			102	98 - 103			0.034	N/A		
9799880	Nitrate (N)	2024/12/02	93	80 - 120	99	80 - 120	<0.10	mg/L	NC	20		
9799880	Nitrite (N)	2024/12/02	102	80 - 120	106	80 - 120	<0.010	mg/L	NC	20		
9800102	Total Kjeldahl Nitrogen (TKN)	2024/12/03	105	80 - 120	99	80 - 120	<0.10	mg/L	NC	20	102	80 - 120
9800163	Total Kjeldahl Nitrogen (TKN)	2024/12/03	104	80 - 120	102	80 - 120	<0.10	mg/L	NC	20	97	80 - 120
9800219	Total Phosphorus	2024/12/03	96	80 - 120	96	80 - 120	<0.020	mg/L	NC	20	103	80 - 120
9800305	Total Ammonia-N	2024/12/04	101	75 - 125	100	80 - 120	<0.050	mg/L	NC	20		
9800512	Dissolved Chloride (Cl-)	2024/12/03	82	80 - 120	94	80 - 120	<1.0	mg/L	5.0	20		
9800518	Dissolved Sulphate (SO4)	2024/12/03	NC	75 - 125	92	80 - 120	<1.0	mg/L	0.066	20		
9800532	Alkalinity (Total as CaCO3)	2024/12/06			98	85 - 115	<1.0	mg/L	0.027	20		
9800535	Conductivity	2024/12/06			101	85 - 115	<1.0	umho/cm	0.60	10		
9800539	pH	2024/12/06			102	98 - 103			0.077	N/A		
9800548	Nitrate (N)	2024/12/02	93	80 - 120	98	80 - 120	<0.10	mg/L	NC	20		
9800548	Nitrite (N)	2024/12/02	104	80 - 120	107	80 - 120	<0.010	mg/L	NC	20		

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
9803242	Total Phosphorus	2024/12/04	94	80 - 120	99	80 - 120	<0.020	mg/L	4.9	20	105	80 - 120
9805447	Total Barium (Ba)	2024/12/04	100	80 - 120	100	80 - 120	<2.0	ug/L	6.0	20		
9805447	Total Bismuth (Bi)	2024/12/04	100	80 - 120	100	80 - 120	<1.0	ug/L	NC	20		
9805447	Total Boron (B)	2024/12/04	95	80 - 120	95	80 - 120	<10	ug/L	2.6	20		
9805447	Total Calcium (Ca)	2024/12/04	NC	80 - 120	99	80 - 120	<200	ug/L	2.1	20		
9805447	Total Iron (Fe)	2024/12/04	100	80 - 120	96	80 - 120	<100	ug/L	5.1	20		
9805447	Total Magnesium (Mg)	2024/12/04	NC	80 - 120	95	80 - 120	<50	ug/L	2.9	20		
9805447	Total Manganese (Mn)	2024/12/04	99	80 - 120	97	80 - 120	<2.0	ug/L	2.5	20		
9805447	Total Phosphorus (P)	2024/12/04	108	80 - 120	96	80 - 120	<100	ug/L	NC	20		
9805447	Total Potassium (K)	2024/12/04	98	80 - 120	95	80 - 120	<200	ug/L	6.3	20		
9805447	Total Sodium (Na)	2024/12/04	95	80 - 120	97	80 - 120	<100	ug/L	2.6	20		
9808861	Phenols-4AAP	2024/12/05	103	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20		
9809402	Phenols-4AAP	2024/12/05	103	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

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

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Louise Harding, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

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