



Environmental Compliance Approval No. A272301

Eastnor Landfill Site: Annual Monitoring Report (2024)

Municipality of Northern Bruce Peninsula, Ontario

Submitted to:

Municipality of Northern Bruce Peninsula
56 Lindsay Road 5
Lion's Head, ON N0H 1W0

Submitted by:

GEI Consultants Canada Ltd.
1260 2nd Avenue East, Unit #1
Owen Sound, ON N4K 2J3
519.376.1805
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Project No. 2402867



Andrea Nelson
Project Manager

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1. INTRODUCTION

The Eastnor landfill site is located approximately 25 km north of the geographic town of Wiarton within Lots 17 and 18, Concession 2WBR in the former Township of Eastnor, in the Municipality of Northern Bruce Peninsula, County of Bruce, where shown on Figure 1. The Municipality was formed in 1999 as the result of the amalgamation of the former Townships of Eastnor, Lindsay and St. Edmunds, as well as the Village of Lion's Head. Prior to 1999 each respective township was serviced by a landfill, of which the Municipality assumed ownership upon amalgamation. As a result, the Eastnor landfill is one of three landfill sites that service the Municipality and is approved to accept non-hazardous municipal wastes generated from within the geographic boundaries of the Municipality.

Operations at the Site are governed by Environmental Compliance Approval No. A272301 (ECA) which was issued on February 20, 2007, this superseded and replaced the previous approval issued on September 24, 1980. The ECA, as amended, recognizes the use of a 9.5 ha (23.5 acre) landfill area, a 1.09 ha wood waste disposal area, and a transfer station within a total Site area of 81 ha (200 acres). Further, the ECA approves a total waste disposal capacity of 625,500 m³ including waste, wood waste, and interim cover (i.e., not final cover). The approval, and its amendments, are enclosed in Appendix A.

Of the 9.5-hectare landfill area, a 3.3-hectare area with a volumetric capacity of 103,500 m³ was initially approved for landfilling. A Site Plan is provided in Figure 2. The Approval was amended on December 8, 2009, to permit the establishment of an additional 1.09 ha (2.7 acre) area for the disposal of wood waste (i.e., stumps), with an additional approved volumetric capacity of 39,000 m³. Additional amendments were issued on June 14, 2016, to outline the groundwater monitoring program requirements, and on November 1, 2017 (Notice 3) and April 15, 2019 (Notice 4), to approve the continued use and development of the remaining 6.2 ha waste fill area to the northwest of the existing landfill. More specifically, the amended ECA approves landfill operations within the Phase I area, where shown on Figure 3, which has capacity for waste and interim cover of 270,000 m³ (i.e., not including final cover). An additional capacity of 250,000 m³ remains available in the Phase II area, subject to the submission and approval of a detailed Hydrogeological Assessment and Plan of Development and Operation.

Condition 45 of the Approval requires that a monitoring report be submitted by May 31st of each year to summarize the previous year's operations, waste quantities and groundwater quality results. This monitoring report, for the year 2024, is being submitted to meet these requirements. It is noted that MECP comments pertaining to past Annual Reports are addressed herein, where applicable. MECP correspondence was not received during the reporting year. Select correspondence is included in Appendix B.

2. SITE USAGE

The Eastnor landfill is currently one of three landfill sites approved for the disposal of solid non-hazardous waste that services the Municipality of Northern Bruce Peninsula. Refuse received at the Site originates from full time and seasonal residents and local businesses of the Municipality of Northern Bruce Peninsula. Currently, there are no major industrial, commercial or institutional (IC&I) contributors of waste to the Eastnor Landfill.

According to Statistics Canada's 2021 census data, the Municipality of Northern Bruce Peninsula has a permanent population of 4,404 and a total of 5,101 dwellings, of which 2,206 are occupied by permanent residents. For the purpose of waste generation and usage of waste management services, the contributing population is more accurately estimated to be 5,610. This is based on the method adopted by Waste Diversion Ontario (WDO) where 6 seasonal households are equivalent to 1 permanent household and an average of 2.5 persons per permanent household. The former Township of Eastnor is estimated to account for approximately 45% of the population in the Municipality, which equates to approximately 2,525 persons.

As of January 2017, the entire Municipality is serviced by curbside waste and recycling collection. Residents are limited to 2 bags per week. Household waste collected through the municipally provided waste collection services are disposed of directly in the active area of the landfill. Recycling depots are available at the three landfill sites, where shown in Figure 1.

Activities that currently occur at the Eastnor landfill site include landfilling of residual waste and wood waste, burning of clean wood waste, collection of blue box materials, electronic waste, and mattresses, stockpiling of scrap metal and tires, as appropriate, and goods exchange through their reuse building. According to Site records an estimated 1,425 tonnes (metric) of waste was landfilled at the Eastnor landfill site in 2024.

3. SITE LIFE EXPECTANCY

3.1. Area A and Area B

The ECA, as amended, approves the establishment and use of an 81-ha Site consisting of a 9.5-ha landfill, a transfer station for recyclables, and a 1.09-ha (2.7 acre) wood waste disposal area, where shown on Figure 3. Approved landfilling was originally limited to a 3.3 ha licensed limit/useable area which was divided into two areas: Areas A and B (Figure 3). Based on the original plans for the Site, Area B encompassed 1.84 ha and is no longer used for waste disposal and Area A encompassed an area of 1.46 ha and was filled to capacity in 2019. It is noted that during additional investigations at the Site conducted in 2007, a 0.7 ha portion of Area B situated closest to the southern property boundary was observed to contain no waste (i.e., natural conditions), therefore refuse placement was observed to be limited to an area of approximately 1.1 ha within Area B.

In the fall of 2007, a survey of Areas A and B was completed by Gamsby and Mannerow Limited (now GEI Consultants) to determine the remaining Site capacity. The survey data was used in conjunction with the proposed final contours outlined in the PSMI PDO (May 2004). The remaining capacity for waste and daily cover within this 3.3-hectare area originally approved was determined to be approximately 29,500 m³ at that time.

Since then, the remaining capacity has been determined by subtracting the estimated volumetric capacity used derived from annual surveys of the active fill areas. Using the elevation difference between the December 2023 and December 2024 topographical surveys, a capacity of 3,625 m³ was calculated to have been used during the reporting period. Assuming 20% interim cover by volume, the amount of landfilled waste in 2024 is estimated to be 2,900 m³.

It is noted that in 2019, the remaining capacity for waste and interim cover within the initially approved area (i.e., Area A and Area B) was consumed and landfill operations were initiated within the Phase I area. As per Section 7.3 of the PDO for the Eastnor Landfill Site (December 2017), it is recommended that the following operations be completed.

- Final grading of the entire approved landfill area (i.e., Areas A and B) to the approved final contours, with a maximum 4:1 slope
- Final cover and topsoil be applied to the 0.6 ha area where no additional waste placement is expected
- Intermediate cover be applied to the remainder of the previously approved fill area

3.2. Site Life Estimate

As recognized in the ECA, as amended, additional capacity is available within the remaining 6.2-hectare landfill area (i.e., the Phase I and Phase II areas) and the 1.09-hectare wood waste disposal area. Continued landfill development will include raising the contours of the initially approved landfill area and includes for landfill development to the north along the geologic feature identified as a former beach ridge (Figure 2).

The area demarked as Phase I outlines 5.8 hectares and, in consideration of the Municipality's long-term waste management plan, is estimated to provide for an additional 40 to 45-year disposal period. This landfill development area is designed to overlap with a 2-hectare portion of the initially approved area (i.e., Area A/B) while maintaining a sufficient buffer from the south property boundary and allowing for efficient use of the approved landfilling area.

Based on the conceptual design, the Phase I capacity for waste and interim cover is calculated to be approximately 270,000 m³ (i.e., not including final cover). As shown in Table 1, at the 5-year average fill rate for the Eastnor landfill, it is estimated that the Phase I area alone would provide for greater than 65-years of capacity. However, in consideration of the Municipality's long-term waste management plan to dispose of waste from the entire Municipality at the Eastnor landfill as the other two sites reach capacity, it is projected that the Site will provide the entire Municipality with sufficient capacity for up to about 40 to 45 years of landfilling.

The Phase II area is shown to illustrate the remaining landfilling potential within the approved 9.5 ha area for future consideration and represents the remaining 3.1 hectares, which includes the 0.7 ha area not previously utilized within the initially approved limit of fill (i.e., the southern portion of Area B). This area has an additional capacity of an estimated 250,000 m³ for waste and interim cover.

4. SITE DEVELOPMENT AND OPERATIONS

As previously discussed, the ECA initially approved the use of a 3.3 ha area, within a total approved area of 9.5-hectares, for municipal waste disposal to a total capacity of 103,500 m³ (i.e., waste, interim and final cover). However, upon completion of additional hydrogeological investigations supporting the use of the additional area/capacity and the PDO the ECA, as amended, approves the use of the entire 9.5-hectare area for waste disposal. The ECA also recognizes the waste management operations that are occurring on the property including its use as (i) a waste receiving and waste transfer area, for waste diversion and recycling operations, (ii) buffer lands; and (iii) a 1.09 ha wood waste disposal site.

4.1. Method of Operation

The initially approved landfill footprint was divided into two areas: Areas A and B, as shown in Figure 3. Area B is considered closed and is no longer used for waste disposal and Area A was filled to capacity in 2019. Landfill operations have recently transitioned into the Phase I area. The landfill boundaries are periodically marked with grade stakes in the active landfilling area to ensure waste placement remains within the licensed limit and approved contours. To date, landfill operations have generally occurred from the southeast to northwest within the approved landfill footprint. Landfilling operations are currently occurring within the Phase I area, where shown in Figure 3.

The Municipality uses the area-ramp method of landfilling and uses a packer to help maximize the waste density achieved at the Site. The area-ramp method is efficient with respect to space utilization and requires less cover material than other methods. According to Condition 31 of the ECA, cover material is to be applied three times per week between May and October and once per week between November and May. Continued attention should be given to ensuring that waste at the active face is sufficiently covered in a timely fashion with an adequate amount of material.

4.2. Periods of Operation – Landfill Hours

During the reporting year, the Site was open to the public/vehicles hauling waste during the following operating hours:

Table 4-1. Eastnor Landfill Site – Hours of Operation

Date	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Nov 1 – Mar 31	10:00 – 4:00	Closed	Closed	Closed	Closed	Closed	Closed
April 1 - Oct 31	9:00 – 5:00	Closed	Closed	Closed	Closed	9:00 – 5:00	Closed

A sign at the access gate notes the hours of operation. A site attendant is present during operating hours. When the site is closed to the public, a locked gate across the entrance road controls access to the site. Waste may be received outside the hours of operation, by appointment and under the supervision of a trained attendant.

According to Condition 3.1.2 of the ECA, as amended, the hours of operation may be changed by the Owner at any time, subject to notification given to the District Manager, provided that the hours are correctly posted at the Site gate, and that suitable public notice is given of any change.

4.3. Waste Receiving Station

In 2009, the Municipality completed the construction of a waste receiving station at each of their landfill sites (Eastnor, Lindsay, and St. Edmunds). The station, which includes a weigh scale and collection bins for recyclables and household waste to be landfilled, is located approximately 200 m north of Area A, along the site access road, where shown in Figure 2. The collection bins are available to the public for waste drop-off and sorting. Access to the landfill area is limited to contractors and municipal employees.

4.4. Wood Waste Disposal Area

To accommodate the increase in demand for stump disposal, the Municipality obtained approval to expand its operations to permit the landfilling of uncontaminated stumps in 2009. The wood waste disposal site borders the northeastern limit of the Phase I area and extends an additional distance of approximately 80 m to the northeast, occupying an approved area of 1.09 ha which has an additional approved volumetric capacity of 39,000 m³ (Figure 3). To date, landfilling of wood waste has not occurred in this area.

It is noted that in December 2014 an application to amend the ECA to facilitate the use of the additional capacity associated with the remaining 6.2-hectare landfill area was submitted to the MECP. As part of the review process the wood waste disposal area was moved further to the north to provide a greater buffer area between the wood waste disposal footprint and the southern property boundary. A detailed assessment of the Site conditions and a discussion pertaining to the development of this area is provided in the 'Design and Operations Report – Wood Waste Disposal Site: Revised Footprint' (Revision 2: December 2017).

Prior to disposing of wood waste within this area, the Municipality should ensure that base preparations be completed in accordance with the Design and Operations Report. It is noted that the approved area has been delineated and is clearly defined and signed at the Site.

5. LANDFILL MANAGEMENT

5.1. Vector, Vermin and Wildlife Control

At the Eastnor landfill site there are several types of vermin, vector and wildlife that have been identified as requiring some form of precautionary management plan, including bees/wasps, coyotes, gulls, turkey vultures, rodents and black bears. Control can be accomplished by applying cover material after each day of refuse deposition and through good housekeeping (i.e., daily litter pick-up, regular site inspection and proper waste segregation practices). An electric fence also lines the perimeter of the waste disposal area to discourage black bears and coyotes from entering the active area of the waste disposal site. As per Condition 37 of the ECA, the electric fencing should be operated and maintained from April 1st to November 30th of each year, unless environmental conditions dictate otherwise. As per Condition 34 of the ECA, the 'Vector and Vermin Control/Management Plan' should be implemented if/when vermin, vector and/or wildlife become a nuisance. A copy of the Plan is enclosed in Appendix C.

5.2. Litter Control

Covering and compaction is the most effective tool in preventing the spread of litter via wind or scavenging. Cover material is to be applied, and compaction is to occur three times a week during the cottage season (June to October) and once a week in the off-season (November to May). Additionally, litter pick-up is recommended to help prevent fire hazards and for aesthetic reasons. As per Condition 35 of the ECA, landfill staff should conduct litter pickup each operating day from June to October, and on an as-needed basis from November through May.

If the windblown debris becomes unmanageable, the installation of mobile litter screens should be erected to further control resultant litter. Litter screens should be placed adjacent to active deposition faces. Moveable fencing in the unloading area close to the working face can be used, if necessary, to reduce the problems of litter and blowing paper. However, the moveable fencing should be kept clean to remain effective. Once a fence becomes clogged, air flow patterns change, and litter can be blown over the fence.

5.3. Site Inspections

As part of site operations, inspections of the landfill property and operations are to be conducted on a routine basis to ensure best management practices are maintained and that operations remain compliant. According to Condition 33 of the ECA, the following inspection schedule must be maintained:

- a. On each operating day, an inspection of the working face and storage areas.
- b. On a weekly basis, during the period of April 1st and November 30th, the fence voltage and the perimeter of the electric fencing must be checked.
- c. On a monthly basis, an inspection of the general condition of the site, access road, signage, fencing and gate, and the amount of available cover material.
- d. On a semi-annual basis, an inspection of the monitoring wells and the condition of the cover material.
- e. On an annual basis, a field survey of the fill area.

At this time, the site operator and/or supervisor ensure that inspection items (a), (b) and (c) are completed and inspection items (d) and (e) are completed by a qualified consultant. Changes to the Site inspection requirements and/or frequency may be made as the Municipality increases the waste receiving volumes at the Eastnor landfill in conjunction with the closing of the St. Edmunds and Lindsay landfill sites. It is recommended that the inspections document (i) the date of the inspection; (ii) the name of the operator conducting the inspection; (iii) any deficiencies noted; and (iv) when applicable, the date and steps taken to correct an identified issue.

6. RECYCLING AND WASTE REDUCTION

Currently, refuse segregation and recycling services are available at all three municipal landfill sites. Further, to encourage recycling, curbside collection of recyclables is provided to the entire Municipality.

The site attendant/supervisor is responsible for the proper segregation and recycling of refuse at the Site. Waste segregation and recycling occurs in the waste transfer and receiving area for ease of access and supervision, where shown on Figure 3. 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. The following goods are separated from the solid waste stream and stockpiled in designated areas that are clearly labelled.

6.1. Blue Box Materials

In addition to the curbside collection of recyclable materials, the Municipality currently provides three depot locations to drop off recyclables, each associated with the municipal landfill sites, where shown on Figure 1. The Municipality accepts mixed recyclables, meaning that all accepted recyclable materials can be placed into one bin at the Municipality's Recycling Depots/Facilities. Recyclables are then transferred to a Material Recovery Facility (MRF) in Mount Forest. This single-stream recyclable processing uses separation technologies specifically designed for a mixed recyclable stream. The list of recyclable items accepted includes the following:

- glass
- steel paint cans
- aluminum cans, foil and pie pans
- paper, boxboard and cartons
- various types of plastic including, but not limited to, PETE, HDPE, LDPE, PP, and PVC

Waste Management has provided an analysis of the blue box recyclables diverted for the 2024 calendar year. It is noted that the amount of blue box recyclables diverted, specifically from the former Township of Eastnor, is not available. However, an estimate has been completed based on the percentage of the estimated population contributing recyclables from within the former Township of Eastnor. The estimated population contributing waste to each municipal landfill is as follows:

Table 6-1. Northern Bruce Peninsula – Population Proportions

Estimated Contributing Population		
Site	Total Persons	Percent
Eastnor	2,525	45%
Lindsay	840	15%
St. Edmunds	2,245	40%
Total	5,610	100%

Based on the estimated proportion of the municipal population in each of the former townships, the estimated recyclables diverted from each of the municipal landfills (in tonnes) for the 2024 calendar year is presented below:

Table 6-2. Northern Bruce Peninsula – Diversion Estimates

Landfill Site	Total Diverted
Eastnor	217.8
Lindsay	72.6
St. Edmunds	193.6
Total	484.0

Note: All values are presented in tonnes

The total combined amount of blue box recyclables collected during the reporting period by Waste Management for the Municipality was 484 tonnes. Based on the proportion of the Municipality's population serviced by the Eastnor landfill (i.e., 45%), an estimated 218 tonnes of the blue box recyclables were diverted from the Eastnor landfill.

6.2. Used Tires

In January 2019, tires were the first material to be moved to the individual producer responsibility (IPR) framework under the recent waste diversion legislation, the Waste-Free Ontario Act. The Municipality continues to collect, and stockpile, used tires at all three of its landfills. As a registered collector, the Municipality accepts used tires from residents. These tires are recycled by tire producers (or Producer Responsibility Organizations), who are now directly responsible and accountable for meeting mandatory collection and recycling targets for used tires. According to the site records, an estimated quantity of 632 tires weighing approximately 8.7 tonnes were received at the Eastnor landfill in 2024.

According to Condition 28(g) of the ECA, the volume of tires within an individual stockpile should not exceed 45 m³. There must be greater than 15 meters between the stockpile and the property line, buildings, and the active area of the landfill, and greater than 30 meters separation from the burn pile. Tires should be stockpiled in an area where there is no vegetation within 4.5 meters. Individual stockpiles should be separated from each other and from other waste piles by a minimum of 6 meters.

6.3. Scrap Metal: Propane Tanks, Scrap Metal and White Goods

The Municipality accepts scrap metal at the Site, including propane tanks and both chlorofluorocarbon (CFC)-containing (i.e., air conditioners, dehumidifiers, freezers, refrigerators and water coolers) and non-CFC-containing white goods. According to Condition 28(c) of the ECA, white goods and marketable scrap metals should be stockpiled separately and should not exceed 100 tonnes.

Site records indicate that 32.1 tonnes of scrap metal (including propane tanks and white goods) were diverted from the waste stream at the Eastnor landfill site during the reporting period. Scrap metal and white goods are periodically removed from the Site for recycling by All Ontario Recycling (AOR).

Propane Tanks

According to Condition 28(e) of the Approval, empty propane tanks should be stored on the ground surface in a segregated area no larger than 500 m². Tanks should be stored in such a manner that minimizes the potential for cylinder valves to be damaged or broken (i.e., in a single layer and in an upright position).

White Goods

In compliance with Ontario Regulation 463/10, CFC-containing white goods are to be properly drained by a certified technician and then tagged to indicate that the CFC's have been removed, prior to the removal of white goods from the site. White goods and scrap metal are collected by a hauler on an as needed basis for salvage. According to Condition 30 of the Approval, the site operator is required to maintain a detailed log of all CFC-containing white goods received at the Site that includes:

- i. The date
- ii. The types, quantities and sources of CFC-bearing items
- iii. The destination of the white goods
- iv. The details on the removal of refrigerants

6.4. Automotive Batteries

Batteries are to be stored in a single layer under a roof to prevent precipitation from coming in contact with the batteries and in a manner that provides secondary containment in the event of leakage. Currently, batteries are stored in the re-use storage building to prevent spills or weathering. According to the Site operational records, no battery units were received at the site during the reporting period. Automotive batteries are periodically removed by Sullivan Salvage for recycling.

6.5. Electronic Waste

The Municipality has been collecting e-waste since 2010. Initially the electronic waste diversion program was operated by the Ontario Electronic Stewardship (OES) who was responsible for electronics recycling in Ontario on behalf of the electronics industry. In January 2021, Electrical and Electronic Equipment (EEE), specifically information technology, telecommunications and audio-visual equipment (ITT/AV), became the third material to be moved to the individual producer responsibility (IPR) framework under the Waste-Free Ontario Act. The producer responsibility for lighting equipment came into effect in January 2023.

The Municipality continues to collect and stockpile electronic waste at all three of its landfills. Electronic waste can be dropped off free of charge. At the Eastnor landfill site e-waste is stored and locked in a steel shipping container adjacent to the scale house. The municipality reported receiving 3.4 tonnes of e-waste at the site during the reporting period.

6.6. Bale Wrap

White plastic bale wrap is accepted by the Municipality free of charge at the Eastnor Landfill Site. This material is collected in a designated area which prevents the plastic from blowing (within a perimeter of concrete block walls). This material should be free of rocks and stones, with a minimal amount of dirt. No colored wrap, twine or other plastic materials should be stored in this pile. Currently, the Municipality has retained Clean Farms to remove the material from the Site. Material is typically removed on an as needed basis. According to site records, approximately 4.25 tonnes of bale wrap was diverted from the waste stream at the Eastnor landfill site during the reporting period.

6.7. Mattresses

In 2012, the Municipality began diverting mattresses as an additional waste diversion stream. According to the Site operational records 213 mattresses, totaling 3.2 tonnes, were received at the Eastnor landfill in 2024. These mattresses are stored in a dry storage area at the Site and are removed periodically for recycling by Recyc-matelas.

6.8. Hazardous and Special Products (HSP)

In October 2021, Hazardous and Special Products transitioned to the individual producer responsibility framework. The HSP program for the Municipality is operated by the County of Bruce through the Orange Drop Program. In the Municipality of Northern Bruce Peninsula, the County typically provides two to three collection events per year.

Based on the Household Hazardous Waste Program summary of materials reportedly received by the County, the amount of HSP collected through the Orange Drop Program was estimated to be 15.3 tonnes during the reporting period. Based on the proportion of the Municipality's population serviced by the Eastnor landfill (i.e., 45%), an estimated 6.9 tonnes of HSP were diverted from the Eastnor landfill through the Orange Drop Program.

6.9. Leaf and Yard Waste

Although the Municipality promotes home composting for wet organics through the distribution of backyard composting bins, a leaf and yard waste composting pile is maintained at the Site. The municipality reported receiving approximately 114 tonnes of leaf and yard waste at the site during the reporting period. This pile should be turned on a regular basis. Surface water run-off generated from this pile should be either prevented or managed. If the pile becomes odorous, it should be placed in the active face of the landfill and immediately covered. Topsoil generated from this service can be used for placement over the final cover.

6.10. Waste Diversion Summary

Based on the sum of the diversion programs at the Eastnor landfill site and local depot, approximately 392 tonnes of materials were diverted from the landfill during the reporting period. It is noted that this quantity of diverted materials does not account for the clean wood and brush (i.e., burnable) that is also diverted from the landfill.

Table 6-3. Summary of Waste Diversion (Tonnes)

Materials Diverted	2017	2018	2019	2020	2021	2022	2023	2024
Blue Box Recyclables	234.5	247.8	219.1	234.9	255.8	238.7	202.8	217.8
Tires	5.2	7.0	10.2	10.0	17.4	9.8	5.4	8.7
Scrap Metal & White Goods	48.9	53.9	69.9	75.7	87.8	64.4	37.3	32.1
Automotive Batteries	0.07	0.11	0.27	0	0.09	0.17	0	0.05
Bale Wrap	8.4	5.4	10.9	5.8	6.1	9.5	3.5	4.3
Electronic Waste	4.46	8.16	14.87	8.9	8.7	8.4	4.0	3.4
Mattresses	1.7	1.8	2.8	2.7	3.8	3.2	2.5	3.2
HSP	9.0	9.6	7.6	4.0	6.7	7.1	7.1	6.9
Polystyrene	---	---	---	---	2.4	---	---	1.4
Leaf and Yard Waste	61.2	91.1	144.5	76.8	244	456	444	114
Total	373.4	424.9	480.1	418.8	632.8	797.3	706.6	391.9

Note: All values are presented in tonnes. NA = Not Available

7. BURNING OPERATIONS

Any brush, trees and clean wood material should be stockpiled separately. According to Condition 29(a) of the Approval, this material should be placed in a cleared area no larger than 1,000 m² with a height of 3 meters or less, and a minimum of 30 m separation distance to all other wastes, flammable materials and buildings. As per Condition 29 of the ECA, the burning of clean wood and brush in accordance with the MOE Guideline "Burning at Landfill Sites" is allowed. Before burning takes place, the Chief Fire Official must be notified of the date and time the burning is to take place, in accordance with the Municipal By-Law No. 2000-24, as amended. In 2024, approximately 200 tonnes of clean wood waste and brush was reportedly received at the Site. This material was presumably burned.

Burning at the site is to be restricted to clean, dry wood waste such as brush, trees and lumber. Wood waste is to be stockpiled in a designated burn area. Burning of designated wood waste is to be carried out in an area at least 30 meters away from the active area of landfilling. Additionally, an area of 4.5 meters around the burn pit should be kept free of vegetation.

Burning may occur only on clear, dry, windless days and is to be conducted under the direct supervision of an attendant. The site attendant is responsible for the removal of any non-wood waste from the pile prior to burning, as well as regularly removing cold ashes from the burn area for disposal in the active landfill area. The attendant must fully extinguish the fire at the end of the day.

8. SUMMARY OF HYDROGEOLOGIC SETTING

8.1. Physiographic Setting and Regional Geology

Based on Chapman and Putnam (1984), the Eastnor landfill site is located within the physiographic region known as the Bruce Peninsula. With the exception of the small clay plains characterized by deep poorly drained lacustrine deposits/silt beds in Eastnor Township and various drumlins, gravel bars and sand dunes, the region is generally characterized by flat topography sloping gradually towards Lake Huron, with shallow overburden and abundant bedrock exposed at ground surface (i.e., dolostone plains). The overburden thickness over the majority of the Northern Bruce Peninsula is typically less than 10 meters thick.

8.2. Site Geology

Based on physiographic mapping from the Ontario Geologic Survey and the Ontario Department of Mines and Northern Affairs (Map 2224), the approved fill area is situated on a former beach ridge and the majority of the property is characterized by clay plains (i.e., silt loam soils). It is noted that sand was mined from the former beach ridge associated with the Site prior to its use as a landfill.

Consistent with the regional topography, the Site generally slopes to the west towards West Road. Downgradient of the former beach ridge is an area of saturated soil conditions associated with the poor drainage characteristics of the silt loam plain. This lacustrine deposit (i.e., the silt loam plain) was derived from a former shallow water environment and/or shoreline area and extends towards Little Pike Bay. Consistent with the presence of a lacustrine deposit in the location of the former Bay, the depth to bedrock/overburden thickness appears to be greater in the area that extends from Little Pike Bay to the former beach ridge at the Site. This trend of thicker overburden is inferred to occur in a linear fashion from the beach ridge to Little Pike Bay. Bedrock valleys with thicker overburden that coincide with existing Bays occur throughout the Bruce Peninsula, from Owen Sound to Tobermory.

Local water well records indicate that the overburden in the area is typically less than 5 meters in depth, however, it extends to greater than 10 meters in some areas. Overburden to the north and south of the Site is described as sandy loam underlain by clay in some areas. The overburden becomes finer to the east, along Shaw Road, and is described as clay and silt in this area. The underlying bedrock is characterized by buff to brown medium bedded dolostone of the Guelph Formation. The exposed bedrock surfaces are scoured from glacial activity and are typically irregular due to weathering.

8.3. Overburden Characteristics

Shallow and deep groundwater monitoring wells have been installed at the Site and are located where shown on the attached Figures. With the exception of the boreholes associated with the deep wells, which extend to depths of up to 15.2 m below ground surface (mbgs), well/testhole depths generally range between 3 mbgs and 7 mbgs. The overburden thickness extends to depths of at least 11.7 m, and to greater than 15 m, in the vicinity of the approved fill area. In addition, results of the subsurface investigations conducted at the Site are generally consistent with the Grey and Bruce Counties Groundwater Study which indicates that the overburden in the vicinity of the Site is in the range of 20 m thick. Borehole logs documenting the overburden soils encountered during the well installation activities are enclosed in Appendix D. A detailed summary is provided in Table 2.

Based on a detailed review of the borehole logs, the overburden soils at the Site were divided into four units that generally slope towards the west, as shown on the cross-sections provided in Appendix E. Underlying the thin layer of topsoil or peat, the overburden consists of a medium to fine sand that is an estimated 2.5 to 4 m thick in the

vicinity of the fill area and thins out to the west (UNIT 1). In areas of the Site where the beach ridge has not been extracted/disturbed, the sand unit extends to depths of up to 8.5 meters (i.e., BH-1(15) and BH-2(15)).

This upper sand unit is underlain by UNIT 2 which is a relatively thick unit of silt loam soils (i.e., greater than 4 m in thickness). Based on the borehole logs associated with the deep overburden wells OW-7D, OW-10D and OW-12D, the silt unit is further underlain by a medium to coarse sand, with gravel in some locations (i.e., UNIT 3), which is further underlain by stiff silty clay with gravel (i.e., Unit 4) which is inferred to overlie the bedrock unit.

8.4. Groundwater Flow

Groundwater level measurements are collected bi-annually in conjunction with the monitoring program. Groundwater flow maps, developed using the fall water level measurements, are provided as Figure 4 for the shallow overburden unit and Figure 5 for the deeper sand unit.

Based on the observed water levels, groundwater flow in the shallow overburden aquifer is generally to the southwest across the Site. Groundwater through the deeper sand unit flows in a similar direction, to the southwest. The hydraulic gradient in the vicinity of the former beach ridge was calculated to be approximately 0.2% to 0.45% within the upper and lower sand units. Comparatively the hydraulic gradient downgradient of the landfill footprint was calculated to be more variable, typically ranging between 0.5% and 2.2% within the upper sand unit. Based on the results of the hydrogeological assessment, the representative K-values for Unit 1 and Unit 2 were determined to be approximately 3.7×10^{-5} m/s and 3.3×10^{-7} m/s, respectively.

Previous hydrogeologic evaluations and ongoing annual monitoring programs indicate that the vertical gradient in the overburden unit is predominantly downwards in the vicinity of the landfill, as indicated by the gradient noted at well couplet OW-10S/D. This gradient becomes primarily horizontal in the vicinity of OW-7S/D. However, although the vertical gradients measured indicate that a downwards flow component exists in the vicinity of the landfill footprint, the downward migration of leachate-impacted groundwater would be limited by the low permeability associated with the silt loam unit that underlies the upper sand unit. In other words, the underlying low-permeability soils appear to act as an aquitard which would reduce the downward migration of shallow groundwater and result in groundwater flow into the generally flat and wet area situated to the west of the landfill. Groundwater migration from beneath the landfill is likely to be primarily horizontal within the shallow more permeable sand unit in the area directly downgradient of the landfill (i.e., within the area monitored).

Based on the thinning of the shallow sand unit towards the west, as noted in the cross-sections, the wet surficial soils noted further downgradient of the former beach ridge, and the water levels that are typically at or above ground surface at the most downgradient monitoring locations, a predominantly horizontal to upwards gradient is inferred to exist in the vicinity of, and downgradient from, wells OW-4, OW-6 and OW-9.

9. MONITORING REQUIREMENTS

9.1. Monitoring Locations and Parameters

Currently, the Eastnor Waste Disposal Site has 16 groundwater monitoring wells at thirteen different locations, where shown on Figure 3. In September 2000, the first four monitoring wells were installed, followed by the installation of OW-5 and OW-6 in 2010. In conjunction with hydrogeological investigations for the Site, an additional six monitoring wells at four different locations (i.e., two well couplet locations) were installed in 2012 and four monitoring wells at three different locations were installed in 2015. While some of these wells are only used to assess the groundwater flow regime at the Site, several wells are also used to monitor groundwater quality downgradient of the fill area and to assess compliance along the southern compliance limit, as well as site compliance downgradient and to the west of the fill area.

As per Condition 41(3) of the ECA, as amended in November 2017, the groundwater quality is monitored twice annually in the Spring and Fall as per the requirements outlined in Schedule B (Appendix A) and summarized in the following Table.

Table 9-1. Groundwater Monitoring Program

Monitoring Location and Purpose		Parameters	
		Spring	Fall
OW-1	Background	---	IND
OW-2	Leachate – Closed Area B	---	COMP + VOCs
OW-3	Downgradient	---	IND
OW-4	Downgradient / South Compliance Well	IND	IND
OW-5	South Compliance Well	IND	IND
OW-6	Furthest Downgradient Well	IND	IND
OW-7S	Downgradient of Active Area - Shallow	IND	IND
OW-7D	Downgradient of Active Area - Deep	---	IND
OW-8	Leachate – Active Area A	IND	COMP + VOCs
OW-9	Background (GW Levels Only)	---	---
OW-10S	Background (Phase I Area) - Shallow	---	IND
OW-10D	Background (Phase I Area) - Deep	---	IND
OW-11	Background (Phase I Area)	---	IND
OW-12S	Background (Phase I Area) - Shallow	---	IND
OW-12D	Background (Phase I Area) - Deep	---	IND
OW-13	Background (Phase I Area)	---	---

Notes: Parameter Requirements:

--- = Water levels to be measured at all monitoring locations during each monitoring event.

Indicator List [IND]:

Alkalinity, conductivity, pH, ammonia, hardness, calcium, iron, magnesium, manganese, phosphorus, potassium, sodium, chloride, nitrate, nitrite, phosphate, sulphate, DOC and TKN. *As of 2019, boron is included in this list of required parameters.*

Comprehensive List [COMP]:

(as per Column 1, Schedule 5: Inorganic Parameters for Groundwater) and DOC.

Volatile Organics [VOCs]:

Once a year for BTEX and once every three years for VOCs. Analysis is scheduled for 2026. VOCs were added to the list of required parameters for leachate well OW-2 (Fall only).

Water quality results from 2023 and 2024 are summarized in Table 4. Historical groundwater sampling results, including VOCs, and graphical trends of select indicator parameters are included in Appendix F.

To ensure there are adequate sampling locations as landfill development continues within the approved area, monitoring results are reviewed annually with comments provided in the Annual Monitoring Reports. As per the Approval for the Site, recommendations for changes to the monitoring program are to be proposed within the Annual Reports and require approval from the MECP, under the process described in Conditions 4.1 and 4.2.2 of the ECA (as amended November 2017), prior to implementation. In response to MECP comments pertaining to the Trigger Mechanism and Contingency Plan, boron was added to the list of required indicator parameters (i.e., the Indicator List outlined in Schedule B). Further, in response to MECP comments dated August 17, 2022, VOCs were added to the list of required parameters for leachate well OW-2 (Fall only).

9.2. Sampling Methodology

For 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 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 are collected in laboratory supplied containers and are kept chilled following completion of the sampling program and sent within 24 hours of the sampling event to an accredited laboratory for analysis. Under the site-specific program, samples collected for indicator metals are placed in laboratory supplied containers without preservative and are filtered and preserved at the lab prior to analysis. Samples collected for metals under the comprehensive list are filtered in the field and placed in laboratory supplied containers with preservative. The laboratory analytical reports for samples collected during the reporting period are included in Appendix G.

10. DETERMINATION OF REASONABLE USE CRITERIA FOR THE SITE

10.1. Determination of Action Levels

MECP Guideline B-7 establishes the basis for determining what constitutes the reasonable use of groundwater on properties adjacent to landfill sites. This approach uses both the provincial maximum concentrations identified in the Ontario Drinking Water Standards (ODWS), revised June 2006, and the site-specific background values, to calculate acceptable concentrations at the Site boundary. By applying the RUC, the potential use of groundwater for domestic consumption will almost always provide the lowest allowable concentration limits, referred to as the objective levels. MECP Procedure B-7-1 provides technical details for the application of the reasonable use approach. A change in the quality of groundwater on an adjacent property, where the reasonable use is determined to be for drinking water, will be acceptable only where:

- i. Quality is not degraded by more than 50% of the difference between background concentrations and the ODWS for non-health related parameters, and
- ii. Quality is not degraded by more than 25% of the difference between background concentrations and the ODWS for health-related parameters.

Background concentrations are the quality of the groundwater prior to any contamination from landfill activities.

VOC Analyses at OW-3/OW-8

It is noted that VOC sampling was initiated at well OW-3 in 2005. VOC or BTEX analysis occurred at monitoring well OW-3 until 2015 at which time the VOC sampling location was revised to well OW-8 in order to better reflect groundwater quality downgradient of the active area of landfilling. For RUC calculation purposes, it is assumed that VOCs were not present prior to the initiation of landfill operations at the Site as VOC compounds are not considered to occur naturally in groundwater. A table summarizing the VOC analytical results with comparison to the RUC is provided in Appendix F.

Historically, VOC analytical results reported for well OW-3 indicated trace concentrations of toluene and xylene (i.e., less than 1 µg/L), when detected. However, VOC results obtained from well OW-8, located closer to the recently active area of landfilling, reported benzene concentrations generally in the range of 1.5 to 2.5 µg/L between 2015 and 2024, exceeding the RUC of 1.25 µg/L for benzene. It is noted that, based on the relatively low concentration previously detected and the buffer area of greater than 500 meters to the western compliance limit, it is anticipated that benzene will be adequately attenuated on-site. As per the revised monitoring program, monitoring for VOCs or BTEX from well OW-8 will continue to occur on an annual basis. Further, in response to MECP comments dated August 17, 2022, VOCs were added to the list of required parameters for leachate well OW-2. VOC compounds have not been detected in the groundwater quality samples collected from OW-2.

10.2. Background Water Quality

Background concentrations are the quality of the groundwater prior to any contamination from landfill activities. Monitoring well OW-1 has historically been used as the background monitoring location based on the direction of the shallow groundwater flow at the Site and its cross-gradient location relative to the fill area which results in the least potential for impacts from the landfill. Historical and on-going water quality results support the use of OW-1 as a background well as the results indicate that this monitoring location has consistently had the lowest concentrations of indicator parameters with no indication of leachate influence. Monitoring well couplet OW-10S/D, located upgradient of the fill area, which is also considered to represent background conditions, shows similar parameter concentrations and supports the ongoing use of OW-1 as a background well at this time.

Groundwater quality results collected from well OW-1 between 2001 and November 2017, provided in Appendix F, were used to calculate the average and 95th-percentile background concentrations for each indicator parameter to aid in the determination of RUC values. The 95th-percentile concentration was used to reflect the RUC background concentrations for parameters with concentrations that exceed the ODWS, including hardness, iron, manganese, and DOC. The background concentration ranges, averages, and resulting RUC values (i.e., objective levels) for several indicator parameters are summarized in Table 3.

Based on the analytical data for well OW-1, the shallow background groundwater chemistry for the Site can generally be described as having low levels of chloride, typically less than 5 mg/L, a slightly basic pH of approximately 7.9, and conductivity in the range 415 µS/cm. The average hardness and alkalinity are approximately 235 mg/L and 210 mg/L, respectively, which is representative of a carbonate-rich groundwater system.

10.3. Calculation of Objective Levels

Table 3 identifies the concentrations of groundwater quality indicator parameters used for evaluating 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 Technical Support Document for Ontario Drinking Water Standards Objectives and Guidelines (June 2006), referred to herein as the ODWS. Acceptable concentrations at the site boundary (Cm) (herein referred to as the Reasonable Use Criteria (RUC)), are calculated from MECP Procedure B-7-1 using the following formula.

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

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/OG) and 0.25 for health-related parameters (MAC & IMAC).

AO = Aesthetic Objective

OG = Operational Guideline

MAC = Maximum Acceptable Concentration, Parameters Related to Health

IMAC = Interim Maximum Acceptable Concentration, Parameters Related to Health

It should be noted that if background concentrations exceed the ODWS, the objective level is to be set at the background concentration, as outlined by Procedure B-7-1. A summary of the 2023 and 2024 analytical results compared to the RUC and ODWS is provided in Table 4.

To determine if leachate is impacting groundwater, individual indicator parameters were evaluated in conjunction with other indicator parameters and concentration trends. Wells with elevated and stable concentrations of the identified naturally elevated constituents, that show no increases in other leachate indicator parameters, are deemed un-impacted by landfill leachate. Additionally, known leachate impacted groundwater is compared to the groundwater chemistry at locations with naturally elevated concentrations to determine if leachate contributes to the elevated concentrations measured.

11. MONITORING RESULTS AND DISCUSSION

11.1. Leachate Generation

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. Landfill derived leachate that enters into the groundwater is often attenuated by natural mechanisms along the water migration pathway. The attenuation of leachate can occur by dilution, biologic activity, and geochemical mechanisms.

To determine the presence of potential impacts from leachate, several indicator parameters are monitored, and a trend analysis is conducted to determine changes in water quality over time. The following sections discuss the potential impacts to groundwater, with a focus on the water quality crossing the property boundaries and compliance with the Reasonable Use Criteria (RUC). The results of the most recent groundwater monitoring and compliance with the RUC are provided in Table 4. Historical groundwater sampling results and graphical trends of indicator parameters are included in Appendix F.

11.2. Leachate Characterization

Leachate production is typically greatest directly beneath the landfill and at the perimeter of the landfilled area. According to a letter dated January 9, 2003 and addressed to the MOE summarizing the results of an EM survey conducted by the MOE in November 1995, a contaminant plume was interpreted to be migrating to the southwest, as later monitored by well OW-3, and a high conductivity zone was noted to extend approximately 200 m downgradient from the fill area (i.e., in the vicinity of OW-4).

Monitoring well OW-2 was historically used to monitor the characteristics of the leachate impacted groundwater at the Site. This leachate well is located approximately 10 meters west of the approved landfill limit for historically filled Area B. In conjunction with the well installation activities that were required to support the Hydrogeological Investigations in 2013, the characteristics of the leachate downgradient of Area A was evaluated from well OW-8.

As would be expected due to the proximity these wells to the fill area, while OW-2 had historically shown the greatest influence from landfill leachate downgradient from Area B, groundwater quality results from well OW-8 were indicative of leachate impacts downgradient of Area A.

Comparison of the groundwater quality from these two wells most proximal to the fill area suggests that leachate characteristics downgradient of historically landfilled Area B and the more recently active Area A are notably different. Consequently, the primary site-specific indicator parameters associated with each area of landfilling is considered as part of the impact assessment for downgradient monitoring wells. A comparison of the primary leachate parameter characteristics for each location, based on each of the 2014 and 2015 monitoring events, the 2016 and 2017 monitoring events and the monitoring events from 2018 to present is provided in Table 11-1. It is noted that the geochemical signature at each of these locations generally remains similar, however concentrations at OW-8 have generally decreased in recent years.

Table 11-1. Leachate Characterization

Parameter	Units	Back ground	Average Concentration (2014/2015)		Average Concentration (2016/2017)		Average Concentration (2018 to 2024)	
Monitoring Location		OW-1	OW-2 (Area B)	OW-8 (Area A)	OW-2 (Area B)	OW-8 (Area A)	OW-2 (Area B)	OW-8 (Area A)
Conductivity	µS/cm	418	3,238	3,523	3,265	3,040	2,962	2,213
Alkalinity	mg/L	214	1,010	1,575	977	1,363	962	993
Hardness	mg/L	237	1,643	883	1,558	828	1,482	693
Calcium	mg/L	61.0	259	236	254	226	268	205
Magnesium	mg/L	19.8	242	71.2	226	64.4	198	44
Chloride	mg/L	3.36	129	244	166	155	129	103
Sulphate	mg/L	20.7	903	31.2	838	98.6	768	59
Sodium	mg/L	1.47	77.2	212	77.1	148	78	94
Potassium	mg/L	0.52	143	123	133	106	122	56
Ammonia	mg/L	0.22	0.12	114	1.45	89.5	0.07	44
DOC	mg/L	19.3	9.53	63.3	12.3	50.9	13.4	35
TKN	mg/L	1.1	0.77	127	2.26	98.9	0.58	54

Note: Background concentration for OW-1 is based on the average value from data collected between 2001 and 2024.

Based on a comparative analysis of the primary leachate indicator parameters downgradient of Areas A and B, it is evident that the indicator parameters, and/or relative magnitude thereof, are variable. Area A is considered to be reflective of reducing conditions. Comparatively, Area B, which is older and contains increasingly mature and degraded refuse, is more oxidized. This is considered to be typical for the progression of water quality associated with leachate generation. In either case, it is important to note that areas influenced by leachate have increased concentrations for several leachate indicator parameters.

While some of the leachate indicators for both Area A and Area B are similar, including conductivity, hardness, alkalinity, chloride, sodium and potassium, the relative concentrations for some of these parameters differs between both locations. For example, the alkalinity at OW-2 is lower than that reported for OW-8 while the hardness is significantly higher at OW-2. Hardness concentrations at OW-2 appear to be more significantly affected by increased magnesium concentrations (i.e., at OW-2 calcium and magnesium concentrations are similar, whereas at OW-8 magnesium concentrations are typically one quarter to one-third the concentration of calcium). In addition, while sulphate appears to be a primary indicator for leachate downgradient of closed Area B, with concentrations reported to be in the range of approximately 600 mg/L to 900 mg/L, recent concentrations downgradient of the active area are only slightly elevated above background (i.e., less than 100 mg/L). Conversely, ammonia, DOC and TKN appear to be primary indicators of leachate downgradient of Area A, while concentrations downgradient of Area B remain similar to background.

Groundwater quality trends at OW-2, as presented on the graph provided in Appendix F, suggest that leachate indicator parameter concentrations are generally lower than they were in the early 2000's. More specifically, chloride concentrations, which were in the range of 250 to 400 mg/L, have generally remained below 200 mg/L since 2005, periodically exceeding the RUC of 127 mg/L. The concentrations of other leachate indicator parameters have generally remained stable.

11.3. East Property Boundary Condition (UpGradient)

The eastern property boundary is located approximately 130 meters upgradient from the landfill footprint at its closest point. Due to the southwesterly groundwater flow direction and the extensive buffer zone to the east of the landfill, leachate impacts to groundwater are not anticipated along the eastern compliance limit.

Groundwater quality to the east of the landfill is currently monitored at OW-10S/D, located greater than 30 meters upgradient of the active fill area. Based on the underlying sandy soils in the vicinity of the fill area and the groundwater flow direction, the potential for radial flow at a scale that would result in measurable impacts to background well OW-10S/D is considered to be low. An additional monitoring location OW-11 is situated 150 meters to the north and upgradient of the future Phase I landfill area. Water quality at well OW-1 is considered to represent background conditions.

Review of the analytical data from the shallow groundwater monitoring wells OW-10S and OW-11 compared to background well OW-1 indicates that, in general, the analytical data from wells OW-10S/D and OW-11 is similar to that reported for the established background monitoring well OW-1 (Table 4). However, some minor differences are evident. More specifically, the shallow groundwater in the area to the east of the existing and future approved fill areas has a slightly higher conductivity than that noted at background well OW-1. This is likely due to the slightly elevated hardness, alkalinity, and DOC concentrations, as well as slightly higher concentrations of sulphate and sodium noted for wells OW-10S and OW-11.

A comparison of the average concentrations calculated using all the available data (i.e., up to and including 2024) is provided in Table 11-2.

Table 11-2. East Boundary Condition – Groundwater Quality

Parameter	Units	Background	Average Concentration		
Monitoring Location		OW-1	OW-10S	OW-11	OW-10D
Conductivity	µS/cm	418	606	600	524
Alkalinity	mg/L	214	304	327	284
Hardness	mg/L	237	296	317	279
Calcium	mg/L	61.0	82.7	89.6	71.6
Magnesium	mg/L	19.8	21.8	22.6	24.3
Chloride	mg/L	3.36	5.8	4.96	3.98
Sulphate	mg/L	20.7	33.5	18.8	12.7
Sodium	mg/L	1.47	16.9	4.19	1.62
Potassium	mg/L	0.52	0.95	0.46	0.67
Ammonia	mg/L	0.22	0.48	0.21	0.12
DOC	mg/L	19.3	36.1	42.8	8.8
TKN	mg/L	1.1	1.92	2.26	0.27

RUC exceedances in the background monitoring locations OW10S/D and OW-11 were noted for hardness and DOC during the reporting period.

11.4. North Property Boundary Condition (Cross-Gradient)

The northern property boundary is cross-gradient from the landfill and is located greater than 500 m from the existing landfill footprint at its closest point, as shown in Figure 2. Monitoring well OW-1 is situated approximately 30 meters north of the approved landfill footprint. As previously discussed, this well is used as the background monitoring location and, to date, the reported groundwater chemistry has not exhibited influence from landfill leachate.

Two additional monitoring locations are available further to the north, including well couplet OW-12S/D and OW-13. These were installed proximal to the western limit of the approved Phase I area and are located an estimated 75 m and 175 m north of OW-1, respectively. As would be expected, water quality monitoring completed at these monitoring locations consistently indicates that the water quality in this area to the north of the existing landfill and west of the beach ridge is generally similar to that reported for well OW-1. A comparison of the average concentrations calculated using the available data for OW-1, OW-12S/D and OW-13 is provided in Table 11-3.

Table 11-3. North Boundary Condition – Groundwater Quality

Parameter	Units	Background	Average Concentration		
Monitoring Location		OW-1	OW-12S	OW-13	OW-12D
Conductivity	µS/cm	418	363	438	369
Alkalinity	mg/L	214	207	227	229
Hardness	mg/L	237	190	204	189
Calcium	mg/L	61.0	49.5	62.2	53.9
Magnesium	mg/L	19.8	16.2	11.8	13.2
Chloride	mg/L	3.36	1.9	0.91	1.98
Sulphate	mg/L	20.7	5.0	2.46	1.08
Sodium	mg/L	1.47	0.86	0.78	2.3
Potassium	mg/L	0.52	0.48	0.27	1.3
Ammonia	mg/L	0.22	0.018	0.06	0.12
DOC	mg/L	19.3	8.5	23.4	43.0
TKN	mg/L	1.1	0.13	0.23	1.04

No RUC exceedances were noted at well couplet OW12S/D during the reporting period.

11.5. Downgradient – West of the Existing Landfill

The western compliance boundary is situated greater than 600 m downgradient of the existing landfill footprint. Groundwater quality is monitored downgradient of Area B at wells OW-2, OW-3 and OW-4, and downgradient of Area A at wells OW-6, OW-7S/D and OW-8, where shown on Figure 4.

As discussed in Section 11.2 of this Report, both OW-2 and OW-8 are used to monitor the characteristics of leachate impacted groundwater in the shallow sand unit. Monitoring well OW-2 is located approximately 10 m downgradient of closed Area B and well OW-8 is located directly downgradient of Area A. Since the associated primary leachate indicator parameters, and/or relative magnitude thereof, identified at each leachate well differs, the downgradient water quality is evaluated based on its interpreted upgradient source. In other words, the water quality reported for wells OW-3 and OW-4 is compared to the water quality in leachate well OW-2 and in monitoring wells OW-7S/D and OW-6 is compared to leachate well OW-8 (Table 4). Furthermore, although the majority of the downgradient wells monitor groundwater quality in the shallow sand unit, it is noted that wells OW-4 and OW-7D monitor groundwater quality in the silt loam unit (i.e., Unit 2) and the deeper sand unit (i.e., Unit 3), respectively.

Shallow Sand Unit – Downgradient of Area A

Monitoring wells OW-7S/D and OW-8 were installed in 2012. These wells are situated approximately 30 meters and 90 meters downgradient of Area A, respectively, and upgradient of compliance well OW-6. Groundwater quality results indicate that a similar suite of leachate indicator parameters exists at both OW-8 and OW-7S although, consistent with its location further downgradient from the landfill, concentrations at OW-7S have typically been slightly lower.

As would be expected with the completion of landfilling within Area A and the continued placement of refuse within the Phase I area (i.e., in the more southerly portion of the approved fill area), between 2015 and about 2023 concentration trends for several leachate indicator parameters at wells OW-7S and OW-8 showed a decreasing to stable concentration trend (refer to Appendix F). This reflected a shift in operations to an area that was not directly upgradient of these monitoring locations (i.e., OW-8 and OW-7S). More recently, concentrations have increased slightly. Consistent with the monitoring results from wells OW-2 and OW-3, located downgradient of Area B, the leachate ‘plume’ appears to extend to greater than 90 meters from the landfill footprint (i.e., OW-7S). RUC exceedances are noted for alkalinity, hardness, manganese and DOC at these locations. It is noted that in 2024, chloride concentrations approached the RUC at well OW-7S.

Monitoring results from well OW-6, located furthest downgradient from the existing landfill footprint, indicate that the leachate strength becomes greatly reduced within approximately 210 m of the landfill limits with minor landfill leachate derived impacts evident. Concentrations of several leachate indicator parameters appear to be slightly elevated, however concentration trends remain relatively stable. Chloride concentrations typically remain in the range of 20 mg/L to 45 mg/L, below the RUC of 127 mg/L. RUC exceedances were noted for hardness and alkalinity and a minor RUC exceedance of manganese was reported in the spring.

Shallow Sand Unit – Downgradient of Closed Area B

Consistent with the location of well OW-2 directly downgradient of the closed landfill footprint, indicator parameter concentrations have historically been greatest at this monitoring location. Monitoring well OW-3, situated approximately 85 m downgradient of OW-2, shows a similar suite of elevated leachate indicator parameters, although the concentrations are typically lower. Overall, groundwater quality showed a decreasing concentration trend at these monitoring locations until about 2007. Since that time, chloride concentrations at wells OW-2 and OW-3 have remained relatively stable, typically in the range of 60 mg/L to 200 mg/L and 60 mg/L to 110 mg/L, respectively, periodically exceeding the RUC of 127 mg/L at OW-2. RUC exceedances were noted for alkalinity, hardness, sulphate and manganese during the reporting period.

The most recent water quality results indicate that the leachate indicator parameter concentrations in this area to the southwest of Area B continue to remain stable. Based on our assessment it appears that, consistent with the northerly progression of waste placement, the landfill leachate plume generally appears to be stabilizing in the vicinity of OW-2 and OW-3. Periodic spikes in chloride concentrations observed may be related to the application of dust suppressants and/or road salt to the access road in this area of the Site.

Although the groundwater chemistry downgradient of the active landfilling area continues to show minor leachate influence that can extend greater than 200 m downgradient of the landfill (i.e., OW-6), considering the additional distance of greater than 300 m from the downgradient compliance wells to the western property boundary, the potential for the migration of leachate impacted groundwater beyond the western property boundary is considered to be very low.

Silt Loam Unit – Downgradient of Closed Area B

Groundwater quality in the silt loam unit, which underlies the shallow sand unit, is monitored at well OW-4 which is situated approximately 200 meters downgradient of the landfill footprint. It is noted that groundwater quality is measured from the silt loam unit as the shallow sand unit pinches out in this area (i.e., Unit 2 was reportedly encountered at an estimated 0.65 mbgs). Results show parameter concentrations similar to background indicating the absence of landfill leachate impacts within the silt loam unit at this monitoring location.

Deeper Sand Unit

Comparison of the groundwater quality from wells OW-10D and OW-12D to well OW-7D, situated upgradient and downgradient of the active landfill area, respectively, indicates that there is a slight component of downward groundwater migration through the silt loam soils resulting in minor leachate-derived influence in the deeper overburden unit. Based on the available groundwater quality data, chloride concentrations are typically less than 10 mg/L in the deeper background wells (i.e., OW-10D and OW-12D) and range between 15 to 30 mg/L in well OW-7D located 90 m downgradient of the active landfill area. In addition, the conductivity and concentrations of hardness and alkalinity are generally greater in well OW-7D. Based on the groundwater quality results reported for the deeper sand unit (i.e., Unit 3) and the presence of the silt loam soils separating the shallow sand unit (i.e., Unit-1) from the deeper sand unit, landfill-leachate derived impacts to groundwater in the deeper sand unit are considered to be low relative to those observed in the shallower soils.

11.6. South Property Boundary Condition (Cross-Gradient)

The southern property boundary is located approximately 6 meters from the approved limit for landfilling, as shown in Figure 3. As discussed in the Annual Progress Report (2007) (G&M, 2008), in response to concerns regarding an insufficient buffer zone along the southern property limit a test pit program was completed in the fall of 2007 to delineate the southern limit of buried waste more accurately. The test pit program revealed that a portion of Area B, previously thought to have contained buried waste, had not been utilized for waste placement. This unused area is outlined in Figure 3. Based on field observations, buried waste did not appear to be present within 40 meters of the southern property boundary, contrary to the 6-meter buffer area previously inferred by the topography.

OW-5 monitors groundwater quality in the shallow sand unit and is located approximately 50 meters cross-gradient and to the south of the existing landfill footprint and less than 10 meters from the southern property boundary. Based on the groundwater quality data, minor leachate influence has historically been noted at this monitoring location. Slightly elevated concentrations of leachate indicator parameters, as compared to background concentrations, have been reported for several parameters, including conductivity, alkalinity, hardness, chloride, sodium, sulphate, potassium, and manganese. Similar to the background monitoring locations, RUC exceedances were noted for hardness, manganese and alkalinity during the reporting period.

While chloride concentrations at well OW-5 prior to 2015 remained below 100 mg/L, concentrations were generally detected in the range of 150 mg/L and 270 mg/L between 2015 and the spring of 2018 and again in 2020/2021, exceeding the RUC of 127 mg/L. Chloride concentrations decreased to 77 mg/L in the Fall of 2021 and were detected at concentrations of less than 20 mg/L during the reporting period. Comparison to other leachate indicator parameters suggest that, except for a similar concentration trend for hardness, the remainder of the parameter concentrations have remained relatively stable. These results suggest that the water quality at this compliance well was likely influenced by operations at the site rather than landfill leachate generation from within closed Area B.

The use of dust-suppressants (i.e., Ca-Cl) along the nearby access road was interpreted as the cause of the change in water quality at OW-5. It is noted that the magnitude of the increase in chloride concentrations was greater at well OW-5 than that reported for other monitoring locations. The greater degree of influence was interpreted to be directly related to the layout of the Site. More specifically, dust suppressant upgradient of OW-2 was applied to the existing access road, a cross-sectional area of approximately 8 meters, whereas the access road directly upgradient of OW-5 that was in use until the spring of 2021 ran in an easterly direction resulting in a length of road covering a distance of 60 to 80 meters that sloped towards OW-5. Therefore, the area to which dust suppressant would have been applied was greater directly upgradient of OW-5 compared to OW-2.

In 2020, it was recognized that the transition of landfill operations into the southerly portion of the Phase I area could potentially be having a greater impact on the water quality along the southerly compliance limit (i.e., OW-5). As a result, an assessment of the operational practices, including road maintenance standards (i.e., salt, dust control) and site grading, particularly in the area to the south of the landfill, was completed. Mitigation measures included minor site grading efforts. Based on the groundwater quality results from well OW-5 since the fall of 2021, it appears that the operational adjustments sufficiently addressed the groundwater exceedances at this location. On-going groundwater monitoring will continue to be reviewed to evaluate the adequacy of the mitigation measures implemented. It has been recommended that the Municipality cease the use of dust-suppressants along the access road in this area of the Site, when possible.

11.7. Water Quality Summary

The overburden groundwater flow, in the vicinity of the existing landfill, is generally in a southwesterly direction towards the western property boundary. Consequently, the leachate plume from the landfill is inferred to be most prevalent in this direction and, based on the presence of the silt loam soils underlying the medium to fine sand associated with the beach ridge, is inferred to be primarily limited to the shallow groundwater. While the background groundwater quality can be described as highly mineralized with concentrations of hardness, iron, manganese and DOC typically exceeding the ODWS, the shallow groundwater quality to the east of the beach ridge (i.e., OW-10S and OW-11) is slightly different than that to the west (i.e., OW-12S and OW-13), as is indicated by the higher conductivity, alkalinity and hardness noted to the east. This suggests that some degree of variability in the groundwater quality can be expected. Therefore, to determine if leachate is impacting groundwater, individual indicator parameters were evaluated in conjunction with other indicator parameters and concentration trends.

Based on a comparison of the primary leachate indicator parameters downgradient of Areas A and B, it is evident that the indicator parameters and/or relative magnitude thereof are variable. In general, the primary leachate indicator parameters include conductivity, hardness, alkalinity, chloride, sodium and potassium. In addition, sulphate appears to be a primary indicator for leachate downgradient of closed Area B and ammonia, DOC and TKN appear to be primary indicators of leachate downgradient of Area A.

Analytical data indicates that leachate impacted groundwater is present immediately downgradient of the landfill at wells OW-2 and OW-8, with leachate-derived impacts that exceed the RUC limited to approximately 100 m downgradient of the non-active portion of the landfilled area (i.e., Area B) and extending to greater than 90 m

downgradient of the recently active landfill area (i.e., beyond OW-7S). Further downgradient of the landfill, beyond well OW-7S, leachate indicator parameter concentrations in the shallow sand unit (i.e., at OW-6) are greatly reduced relative to those wells situated within 100 m of the landfill limit (i.e., OW-2, OW-3, OW-7S, and OW-8), suggesting that significant leachate attenuation is occurring within 210 m of the landfill footprint. Considering the downgradient groundwater quality distribution in the upper sand unit, the relatively stable groundwater quality trends, and the additional distance to the western property boundary of greater than 300 meters from the most westerly compliance monitoring locations, the potential for off-site impacts to the west is considered to be very low.

12. TRIGGER MECHANISMS AND CONTINGENCY PLAN

A trigger mechanism and contingency plan entitled '*Trigger Mechanisms and Contingency Plan, Eastnor Waste Disposal Site, Municipality of Northern Bruce Peninsula*' (the Plan) was prepared by GM BluePlan (now GEI) and submitted to the MECP for review and approval. This Plan was updated in December 2017, as is recognized by the ECA, as amended. Condition 5.1 outlines the trigger parameters, trigger levels, and locations for the site.

The Plan describes the conditions (i.e., trigger levels) under which contingency measures may be required and recommends the corresponding contingency and remedial action plans for the Site. The primary goal of the Contingency Plan is to provide a course of action in the event that the monitoring program indicates a potential for off-site impacts related to the production and migration of leachate. A summary of the trigger locations, parameters, and levels, compared to the recent monitoring results, is provided in Table 5, and is discussed below. The reader is referred to the Plan (December 2017) for more detail pertaining to the trigger mechanisms and for a description of the contingency and remedial action plans for the Site.

12.1. Trigger Locations

Trigger locations were selected to indicate potential off-site migration of landfill leachate impacts. At the Eastnor Waste Disposal Site it was determined that potential off-site impacts related to the migration of leachate-impacted groundwater are limited to the southerly and westerly property boundaries. Groundwater migrating towards the western and southern property boundaries is monitored at wells OW-4, OW-5 and OW-6. Consequently, these wells have been established as the trigger locations for the Site.

12.2. Trigger Levels

Trigger levels for groundwater, based on compliance with MECP Guideline B-7-1, were established to determine when the contingency plan was to be implemented. The Contingency Plan outlines measures that are to be implemented if the trigger levels are exceeded.

Based on an evaluation of the background groundwater quality, historic site data, primary indicator parameters, the Reasonable Use Criteria (RUC) for the Site, and MECP comments, it was determined that the trigger parameters would include chloride, sodium, sulphate, boron, nitrate, and alkalinity. For early detection purposes, the trigger levels were set at either:

- i. Where indicator parameters are naturally low, 80% of the RUC at monitoring locations situated in close proximity to the property boundary (i.e., OW-4 and OW-5). Although monitoring location OW-6 is located greater than 100 meters from the property boundary, a similar trigger level was outlined in the ECA.
- ii. Where the indicator parameter is naturally elevated in the groundwater at the Site (i.e., where the RUC is less than the background concentrations noted), the trigger level is based on the 95th percentile of the concentrations historically reported.

This approach ensures that contingency measures will not be implemented for trigger parameters that remain within the concentration range considered to be naturally occurring and that a reasonable timeframe will be available to implement the contingency plan prior to the occurrence of a non-compliance scenario. The trigger for the Contingency Plan is when two or more of the same trigger parameters exceed the trigger levels at the same location for two consecutive monitoring events.

12.3. Trigger Levels – Comparison and Findings

Exceedances of the established trigger concentrations for chloride of 102 mg/L and alkalinity of 284 mg/L have historically been reported for well OW-5. A comparison of the groundwater monitoring results to the trigger parameters and levels established in Table 1 of the ECA, as amended on April 15, 2019, provided as Table 5, shows that in the Fall of 2021 the indicator parameter concentrations decreased to levels below the established trigger levels. Since that time, groundwater quality parameter concentrations have continued to show a decreasing trend, with concentrations appearing to become more similar to historical levels.

Based on an assessment of the historical groundwater quality results and trends and a review of site operations, increased chloride concentrations noted at OW-5 were interpreted to be related to the application of dust suppressant along the access road to Area B. An operations related cause for the increased chloride concentrations was consistent with the absence of landfill-related activities upgradient and in closer proximity to OW-5. To alleviate this potential contributing source of chloride to the shallow aquifer, it was recommended that the Municipality cease the use of dust-suppressant along the access road in this area of the Site, when possible. In addition, the re-location of the access road was considered. Modifications to the grading in this area was completed in early 2021 to address past trigger exceedances. On-going groundwater quality monitoring will continue to be reviewed to evaluate the adequacy of the mitigation measures implemented.

13. METHANE GAS MIGRATION

Landfill gas is primarily produced by the bacterial decomposition of organic materials after the capping and closure of a landfill has been completed and is combustible if it accumulates to concentrations greater than the lower explosive limit (LEL). Landfill gas tends to migrate laterally from the landfill area when the gas is unable to escape vertically through the ground surface via dry relatively permeable soils, commonly due to an overlying low permeability geologic stratum, or when the ground surface is frozen.

At the Site, the sandy soils in the vicinity of the landfill have a relatively high permeability that permits the venting of gases to the atmosphere. In addition, the landfill is constructed above grade and the vadose zone around the perimeter of the waste is relatively thin, limiting the potential pathway for methane gas migration. Therefore, at the Eastnor Landfill site methane gas is vented passively to the surrounding atmosphere.

As there is no methane gas control system required for landfilling, ECA Condition 41(1) requires that any buildings or structures with 100 m of the landfill footprint contain adequate ventilation systems to relieve any possible landfill gas accumulation. At this time, the re-use storage building, and operator weigh scale building, are both located greater than 250 meters from the landfill footprint. Therefore, methane gas is not thought to be of concern at the Site.

14. CONCLUSIONS

1. The Site comprises an approved landfill area of 9.5 ha, a waste transfer station for recyclable wastes, and since 2009, an additional 1.09 ha area for the disposal of wood waste only (i.e., stumps). Of the 9.5 hectares for waste disposal, a 3.3-hectare area described as Area A and Area B, was originally approved with a capacity of 93,000 m³ for waste and interim cover. Since these areas have reached their capacity, operations have transitioned into the Phase I area. The additional capacity associated with the remaining 6.2-hectare area (i.e., Phase I and Phase II) is recognized in the ECA, as amended.
2. Based on the fill rate determined by annual topographical surveys of the active area, it is estimated that a volume of 3,625 m³ was used for the year 2024 with a remaining capacity for waste and daily cover estimated to be approximately 250,000 m³.
3. In consideration of the capacity of the Phase I area of 270,000 m³ for waste and interim cover and the anticipated use of the landfill by the entire Municipality, which will increase the annual fill rate, the site life is estimated to be 40 to 45 years.
4. It is important that the Municipality continue to promote the segregation and recycling of waste. Stockpiles of recyclable goods should be removed on a regular basis to prevent clutter and to maintain an aesthetically acceptable site. Items that are to be separated from the residual waste and stockpiled in designated areas include, household recyclables, white goods, scrap metal, propane tanks, batteries, tires, mattresses, bale wrap, construction materials, HSP, electronic waste, leaf and yard waste, and scrap wood and brush.
5. Shallow groundwater flow in the overburden aquifer is generally to the southwest across the Site. Ongoing groundwater level monitoring indicates that groundwater migration in the overburden unit is predominantly downwards in the vicinity of the landfill, as indicated by the gradient noted at OW-10S/D, becoming primarily horizontal in the vicinity of OW-7S/D. Based on the thinning of the shallow sand unit towards the west, and the wet surficial soils noted further downgradient of the former beach ridge, a predominantly horizontal gradient is inferred to exist downgradient of wells OW-4 and OW-6.
6. Groundwater quality data from monitoring well OW-1 indicates that the background water quality has naturally elevated concentrations of hardness, iron, manganese, and DOC.
7. Based on a comparison of the primary leachate indicator parameters downgradient of Areas A and B, it is evident that the indicator parameters and/or relative magnitude thereof are variable. In general, the primary leachate indicator parameters include conductivity, hardness, alkalinity, chloride, sodium, and potassium. In addition, sulphate appears to be a primary indicator for leachate downgradient of closed Area B and ammonia, DOC and TKN appear to be primary indicators of leachate downgradient of Area A.
8. Analytical data indicates that leachate impacted groundwater is present immediately downgradient of the landfill at wells OW-2 and OW-8, with leachate-derived impacts that exceed the RUC limited to approximately 100 m downgradient of the non-active portion of the landfilled area (i.e., Area B) and extending to greater than 90 m downgradient of the recently active landfill area (i.e., beyond OW-7S). Further downgradient of the landfill, beyond well OW-7S, leachate indicator parameter concentrations in the shallow sand unit (i.e., at OW-6) are greatly reduced, suggesting that significant leachate attenuation is occurring within 210 m of the landfill footprint. Considering the additional distance to the western property boundary of greater than 300 m, the potential for off-site impacts to the west is considered to be low.
9. Groundwater quality at well OW-5, located approximately 10 meters from the southern property boundary was historically indicative of minor leachate influence with concentrations typically remaining below the RUC and generally exhibiting stable to decreasing trends. The groundwater quality results measured between 2015 and 2018, and again in 2020, reported a significant increase in chloride to concentrations in exceedance of the RUC. However, these exceedances were not interpreted to be solely related to landfilling, rather were also attributed

to landfill operations. As expected, the minor changes to Site operations have resulted in decreased chloride concentrations. In 2024, the groundwater quality at OW-5 reflected concentrations similar to historical levels, with chloride concentrations reported to be less than 20 mg/L.

10. The continual and progressive placement of waste at the Site allows for the continual evaluation of impacts due to waste placement, through the twice annual groundwater monitoring program, resulting in an additional level of protection and ensuring the protection of groundwater resources.

15. RECOMMENDATIONS

Based on the findings of this Report and the Conditions of the ECA, the following recommendations are provided:

1. The Municipality should continue to employ the area ramp method in order to achieve optimal compaction and an increased site life.
2. A topographic survey of the active area of the Site should be completed in the fall of 2025 to update site conditions, the annual fill rate, and to determine remaining landfill capacity.
3. The application of interim or final cover to areas that have been filled to final grade should be considered to help reduce the generation and downgradient migration of leachate. As Area A and Area B have reached capacity, these landfill areas should be capped, as per the PDO for the Eastnor Landfill Site (December 2017).
4. The twice annual monitoring program, as outlined in Schedule B of the ECA, should continue to be completed. In consideration of the updated Trigger Mechanism and Contingency Plan, boron should continue to be included to the list of 'Indicator' parameters outlined in Schedule B. In addition, based on MECP comments received in correspondence dated August 17th, 2022, VOCs were added to the list of parameters for well OW-2. The twice annual monitoring program, including locations and parameters, is outlined in Section 9.1 of this report.
5. The application of road salt and or dust suppressant to the access road for Area B should be avoided, as possible.
6. In recognition of the past trigger exceedances at well OW-5 and the transition of landfill operations into the southerly portion of the Phase I area, attention to site conditions and operations should continue in this area. It is anticipated that the mitigation measures implemented in 2021 will continue to help alleviate the historical groundwater exceedances at this location.

Tables

Table 1: Eastnor Landfill Volume Capacity (m³)

Table 2: Summary of Borehole Logs and Monitoring Well Installation Details

Table 3: Site Specific Background Concentrations & Guideline B-7-1 RUC Determination

Table 4: Groundwater Quality Summary – 2023 and 2024

Table 5: Comparison of Groundwater Quality at the Established Trigger Locations to the Trigger Levels

TABLE 1
EASTNOR LANDFILL VOLUME CAPACITY (m³)

	Limited to Area A and B	A/B + Phase I						
	2018	2018	2019	2020	2021	2022	2023	2024
Total Approved Capacity		Approval for additional capacity, as per ECA as amended in November 2017 and April 2019.						
Total Capacity for Waste and Daily Cover	93,000		363,000	363,000	363,000	363,000	363,000	363,000
Total Capacity for Final Cover	10,500		48,000	48,000	48,000	48,000	48,000	48,000
Total Air space Capacity	103,500		411,000	411,000	411,000	411,000	411,000	411,000
Capacity Used During Year								
Capacity Used for Waste and Daily Cover	2,950		N/A	2,650	2,750	2,750	4,000	5,800
Capacity Used for Final Cover	0			0	0	0	0	0
Total Capacity Used	2,950			2,650	2,750	2,750	4,000	5,800
Volume Filled at End of Year								
Volume of Waste and Daily Cover	91,700		91,700	94,350	97,100	99,850	103,850	109,650
Volume of Final Cover	0		0	0	0	0	0	0
Total Volume Filled	91,700		91,700	94,350	97,100	99,850	103,850	109,650
Remaining Capacity at End of Year								
Capacity for Waste and Daily Cover	1,300		271,300	268,650	265,900	263,150	259,150	253,350
Capacity for Final Cover	10,500		48,000	48,000	48,000	48,000	48,000	48,000
Total Remaining Capacity	11,800		319,300	316,650	313,900	311,150	307,150	301,350
Remaining Site Life								
At 5-Year Average Fill Rate (3,800 m ³ /yr)			71.4	70.7	70.0	69.3	68.2	66.7

Notes:

1. Since 2007, annual capacities used have been calculated using elevations obtained from topographic surveys of the active landfill areas conducted in the fall of each year.
2. In consideration of the additional approved Phase I and Phase II areas of 6.2-hectares for landfilling and 1.09-hectares for wood waste disposal, the ECA, as amended, approves a total capacity of 652,500 m³, not including final cover (613,500 m³ for refuse and daily/interim cover and 39,000 m³ for wood waste).
3. An additional capacity of 250,000 m³ for waste and interim cover (i.e. not including final cover and topsoil) is available in the Phase II area, subject to the submission and approval of a detailed Hydrogeological Assessment and Plan of Development and Operation.

TABLE 2
SUMMARY OF BOREHOLE LOGS AND MONITORING WELL INSTALLATION DETAILS

Well ID	Installation Details		Elevation (masl)			Screen Interval (masl)			Top of Sandpack Elevation	Well Screen and Sandpack Interval	Unit No.	Depth Interval of Each Unit				Description of Unit Encountered	Hydraulic Conductivity (m/s)		
	Date	Method	Ground	TOC	BH Btm	Bottom	Top	Length (ft)				From	To	From	To		Hazen Method	Slug Test	
												mbgs		masl			[sample depth mbgs]	Bouwer and Rice	
OW-1	2000	H.S.A.	194.57	195.57	187.87	187.87	189.37	5	191.07		1	0	1.5	194.57	193.07	Loose orangy-brown silty fine SAND			
			assumed	measured	assumed					OW-1	1	1.5	6.7	193.07	187.87	Compact brown to grey fine to medium SAND			
OW-2	2000	H.S.A.	194.28	195.28	187.58	188.18	189.68	5	191.28		Topsoil	0	0.2	194.28	194.08	Topsoil			
			assumed	measured	assumed						1	0.2	2.9	194.08	191.38	Loose orange-brown fine SAND, some silt			
										OW-2	1	2.9	5.1	191.38	189.18	Dense brown to grey medium SAND			
											2	5.1	6.7	189.18	187.58	Mottled olive-grey SILT, some fine sand			
OW-3	2000	H.S.A.	190.79	191.79	187.14	187.14	188.69	5	189.89		PEAT	0	0.5	190.79	190.29	Black fibrous PEAT			
			assumed	measured	assumed					OW-3	1	0.5	3.2	190.29	187.59	Loose to compact brown medium to fine SAND			
											2	3.2	3.65	187.59	187.14	Stiff brown SILT, trace fine sand			
OW-4	2000	H.S.A.	188.64	189.64	181.94	182.54	184.04	5	184.64		PEAT	0	0.45	188.64	188.19	Black fibrous PEAT			
			assumed	measured	assumed						1	0.45	0.65	188.19	187.99	Dark brown silty fine SAND			
										OW-4	2	0.65	6.7	187.99	181.94	Firm to stiff mottled olive grey grading to blueish grey SILT, some fine sand			
OW-5	2010	S.S.A.	191.62	192.7	187.82	187.82	191.02	10	191.02		PEAT	0	0.25	191.62	191.37	Organics			
										OW-5	1	0.25	3.65	191.37	187.97	Brown medium to coarse sand grading to grey fine to medium SAND			
											2	3.65	3.8	187.97	187.82	Grey clayey SILT			
OW-6	2010	S.S.A.	188.62	189.58	184.82	184.82	187.82	10	188.14		PEAT	0	0.3	188.62	188.32	Black topsoil			
										OW-6	1	0.3	1.0	188.32	187.62	Dense brown fine SAND			
											2	1.0	3.8	187.62	184.82	Grey-blue clayey SILT		2.01 x 10 ⁻⁷	
OW-7S	2012	H.S.A.	191.02	191.85	175.82	187.02	189.42	8	189.72		PEAT	0	0.6	191.02	190.42	PEAT			
OW-7D				191.73		178.87	180.37	5	180.72	OW-7S	1	0.6	2.74	190.42	188.28	Grey/green SAND		2.5 x 10 ⁻⁵	
											2	2.74	11.6	188.28	179.42	Brown to grey/green SILT	2.9 x 10 ⁻⁹ [6.1-6.7]		
											3	11.6	14.9	179.42	176.12	Grey/green medium to coarse SAND	3.2 x 10 ⁻⁴ [12.2-12.8]	2.4 x 10 ⁻⁵	
											4	14.9	15.2	176.12	175.82	Stiff grey/brown silty CLAY with gravel			
OW-8	2012	H.S.A.	191.95	192.75	188.17	188.35	190.75	8	190.98		PEAT	0	0.6	191.95	191.35	PEAT			
										OW-8	1	0.6	3.05	191.35	188.90	Brown to grey SAND	5.4 x 10 ⁻⁶ [3.0-3.6]	4.1 x 10 ⁻⁵	
											1 to 2	3.05	3.78	188.90	188.17	Grey/green SAND grading to grey/green clayey SILT			
OW-9	2012	H.S.A.	189.19	190.15	182.26	182.39	185.44	10	185.99		Topsoil	0	0.3	189.19	188.89	Topsoil			
											1	0.3	1.52	188.89	187.67	Brown SAND			
										OW-9	2	1.52	6.93	187.67	182.26	Grey/green SILT and fine sand	6.0 x 10 ⁻⁹ [1.5-2.1] 2.4 x 10 ⁻⁹ [6.1-6.7]	4.1 x 10 ⁻⁷	
OW-10S	2012	H.S.A.	192.31	193.14	177.07	189.21	190.71	5	190.98		PEAT	0	0.6	192.31	191.71	PEAT			
OW-10D				94.54		177.56	179.11	5	179.71	OW-10S	1	0.6	3.4	191.71	188.91	Grey/green SAND			
											2	3.4	11.0	188.91	181.34	Grey/green SILT grading to silty SAND	5.4 x 10 ⁻⁸ [4.6-5.2] 4.9 x 10 ⁻⁹ [7.6-8.2]		
											OW-10D	3	11.0	14.0	181.34	178.29	Grey coarse grained SAND	1.8 x 10 ⁻⁴ [12.2-12.8]	8.8 x 10 ⁻⁵
											4	14.0	15.2	178.29	177.07	Grey limestone COBBLES			
OW-11	2015	H.S.A.	192.06	193.01	186.12	189.01	190.54	5	191.15		PEAT	0	0.76	192.06	191.30	Peat and topsoil			
										OW-11	1	0.76	3.12	191.30	188.94	Grey fine to medium SAND with some silt. Loose.			
											2	3.12	4.57	188.94	187.49	Grey clayey SILT with trace sand.			
											2	4.57	5.94	187.49	186.12	Grey-brown clayey SILT with trace sand increasingly stiff with depth.			
OW-12S	2015	H.S.A.	192.21	192.92	179.41	189.16	190.69	5	191.30		Topsoil	0	0.83	192.21	191.38	Light brown sandy topsoil			
OW-12D			192.16	192.93		180.06	183.10	10	183.71	OW-12S	1	0.83	2.10	191.38	190.11	Brown SAND with little silt			
											1	2.10	4.11	190.11	188.10	Grey fine to medium SAND with some silt. Loose.			
											2	4.11	7.62	188.10	184.59	Grey clayey SILT with trace sand			
											2	7.62	11.26	184.59	180.95	Grey silty fine SAND			
										OW-12D	3	11.26	12.80	180.95	179.41	Grey coarse grained SAND. Very loose.			
OW-13	2015	H.S.A.	191.72	192.5	186.54	188.38	189.90	5	190.81		PEAT	0	0.70	191.72	191.02	Peat and topsoil			
										OW-13	1	0.70	3.50	191.02	188.22	Brown-grey fine to medium SAND with some silt			
											2	3.50	5.18	188.22	186.54	Grey silty Clay			
BOREHOLES																			
BH-1(15)	2015	H.S.A.	194.08	NA	182.34	NA	NA	NA	NA	NA	1	1	3.15	193.08	190.93	Loose brown SAND			
											1	3.15	6.17	190.93	187.91	Grey medium to fine SAND with some silt			
											2	6.17	11.20	187.91	182.88	Grey clayey SILT with trace sand			
											2	11.20	11.60	182.88	182.48	Grey silty fine SAND. Loose.			
											Refusal	11.60	11.74	182.48	182.34	Auger refusal, potential bedrock surface.			
BH-2(15)	2015	H.S.A.	196.72	NA	185.44	NA	NA	NA	NA	NA	1	0	6.17	196.72	190.55	Loose light brown SAND			
											1	6.17	8.60	190.55	188.12	Loose grey fine to medium SAND with some silt			
											2	8.60	11.28	188.12	185.44	Grey clayey SILT with trace sand			

Notes:

- mbgs = meters below ground surface.
- TOC = top of PVC pipe (i.e. measuring point); BH btm = Bottom of Borehole.
- Information presented for wells OW-1 through OW-4 was obtained from borehole logs prepared by AMEC.
- Elevations were adjusted in 2022 to suit UTM derived coordinates and the elevation across the site was raised by 98.4 meters to reflect geodetic elevations.

TABLE 3
SITE SPECIFIC BACKGROUND CONCENTRATIONS AND
GUIDELINE B-7-1 RUC DETERMINATION

GROUNDWATER INDICATOR PARAMETERS EASTNOR LANDFILL SITE						
Parameter (mg/L)	Maximum Concentration (Cr)	ODWS Classification	Background Concentration Range [n]	Background Concentration (Cb)	95th Percentile Concentration	Objective Level (Cm)
Conductivity (uS/cm)	NV	NV	322 - 487 [32]	414	464	NV
Chloride	250	AO	1.2 - 5.4 [33]	3.3	5.0	127
Hardness	80 to 200	OG	211 - 289 [31]	239	261	261
DOC	5	AO	10.8 - 33.9 [22]	19.2	30.2	30.2
Iron	0.3	AO	0.18 - 5.07 [30]	0.88	1.83	1.83
Manganese	0.05	AO	0.14 - 0.38 [21]	0.18	0.31	0.31
Boron	5	IMAC	0.018 [1]	0.018	N/A	1.26
Alkalinity	500	OG	185 - 257 [33]	210	249	355
Ammonia	NV	NV	<0.05 - 0.52 [31]	0.22	0.42	NV
TKN	NV	NV	0.64 - 2.8 [20]	1.2	1.8	NV
Nitrate	10	MAC	<0.05 - 0.34 [27]	0.10	0.27	2.58
Nitrite	1	MAC	<0.05 [23]	<0.05	NA	0.25
Phosphorus	NV	NV	<0.05 - 0.54 [20]	0.24	0.50	NV
Phosphate	NV	NV	<0.10 [21]	<0.10	NA	NV
Sulphate	500	AO	12.7 - 42.5 [32]	21.6	33.8	261
pH (no units)	6.5 to 8.5	OG	7.48 - 8.24 [30]	7.86	8.13	6.5 to 8.5
Potassium	NV	NV	0.25 - 1.44 [21]	0.53	1.43	NV
Sodium	200	AO	0.90 - 2.42 [32]	1.38	1.95	101
Calculation of Objective Levels - Volatile Organics						
Parameter	Maximum Concentration (Cr)	ODWS Classification	Assumed Background Concentration (Cb)		Objective Level (Cm)	
Benzene	0.005	MAC	0		0.00125	
1,4 Dichlorobenzene	0.005	MAC	0		0.00125	
Dichloromethane	0.1	MAC	0		0.0125	
Toluene	0.024	AO	0		0.012	
Vinyl Chloride	0.002	MAC	0		0.0005	

Notes:

- [n] = number of data points used to determine the average background concentration.
- Available data from OW-1 collected from 2001 to November 2017 was used to calculate background concentrations.
- mg/L = milligrams per litre; uS/cm = microsiemens per centimetre; NV = No Value.
- AO = Aesthetic Objective; OG = Operational Guideline
MAC = Maximum Acceptable Concentration, Parameters Related to Health
IMAC = Interim Maximum Acceptable Concentration, Parameters Related to Health

MOECC Procedure B-7-1

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

Where:

- C_m = Maximum concentration acceptable in groundwater beneath an adjacent property.
- C_b = Background concentration.
- C_r = Maximum concentration that should be present in groundwater for domestic consumption according to the Ontario Drinking Water Standards (ODWS).
- x = 0.5 for non-health related parameters and 0.25 for health related parameters.

- For parameters in which the background concentration (i.e. the average concentration) exceeds the ODWS, the 95th percentile is used to represent the RUC for the Site. These parameters are shaded and shown in **BOLD**.

TABLE 4
GROUNDWATER QUALITY SUMMARY - 2023 and 2024

Parameter	Units	ODWS		RUC	Background						Background (Crossgradient)					
					OW-1 [S]		OW-10S		OW-10D		OW-11 [S]		OW-12S [S]		OW-12D [D]	
					28-Nov-23	12-Nov-24	28-Nov-23	12-Nov-24	28-Nov-23	12-Nov-24	28-Nov-23	12-Nov-24	28-Nov-23	12-Nov-24	28-Nov-23	12-Nov-24
Conductivity	(µS/cm)	NV	NA	NV	457	525	506	598	552	534	633	609	369	341	338	350
pH	(Unitless)	6.5 to 8.5	OG	6.5 to 8.5	7.58	7.70	7.26	7.29	7.78	7.77	7.17	7.52	7.58	7.88	7.44	7.72
Alkalinity	mg/L	30-500	OG	355	262	295	310	324	323	339	408	373	238	234	234	360
Hardness	mg/L	80-100	OG	261*	243	278	244	280	297	253	330	291	209	166	191	171
Chloride	mg/L	250	AO	127	3.35	3.69	4.72	4.68	3.97	2.58	5.29	2.90	7.12	0.74	1.93	1.57
Nitrate	mg/L	10.0	MAC	2.58	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.18	0.24
Nitrite	mg/L	1.0	MAC	0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	500	AO	261	19.6	35.2	10.6	35.5	13.1	6.45	3.15	0.31	4.91	4.18	1.09	0.78
Phosphate	mg/L	NV	NA	NV	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phosphorus	mg/L	NV	NA	NV	0.18	0.14	0.70	1.10	0.11	0.70	0.80	0.12	0.42	0.54	0.84	3.11
Calcium	mg/L	NV	NA	NV	64.7	73.6	66.8	74.9	76.5	65.9	91.7	82.7	55.4	42.6	54.5	48.6
Magnesium	mg/L	NV	NA	NV	19.8	22.8	18.7	22.5	25.8	21.4	24.5	20.4	17.2	14.5	13.4	12.1
Sodium	mg/L	200	AO	101	1.71	2.22	8.74	3.85	1.69	1.72	2.71	2.75	1.03	0.72	2.22	1.81
Potassium	mg/L	NV	NA	NV	<0.50	<0.50	0.71	0.53	0.63	<0.50	<0.50	<1.0	<0.50	<0.50	1.45	0.71
Iron	mg/L	0.3	AO	1.83*	0.55	0.34	0.24	0.27	<0.010	<0.020	0.91	0.94	<0.010	<0.020	0.018	0.033
Manganese	mg/L	0.05	AO	0.31*	0.17	0.23	0.26	0.26	0.038	0.062	0.26	0.26	0.010	0.003	0.051	0.038
Boron	mg/L	5.0	IMAC	1.26	0.027	0.018	0.064	0.041	0.017	0.022	0.020	0.021	<0.010	<0.010	0.028	0.020
Ammonia	mg/L	NV	NA	NV	0.20	0.29	0.20	0.24	0.06	0.28	0.13	0.12	<0.02	<0.02	0.08	0.06
DOC	mg/L	5.0	AO	30.2*	14.6	13.0	25.8	35.9	1.7	9.2	34.1	38.6	1.4	1.9	7.2	18.2
TKN	mg/L	NV	NA	NV	0.76	0.90	3.39	1.60	<0.10	0.54	4.43	1.20	0.41	<0.10	2.01	1.14

Parameter	Units	ODWS		RUC	Leachate		Downgradient		Crossgradient				Downgradient			
					OW-2 [S]		OW-3 [S]		OW-5 [S]				OW-4 [SL]			
					28-Nov-23	12-Nov-24	28-Nov-23	12-Nov-24	21-Apr-23	28-Nov-23	30-Apr-24	12-Nov-24	21-Apr-23	28-Nov-23	30-Apr-24	12-Nov-24
Conductivity	(µS/cm)	NV	NA	NV	2830	2830	2150	2590	789	794	952	1030	457	394	434	441
pH	(Unitless)	6.5 to 8.5	OG	6.5 to 8.5	7.49	7.48	7.83	7.47	7.59	7.56	7.50	7.53	7.83	7.76	7.88	7.83
Alkalinity	mg/L	30-500	OG	355	988	822	742	831	353	414	485	553	221	250	257	266
Hardness	mg/L	80-100	OG	261*	1325	1048	1020	1150	379	399	520	507	205	211	255	216
Chloride	mg/L	250	AO	127	100	56.5	74.6	64.3	19.3	14.7	14.2	12.7	1.73	1.72	1.44	1.48
Nitrate	mg/L	10.0	MAC	2.58	<0.07	<0.14	0.42	<0.14	0.08	0.11	<0.05	<0.05	0.05	0.11	<0.05	<0.05
Nitrite	mg/L	1.0	MAC	0.25	<0.05	<0.11	<0.05	<0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	500	AO	261	729	583	471	496	50.4	57.0	74.8	89.7	13.4	11.5	11.6	10.5
Phosphate	mg/L	NV	NA	NV	NM	----	<0.13	<0.26	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phosphorus	mg/L	NV	NA	NV	1.05	0.50	0.12	0.15	1.18	1.89	1.11	0.56	0.03	0.05	0.03	0.11
Calcium	mg/L	NV	NA	NV	232	193	184	209	103	110	137	137	53.8	56.9	66.3	57.4
Magnesium	mg/L	NV	NA	NV	181	138	136	153	29.6	30.1	43.1	40.1	17.1	16.7	21.8	17.7
Sodium	mg/L	200	AO	101	68.1	43.6	36.4	40.9	8.54	6.54	8.75	9.12	3.29	2.79	3.10	2.92
Potassium	mg/L	NV	NA	NV	128	105	59.6	62.6	6.24	5.28	6.96	6.34	1.01	1.06	1.26	0.88
Iron	mg/L	0.3	AO	1.83*	5.23	0.033	0.025	<0.020	0.026	0.046	<0.020	0.025	0.56	0.18	0.12	<0.020
Manganese	mg/L	0.05	AO	0.31*	1.17	0.96	0.61	0.78	0.45	0.15	0.77	0.60	0.027	0.008	0.031	0.025
Boron	mg/L	5.0	IMAC	1.26	1.54	1.62	0.87	1.19	0.34	0.35	0.48	0.55	0.026	0.049	0.040	0.038
Ammonia	mg/L	NV	NA	NV	0.07	0.03	<0.02	0.17	<0.02	<0.02	0.40	<0.02	<0.02	<0.02	0.05	<0.02
DOC	mg/L	5.0	AO	30.2*	13.3	23.0	11.9	22.4	14	8.2	12.1	11.7	10.5	6.5	10.7	10.6
TKN	mg/L	NV	NA	NV	0.56	0.60	0.18	0.77	1.07	0.88	1.06	0.50	0.21	<0.10	0.12	0.26

TABLE 4
GROUNDWATER QUALITY SUMMARY - 2023 and 2024

Parameter	Units	ODWS		RUC	Leachate				Downgradient						Downgradient			
					OW-8 [S]				OW-7S				OW-7D		OW-6 [S]			
					21-Apr-23	28-Nov-23	30-Apr-24	12-Nov-24	21-Apr-23	28-Nov-23	30-Apr-24	12-Nov-24	28-Nov-23	12-Nov-24	21-Apr-23	28-Nov-23	30-Apr-24	12-Nov-24
Conductivity	(µS/cm)	NV	NA	NV	1510	2150	2450	2370	2360	2240	3050	2900	904	924	769	775	882	836
pH	(Unitless)	6.5 to 8.5	OG	6.5 to 8.5	7.21	7.33	7.06	7.09	7.15	7.25	6.98	7.03	7.57	7.63	7.73	7.85	7.67	7.77
Alkalinity	mg/L	30-500	OG	355	635	988	937	961	1090	1170	1200	1220	455	496	345	420	416	512
Hardness	mg/L	80-100	OG	261*	542	677	679	597	609	623	794	597	481	250	340	402	419	353
Chloride	mg/L	250	AO	127	103	122	115	118	95.5	83.0	128	126	20.9	18.2	21.0	21.7	20.1	23.1
Nitrate	mg/L	10.0	MAC	2.58	<0.05	<0.07	<0.14	<0.14	<0.14	0.78	<0.14	<0.14	<0.05	<0.05	<0.05	0.09	<0.05	<0.05
Nitrite	mg/L	1.0	MAC	0.25	<0.05	<0.05	<0.11	<0.11	<0.11	<0.05	<0.11	<0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/L	500	AO	261	51.0	65.4	55.8	51.1	<0.38	9.55	2.92	3.08	84.4	78.9	38.2	32.9	34.6	25.6
Phosphate	mg/L	NV	NA	NV	<0.10	NM	<0.26	----	<0.26	<0.13	<0.26	<0.26	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phosphorus	mg/L	NV	NA	NV	0.64	0.66	0.28	1.15	0.14	0.63	0.67	1.03	1.50	2.87	2.80	2.02	2.49	2.32
Calcium	mg/L	NV	NA	NV	161	219	198	179	185	191	235	182	129	65.3	91.8	112	113	97.0
Magnesium	mg/L	NV	NA	NV	34.0	31.6	44.8	36.4	35.7	35.4	50.2	34.7	38.5	21.0	27.0	29.8	33.2	26.9
Sodium	mg/L	200	AO	101	94.4	112	103	109	128	85.1	120	114	13.3	1.65	11.9	13.8	13.1	14.1
Potassium	mg/L	NV	NA	NV	36.8	43.6	44.0	34.1	40.8	56.1	62.3	53.3	0.81	<0.50	3.80	4.99	4.53	4.95
Iron	mg/L	0.3	AO	1.83*	0.049	40.7	0.082	0.080	0.081	0.086	0.15	0.11	0.035	0.022	0.017	0.036	<0.020	<0.020
Manganese	mg/L	0.05	AO	0.31*	0.62	1.16	0.81	0.89	0.75	1.11	1.55	1.13	0.16	0.059	0.36	0.04	0.63	0.041
Boron	mg/L	5.0	IMAC	1.26	0.82	1.34	1.27	0.93	1.29	1.44	1.94	1.63	0.037	0.023	0.083	0.16	0.11	0.16
Ammonia	mg/L	NV	NA	NV	21.0	48.8	30.6	30.4	60.7	74.0	63.5	90.5	0.17	0.10	0.03	0.03	0.13	<0.02
DOC	mg/L	5.0	AO	30.2*	42.8	41.4	29.8	43.3	45.6	27.0	56.9	51.8	6.9	17.4	14.2	13.8	18.0	20.8
TKN	mg/L	NV	NA	NV	22.4	53.5	35.6	31.1	61.4	74.0	66.0	344.00	2.96	0.79	1.77	4.40	3.55	1.88

Notes:

1. ODWS = Ontario Drinking Water Standards (June 2003, Revised June 2006)
2. RUC = Reasonable Use Criteria. **RUC shown in italics represents parameters in which the background concentration exceeds the ODWS and the 95th-percentile concentration is used.*
3. AO = Aesthetic Objective; OG = Operational Guideline; MAC = Maximum Acceptable Concentration; IMAC = Interim Maximum Acceptable Concentration
4. Cb = Background concentration calculated using all available data collected from well OW-1 by various consultants from 2001 to November 2017.
5. NV = No Value Specified
6. Values in bold represent results greater than the Reasonable Use Criteria
7. Shaded values represent results greater than the ODWS.
8. Samples analyzed by AGAT Laboratories Ltd.
9. mg/L = milligrams per litre; µS/cm = microsiemens per centimeter
10. [S] = well screened primarily in the shallow sand unit; [SL] = well screened primarily in the silt loam unit; OW7S/D and OW10S/D are well couplets screened in the shallow sand (S) and deeper sand (D) units

TABLE 5
COMPARISON OF GROUNDWATER QUALITY AT THE ESTABLISHED
TRIGGER LOCATIONS TO THE TRIGGER LEVELS

Indicator Parameter			Chloride (in mg/L)	Sodium (in mg/L)	Sulphate (in mg/L)	Boron (in mg/L)	Nitrate (in mg/L)	Alkalinity (in mg/L)
Background			1.2 - 5.4	0.90 - 2.4	12.7 - 42.5	<0.01 - 0.06	<0.05 - 0.34	185-257
ODWS			250	200	500	5.0	10	500
RUC			127	101	261	1.26	2.58	355
Trigger Levels	OW-4, OW-5 & OW-6 (80% RUC)		102	81	209	1.01	2.06	284
OW-4	14-Apr-11		1.11	3.25	17.2		<0.05	222
	01-Nov-11		1.38	3.37	14.3		<0.05	236
	11-Apr-12		1.23	3.19	13.4		<0.05	220
	01-Nov-12		1.32	3.60	7.92		<0.05	223
	15-Apr-13		1.38	3.27	14.8		<0.05	232
	14-Nov-13		1.28	3.58	10.9		<0.05	218
	12-May-14		1.42	3.75	13.7		0.46	235
	29-Oct-14	5	1.52	3.23	13.5		<0.10	222
	23-Apr-15		1.40	3.20	13.2		<0.05	218
	29-Oct-15		2.01	3.26	13.5		<0.10	232
	21-Apr-16	5	1.45	3.30	25.7		<0.05	229
	01-Nov-16		1.24	3.01	12.7		<0.05	224
	25-Apr-17		0.74	2.63	10.0		<0.05	194
	20-Sep-17		1.47	3.16	10.1		<0.05	235
	08-May-18		1.70	2.70	16.0		<0.10	200
	20-Nov-18		4.41	4.88	14.8	0.031	0.12	233
	29-Apr-19		1.22	3.17	11.2	<0.10	<0.05	247
	22-Oct-19		1.46	3.24	12.0	0.085	0.14	221
	25-Apr-20		1.66	3.03	13.8	0.013	<0.05	230
	28-Oct-20		1.58	3.10	11.0	<0.002	0.18	218
	04-May-21		1.63	3.25	11.7	0.045	<0.05	218
	06-Oct-21		1.29	2.76	10.9	0.033	<0.05	224
	26-Apr-22		1.35	2.95	13.3	0.034	<0.05	204
	27-Sep-22		1.68	4.12	13.0	0.036	<0.05	233
	21-Apr-23		1.73	3.29	13.4	0.026	0.05	221
	28-Nov-23		1.72	2.79	11.5	0.049	0.11	250
	30-Apr-24		1.44	3.10	11.6	0.040	<0.05	257
	12-Nov-24		1.48	2.92	10.5	0.038	<0.05	266

TABLE 5
COMPARISON OF GROUNDWATER QUALITY AT THE ESTABLISHED
TRIGGER LOCATIONS TO THE TRIGGER LEVELS

Indicator Parameter			Chloride (in mg/L)	Sodium (in mg/L)	Sulphate (in mg/L)	Boron (in mg/L)	Nitrate (in mg/L)	Alkalinity (in mg/L)
Background			1.2 - 5.4	0.90 - 2.4	12.7 - 42.5	<0.01 - 0.06	<0.05 - 0.34	185-257
ODWS			250	200	500	5.0	10	500
RUC			127	101	261	1.26	2.58	355
Trigger Levels	OW-4, OW-5 & OW-6 (80% RUC)		102	81	209	1.01	2.06	284
OW-5	14-Apr-11		60.4	14.8	82.5		<0.05	376
	01-Nov-11		34.6	12.9	65.2		<0.05	365
	11-Apr-12		24.0	9.15	35.3		<0.05	266
	01-Nov-12		32.0	11.9	54.0		<0.05	353
	15-Apr-13		28.6	12.4	74.5		<0.25	425
	14-Nov-13		66.5	15.7	57.4		<0.25	356
	12-May-14		46.3	15.9	75.0		<0.25	407
	29-Oct-14		77.3	16.6	65.2		<0.25	376
	23-Apr-15		116	18.7	72.6		<0.25	397
	29-Oct-15		192	22.1	77.0		<0.25	393
	24-Nov-15		233	28.1	58.8		<0.25	378
	21-Apr-16		91.4	18.7	68.1		<0.25	349
	01-Nov-16		264	27.7	57.8		<0.25	376
	25-Apr-17		161	20.3	48.0		<0.25	376
	20-Sep-17		205	23.2	49.2		<0.25	341
	08-May-18		150	26.0	49.0		<0.10	370
	20-Nov-18		93.7	14.8	43.1	0.51	<0.25	331
	29-Apr-19		82.9	17.1	37.2	0.54	<0.25	369
	22-Oct-19		115	13.4	28.9	0.33	<0.25	282
	25-Apr-20		146	21.4	49.8	0.68	<0.25	341
	28-Oct-20		212	22.8	55.7	0.82	<0.25	337
	04-May-21		156	10.6	47.6	0.49	<0.25	299
	Minor regrading efforts completed in the southerly area of the landfill							
	06-Oct-21		77.1	17.0	43.1	0.94	<0.05	349
	26-Apr-22		34.3	12.6	36.4	0.61	<0.05	324
	27-Sep-22		23.7	9.95	47.6	0.43	<0.05	380
	21-Apr-23		19.3	8.54	50.4	0.34	0.08	353
	28-Nov-23		14.7	6.54	57.0	0.35	0.11	414
	30-Apr-24		14.2	8.75	74.8	0.48	<0.05	485
	12-Nov-24		12.7	9.12	89.7	0.55	<0.05	553

TABLE 5
COMPARISON OF GROUNDWATER QUALITY AT THE ESTABLISHED
TRIGGER LOCATIONS TO THE TRIGGER LEVELS

Indicator Parameter			Chloride (in mg/L)	Sodium (in mg/L)	Sulphate (in mg/L)	Boron (in mg/L)	Nitrate (in mg/L)	Alkalinity (in mg/L)
Background			1.2 - 5.4	0.90 - 2.4	12.7 - 42.5	<0.01 - 0.06	<0.05 - 0.34	185-257
ODWS			250	200	500	5.0	10	500
RUC			127	101	261	1.26	2.58	355
Trigger Levels	OW-4, OW-5 & OW-6 (80% RUC)		102	81	209	1.01	2.06	284
OW-6	14-Apr-11		30.6	19.9	22.1		0.12	363
	01-Nov-11		22.0	15.4	12.5		<0.05	335
	11-Apr-12		26.3	14.6	15.3		0.15	337
	01-Nov-12		27.1	13.9	12.8		0.11	329
	15-Apr-13		37.0	20.5	22.1		0.44	320
	14-Nov-13		29.4	17.9	16.5		0.12	325
	12-May-14		30.9	18.4	20.8		<0.25	332
	29-Oct-14	5	35.3	23.3	15.5		<0.25	361
	23-Apr-15		36.4	23.5	21.0		<0.25	345
	29-Oct-15		56.1	38.3	24.0		<0.25	415
	21-Apr-16	5	35.0	19.5	28.5		<0.25	352
	01-Nov-16		34.8	25.5	24.4		0.91	379
	25-Apr-17		26.9	20.3	24.2		<0.25	339
	20-Sep-17		44.4	37.3	22.4		0.27	490
	20-Nov-18		31.9	20.2	34.6	0.16	<0.25	388
	29-Apr-19		25.2	18.9	28.3	0.114	<0.25	411
	22-Oct-19		23.4	15.9	33.2	0.176	<0.10	359
	25-Apr-20		23.9	13.0	43.8	0.111	<0.25	342
	28-Oct-20		24.7	15.0	35.6	0.163	0.17	366
	04-May-21		27.2	14.4	22.3	0.146	<0.10	325
	06-Oct-21		22.7	15.4	29.6	0.227	0.11	367
	26-Apr-22		21.0	17.3	30.7	0.137	0.21	306
	27-Sep-22		25.8	15.1	28.9	0.200	<0.05	388
	21-Apr-23		21.0	11.9	38.2	0.083	<0.05	345
	28-Nov-23		21.7	13.8	32.9	0.163	0.09	420
	30-Apr-24		20.1	13.1	34.6	0.111	<0.05	416
	12-Nov-24		23.1	14.1	25.6	0.158	<0.05	512
Trigger Levels	OW-9 (100% RUC)		127	101	261	1.26	2.58	355
OW-9	01-Nov-12		1.19	4.66	4.04	NM	<0.05	224
	15-Apr-13		1.16	4.05	1.28	NM	<0.05	233

Notes:

1. ODWS = Ontario Drinking Water Standards

2. RUC = Reasonable Use Criteria

3. mg/L = milligrams per litre

4. The Contingency Plan is to be implemented when two or more of the same parameters exceed the trigger levels at the same trigger location for two consecutive monitoring events (as per Condition 5.1 of the ECA Notice 4).

5. Results reported appear to have been erroneously identified. Based on the analytical data, the results for OW4 and OW6 are assumed to be the reverse of that reported on the COC.

Figures

Figure 1: Site Location Map

Figure 2: Site Layout

Figure 3: Site Layout Showing Monitoring Locations

Figure 4: Shallow Groundwater Flow & Chloride Concentration Distribution (Fall 2024)

Figure 5: Groundwater Flow: Deeper Sand Unit (Fall 2024)



-  FIRST NATION LANDS
-  NATIONAL, PROVINCIAL PARKS & RESERVES
-  RECYCLING DEPOT LOCATION



NOT TO SCALE
APRIL 2025

SITE LOCATION MAP

EASTNOR LANDFILL

Figure No. 1

2402867
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Lots 17 & 18, Conc. 2 W.B.R.
Municipality of Northern Bruce Peninsula



LEGEND

-  PROPERTY LIMIT/COMPLIANCE BOUNDARY
-  APPROXIMATE DUG WELL LOCATION

NOTES:

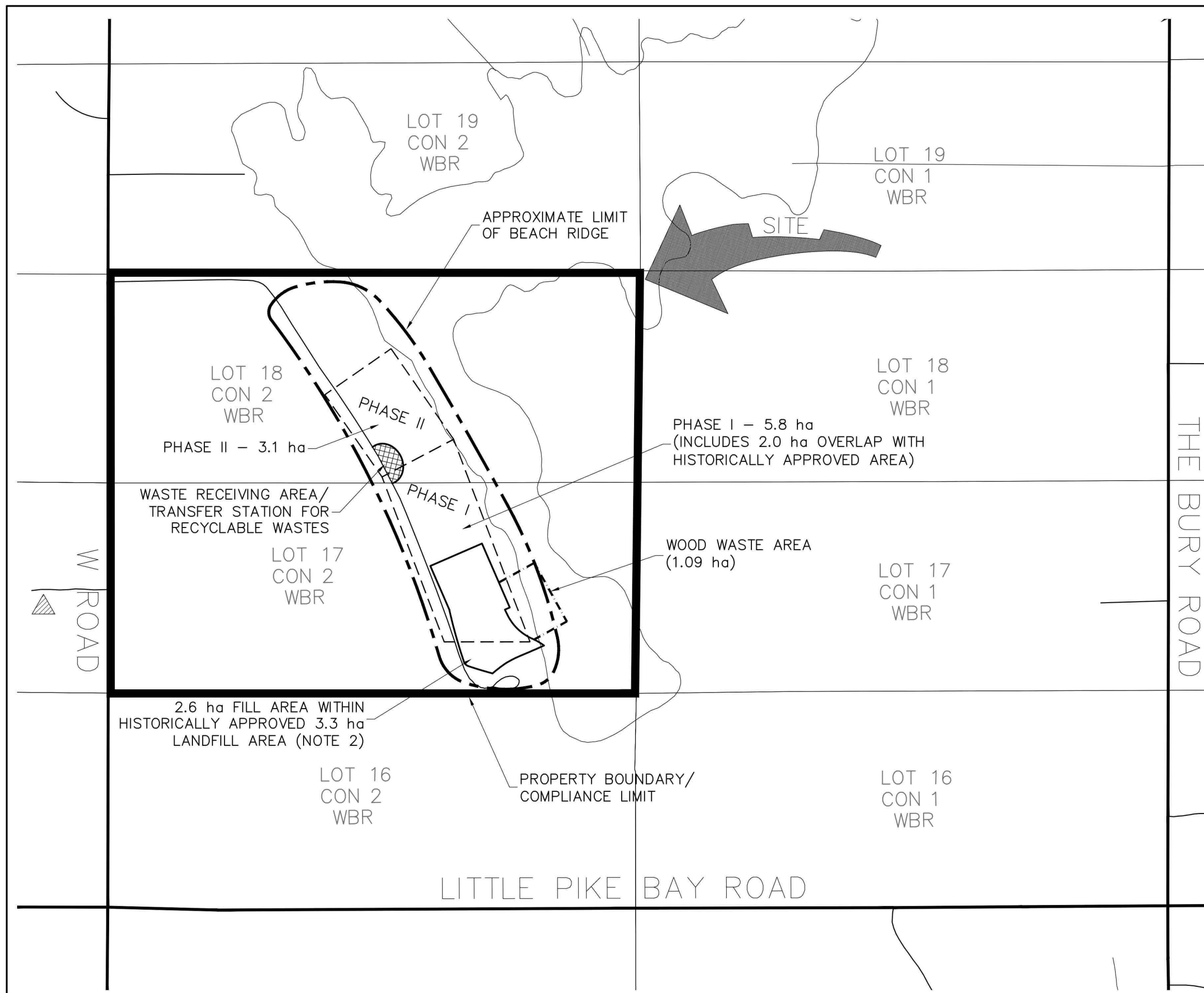
1. AS PER THE ECA, A CERTIFICATE OF PROHIBITION WAS REGISTERED ON TITLE FOR THE SITE DESCRIBED AS LOTS 17 & 18, CONCESSION 2 WBR, FORMER TOWNSHIP OF EASTNOR, MUNICIPALITY OF NORTHERN BRUCE PENINSULA, COUNTY OF BRUCE.
2. A 0.7 ha* PORTION OF THE HISTORICALLY APPROVED 3.3 ha LANDFILL AREA WAS OBSERVED TO CONTAIN NO WASTE. THEREFORE THE HISTORICAL WASTE PLACEMENT WAS LIMITED TO AN AREA OF 2.6 ha.

SCALE = 1:7,500
APRIL 2025

SITE PLAN

EASTNOR LANDFILL

Figure No. 2



2402867
Annual Monitoring Report
Lots 17 & 18, Conc. 2 W.B.R.
Municipality of Northern Bruce Peninsula



LEGEND

- PROPERTY LINE
- LIMIT OF HISTORICALLY APPROVED AND FILLED LANDFILL AREA (3.3 ha)
- PROPOSED LANDFILL EXPANSION AREA
- EXISTING TREELINE
- OW4 MONITORING WELL
- BH2 (15) BOREHOLE (2015)
- ACTIVE AREA

NOTES:

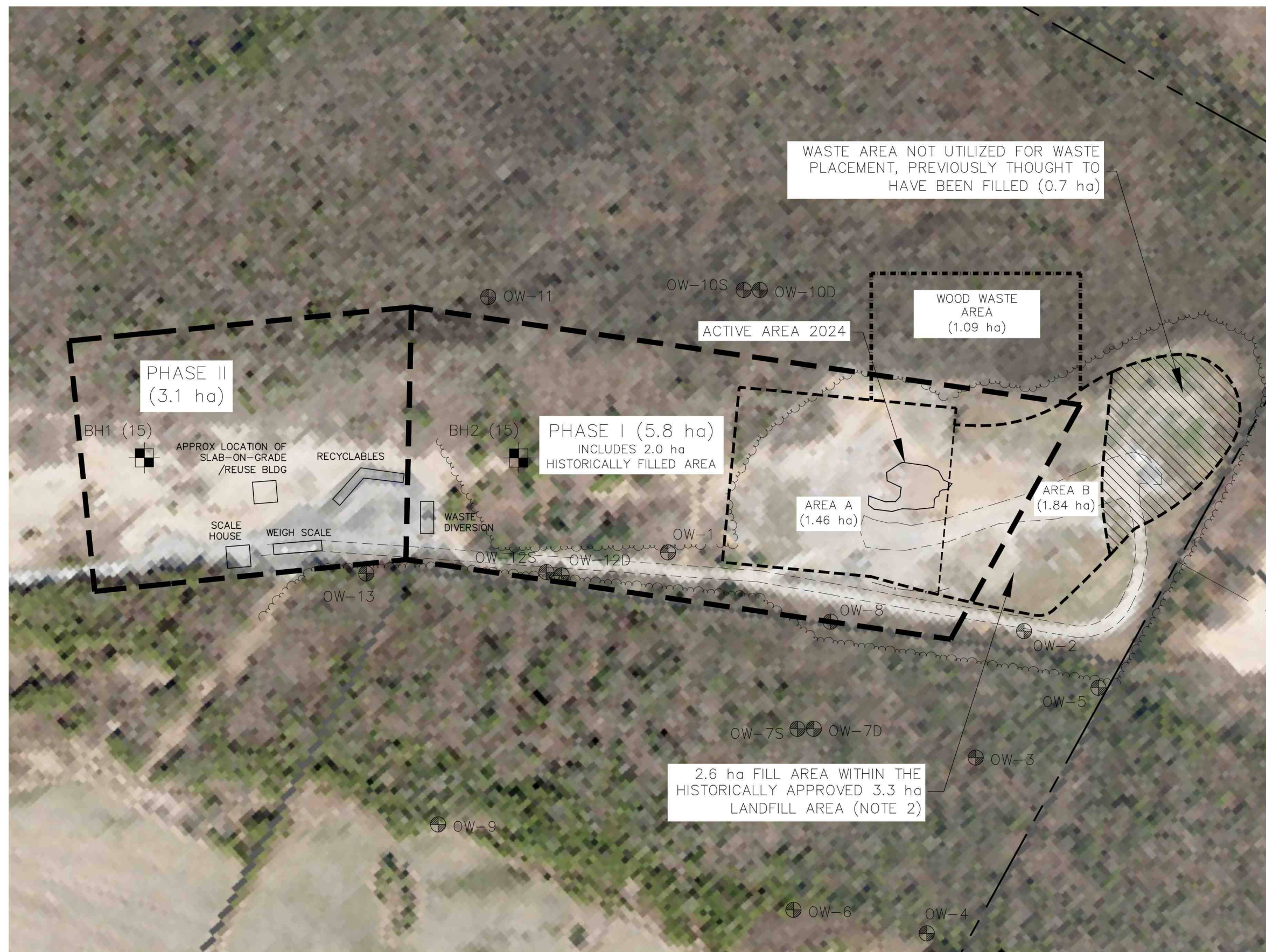
1. LOCATION OF PROPERTY LINES ARE APPROXIMATE.
2. A 0.7 ha* PORTION OF THE HISTORICALLY APPROVED 3.3 ha LANDFILL AREA WAS OBSERVED TO CONTAIN NO WASTE. THEREFORE THE HISTORICAL WASTE PLACEMENT WAS LIMITED TO AN AREA OF 2.6 ha.

SCALE = 1:2,500
APRIL 2025

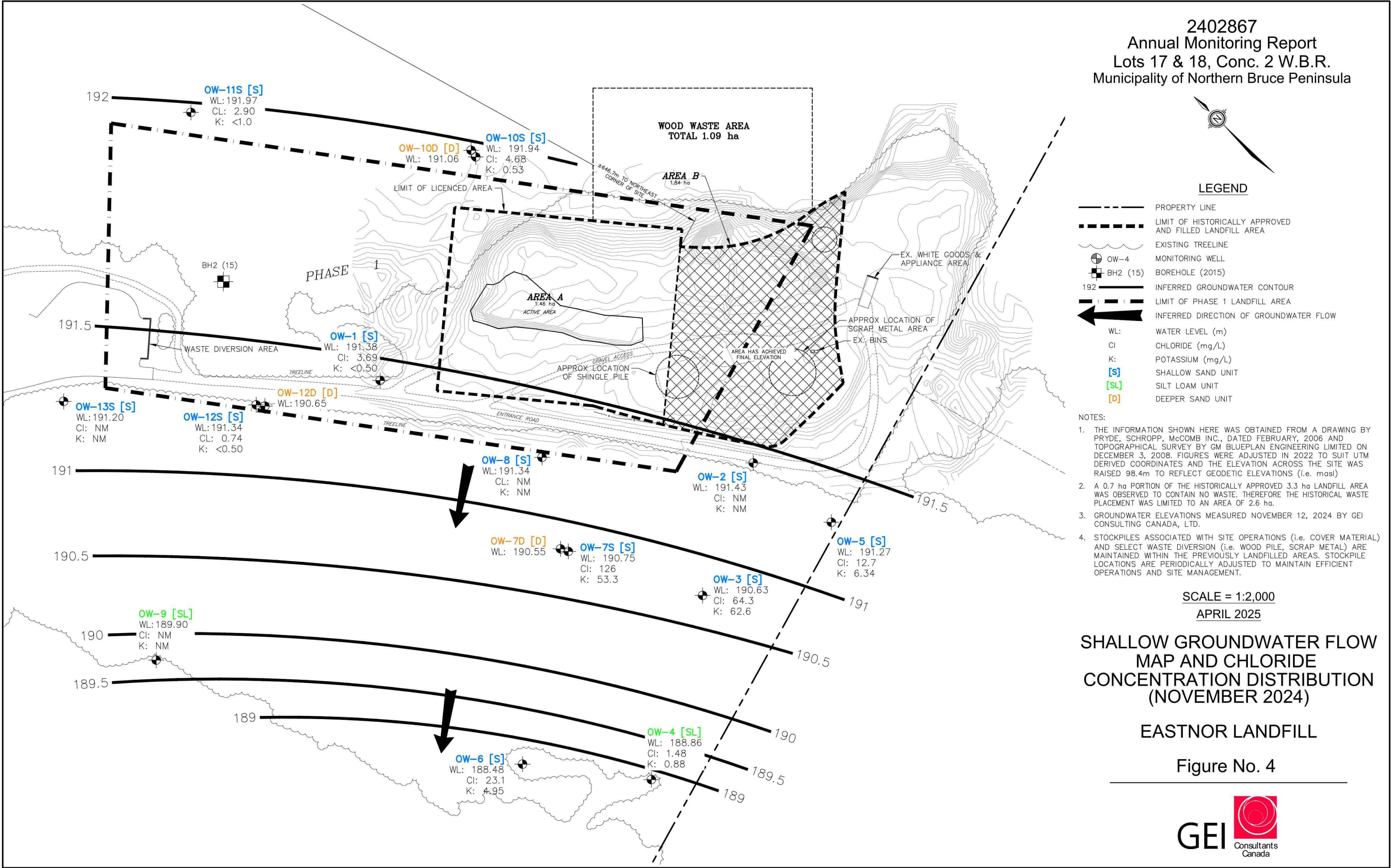
**SITE LAYOUT SHOWING
MONITORING LOCATIONS**

EASTNOR LANDFILL

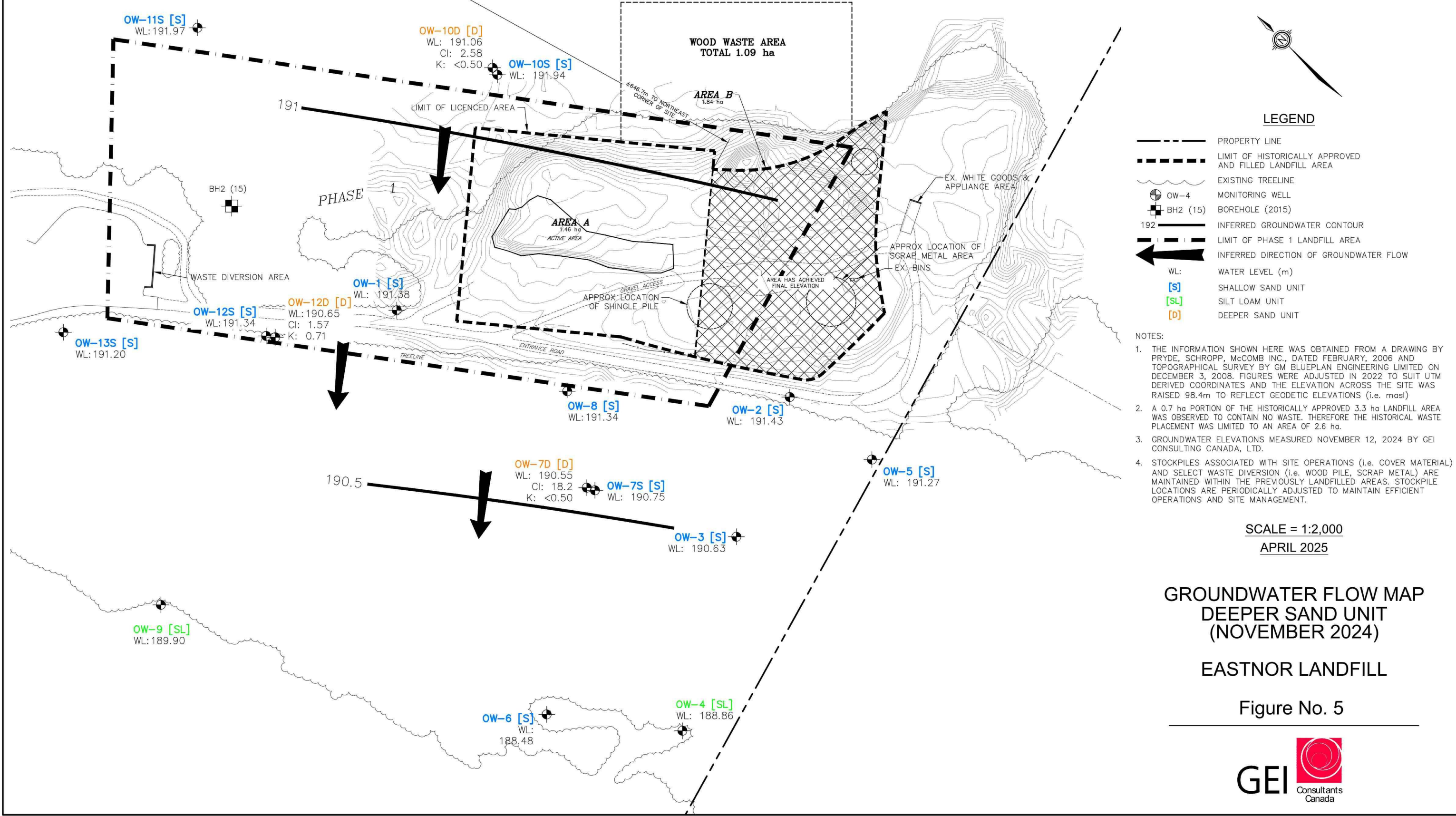
Figure No. 3



2402867
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Lots 17 & 18, Conc. 2 W.B.R.
Municipality of Northern Bruce Peninsula



2402867
Annual Monitoring Report
Lots 17 & 18, Conc. 2 W.B.R.
Municipality of Northern Bruce Peninsula



Appendix A Environmental Compliance Approval No. A272301



Ministry
of the
Environment

Ministère
de
l'Environnement

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A272301
Issue Date: February 20, 2007

Ontario

The Corporation of the Municipality of Northern Bruce Peninsula
Rural Route, No. 2
Lions Head, Ontario N0H 1W0

Site Location: Eastnor Landfill Site
Lot 18 & 17 pt., Concession 2 W.B.R.
Northern Bruce Peninsula Municipality, County of Bruce

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

the establishment and use of a 81 hectare (200 acre) hectare Waste Disposal Site consisting of a 9.5 hectare (24 acre) landfill and a transfer station for recyclable wastes.

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

- (a) **"Act"** means the *Environmental Protection Act*, R.S.O. 1990, C.E-19, as amended;
- (b) **"buffer"** means those lands between the *limit of fill* and the boundaries of the property owned by the *Owner*;
- (c) **"Certificate"** means this Provisional Certificate of Approval;
- (d) **"clean wood"** means tree branches, leaves and brush, and wood that is not contaminated with chromated copper arsenate, ammoniacal copper arsenate, pentachlorophenol or creosote, has no hardware, fittings or attachments unless they are predominantly wood or cellulose, is not an upholstered article, and does not have any non-cellulose surfaces adhered to it;
- (e) **"Director"** means Director, Environmental Assessment and Approvals Branch, Ontario Ministry of the Environment;
- (f) **"District Manager"** means District Manager, Owen Sound Office, Ontario Ministry of Environment;
- (g) **"limit of fill"** means the area in which waste is approved for final disposal according to this *Certificate* limited to the area shown as 'limit of fill' and 'area a - area of future landfilling' on Item 4 in Schedule "A" attached to this *Certificate*;
- (h) **"Ministry"** and **"MOE"** means the Ontario Ministry of the Environment;
- (i) **"OWRA"** means the *Ontario Water Resources Act*, R.S.O. 1990, c. O.40, as amended;
- (j) **"Ontario Regulation 347"** means Ontario Regulation 347 - R.R.O. 1990, General - Waste Management, as amended from time to time, made under the *Act*;
- (k) **"Ontario Regulation 189"** means Ontario Regulation 189/94, Refrigerants, or as amended, made under the *Act*;
- (l) **"Ontario Regulation 903"** means Ontario Regulation 903 - R.R.O. 1990, Wells, amended to Ontario Regulation 128/03, made under the *OWRA*;
- (m) **"Operator"** means any person, other than the *Owner's* employees, authorized by the *Owner* as having access to the *Site* during non-operating hours for the purpose of depositing waste at the *Site* and has been trained in accordance with Condition 38;

(n) "**Owner**" means the Municipality of Northern Bruce Peninsula and any person(s) contracted by the Municipality of Northern Bruce Peninsula to manage operations on the *Site* on behalf of the *Owner*;

(o) "**PWQO**" means the Provincial Water Quality Objectives included in the July 1994 publication entitled *Water Management Policies, Guidelines, Provincial Water Quality Objectives*, as amended from time to time;

(p) "**recyclable waste**" means solid, non-hazardous waste that is segregated for transfer to an end user thereby diverting it from final disposal and may include, but is not limited to, cardboard, boxboard, newspaper, used beverage/food containers, plastics, metal and bale wrap;

(q) "**RUP**" means the Reasonable Use Policy (Guideline B-7) of the Ministry of the Environment;

(r) "**Site**" means the 81 hectare property located at Lots 17 and 18, concession 2 WBR, Municipality of Northern Bruce Peninsula, Bruce County;

(s) "**tire units**" means a tire weighing 12 kilograms or less. Each tire weighing 12 kilograms or more is the number of tire units that results from dividing 12 into the number of kilograms that the tire weighs. For tires which have been chipped, shredded or ground, each 12 kilograms is a tire unit;

(t) "**white goods which contain refrigerants**" means white goods which contain, or may contain refrigerants, and which include, but is not restricted to, refrigerators, freezers and air-conditioning systems.

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

TERMS AND CONDITIONS

General

1. This *Certificate* supersedes and replaces Provisional Certificate Number A272301 issued September 24, 1980.

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

3. The requirements of this *Certificate* are severable. If any requirements 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.

4. The *Owner* must ensure compliance with all terms and conditions of this *Certificate*. Any non-compliance constitutes a violation of the *Act* and is grounds for enforcement.

5. (a) The *Owner* 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* 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*, or to require the *Owner* 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* relating to the Information, amounting to non-compliance with this *Certificate* or any statute or regulation.

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

(a) carry out any and all inspections authorized by Section 156, 157 or 158 of the *Act*, Section 15, 16 or 17 of the *OWRA*, 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,

(b) without restricting the generality of the foregoing, to:

- (i) enter upon the premises where records required by the conditions of this *Certificate* are kept;
- (ii) have access to and copy, at reasonable times, any records required by the conditions of this *Certificate*;
- (iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this *Certificate*; and
- (iv) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this *Certificate*.

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

8. 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.

9. All records and monitoring data required by the conditions of this *Certificate* must be kept on the *Owner's* premises for a minimum period of five (5) years from the date of their creation.

Certificate of Prohibition

10. (a) Pursuant to Section 197 of the *Act*, no person having an interest in the *Site* shall deal in any way with the *Site* without first giving a copy of this *Certificate* to each person acquiring an interest in the *Site* as a result of the dealing.

(b) Two copies of a completed Certificate of Prohibition, containing a registerable description of the *Site*, shall be submitted to the *Director* for the *Director's* signature within 90 calendar days of the date of this *Certificate*.

(c) The Certificate of Prohibition shall be registered in the appropriate land registry office on title to the *Site* by the *Owner* within 30 calendar days of receiving the Certificate of Prohibition signed by the *Director*, and a duplicate registered copy shall be submitted to the *Director*.

Transferral or Encumbrance of Site

11. 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.

Landfill Design and Operations

12. 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 or installed in accordance with the Application for a Certificate of Approval for a Waste Disposal Site dated December 9, 2003, and supporting documentation, and plans and specifications listed in Schedule "A".

Service Area

13. Only wastes generated from within the geographic boundaries of Municipality of Northern Bruce Peninsula and waste, limited to bale wrap, generated within the geographic boundaries of Manitoulin Island may be received at this *Site*. No waste shall be received for disposal at this *Site* from outside the approved service area.

Site Capacity

14. (a) The total approved waste disposal capacity of the *Site* shall be limited to 103,500 m³.
(b) The *Owner* shall not exceed the approved capacity of 103,500 m³ unless approved by the *Director*, and
(c) The *Owner* shall not exceed the final contours as shown in Item 6, Schedule "A".

Operating Hours

15. The *Owner* shall set operational hours which provides an adequate level of service to receive waste from the general public. The hours of operation:
(a) shall be any day of the week during daylight hours; and
(b) may be changed by the *Owner* at any time provided that the hours are correctly posted at the *Site* gate and that suitable public notice is given of any change.
16. No waste shall be received at the *Site* except under the supervision of an attendant or Operator that has been trained in accordance with Condition 38.
17. During non-operating hours, the *Site* gates will be locked or otherwise secured against access by unauthorized persons.
18. During non-operating hours, the *Owner* may conduct equipment maintenance, administrative functions and on-Site activity (compaction, covering, grading and similar operations) other than waste disposal by the general public as required. Transfer of *recyclable* waste during non-operating hours is permitted under the supervision of a site attendant or *Operator*.

Signage and Security

19. A sign shall be posted at the entrance gate of the *Site* with the following information:
- (a) name of the *Site* and *Owner*;
 - (b) *Certificate* number for the *Site*;
 - (c) days and hours of operation;
 - (d) allowable and prohibited waste types;
 - (e) a 24 hours telephone number to contact the *Owner* in the event of an emergency or complaint;
 - (f) warning against unauthorized access and against dumping outside the *Site*.

20. The *Owner* shall ensure that:

- (a) access to the *Site* is restricted by fencing and/or natural features;
- (b) fencing and lockable gate are kept in good repair;
- (c) the *Site* is screened from public view on all sides.

21. The *Owner* shall maintain the existing natural brush around the perimeter of the *Site* to provide a visual screen.

Waste Types

22. Only solid non-hazardous municipal waste shall be received for disposal at this *Site*. No liquid industrial waste or hazardous waste, as designated under *Ontario Regulation 347*, shall be disposed of at the *Site*.

Waste Placement

23. No waste shall be landfilled outside of the *limit of fill* area as shown on Map 3, Revision 5 - Existing Conditions November 11, 2003, plotted June 3, 2004 (Item 4 in Schedule "A" attached to this *Certificate*).

24. The *buffer* shall not be used for waste disposal but may be used for receiving and recording waste arrivals, monitoring, surface water management, storing cover and granular type materials, the operation of other approved ancillary waste management activities or other activities not related to waste management as identified by the *Owner* in Item 8 of Schedule

"A". All parts of the *buffer*, other than roadways, parking areas and structures shall be maintained with a healthy vegetative cover or other appropriate surface treatment which will minimize erosion.

25. The *Owner* shall deposit waste in the *limit of fill* using a bank dumping method and/or use of an area ramp style method as described in Section 2.1 Method of Operation referenced as Item 3 in Schedule "A".

26. (a) The *Owner* shall mark the boundary of the *limit of fill* and the markings shall be maintained so as to be visible throughout the year.

(b) The *Owner* shall place grade stakes delineating a 4:1 slop at the active face of the landfill and the grade stakes shall be reviewed and updated at least annually to ensure that a 4:1 slope is maintained.

27. The *Owner* shall ensure that waste is deposited in the *limit of fill* as follows:

- (a) no waste shall be deposited in standing water;
- (b) no waste shall be deposited within 30 meters of the wetland or watercourse;
- (c) waste shall be deposited in a manner that minimizes the area of exposed waste at the active face of the landfill;
- (d) all waste shall be deposited at the active face of the landfill except for waste that is segregated for the purpose of diversion through recycling or reuse or for burning.

28. *Recyclable waste* shall be stored in clearly labelled areas, segregated by barriers where practicable, in amounts and in a manner which does not create a nuisance or danger including but not limited to:

- (a) brush and clean lumber shall be placed in a cleared area no larger than 1000 m² and a height of 3 metres or less, with a minimum of 30 m separation distance to all other wastes, flammable materials and buildings;
- (b) stumps shall be placed in a cleared area no larger than 2000 m² with a maximum height of 3 metres;
- (c) white goods and marketable scrap metals, not to exceed 100 tonnes, shall be placed on the ground surface or in roll-off containers in a designated area;
- (d) cardboard, plastic, boxboard, steel/aluminium cans and other *recyclable waste* which may become windblown litter, shall be placed in designated containers;
- (e) propane tanks shall be stored on the ground surface in an area no larger than 500 m² in a manner which minimizes the potential for cylinder valves to be damaged/broken;
- (f) vehicular batteries shall be stored in a segregated storage location which is covered to provide shelter from precipitation and is equipped with spill containment; and
- (g) tires shall not exceed 700 *tire units* and shall be stored as follows:

- (i) the stockpile shall not exceed a volume of 45 m³;
- (ii) the stockpile shall be located a minimum of 15 metres from the property line, any buildings and the active landfilling area;
- (iii) the stockpile shall be separated from other waste piles by a minimum of 6 metres; and
- (iv) an area around stockpile of no less than 4.5 metres shall be kept free of vegetation

29. The *Owner* shall ensure that:

- (a) no waste other than segregated brush, lumber and *clean wood* shall be burned at this *Site*;
- (b) atmospheric conditions are suitable for burning. Specifically burning shall not take place when:
 - (i) rain or fog is present;
 - (ii) wind speeds are high or wind directions are changing frequently; or
 - (iii) a Smog Alert Advisory has been issued.
- (c) an area of no less than 4.5 m around the burn pit is kept free of vegetation;
- (d) access to the burning area by the public and other unauthorized personnel is prohibited when burning is carried out;
- (e) no burning is to occur without the continuous supervision of the attendant;
- (f) the Chief Fire Official has been notified of the designated date and time of the burn in accordance with Municipality of Northern Bruce Peninsula By-Law Number 2000-24 as amended; and

(g) the fire shall be fully extinguished at the end of the day.

30. The *Owner* shall ensure that:

- (a) all *white goods which contain refrigerants* accepted at the *Site*, which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, are stored in an upright position and in such a manner as to allow for the safe handling and removal of refrigerants as required by *Ontario Regulation 189*;
- (b) the *Owner* shall ensure that refrigerant is removed by a licensed technician, in accordance with *Ontario Regulation 189*, prior to shipping *white goods which contain refrigerants* off-Site; and
- (c) a detailed log of all *white goods which contain refrigerants* received is maintained which includes the following information:
 - (i) date of the record;
 - (ii) types, quantities and source of *white goods which contain refrigerants* received;
 - (iii) destination of the white goods; or
 - (iv) the details on removal of refrigerants, and the quantities and destination of the refrigerants transferred from the *Site*.

Cover

31. Cover material shall be applied as follows:

- (a) Cover material consisting of a minimum of 0.15 m thickness of soil, or an alternate material approved in writing by the *District Manager*, shall be applied such that no waste material is exposed. Cover material shall be applied three (3) times per week between June and October and once (1) per week between November and May. Any alternative cover material must be approved, in writing, by the *District Manager*;
- (b) In landfilling areas where waste placement is below the final approved contours and landfilling is to be suspended for thirty (30) days or more, an interim cover consisting of a minimum of 0.30 m thickness of soil and/or sand shall be applied;
- (c) In landfilling areas which are no longer in use (i.e. historical), a final cover of 0.60 m thickness of sand with an additional 0.15 m of topsoil (or equivalent which promotes natural growth) shall be applied; and
- (d) Where existing cover material has eroded such that waste is exposed, the cover material shall be promptly replaced.

32. Final cover shall be applied progressively, as weather conditions permit, as each part of the *limit of fill* reaches its final grades. Vegetation of completed final cover using drought-resistant, low-nutrient requirement grass and legume blends which regenerate annually shall occur within one month of its placement and final grading, or as soon as weather permits.

Inspections

33. The *Owner* shall ensure that the following inspection schedule is adhered to:

- (a) on each operating day, an inspection of the working face and storage areas;
- (b) on a weekly basis, during the period between April 1st and November 30th, check the fence voltage and inspect the perimeter of the electric fencing for:
 - (i) signs of animal entry;
 - (ii) damage to fencing;
 - (iii) wire height and tension; and
 - (iv) vegetation growth.
- (b) on a monthly basis, an inspection of the general condition of the *Site*, access road, signage, fencing and gate, and the amount of available cover material;
- (c) on a semi-annual basis, an inspection of the monitoring wells and condition of the cover material; and
- (d) on an annual basis, a field survey of the *limit of fill* area.

Nuisance Control

34. The *Site* shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance. Specifically, the *Owner* shall implement the vector and vermin control / management plan as described in Item 7 of Schedule "A". The plan shall remain in place until the *Site* has been closed.

35. The *Owner* shall minimize the amount of litter generated by placing plastic mesh fencing, or equivalent, around the active landfilling face if directed to do so, in writing, by the *District Manager*.

36. The *Owner* shall conduct litter pickup each operating day from June through October and as needed from November through May.

37. The *Owner* shall operate the electric fencing from April 1 to November 30 of each year unless environmental conditions (such as snow depth) dictate otherwise. The *Owner* shall maintain the electric fencing by:

- (a) performing inspections required by Condition 33(b);
- (b) ensuring that ground to bottom strand clearance is maintained at approximately 5 cm and no greater than 7 cm;
- (c) ensuring proper wire tension;
- (d) taking immediate additional deterrent approaches (use of stones, logs, electrified mats or additional wiring) where signs of animal entry are detected;
- (e) clearing vegetation or other objects that may come in contact with charged strands.

Training

38. (a) The *Owner* shall ensure that all *Site* attendants and *Operators* have been adequately trained, and receive on-going annual re-fresher training, with respect to the following:

- (i) terms, conditions and operating requirements of this *Certificate*;
- (ii) use, operation, inspection and maintenance of any equipment to be used;
- (iii) requirements of the Design and Operations manual;
- (iv) record keeping procedures;
- (v) *Site* inspection procedures;
- (vi) emergency response procedures; and
- (vii) complaints response procedure.

(b) The *Owner* shall maintain a written record of training provided which shall include:

- (i) date of training;
- (ii) name and signature of person who has been trained; and
- (iii) description of the training provided.

Emergency Response

39. The *Owner* shall:

(a) have in place a written emergency response procedures which shall include, as a minimum, the following:

- (i) response procedures to be undertaken in the event of a fire, spill or medical emergency;
- (ii) a list of contingency equipment available in the event of an emergency;
- (iii) names and telephone numbers of emergency responders;
- (iv) a notification protocol, with names and telephone numbers of persons to be contacted including Municipality of Northern Bruce Peninsula personnel, MOE District Office, Spills Action Centre and fire department;
- (v) a list of approved facilities where waste can be re-directed in the event of a process upset.

(b) ensure that the contingency equipment and materials outlined in Condition 39 (a) (ii) are in a good state of repair,

- fully operational and immediately available to the attendant;
- (c) ensure that the *Site* attendant(s) is fully trained in the emergency response procedures and contingency equipment to be employed in the event of an emergency; and
- (d) review the contingency plan on an annual basis, as a minimum, to ensure that it is current. Specifically, the *Owner* shall ensure that the names and telephone numbers of the persons to be contacted as required under Condition 39 (a)(iii) and (iv) are up-to-date.

40. The *Owner* shall ensure that *Site* attendant(s) has access to a reliable means of summoning assistance (e.g. telephone, cellular phone, mobile radio) at all times.

Groundwater Monitoring

41. (a) Groundwater monitoring shall be conducted by the *Owner* in accordance with Schedule "B".

- (b) Any future changes in the groundwater monitoring program shall be approved by the *District Manager*.

42. (a) In the event that:

- (i) persistent leachate impacts, as defined in Section 6.1 of Item 3 of Schedule "A" are detected at well OW-4-00; or
- (ii) the concentration of a leachate-related parameter increases for three consecutive monitoring events in well OW3; then

- (b) the *Owner* shall install and monitor a fifth well near the southern property line and revise the leachate contingency plan accordingly.

43. (a) All monitoring wells which form part of any monitoring program shall be protected from damage.

(b) Any groundwater monitoring wells that are damaged shall be repaired or replaced forthwith or properly abandoned in accordance with *Ontario Regulation 903*.

(c) Any monitoring wells which are no longer required for monitoring or which need to be closed due to operational changes on the *Site*, shall be properly abandoned in accordance with *Ontario Regulation 903*.

Record Keeping

44. The *Owner* shall maintain a written log of the following information:

- (a) date;
- (b) the type, amount and destination of *recyclable waste* transferred from the *Site*;
- (c) waste refused and reason for refusal;
- (d) record of inspections required under Condition 33;
- (e) record of the litter collection required under Condition 36;
- (f) details of any maintenance activities conducted under Condition 37;
- (g) application of dust suppressant;
- (h) description of any out-of-service period, the reasons for the loss of service and action taken to restore and maintain service;
- (i) details of any controlled burning;
- (j) details of any complaints related to the operations of the *Site*.

Annual Monitoring Report

45. By May 31st of each year, the *Owner* shall submit to the *District Manager* an annual monitoring report covering the preceding calendar year. The report shall include the following:

- (a) an estimation of the amount of waste deposited over the previous calendar year based on topographical surveys;

- (b) a summary of the amount of *recyclable waste* diverted from disposal;
- (c) an updated *Site* plan showing the location of *recyclable waste* storage areas, cover material stockpile and active landfill face;
- (d) a summary of operational problems experienced or complaints regarding operation of the *Site* received and their resolution;
- (e) a summary of the effectiveness of the electric fencing in preventing animal entry and recommendations for any changes to the electric fencing program or the vector and vermin control / management plan that may be necessary;
- (f) recommendations respecting any proposed changes in the operations of the *Site*;
- (g) a summary of inspections;
- (h) a plan of the *Site* monitoring locations;
- (i) tables outlining monitoring locations, analytical parameters sampled, and frequency of sampling;
- (j) an assessment of groundwater quality in relation to the trigger concentrations and the *RUP*;
- (k) conclusions of the monitoring data, a review of the adequacy of monitoring programs, recommendations for any changes to monitoring programs that may be necessary;
- (l) a summary of complaints made regarding *Site* operations, maintenance and monitoring; and
- (m) a statement as to compliance with all Conditions of this *Certificate* and with the inspections, monitoring and reporting requirements of the Conditions herein.

46. In the event that the results of the monitoring program are such that an off-site exceedance of the *RUP* or *PWQO* can reasonably be predicted to occur, the *Owner* shall include in the annual report:

- (a) the details of any such predicted off-site exceedance, including the assumptions upon which the prediction is based;
- (b) a discussion of the modifications, if any, to intended operations which would be necessary to prevent the predicted off-site exceedance;
- (c) a discussion of the modifications, if any, which should be made to the monitoring program; and
- (d) a discussion of other mitigation measures or contingency actions, if any, which may be necessary to prevent off-site impacts.

Closure Plan

47. Two years prior to *Site* closure, the *Owner* shall submit for the *Director's* approval a detailed closure plan. This plan shall include, but not limited to, the following subjects:

- (a) proposed end use;
- (b) final closure schedule;
- (c) final contour configuration;
- (d) landscaping;
- (e) *Site* facilities (if any);
- (f) rodent control;
- (g) groundwater, surface water and landfill gas control; and
- (h) post-closure inspection, maintenance, monitoring and reporting.

SCHEDULE "A"

This Schedule "A" forms part of Certificate of Approval No. A272301.

1. Application for a Provisional Certificate of Approval for a Waste Disposal Site, signed by Cathy Robins, CAO, Township of Eastnor, dated December 9, 2003.
2. Letter from W. Rydall, Public Works and Property Manager, Municipality of Northern Bruce Peninsula, to Environmental Assessment and Approvals Branch, dated February 18, 2004 re: maximum quantities for materials diverted from landfill.
3. Eastnor Waste Disposal Site, Municipality of Northern Bruce Peninsula, Plan of Development and Operation Addendum, prepared by Pride Schropp McComb, Inc., dated May 2004.

4. Map 3 Revision 5 - Existing Conditions November 11, 2003, plotted June 3, 2004.
5. Township of Eastnor Waste Disposal Site, Hydrogeologic Assessment and Plan of Development and Operation, Prepared by Stanley Consulting Group Ltd., dated October 1998.
6. Map 5 Revision 8 - Final Contours October 16, 2006, plotted November 3, 2006.
7. Municipality of Northern Bruce Peninsula, Eastnor Waste Disposal Site, Vector and Vermin Control/Management Plan, undated.
8. Letter from Mr. R. Deverell, Municipality of Northern Bruce Peninsula, to Environmental Assessment and Approvals Branch, dated January 4, 2007, providing additional comments on the draft Certificate including clarification of fire department exercises, storage of materials other than waste, municipal by-law with respect to open fires and pest control management.

SCHEDULE "B"

This Schedule "B" forms part of Certificate of Approval No. A272301.

Groundwater Monitoring Program

Sampling Location	Parameters	Frequency
OW-1-00, OW2-00, OW3-00, OW4-00	water level, alkalinity, conductivity, pH, ammonia, hardness, calcium, iron, magnesium, manganese, phosphorous, potassium, sodium, chloride, nitrate, nitrite, phosphate, sulphate	spring and fall
OW3-00	BTEX	annually
OW3-00	VOC	every three years

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

The reason for Condition 1 is to clarify that the previously issued Certificate of Approval No. A272301 issued on September 24, 1980 is no longer in effect and has been replaced and superseded by the Terms and Conditions stated in this Certificate.

The reason for Conditions 2, 3, 4, 5 and 8 is to clarify the legal rights and responsibilities of the Owner under this Certificate.

The reason for Condition 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. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act and OWRA.

The reason for Condition 7 is to clarify how to interpret this Certificate in relation to the application and supporting documentation submitted by the Owner.

The reason for Condition 9 is to ensure the availability of records and drawings for inspection and information purposes.

Condition 10 is included, pursuant to subsection 197(1) of the Act, 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.

The reason for Condition 11 is to restrict potential transfer or encumbrance of the Site without the approval of the Director. Any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this

Certificate.

The reason for Conditions 12, 44 and 45 is to ensure that the Site is designed, 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.

The reason for Conditions 13 and 14 is to specify the approved areas from which waste may be accepted at the Site and the types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

The reason for Condition 15 is to specify the hours of operation for the Site and a mechanism for amendment of the hours of operation, as required.

The reason for Conditions 16 and 18 is to ensure that the Site is supervised and operated by properly trained staff. Training will help ensure that operations do not result in a hazard or nuisance to the natural environment or any person.

The reason for Condition 17 is to minimize the risk of unauthorized entry and to ensure the Site is only operated in the presence of trained personnel and to ensure proper management of waste.

The reason for Condition 19 is to ensure that the public have the necessary contact information in the event of an emergency or complaint.

The reason for Condition 20 is to ensure that the Site is secure when unattended to prevent vandalism or theft.

The reason for Conditions 21, 29, 34, 35, 36 and 37 is to ensure that the Site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 22 is to ensure that only waste approved under this Certificate are received at the Site.

Conditions 23, 24, 25, 26, 27, 28 and 30 are included to ensure that waste storage and disposal are done in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

The reason for Condition 31 and 32 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 appearance is maintained. The proper closure of a landfill requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the Site.

The reason for Conditions 33 and 43 is to ensure that all equipment and facilities are maintained in good working order.

The reason for Condition 38 is to ensure that the Owner's staff are properly trained in the operation of the equipment used at the Site and emergency response procedures.

The reason for Conditions 39 and 40 is to ensure that the Owner is prepared and properly equipped to take action in the event of a spill, fire or other operation upset.

The reason for Condition 41 is to demonstrate that the landfill impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial / contingency action can be taken.

The reason for Conditions 42 and 46 is to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to potential impacts from the operation of this Site.

The reason for Condition 47 is to ensure that the Site is closed in accordance with MOE standards and to protect the health and safety of the environment.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A272301 issued on September 24, 1980

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
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

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

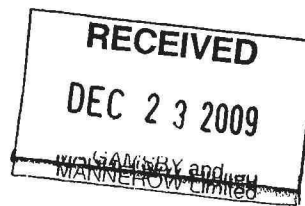
*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

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

DATED AT TORONTO this 20th day of February, 2007

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

VP/
c: District Manager, MOE Owen Sound

AMENDMENT TO PROVISIONAL CERTIFICATE OF
APPROVAL
WASTE DISPOSAL SITE

NUMBER A272301

Notice No. 1

Issue Date: December 8, 2009

The Corporation of the Municipality of Northern Bruce Peninsula
56 Lindsay Rd
Northern Bruce Peninsula, Ontario
N0H 1W0

Site Location: Eastnor Landfill Site
1252 West Road
Lot 18, part 17, Concession 2 W.B.R.
Northern Bruce Peninsula Municipality, County of Bruce

You are hereby notified that I have amended Provisional Certificate of Approval No. A272301 issued on February 20, 2007 for the establishment and use of a 81 hectare (200 acre) Waste Disposal Site consisting of a 9.5 hectare (24 acre) landfill and a transfer station for recyclable wastes. , as follows:

Definition for wood waste disposal area is added to the Certificate:

"Wood Waste Disposal Area" is the area marked as "Proposed Wood Waste Disposal Area" in Figure 2 of Item 9 of Schedule "A".

Condition 14. (d) is hereby added.

14. (d) Notwithstanding Condition 23, disposal of 39,000 cubic meters of wood waste in the 1.09 hectare area designated *Wood waste Disposal Area* is hereby approved. This volume of wood waste is in addition to the volume of waste approved under the Condition 14. (a).

Condition 41, 43 and Schedule "B" are revoked and replaced with the following:

41. LANDFILL MONITORING

Landfill Gas

- (1) (a) The *Owner* shall ensure that any buildings or structures at the *Site* within 100 meters from the landfill foot print contain adequate ventilation systems to relieve any possible landfill gas accumulation. Routine monitoring for explosive methane gas levels shall be conducted in all buildings or structures at the *Site*, especially enclosed structures which at times are occupied by people located within 100 meters from the landfill foot print.

Compliance Limits

- (2) The *Site* shall be operated in such a way as to ensure compliance with the Reasonable Use Guideline B-7 for the protection of the groundwater at the *Site*.

Groundwater Monitoring

- (3) The *Owner* shall monitor groundwater as per Items in Schedule "A" and approved by the Director.
- (4) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience shall execute or directly supervise the execution of the groundwater monitoring and reporting program.

Groundwater Wells and Monitors

- (5) The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.
- (6) Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.
- (7) Any groundwater monitoring well included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the *Owner*, as required.
 - (a) The *Owner* shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.
 - (b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the *District Manager* for

abandonment, shall be decommissioned by the *Owner*, as required, in accordance with *O.Reg. 903*, that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the Annual Report for the period during which the well was decommissioned.

Trigger Mechanisms and Contingency Plans

- (8)
 - (a) Within six (6) months from the date of this *Certificate*, the *Owner* shall establish and submit to the *District Manager*, site-specific trigger mechanisms for surface water and groundwater at the *Site*.
 - (b) Within six (6) months from the date of this *Certificate*, the *Owner* shall submit to the *District Manager* for approval, details of a contingency plan to be implemented in the event that the surface water or groundwater quality exceeds the trigger mechanism.
 - (c) The *Owner* shall ensure that any proposed site-specific trigger levels for leachate impacts to groundwater and contingency plans are approved in advance by the *Director* via an amendment to this *Certificate*. The *Owner* may follow the same procedure as in conditions 41(12) to 41(14) to seek approval for the proposed trigger mechanisms and contingency plans.
- (9) In the event of a confirmed exceedence of a site-specific trigger level relating to leachate mounding or groundwater or surface water impacts due to leachate, the *Owner* 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* in accordance with the approved trigger mechanisms and associated contingency plans.
- (10) If monitoring results, investigative activities and/or trigger mechanisms indicate the need to implement contingency measures, the *Owner* shall ensure that the following steps are taken:
 - (a) The *Owner* shall notify the *District Manager*, in writing of the need to implement contingency measures, no later than 30 days after confirmation of the exceedences;
 - (b) Detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures shall be prepared and submitted by the *Owner* to the *District Manager* for approval; and
 - (c) The contingency measures shall be implemented by the *Owner* upon approval by the *District Manager*.
- (11) The *Owner* shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to groundwater, are approved in advance by the *Director* via an amendment to this *Certificate*. The *Owner* may follow the same procedure as in conditions 41(12) to 41(14) to seek approval for the changes to the trigger mechanisms

and contingency plans.

Changes to the Monitoring Plan

- (12) The *Owner* may request to make changes to the monitoring program(s) to the *District Manager* in accordance with the recommendations of the annual report. The *Owner* shall make clear reference to the proposed changes in separate letter that shall accompany the annual report.
- (13) Within fourteen (14) days of receiving the written correspondence from the *District Manager* confirming that the *District Manager* is in agreement with the proposed changes to the environmental monitoring program, the *Owner* shall forward a letter identifying the proposed changes and a copy of the correspondences from the *District Manager* and all other correspondences and responses related to the changes to the monitoring program, to the *Director* requesting the *Certificate* be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.
- (14) In the event any other changes to the environmental monitoring program are proposed outside of the recommendation of the annual report, the *Owner* shall follow current ministry procedures for seeking approval for amending the *Certificate*.

Following items are added to the Schedule "A"

Schedule "A"

9. Report dated July 24, 2008 titled "Design and Operations Report, Proposed Woodwaste Disposal Site, Eastnor Landfill, Former Township of Eastnor, Municipality of Northern Bruce Peninsula, County of Bruce" prepared by Gamsby and Mannerow Limited.
10. 2008 Annual Progress Report for the Eastnor Waste Disposal Site, prepared by Gamsby and Mannerow, dated March 2009.
11. Letter dated September 14, 2009 from M.D. Nelson, M.Sc. P.Eng., Gamsby and Mannerow Limited to R. Munasinghe, Ministry of the Environment.
12. Letter dated October 30, 2009 from M.D. Nelson, M.Sc. P.Eng., Gamsby and Mannerow Limited to R. Munasinghe, Ministry of the Environment.

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

1. The reason for condition 14 (d) is to approve the 1.09 hectare disposal area for wood waste.
2. Reasons for Condition 41 (1) are to ensure that off-site migration of landfill gas is monitored and all buildings at the *Site* are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the *Site*.

3. Condition 41(2) is included to provide the groundwater and surface water limits to prevent water pollution at the *Site*.
4. Conditions 41(3) and 41(4) are included to require the Owner to demonstrate that the *Site* is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.
5. Conditions 41(5), 41(6) and 41(7) are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.
6. Conditions 41(8) to 41(11) inclusive are added to ensure the *Owner* has a plan with an organized set of procedures for identifying and responding to potential issues relating to groundwater and surface water contamination at the *Site's* compliance point.
7. Reasons for conditions 41(12), 41(13) and 41(14) are included to streamline the approval of the changes to the monitoring plan, trigger mechanisms and contingency plans.

This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A272301 dated February 20, 2007

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

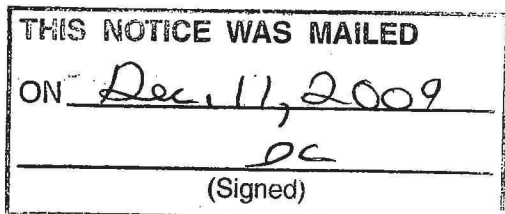
The Director
Section 39, *Environmental Protection Act*
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A

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 8th day of December, 2009



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

RM/

c: District Manager, MOE Owen Sound
Matt Nelson, Gamsby and Mannerow Limited ✓



Ministry of the Environment

PROVISIONAL CERTIFICATE OF APPROVAL FOR A WASTE DISPOSAL SITE

Provisional Certificate No. 272301

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to

Township of Eastnor, (S. L. Rutherford, Clark)

Lion's Head, Ontario

for the Dump

Site

located Part of Lot 17 & 18, Concession 2 W.B.R.,

Township of Eastnor

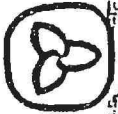
subject to the following conditions

That the operation of the disposal site be reviewed by the Waste Management Branch before May 31st, 1973.

This Provisional Certificate expires on the 30th day of June, 1973.

Dated this 21st day of December, 1972.

Director, Waste Management Branch



Ministry of the Environment
Ottawa

Provisional Certificate
No. 2230

PROVISIONAL CERTIFICATE OF APPROVAL FOR A WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued for
Township of Eastnor
Box 40
Eton's Head, Ontario

For the use and operation of an approximately 140-acre dump-site (approximately 23 acres of which will be used for waste disposal) all in accordance with the site plan dated January 23, 1978 and the Township of Eastnor letter dated January 25, 1978.

Located at
P.L. Lots 17 & 18, Concession 2 N.B.R.
Township of Eastnor
County of Bruce

This Provisional Certificate expires on the 31st day of December 1978

Dated this 6th day of March 1978

MARSH

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December 1978

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DIRECTOR GENERAL



Ontario

Ministry
of the
Environment

Provisional Certificate No. A 272301

PROVISIONAL CERTIFICATE OF APPROVAL WASTE DISPOSAL SITE

Under The Environmental Protection Act, 1971 and the regulations and subject to the limitations thereof, this Provisional Certificate of Approval is issued to:

Township of Eastnor
P.O. Box 40
Lion's Head, Ontario

for the use and operation of a 9.5 hectare Dump Site within a total area of 60 hectares.

all in accordance with the following plans and specifications: 1. Application and supporting information for a waste disposal site. 2. Site plan of disposal area dated Jan. 23/79. Letter to MDE S.W. Region from Township of Eastnor Municipal Offices, Lion's Head, Ont. dated Jan. 25th, 1978 re: Waste Disposal Site - Twp. of Eastnor.

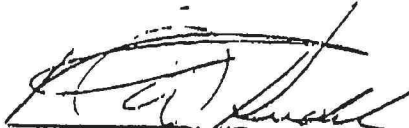
Located: Lot 18 and Part of Lot 17, Concession 2 W.B.R.,
Eastnor Township
County of Bruce

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 2% "other", limited to waste lumber and brush.

and subject to the following conditions:

1. 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 has been returned by the applicant to the Director.

Dated this 24th day of September, 1980.


Director, Section 39,
The Environmental Protection Act, 1971



AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A272301

Notice No. 2

Issue Date: June 14, 2016

Municipality of Northern Bruce Peninsula
56 Lindsay Road 5 Lions Head
Rural Route, No. 2
Northern Bruce Peninsula, Ontario
N0H 1W0

Site Location: Eastnor Landfill Site
1252 West Road
Lot 18, part 17, Concession 2 W.B.R.
Northern Bruce Peninsula Municipality, County of Bruce

You are hereby notified that I have amended Approval No. A272301 issued on September 24, 1980 for the establishment and use of a 81 hectare (200 acre) Waste Disposal Site consisting of a 9.5 hectare (24 acre) landfill and a transfer station for recyclable wastes , as follows:

I. Condition 41.(3) is hereby revoked and replaced as follows:

Groundwater Monitoring

41. (3) Groundwater monitoring shall be conducted by the *Owner* in accordance with Schedule "B".

II. Schedule "B" is hereby added as follows:

Schedule "B"
Groundwater Monitoring Program

Monitoring Location and Purpose		Monitoring Program	Parameters	
			Spring	Fall
OW-1	Background	Fall Only	---	IND*
OW-2	Leachate - Closed Area B	Fall Only	---	COMP**
OW-3	Downgradient	Fall Only	---	IND
OW-4	Downgradient/South Compliance Well	Spring and Fall	IND	IND
OW-5	South Compliance Well	Spring and Fall	IND	IND
OW-6	Furthest Downgradient Well	Spring and Fall	IND	IND
OW-7S	Downgradient of Active Area - Shallow	Spring and Fall	IND	IND
OW-7D	Downgradient of Active Area - Deep	Fall Only	---	IND
OW-8	Leachate - Active Area A	Spring and Fall	IND	COMP + VOCs***

OW-9	Background	None	---	---
OW-10S	Background - Shallow	Fall Only	---	IND
OW-10D	Background - Deep	Fall Only	---	IND

***IND** is the Indicator List including alkalinity, conductivity, pH, ammonia, hardness, calcium, iron, magnesium, hardness, manganese, phosphorus, potassium, sodium, chloride, nitrate, nitrite, phosphate, sulphate, dissolved organic carbon and TKN.

****COMP** is the Comprehensive List as per Column 1, Schedule 5: Inorganic Parameters for Groundwater and dissolved organic carbon.

*****VOCs** are Volatile Organics including once a year for BTEX and once every three years for VOCs. VOCs next analysis scheduled for 2018.

III. The following item is hereby added to Schedule "A":

13. Application, dated September 23, 2015, by Matthew Nelson of GM BluePlan Engineering Limited on behalf of the Municipality of Northern Bruce Peninsula, and all supporting information.

IV. The reason for this amendment to the Approval is as follows:

1. The reason for this amendment is to identify changes in the ground water monitoring program in accordance with item 13 of Schedule "A".

This Notice shall constitute part of the approval issued under Approval No. A272301 dated September 24, 1980

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

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

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 14th day of June, 2016

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

AV/

c: District Manager, MOECC Owen Sound

Matthew Nelson P. Eng., GM BluePlan Engineering Limited, Municipality of Northern Bruce Peninsula

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A272301

Notice No. 3

Issue Date: November 1, 2017

The Corporation of the Municipality of Northern Bruce Peninsula
56 Lindsay Road 5 R.R #2
Northern Bruce Peninsula, Ontario
N0H 1W0

Site Location: Eastnor Landfill Site
1252 West Road
Lots 17 and 18, Concession 2 W.B.R.
Northern Bruce Peninsula Municipality, County of Bruce

You are hereby notified that I have amended Approval No. A272301 issued on February 20, 2007 for the use and operation of a 9.5 hectare Waste Disposal Site within a total Site Area of 81 hectares, and subsequently amended by adding 1.09 ha to the approved waste Disposal Area for the disposal of wood waste , as follows:

CONTINUED USE AND DEVELOPMENT OF THE REMAINING PORTION OF THE APPROVED AREA OF THE SITE

Pursuant to Condition 14 of the Environmental Compliance Approval, A272301, dated February 20, 2007, approval is hereby granted for the continued use and development of the **remaining 6.2 ha.** waste fill area to the northwest of the Site, in accordance with the supporting documentation listed herein under Schedule "A" which forms part of this Environmental Compliance Approval, A272301, and subject to the terms and conditions listed herein.

DOCUMENTATION

The following documentation is added to Schedule "A" and forms part of the Environmental Compliance Approval No. A272301:

14. Letter dated March 23, 2017 from M. D. Nelson, GM Blue Plan Engineering to Dickson Odame-Osafo, Ministry of the Environment and Climate Change Re: Response to comments on this application, with the following selected relevant attachments:

- Drawing No. 3 - Existing Conditions & Conceptual Plan - Eastnor Landfill, dated March 23,

2017.

- Drawing No. 5 - Conceptual Final Contours - Eastnor Landfill, dated March 23, 2017.
 - Figure No. 8 - Progression of Waste Placement - Eastnor Landfill, dated November, 2015.
15. Environmental Compliance Approval Application, dated November 20, 2014, signed by William Rydall, Public Works and Property Manager, Municipality of Northern Bruce Peninsula
 16. Report titled "Plan of Development and Operations - Eastnor Landfill Site", dated November 28, 2014, prepared by GM Blue Plan Engineering.
 17. Report titled "Design and Operations Report - Wood Waste Disposal Site" - Revised Footprint, Eastnor Landfill, dated November, 2015, prepared by GM Blue Plan Engineering.
 18. Report titled "Hydrogeologic Investigation (Revision 1), Eastnor Landfill Site", dated November 28, 2014 (Revised December, 2015), prepared by GM Blue Plan Engineering.
 19. Report titled "Trigger Mechanism And Contingency Plan - Eastnor Landfill Site", dated May, 2010, prepared by GM Blue Plan Engineering.

For the purposes of this Environmental Compliance Approval and the terms and conditions specified herein, the following definitions apply:

DEFINITIONS

"Waste Fill Area" means the area on the surface of the waste disposal site beneath which or above which waste is disposed of by landfilling, including the existing original and north development areas of the Site, and wood waste disposal area of the Site.

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

Certificate of Requirement

- 1.1 Pursuant to Section 197 of the *EPA*, no person having an interest in the Site shall deal in any way with the Site without first giving a copy of this Approval to each person acquiring an interest in the Site as a result of the dealing.
- 1.2 Unless a Certificate of Requirement is otherwise registered in the Land Registry Office on title to the property, the Owner shall:

- (a) within sixty (60) calendar days from the date of issuance of this Approval, submit to the Director, a completed Certificate of Requirement containing a registerable description of the property, including any new buffer lands and supporting documents as follows:
 - (i) a plan of survey of the Site, including any new additional buffer/contaminant attenuation lands, prepared, signed and sealed by a licensed Ontario Land Surveyor;
 - (ii) proof of ownership; and
 - (iii) legal abstract of the property(s).
- (b) within fifteen (15) calendar days of receiving the Certificate of Requirement authorized by the Director, the Owner shall:
 - (i) register the Certificate of Requirement in the appropriate Land Registry Office on the title to the property(s), and
 - (ii) submit to the Director, copy to the District Manager, a written verification that the Certificate of Requirement has been duly registered on title.

2.0 SITE DESIGN - CONTINUED USE AND DEVELOPMENT OF THE REMAINING PORTION OF THE APPROVED AREA

Site Capacity

Condition 14 in the ECA dated February 20, 2007, is hereby revoked and replaced with New **Condition 2.1** as follows:

- 2.1 The total waste disposal **capacity** for the Site, including waste, wood waste, daily cover and interim cover, but excluding final cover system, shall be **652,500 cubic metres**, achieved through the development of the Site in accordance with the contours presented in Section 6.4 in Item 16 and shown on Drawing Nos. 3 and 5 dated March 23, 2017, attached to Item 14 of Schedule "A", attached to this Certificate.

Condition 23 in the ECA dated February 20, 2007, is hereby revoked and replaced with New **Conditions 2.2 and 2.3** as follows:

- 2.2 No waste shall be landfilled outside the **limit of the 9.5 hectares waste fill area and/or the 1.09 hectares wood waste fill area**. The waste fill areas shall be surrounded by a minimum 30 metres wide buffer on all sides. The Site shall be developed in a progressive manner from south (Phase 1) to north (Phase 2), and landfilling shall be carried out sequentially in stages as shown on Figure 8, ("Progression of Waste Placement, dated July 2014), attached to Item 14 of Schedule "A", attached to this Certificate.

- 2.3 No waste shall be landfilled below elevation **95.0 m base contour**, within the new remaining areas of the Site, shown on Drawing No. 5, attached to Item 14 of Schedule "A" attached to this Certificate. The maximum elevation of the fill area, including final cover, shall be **105.0 metres (reference elevation)**. Final slopes above grade within the waste fill areas at the time of site closure, shall be within the range of **4H:1V (25%)** and **20H:1V (5%)** respectively on the sides and top areas.
- 2.4 Except as otherwise provided by these Conditions and subject to condition 2.5 below, the continued use of the landfill site into the new areas shall be designed, developed, operated, maintained and all facilities, including ancillary waste management facilities, equipment and fixtures, shall be installed in accordance with the supporting documentation, and plans and specifications listed in Schedule "A", attached to this Certificate.
- 2.5 Detailed hydrogeological investigation of the Site shall be prepared and submitted for the approval of the Director prior to commencement of development, use or operation of the new remaining portion of the waste fill area under consideration for this approval. The detailed hydrogeological investigation shall include as a minimum, comprehensive characterization of the Site to establish its background conditions both physically and chemically, and shall include information pertaining to the conditions and the suitability of the Site to receive waste, prior to placing waste in the new area.
- 2.6 Detailed updated plan of development and operations for the Site, shall be prepared and submitted for the approval of the Director prior to commencement of development, use and operation of the new remaining portion of the waste fill area under consideration for this approval. The detailed plan of development and operation shall replace Item 16 in Schedule A attached to this Approval and shall include, as a minimum, information pertaining to the operations of the Site and all other waste management activities on site, operational hours, nuisance management controls, monitoring and maintenance programs, service areas, etc.

3.0 SITE OPERATIONS

3.1 General - Hours of Operation

Condition 15 in the ECA dated February 20, 2007, is hereby revoked and replaced with **New Condition 3.1** below.

- 3.1.1 The **Opening Hours** for receipt of waste for disposal at the Site shall be as described in Section 8.2 in Item 16 of Schedule "A", attached to this Certificate and summarized as follows:

November 1 to March 31:- Monday and Tuesday, 9:00 am to 5:00 pm;

April 1 to October 31:- Tuesday and Saturday, 9:00 am to 5:00 pm.

- 3.1.2 The hours of operation may be amended from time to time to accommodate seasonal unusual demand, subject to prior notification given to the District Manager, and the public, and the hours of operation posted at the Site gate.

3.2 Site Operations - Landfilling

Waste Placement

- 3.2.1 The Site development and operation by area ramp method, shall be carried forward into the development and operation of the remaining portion of the Site under consideration in this approval, as described in Section 7.1 in Item 16 of Schedule "A", attached to this Certificate. The waste in each area ramp (cell) shall be well compacted prior to placement of the next lift of waste or daily cover, or interim cover in the case of areas where landfilling is temporary discontinued for a period of 30 days or more.

Daily, Interim and Final Covers

- 3.2.2 Unless more frequent daily cover requirements dictate otherwise, due to increased rate of fill, the daily cover, and interim cover requirements specified in Condition 31 of the Certificate, shall be carried forward in the continued development and operation of the remaining portion of the Site under this Approval, as described in Section 7.5.1 in Item 16 of Schedule "A" attached to this Certificate.

Condition 31(c) in the ECA dated February 20, 2007, is hereby revoked and replaced with New **Condition 3.2.3** as follows:

- 3.2.3 **Final Cover** - As areas of the landfill reach final waste elevations, these areas shall be graded and final cover shall be installed progressively, and vegetated as soon as practically possible. The final cover shall consist of a **600 mm** minimum thick soil having permeability not exceeding 1×10^{-6} cm/sec, or alternative, as approved by the Director, overlain by a minimum **150 mm thick organic soil (topsoil)**, and a **vegetative cover**, as described in Section 7.5.2 in Item 16 of Schedule "A", attached to this Certificate. Unless stability is confirmed otherwise, the **final slopes** of the final cover above grade shall not exceed **1V:4H** on the sides, and not less than **1V:20H** on the top.

3.3 Site Operations - Household Hazardous Waste (HHW) Facility

- 3.3.1 Except as otherwise provided by these Conditions, the HHW Facility shall continue to be developed, operated, and maintained, and all facilities, equipment and fixtures shall be in accordance with Section 8.4 (iii - v) in Item 16 of Schedule "A", attached to this Certificate.
- 3.3.2 The HHW Facility shall continue to receive only wastes which fall under the registered users of the Province of Ontario HWIN system, which shall include but not limited to the following:
- (a) paints and coatings, including their thinners, lacquer, contact cement, paint strippers and degreasers and their containers;
 - (b) oil, oil filters and oil containers (30 litres or less);
 - (c) antifreeze and its containers;
 - (d) batteries, vehicular batteries to be stored in a segregated covered storage to provide shelter

- from precipitation and is equipped with spill containment;
- (e) pressurized containers, such as propane tanks, oxygen and helium tanks which shall be stored on the ground surface in an area not exceeding 500 m² in a manner which minimizes the potential for cylinder valves to be damaged; and
- (f) lawn fertilizers, pesticides and their containers.

3.3.3 The Municipality shall ensure that:

- (a) wastes received are handled, packaged, stored or secured so as not to pose any threat to the general public, Site personnel and the environment;
- (b) the operation of the HHW Facility does not interfere with any other activities associated with this Site;
- (c) trained personnel are on duty at all times during the operation of the HHW Facility.

3.3.4 No storage facilities other than those approved under this Approval shall be used. Fixed storage facilities shall not be moved, replaced or altered without the Director's approval.

3.3.5 All storage buildings and tanks shall be clearly marked indicating the type and nature of the hazardous waste stored. Signs shall be posted at points of access to the HHW Facility to warn that the area contains hazardous materials. Smoking restrictions shall be adhered to and non-smoking signs posted as required by regulation.

3.3.6 HHW storage buildings shall be properly ventilated and shall be constructed in compliance with fire regulations, municipal by-laws and in compliance with Ministry of Labour guidelines. All hazardous waste storage buildings shall be maintained under lock and key and access to these facilities shall be limited to Trained personnel. Access to storage tanks and waste drop-off areas by the public shall be under the supervision of Trained personnel only.

3.3.7 HHW storage facilities shall be inspected daily during operating hours by Site personnel who have received training in contingency measures. All inspections shall be recorded.

3.3.8 Wastes that are collected and stored shall be in amounts which can be safely handled in the HHW Facility. In the event that larger amounts are received than anticipated, the Municipality shall have extra drums and lab-pack containers available on the HHW premises for the storage of the additional waste collected, and arrangements made to remove the waste from the Site as soon as possible, but in any event, within five (5) working days.

3.3.9 Oil and oil-based paints which have been manufactured prior to 1972; or whose manufacturing date cannot be determined, may contain PCBs and shall be handled in the manner prescribed as follows:

- (a) Oil and oil-based paints shall not be mixed (bulked) with other paints prior to testing. Paints which are lab-packed are not considered to be mixed under this Approval; and
- (b) Oil and oil-based paints shall be tested for PCB content.

3.3.10 If oil or oil-based paints are found to have PCBs at or above 50 parts per million, it shall forthwith be reported to the District Manager and the waste shall be managed in accordance with Regulation 362/92 and stored or removed from the Site to an approved PCB storage site, in accordance with written instructions from the District Manager.

3.3.11 Paints collected at the Site may be returned or sold to the general public for re-use, provided that:

- (a) the paint contains no measurable quantity of PCBs; and
- (b) all transactions and volume of paint returned to the public are recorded by invoice.

3.3.12 Except for paints returned to the public for reuse, all waste collected at the HHW Facility shall be transported from the Site by an approved waste management system and disposed of at landfill, transfer and/or processing sites certified to accept these types of waste.

3.4 **Site Operations - Complaint Management Protocol**

3.4.1 The Municipality shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of air quality or water quality, resulting from the operations at the Site, including such accelerated or additional inspection and/or monitoring as may be necessary to determine the nature and extent of the effect or impairment.

3.4.2 If at any time, the Municipality receives complaints regarding the Site and/or all other associated waste management activities on-Site, the Municipality shall respond to these complaints according to the following procedure, as described in Section 8.10 in Item 16 of Schedule "A", attached to this Certificate:

- (a) Record each complaint, either electronically or in a separate log book, and shall include the following information:
 - (i) nature of the complaint,
 - (ii) if complaint is odour or nuisance related, the weather conditions and wind direction at the time of the complaint;
 - (iii) name, address and the telephone number and e-mail address of the complainant (if provided) and
 - (iv) date and time of the complaint;
- (b) The Municipality, upon notification of the complaint, shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and
- (c) The Municipality shall complete and retain on-site a report, written within one (1) week of the complaint date, listing the actions taken to resolve the complaint and any recommendations for remedial measures, and managerial or operational changes to reasonably avoid the recurrence of similar incidents.

4.0 ENVIRONMENTAL MONITORING

- 4.1 The Municipality shall carry forward the existing monitoring programs for waste, groundwater, and leachate, subject to amendments as described in Items 16 and 18 of Schedule "A", attached to this Approval, and in accordance with Schedule "B" attached to this Certificate. Unless specified otherwise, any proposed changes to the monitoring programs under this Certificate shall be approved in advance by the Director via an amendment to this Approval.

4.2 Groundwater/Leachate Monitoring

Condition 41 in the Certificate dated February 20, 2007, is hereby revoked and replaced with New **Conditions 4.2.1** as follows:

- 4.2.1 The current Groundwater/leachate monitoring program for the Site, as described in Section 10.3 in Item 16 of Schedule "A", attached to this Approval, shall be carried forward, subject to changes as summarized in Schedule "B" of this Approval.
- 4.2.2 Changes and/or updates to the groundwater/leachate monitoring program for the Site, may be made based on the monitoring results to date as recommended in the monitoring report, and approved in writing by the District Manager.

5.0 TRIGGER MECHANISM AND CONTINGENCY PLANS

- 5.1 Within ninety days following the date of this Approval, the Municipality shall submit for the approval of the Director, a revised updated trigger mechanism for groundwater/leachate, which specifies as a minimum trigger locations, trigger parameters, and trigger mechanism/criteria.

SCHEDULE "B"

Schedule "B" of Environmental Compliance Approval, No. A272301, dated February 20, 2007, is hereby revoked and replaced with a **New Schedule "B"** as follows:

Groundwater Monitoring Program

Monitoring Location	Parameters (Lists Described Below)	
	Spring	Fall
OW-1	**	IND
OW-2	**	COMP
OW-3	**	IND
OW-4	** + IND	IND
OW-5	** + IND	IND
OW-6	** + IND	IND
OW-7S	** + IND	IND
OW-7D	**	IND
OW-8	** + IND	COMP + VOCs
OW-9	**	**
OW-10S	**	IND
OW-10D	**	IND
OW-11	**	IND
OW-12S	**	IND
OW-12D	**	IND
OW-13	**	**
** Water levels to be measured at all monitoring well locations during each monitoring event.		

Notes: Parameter Requirements:

- (a) **Indicator List [IND]:**
Alkalinity, conductivity, pH, ammonia, hardness,

calcium, iron, magnesium, manganese, phosphorus, potassium, sodium, chloride, nitrate, nitrite, phosphate, sulphate, DOC and TKN.

(b) **Comprehensive List [COMP]:**

As per Column 1, Schedule 5, Reg 232: Inorganic Parameters for Groundwater, and DOC.

(c) **Volatile Organics [VOCs]:**

Once a year for BTEX and once every three years for VOCs (starting in 2018).

REASONS

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

1. The reason for Condition 1.0 is to provide, pursuant to subsection 197(1) of the EPA, 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.
2. The reason for Conditions 2.0, 3.1 and 3.2 is to specify restrictions on the extent of landfilling and operations at the Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity, hours of operation and waste cover of the Site.
3. The reasons for Condition 3.3 are allow continued operation of the HHW Depot and to ensure that the Site is operated in a manner which does not result in a nuisance or a hazard to the natural environment and health and safety of people.
4. The reason for Condition 3.4 is to ensure that complaints regarding the operations of at the Site are responded to in a timely and efficient manner and that records are available to confirm the resolution of the complaint.
5. The reasons for Condition 4.0 are to demonstrate that the landfill Site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial / contingency action can be taken.
6. The reason for Condition 5.0 is to ensure there is plan available to follow with an organized set of procedures for identifying and responding to potential impacts from the operation of the Site. Contingency plan is necessary to ensure protection of the natural environment and public health and safety.

This Notice shall constitute part of the approval issued under Approval No. A272301 dated February 20, 2007

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

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

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

compliance approval.

The Notice should also include:

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

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

This Notice must be served upon:

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

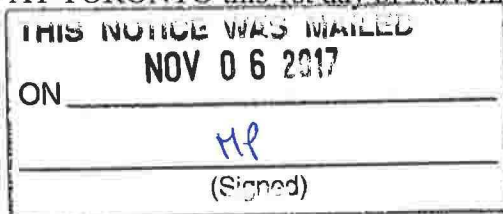
AND

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

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

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

DATED AT TORONTO this 1st day of November, 2017



Dale Gable, P.Eng.

Director

appointed for the purposes of Part II.1 of the
Environmental Protection Act

DO/

c: District Manager, MOECC Owen Sound

Andrea Nelson and Matthew Nelson, GM BluePlan Engineering Limited, The Corporation of the
Municipality of Northern Bruce Peninsula

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL

NUMBER A272301

Notice No. 4

Issue Date: April 15, 2019

Municipality of Northern Bruce Peninsula
56 Lindsay Road 5 Lions Head
Rural Route, No. 2
Northern Bruce Peninsula, Ontario
N0H 1W0

Site Location: Eastnor Landfill Site
1252 West Road
Lot 18, part 17, Concession 2 W.B.R.
Northern Bruce Peninsula Municipality, County of Bruce

You are hereby notified that I have amended Approval No. A272301 issued on February 20, 2007, and amended on December 8, 2009, June 14, 2016, and November 1, 2017 for the use and operation of a 9.5 hectare Waste Disposal Site within a total Site Area of 81 hectares, and subsequently amended by adding 1.09 ha to the approved waste Disposal Area for the disposal of wood waste , as follows:

For the purposes of this Environmental Compliance Approval and the terms and conditions specified herein, the following definitions apply:

The following conditions are hereby revoked and replaced as follows:

2.0 SITE DESIGN - CONTINUED USE AND DEVELOPMENT OF THE REMAINING PORTION OF THE APPROVED AREA**Site Capacity**

- 2.1 The total waste disposal **capacity** for the Site, including waste, wood waste, daily cover and interim cover, but excluding final cover system, shall be **652,500 cubic metres**, achieved through the development of the Site in accordance Items 20 and 21, and final contours as shown on Drawing No. 3 dated November 2017 of Item 20 of Schedule "A" of this Approval.
- 2.2 No waste shall be landfilled outside the **limit of the 9.5 hectares waste fill area and/or the 1.09 hectares wood waste fill area**. The waste fill areas shall be surrounded by a minimum 30 metres wide buffer on all sides. The Site shall be developed in a progressive manner from south (Phase 1) to north (Phase 2), and landfilling shall be carried out sequentially in stages as shown on Figure 6, ("Progression

of Waste Placement, Phase 1: Stage 1 – Stage 6. dated November 2017), attached to Item 20 of Schedule "A" of this Approval.

- 2.3 No waste shall be landfilled below elevation **95.0 m base contour**, within the new remaining areas of the Site, shown on Drawing No. 3 of Item 20 of Schedule "A" of this Approval. The maximum elevation of the fill area, including final cover, shall be **105.0 metres (reference elevation)**. Final slopes above grade within the waste fill areas at the time of the Site closure, shall be within the range of **4H:1V (25%)** and **20H:1V (5%)** respectively on the sides and top areas.
- 2.4 Except as otherwise provided by these Conditions and subject to condition 2.5 below, the continued use of the landfill Site into the new areas shall be designed, developed, operated, maintained and all facilities, including ancillary waste management facilities, equipment and fixtures, shall be installed in accordance with the supporting documentation, and plans and specifications listed in Schedule "A" of this Approval.
- 2.5 The development of Phase 1 as described in Item 20 of Schedule "A" of this Approval is approved, however a detailed hydrogeological investigation of the Site shall be prepared and submitted for the approval of the Director prior to commencement of development, use or operation of Phase 2. The detailed hydrogeological investigation shall include as a minimum, comprehensive characterization of the Site to establish its background conditions both physically and chemically, and shall include information pertaining to the conditions and the suitability of the Site to receive waste.
- 2.6 Detailed updated plan of development and operations for the Site, shall be prepared and submitted for the approval of the Director prior to commencement of development, use and operation of Phase 2. The detailed plan of development and operation shall replace Item 20 in Schedule A of this Approval and shall include, as a minimum, information pertaining to the operations of the Site and all other waste management activities on site, operational hours, nuisance management controls, monitoring and maintenance programs, service areas, etc.

5.0 TRIGGER MECHANISM AND CONTINGENCY PLANS

- 5.1 The owner shall implement the trigger mechanism for groundwater/leachate as outlined within the Trigger Mechanism and Contingency Plan of Item 22 of Schedule A of this Approval, with the following exceptions:
- the trigger parameters, levels and locations of Table 1 of Item 22 has been updated to the following Table 1; and
 - that the contingency plan shall be implemented when two or more of the same parameters of Table 1 exceeds the trigger levels at the same trigger location for two consecutive monitoring events.

Table 1: Summary of Groundwater Trigger Parameters, Levels, and Locations

Parameter	Background (mg/L)		ODWS (mg/L)	RUC (mg/L)	Trigger Levels at OW-4, OW-5 and OW-6	Trigger Levels at OW-9
	Range	Average			(mg/L)	(mg/L)
Chloride	1.2 to 5.4	3.3	250	127	102 (80% RUC)	127 (100% RUC)
Sodium	0.9 to 2.4	1.4	200	101	81 (80% RUC)	101 (100% RUC)
Sulphate	12.7 to 42.5	21.6	500	261	209 (80% RUC)	261 (100% RUC)
Boron	<0.01 to 0.06	0.018	5	1.26	1.01 (80% RUC)	1.26 (100% RUC)
Nitrate	<0.05 to 0.34	2.58	10	2.58	2.06 (80% RUC)	2.58 (100% RUC)
Alkalinity	185 - 257	210	500	355	284 (80% RUC)	355 (100% RUC)

The following condition is hereby added as follows:

- 5.2 Prior to commencement of development, use or operation of Phase 2, the owner shall submit for the approval of the Director, a revised updated trigger mechanism for groundwater/leachate, which specifies as a minimum trigger locations, trigger parameters, and trigger mechanism/criteria that includes the Phase 2 area.

SCHEDULE "A"

The following documentation is added to Schedule "A" and forms part of the Environmental Compliance Approval No. A272301:

20. Municipality of Northern Bruce Peninsula, Plan of Development & Operations - Eastnor Landfill Site, Lots 17&18, Concession 2 WBR, Environmental Compliance Approval No. A272301. GM Blueplan Engineering Limited. November 28, 2014 (Revised December 2017).
21. Municipality of Northern Bruce Peninsula, Design and Operations Report, Wood Waste Disposal Site - Revised Footprint, Eastnor Landfill. GM Blueplan Engineering Limited. December 2017 - Revision 2.
22. Trigger Mechanism and Contingency Plan. Eastnor Waste Disposal Site, Municipality of Northern Bruce Peninsula. GM Blueplan Engineering Limited. May 2010 (Revised: December 2017).
23. Municipality of Northern Bruce Peninsula, Hydrogeologic Investigation - Eastnor Landfill (Rev. 2), Lots 17 & 18, Concession 2 WBR, MOECC Certificate of Approval No. A272301. GM Blueplan Engineering Limited. November 28, 2014 (Revised December 2017).

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

1. *The reason for Condition 2.0 is to specify restrictions on the extent of landfilling and operations at the Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity, hours of operation and waste cover of the Site.*
2. *The reason for Condition 5.0 is to ensure there is plan available to follow with an organized set of procedures for identifying and responding to potential impacts from the operation of the Site. Contingency plan is necessary to ensure protection of the natural environment and public health and safety.*

This Notice shall constitute part of the approval issued under Approval No. A272301 dated February 20, 2007

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

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

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

The Notice should also include:

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

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

This Notice must be served upon:

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

AND

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

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

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

DATED AT TORONTO this 15th day of April, 2019



Mohsen Keyvani, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

CM/

c: District Manager, MECP Owen Sound
Matthew Nelson P. Eng., GM BluePlan Engineering Limited, Municipality of Northern Bruce Peninsula

Appendix B Correspondence

No Correspondence was received during
the reporting period

Appendix C Vector & Vermin Control/Management Plan

Municipality of Northern Bruce Peninsula Eastnor Waste Disposal Site
Vector and Vermin Control/Management Plan
Ministry of the Environment Provisional Certificate of Approval Number:
A272301

Introduction:

The Eastnor waste disposal site is located within an area of the Bruce Peninsula that has a cover of mixed deciduous and coniferous forest and is surrounded by a large area of general rural designated lands. The waste site is not visible from any public roads, and the access road into the facility is quite long and contains several bends. This is a very low volume waste disposal site.

This type of environment lends itself to various types of plants, animals, reptiles, and insects many of which are not, and should not be considered as vector or vermin in this case. However, for the purposes of maintaining a waste disposal site it is important to take precautions with certain types of wildlife. At the Eastnor waste site, there are four types of wildlife that are identified as requiring some form of a precautionary management plan. These are: bees & wasps; scavengers (coyotes, gulls, and turkey vultures); rodents; and black bears. Prior to addressing these concerns, it is important to note that the first step in controlling and managing vector and vermin at this waste site will be to adhere to the Development and Operation Plan.

Strategy:

In order to keep what should be an economical and clear-cut plan to follow economical and clear-cut, the following table will be utilized and a copy of this document will be kept both at the Municipal office and at the Eastnor waste site.

Prevention Method	Bees/wasps	Scavengers	Rodents	Black bears
Good house-keeping	√	√	√	√
Electric fencing		√	√	√
Covering practices		√	√	√
Anti-insect sprays and rodenticide	√		√	
Education	√	√	√	√

Descriptions:

Good house-keeping practices include items such as daily litter pick up, site organization, and ensuring waste materials are properly segregated into their appropriate locations. These

practices also include regular site inspections by the site attendant, at which time existing and or potential vector/vermin problem areas will be identified. After identification, any required remedial actions will be carried out. It is these good house-keeping practices that are the most important component of this plan. Many vector/vermin problem areas will be most effectively resolved if identified early and remedied as soon as possible.

The electric fencing plan is the most sophisticated portion of the vector/vermin control management plan. This electric fence is intended to discourage black bears, coyotes, and larger rodents from entering the inner waste site area. The fenced in section will include all areas where materials are disposed of, including any recycle stations and the site attendant's shack. The Municipality has applied for and been rewarded with a \$20,000 dollar grant from the Ontario Ministry of Natural Resources via their excellent Bear Wise Funding Program. As the name implies, the main intention of this fencing will be to keep bears out of the waste area. At the present time, the Municipality has finalized the purchase of the required fencing materials from a reputable dealer, and we will be waiting for the C of A approval process to be completed, and for fairer weather prior to beginning installation.

Covering processes play two roles in the prevention of vector and vermin problems. Firstly, by keeping exposed garbage surfaces to a minimum both visual and odour attractants/stimulants are kept to a minimum. Secondly, cover material acts as both a barrier and a deterrent to scavenging birds and rodents.

Anti-insect and rodenticide will be used in moderation, and would include only the use of common household products such as Raid and Warfarin. In cases where wasps or bees make nests inside plastic and tin recycling bins, a product such as Raid may be used to stop the nest making activities. Likewise, if rodents became a concern moderate use of a product such as Warfarin may be applied to locations such as the site attendant's shack, and around the active area of landfilling.

Education includes ensuring that the site attendants are aware of and understand the Development and Operation Plan, are familiar with the Certificate of Approval, and appreciate the importance of properly carrying out routine maintenance and house-keeping at the site.

Conclusion:

It is the intention of this plan to be both straight forward in design, and simple for Staff to follow. It is anticipated that the electric fencing in coordination with a well kept waste site managed in accordance with the Development and Operation Plan, will ensure both control and management of vector and vermin.

Appendix D Borehole Logs & Summary of Groundwater Elevations (2000 to Present)

Well OW-1 LOG of BOREHOLE LW1-00

ENCL. No.: 4

REF. NO.:	TK20-9-3	DRILLING DATA
CLIENT :	The Town of North Bruce Peninsula	Field Supervisor: S. Watling
PROJECT :	Overburden Observation Well Installation	Method : Hollow Stem Auger
LOCATION :	Eastnor Waste Disposal Site	Diameter : 200 mm
DATUM :		Date : 21 September 2000

ATTERBURG LIMITS			UNDRAINED SHEAR STRENGTH			SAMPLES			SYMBOL	MATERIAL DESCRIPTION	DEPTH m	ELEV. m	WATER DATA	REMARKS
PL %	NMC %	LL %	Field Pen. kPa	Field Vane kPa	Lab. Compr. kPa	No.	TYPE	N Value						
GROUND SURFACE m														
										TOPSOIL				Concrete surface seal
						1	SS	9		Loose, orangy brown Silty fine SAND				Bentonite seal
											1.0			Auger cuttings
						2	SS	15		Compact, brown medium to fine SAND				
											2.0			
						3	SS	13						
										damp				Bentonite seal
						4	SS	17		coarse to medium sand seams saturated				Water level @ 3.0 m. at completion
											3.0			
										some gravelly seams				#3 Silica Filter sand
						5	SS	23						
											4.0			
											5.0			
						6	SS	4		grey medium to fine SAND methane odour				50 mm diameter Slot PVC well screen
											6.0			
										End of Borehole				
											7.0			

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440 Phillip Street
Waterloo Ontario
N2L 5R9

Checked: SSY

PAGE 1 of 1

Well OW-2 LOG of BOREHOLE BW 1-00

ENCL. No.: 1

REF. NO. :	TK20-9-3	DRILLING DATA
CLIENT :	The Town of North Bruce Peninsula	Field Supervisor: S. Watling
PROJECT :	Overburden Observation Well Installation	Method : Hollow Stem Auger
LOCATION :	Eastnor Waste Disposal Site	Diameter : 200 mm
DATUM :		Date : 20 September 2000

ATTERBURG LIMITS			UNDRAINED SHEAR STRENGTH			SAMPLES			SYMBOL	MATERIAL DESCRIPTION	DEPTH	ELEV.	WATER DATA	REMARKS			
PL %	NMC %	LL %	Field Pen. kPa	Field Vane kPa	Lab. Compr. kPa	No.	TYPE	N Value			m	m					
GROUND SURFACE m																	
										☀	TOPSOIL				Concrete surface seal		
											Loose, orangy brown fine SAND, some silt				Bentonite seal		
										1	SS	6			1.0		Auger cuttings
											light brown		damp				
										2	SS	10			2.0		
										3	SS	12					
													moist				Bentonite seal
										4	SS	31			3.0		Water level @ 2.9 m. at completion
											Dense, brown medium SAND		saturated				Auger cuttings
															4.0		#3 Silica Filter sand
										5	SS	18					
											grey				5.0		
											strong methane odour						
											Soft to firm, mottled olive grey SILT, some fine sand						50 mm diameter Slot PVC wall screen
										6	SS	4			6.0		
													moist to wet				
											End of Borehole			7.0			

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Waterloo Ontario
N2L 5R9

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PAGE 1 of 1

Well OW-3 LOG of BOREHOLE DW 1-00

ENCL. No.: 2

REF. NO. :	TK20-9-3	DRILLING DATA
CLIENT :	The Town of North Bruce Peninsula	Field Supervisor: S. Watling
PROJECT :	Overburden Observation-Well Installation	Method : Hollow Stem Auger
LOCATION :	Eastnor Waste Disposal Site	Diameter : 200 mm
DATUM :		Date : 20 September 2000

ATTERBURG LIMITS			UNDRAINED SHEAR STRENGTH			SAMPLES			SYMBOL	MATERIAL DESCRIPTION	DEPTH m	ELEV. m	WATER DATA	REMARKS
PL	NMC	LL	Field Pen. kPa	Field Vane kPa	Lab. Compr. kPa	No.	TYPE	N Value						
%	%	%												
GROUND SURFACE m														
						1	AS			500 mm Black fibrous PEAT				Concrete surface seal
						2	SS			Loose to compact, brown medium to fine SAND				Bentonite seal
										wet saturated	1.0			Water level @ 1.0 m. at completion
						3	SS							#3 Silica Filter sand
										grey	2.0			
						4	SS			Stiff, brown SILT, trace fine sand	3.0			50 mm diameter Slot PVC well screen
										moist				
										End of Borehole	4.0			
											5.0			
											6.0			
											7.0			

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Environmental Limited
440 Philip Street
Waterloo Ontario
N2L 5R9

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LOG of BOREHOLE DW 2-00

Well OW-4

ENCL. No.: 3

REF. NO. :	TK20-9-3	DRILLING DATA
CLIENT :	The Town of North Bruce Peninsula	Field Supervisor: S. Watling
PROJECT :	Overburden Observation Well Installation	Method : Hollow Stem Auger
LOCATION :	Eastnor Waste Disposal Site	Diameter : 200 mm
DATUM :		Date : 21 September 2000

ATTERBURG LIMITS			UNDRAINED SHEAR STRENGTH			SAMPLES			SYMBOL	MATERIAL DESCRIPTION	DEPTH m	ELEV. m	WATER DATA	REMARKS
PL %	NMC %	LL %	Field Pen. kPa	Field Vane kPa	Lab. Compr. kPa	No.	TYPE	N Value						
										GROUND SURFACE m				
										450 mm Black fibrous PEAT				Concrete surface seal
										Dark brown Silty fine SAND saturated				Water level @ 0.6 m. at completion
						1	SS	4		Soft to firm, mottled olive grey SILT, some fine sand	1.0			Bentonite seal
						2	SS	12						Auger cuttings
										Firm to stiff, bluish grey	2.0			Bentonite seal
						3	SS	11						
						4	SS	11						
						5	SS	7						#3 Silica Filter sand
						6	SS	11						50 mm diameter Slot PVC well screen
										End of Borehole	7.0			

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Checked: SSY

PAGE 1 of 1

Project No: M-1553

Log of Borehole: OW-5

Project: Overburden Observation Well Installation

Drill Date: March 19, 2010

Client: Town of North Bruce Peninsula

Field Eng/Tech: EH

Location: Eastnor Waste Disposal Site

Drilling Company: Walker Drilling Ltd.

SUBSURFACE PROFILE				SAMPLE		Soil Properties N-Value 20 40 60 80	Well Installation Details
Depth	Elevation	Symbol	Description	Number	Type		
ft m							
-2							
-1							
0			Ground Surface				
		~	Organics				
1		•••••	Brown SAND				
2							
3			Brown SAND, dense, wet				
4	1	•••••	Coarse brown and yellow SAND with some stones, wet	1	SS	24	
5			Fine grey SAND, compact, wet				
6			Coarse brown and red SAND, dense, wet				
7	2		Fine to medium grey SAND, wet	2	SS	36	
8							
9							
10	3						
11				3	SS	5	
12			Clayey SILT, grey, wet				
13			Borehole Terminated				

Drill Method: Solid Stem Auger

Notes:

Gamsby and Mannerow Limited

people engineering environments

Guelph, Owen Sound, Listowel, Kitchener

1260 Second Avenue E., Unit 1, Owen Sound, ON N4K 2J3

519-376-1805 Fax 519-376-8977 www.gamsby.com



Gamsby and Mannerow
ENGINEERS

Project No: M-1553

Log of Borehole: OW-6

Project: Overburden Observation Well Installation

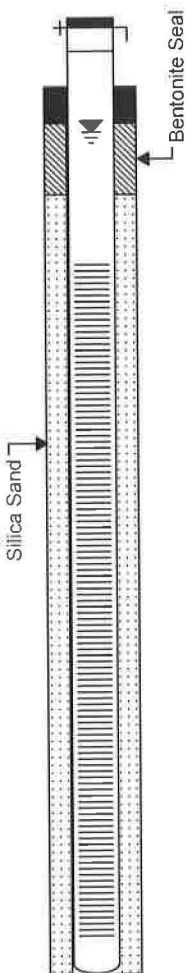
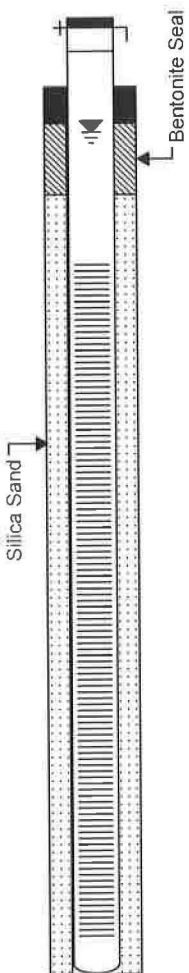
Drill Date: March 19, 2010

Client: The Town of North Bruce Peninsula

Field Eng/Tech: EH

Location: Eastnor Waste Disposal Site

Drilling Company: Walker Drilling Ltd.

SUBSURFACE PROFILE				SAMPLE		Soil Properties N-Value 20 40 60 80	Well Installation Details
Depth	Elevation	Symbol	Description	Number	Type		
-1 ft 0 m			Ground Surface				
0		~	Black topsoil, wet				
1		•••	Fine brown SAND, dense, wet				
2		•••	Brown SAND, wet				
3	1		Grey blue clayey SILT, wet	1	SS	4	
4							
5							
6	2			2	SS	6	
7							
8							
9							
10	3						
11				3	SS	11	
12							
13	4		Borehole Terminated				
14							

Drill Method: Solid Stem Auger

Notes:

Gamsby and Mannerow Limited
 people engineering environments
 Guelph, Owen Sound, Listowel, Kitchener
 1260 Second Avenue E., Unit 1. Owen Sound, ON N4K 2J3
 519-376-1805 Fax 519-376-8977 www.gamsby.com



Gamsby and Mannerow
ENGINEERS

CLIENT Municipality of Northern Bruce Peninsula

PROJECT NAME Hydrogeological Assessment

PROJECT NUMBER M-1553

PROJECT LOCATION Eastnor Landfill Site

DATE COMPLETED July 12, 2012

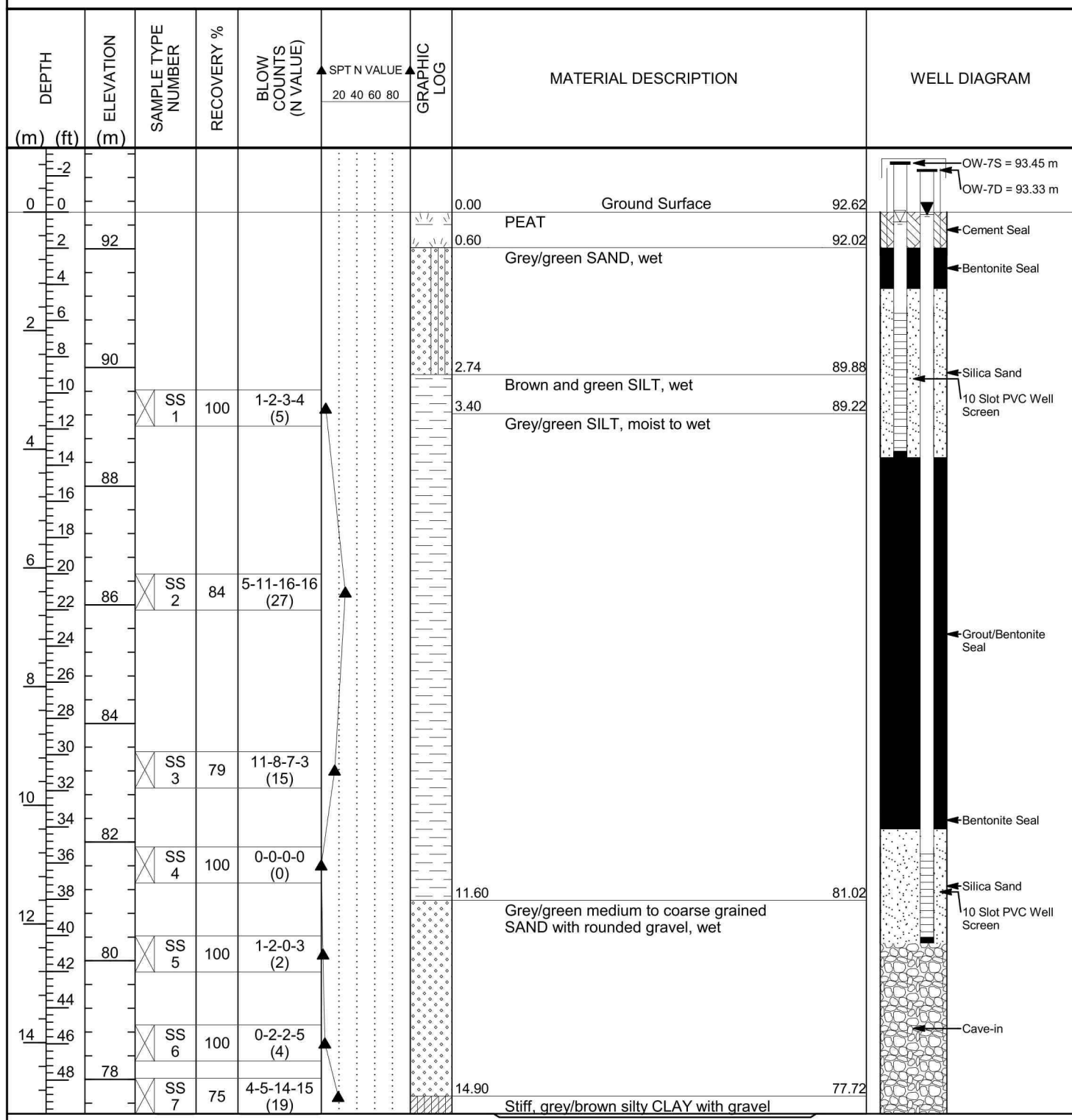
CONTRACTOR Aardvark Drilling Inc.

LOGGED BY DCS

METHOD Hollow Stem Auger

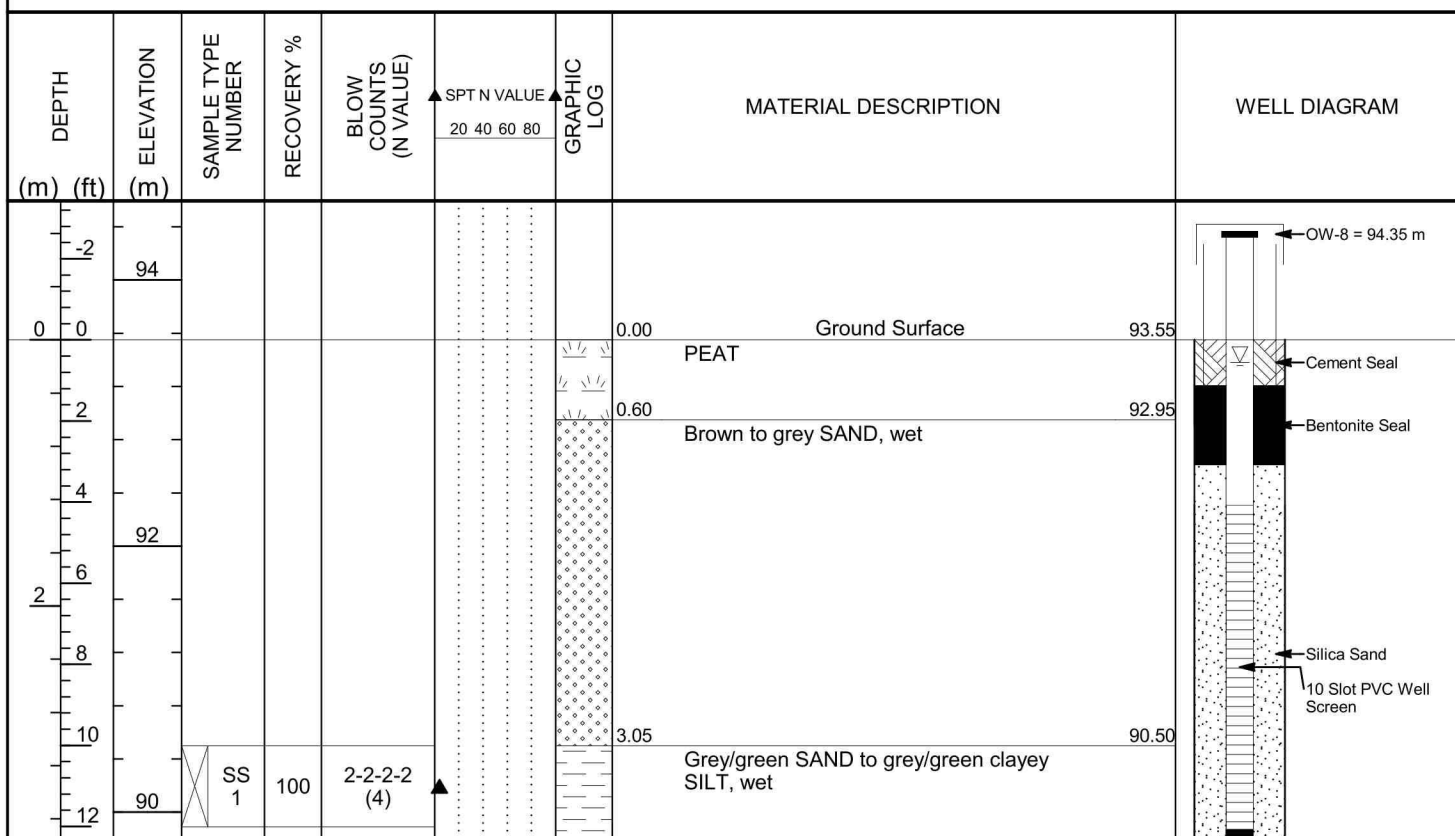
WELL CONSTRUCTION 0.05 m Ø PVC

NOTES Δ = 92.45 m; ∇ = 92.58 m (15-Apr-13)



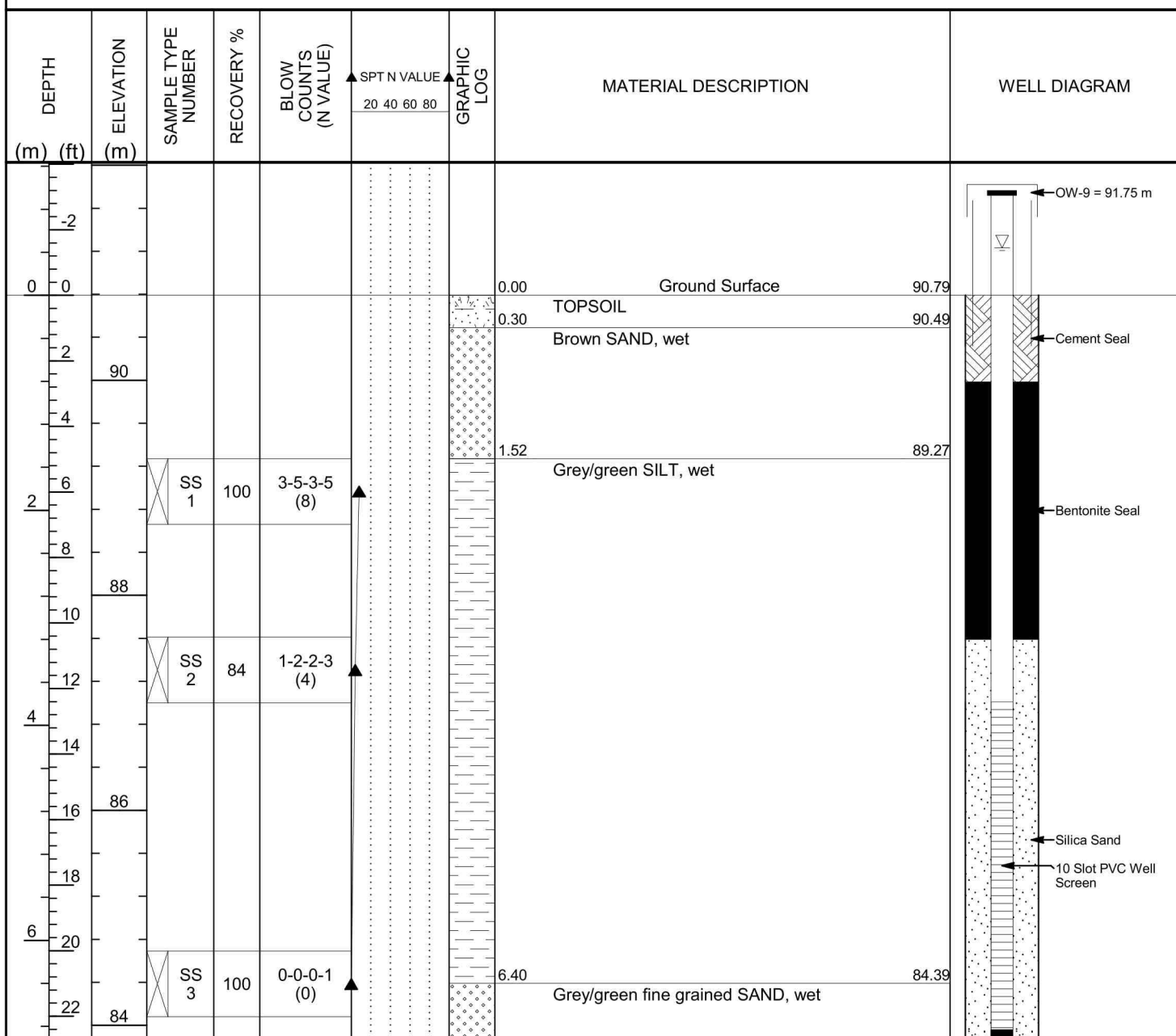
Borehole Terminated at 15.20 m.

CLIENT Municipality of Northern Bruce Peninsula	PROJECT NAME Hydrogeological Assessment
PROJECT NUMBER M-1553	PROJECT LOCATION Eastnor Landfill Site
DATE COMPLETED July 10, 2012	CONTRACTOR Aardvark Drilling Inc.
LOGGED BY DCS	METHOD Hollow Stem Auger
WELL CONSTRUCTION 0.05 m Ø PVC	NOTES ΔZ = 93.38 m (15-Apr-13)



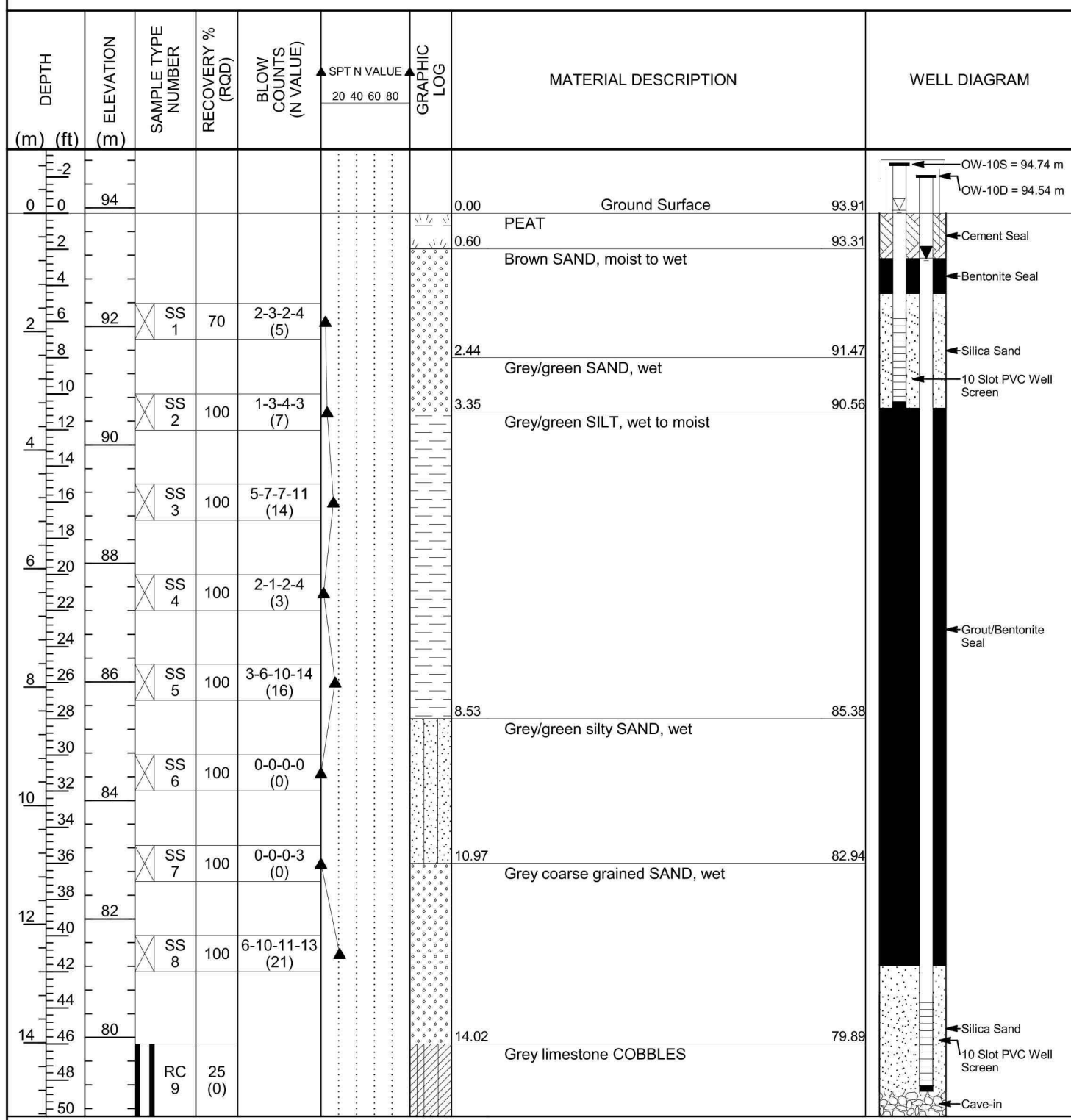
Borehole Terminated at 3.78 m.

CLIENT Municipality of Northern Bruce Peninsula **PROJECT NAME** Hydrogeological Assessment
PROJECT NUMBER M-1553 **PROJECT LOCATION** Eastnor Landfill Site
DATE COMPLETED July 12, 2012 **CONTRACTOR** Aardvark Drilling Inc.
LOGGED BY DCS **METHOD** Hollow Stem Auger
WELL CONSTRUCTION 0.05 m Ø PVC **NOTES** $\frac{1}{2}$ " = 91.23 m (15-Apr-13)



Borehole Terminated at 6.93 m.

CLIENT Municipality of Northern Bruce Peninsula	PROJECT NAME Hydrogeological Assessment
PROJECT NUMBER M-1553	PROJECT LOCATION Eastnor Landfill Site
DATE COMPLETED July 10, 2012	CONTRACTOR Aardvark Drilling Inc.
LOGGED BY DCS	METHOD Hollow Stem Auger/Mud Rotary
WELL CONSTRUCTION 0.05 m Ø PVC	NOTES Δ = 93.96 m; ∇ = 93.15 m (15-Apr-13)



Borehole Terminated at 15.24 m.

CLIENT Municipality of Northern Bruce Peninsula

PROJECT NAME Eastnor Landfill - Hydrogeological Assessment

PROJECT NUMBER 213288

PROJECT LOCATION Eastnor Landfill

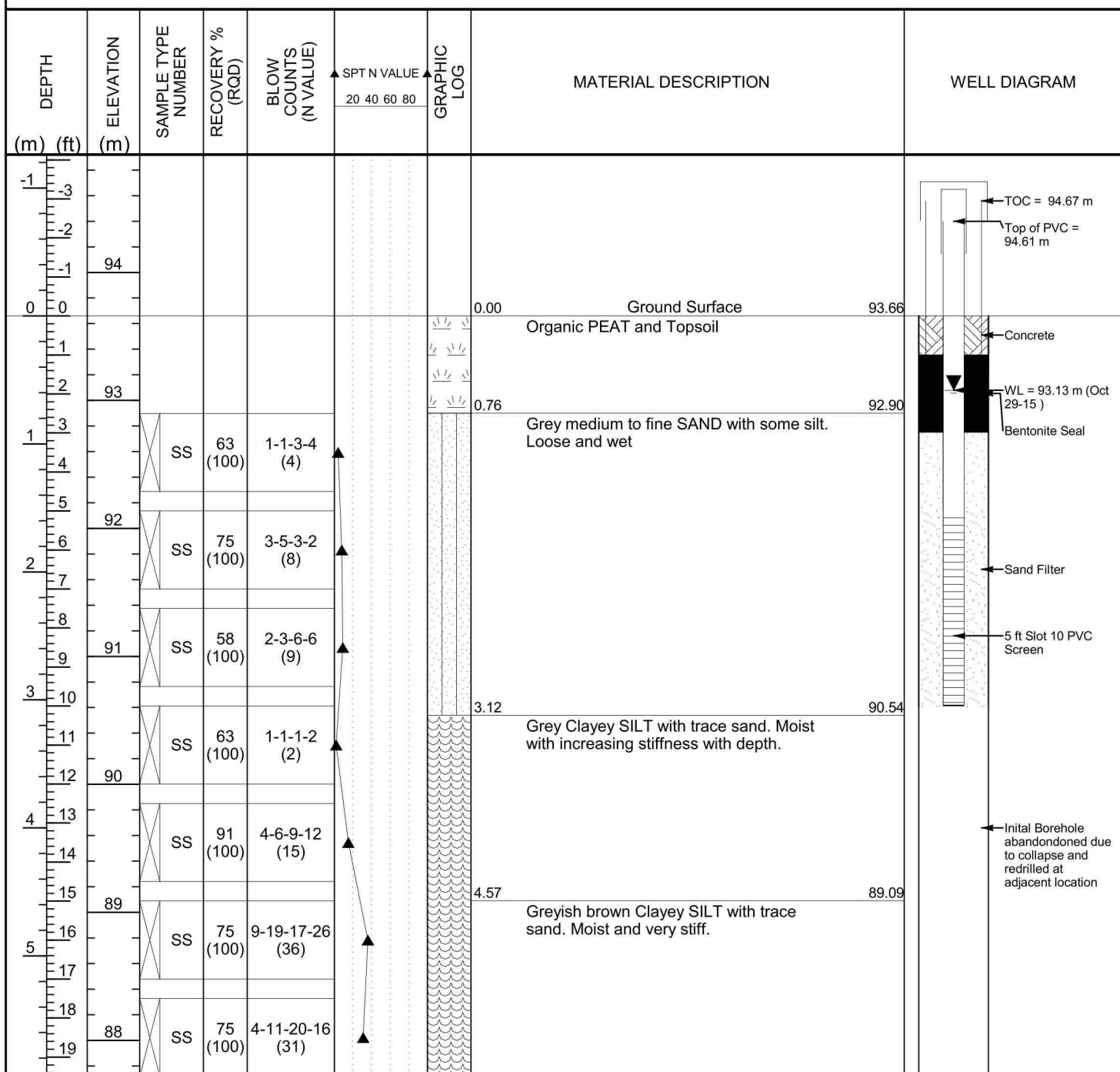
DATE COMPLETED 2015/10/21

CONTRACTOR London Soil Test

LOGGED BY MB

METHOD Hollow Stem Auger

WELL CONSTRUCTION 0.05m Ø PVC

NOTES


Borehole Terminated at 5.94 m.

CLIENT Municipality of Northern Bruce Peninsula

PROJECT NAME Eastnor Landfill - Hydrogeological Assessment

PROJECT NUMBER 213288

PROJECT LOCATION Eastnor Landfill

DATE COMPLETED 2015/10/22

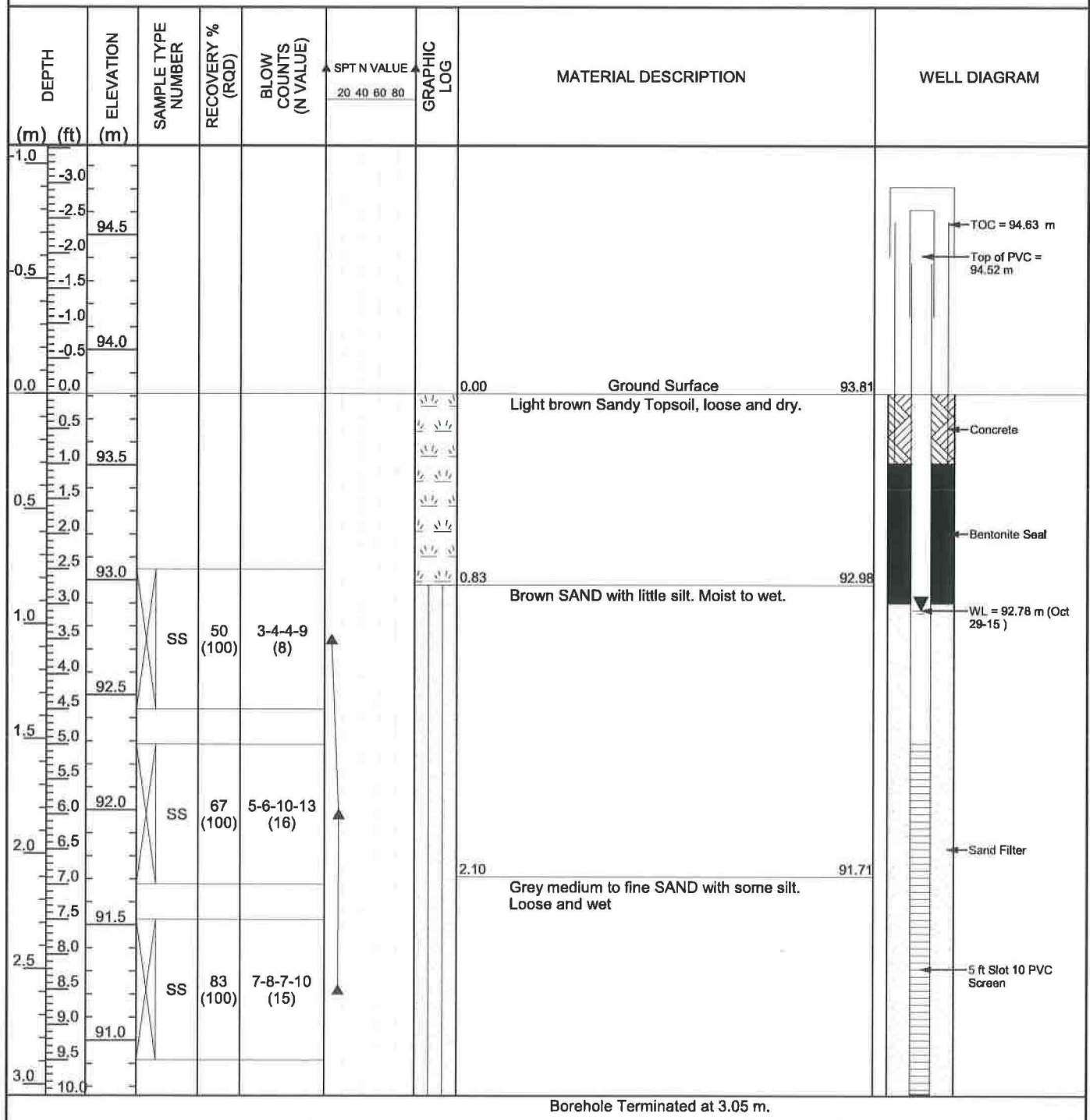
CONTRACTOR London Soil Test

LOGGED BY MB

METHOD Hollow Stem Auger

WELL CONSTRUCTION 0.05m Ø PVC

NOTES



CLIENT Municipality of Northern Bruce Peninsula

PROJECT NAME Eastnor Landfill - Hydrogeological Assessment

PROJECT NUMBER 213288

PROJECT LOCATION Eastnor Landfill

DATE COMPLETED 2015/10/22

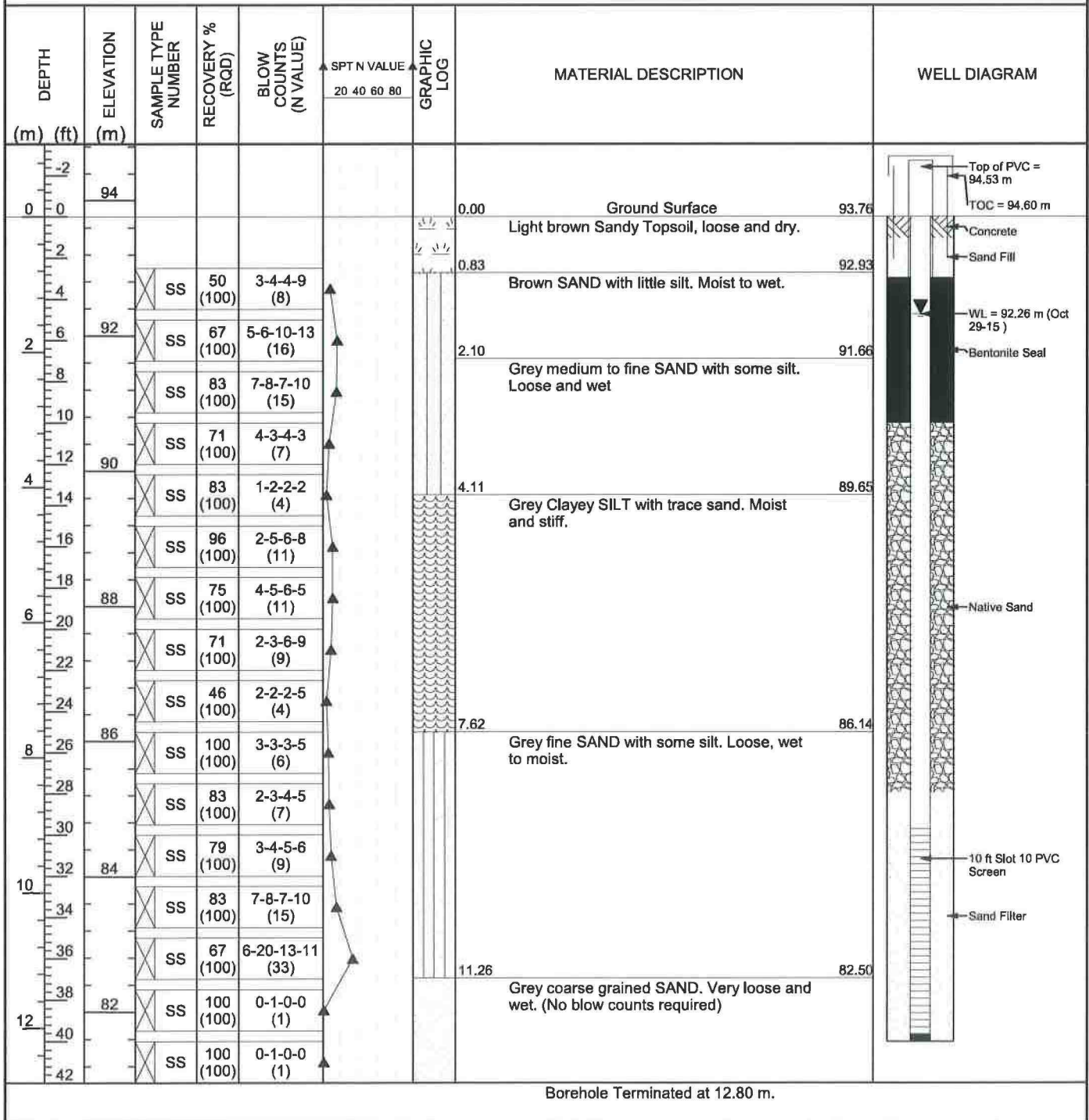
CONTRACTOR London Soil Test

LOGGED BY MB

METHOD Hollow Stem Auger

WELL CONSTRUCTION 0.05m Ø PVC

NOTES



CLIENT Municipality of Northern Bruce Peninsula

PROJECT NAME Eastnor Landfill - Hydrogeological Assessment

PROJECT NUMBER 213288

PROJECT LOCATION Eastnor Landfill

DATE COMPLETED 2015/10/21

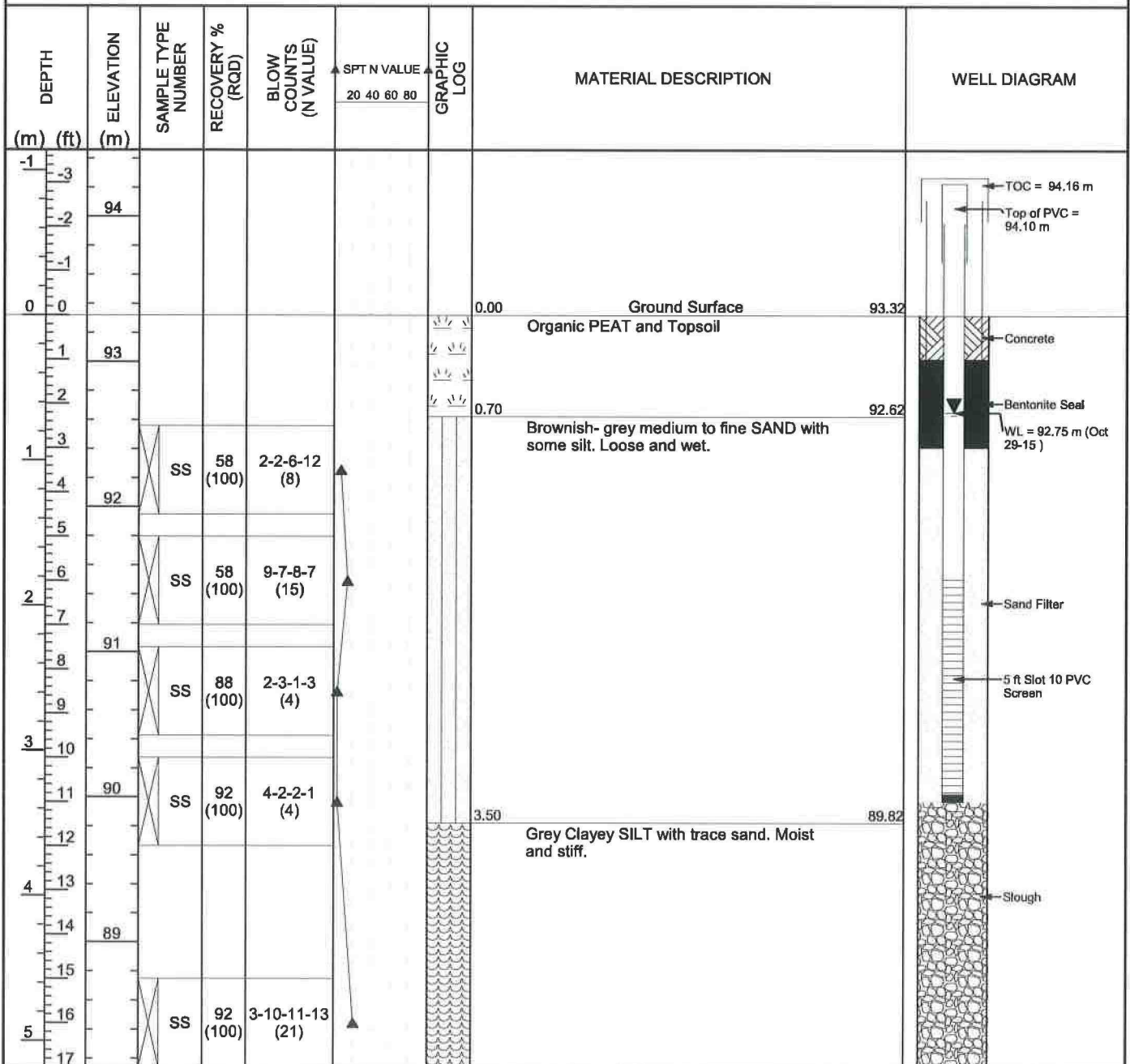
CONTRACTOR London Soil Test

LOGGED BY MB

METHOD Hollow Stem Auger

WELL CONSTRUCTION 0.05m Ø PVC

NOTES



Borehole Terminated at 5.18 m.

CLIENT Municipality of Northern Bruce Peninsula

PROJECT NAME Eastnor Landfill - Hydrogeological Assessment

PROJECT NUMBER 213288

PROJECT LOCATION Eastnor Landfill

DATE COMPLETED 2015/10/22

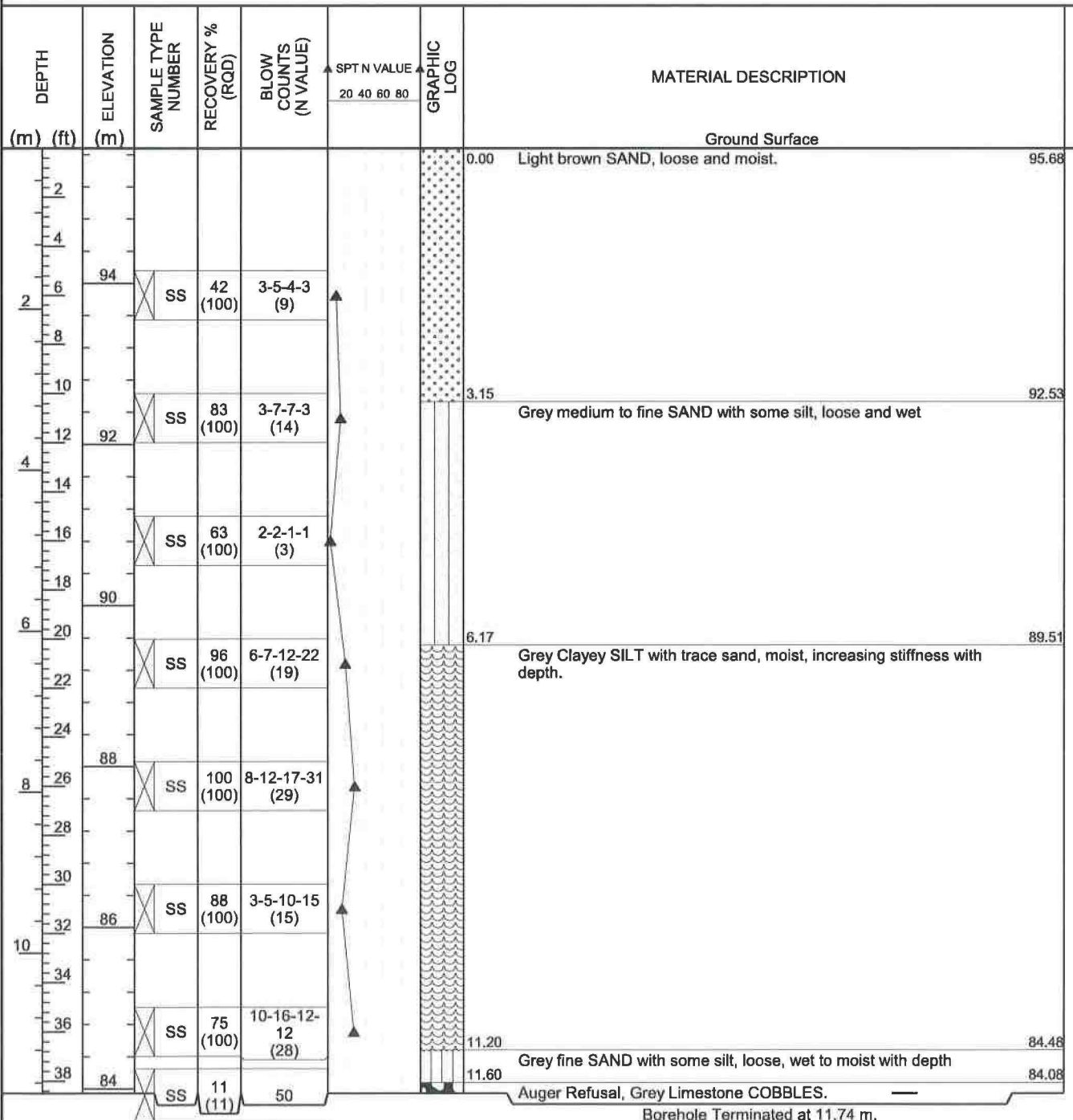
CONTRACTOR London Soil Test

LOGGED BY MB

METHOD Hollow Stem Auger

WELL CONSTRUCTION

NOTES



CLIENT Municipality of Northern Bruce Peninsula

PROJECT NAME Eastnor Landfill - Hydrogeological Assessment

PROJECT NUMBER 213288

PROJECT LOCATION Eastnor Landfill

DATE COMPLETED 2015/10/21

CONTRACTOR London Soil Test

LOGGED BY MB

METHOD Hollow Stem Auger

WELL CONSTRUCTION

NOTES

DEPTH (m) (ft)	ELEVATION (m)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	SPT N VALUE 20 40 60 80	GRAPHIC LOG	MATERIAL DESCRIPTION	
							Ground Surface	
0.00	98.32						Light brown SAND, loose and moist.	98.32
2								
4								
6		SS	67 (100)	2-3-6-11 (9)				
8	96							
10								
12		SS	88 (100)	1-5-7-7 (12)				
14								
16	94							
18		SS	50 (100)	2-4-4-4 (8)				
20								
22	92	SS	92 (100)	10-12-16-20 (28)			Grey medium to fine SAND with some silt, loose and wet.	92.15
24		SS	88 (100)	5-9-8-8 (17)				
26		SS	67 (100)	5-6-5-5 (11)				
28	90							
30		SS	92 (100)	2-1-3-8 (4)			Grey Clayey SILT with trace sand, moist and stiff.	89.72
32		SS	100 (100)	12-8-9-11 (17)				
34	88							
36		SS	100 (100)	6-9-8-13 (17)				

Borehole Terminated at 11.28 m.

**SUMMARY OF GROUNDWATER LEVEL ELEVATIONS
EASTNOR LANDFILL**

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	14-Dec-00		10-Jan-01		12-Jun-01		13-Dec-01	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	4.20	92.97	4.14	93.03	3.78	93.39	3.89	93.28
OW-2	96.88	95.88	3.30	93.58	3.70	93.18	3.41	93.47	3.51	93.37
OW-3	93.39	92.39	1.22	92.17	1.24	92.15	1.16	92.23	1.15	92.24
OW-4	91.24	90.24	-	-	0.96	90.28	0.68	90.56	0.91	90.33

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	15-Jun-02		26-Oct-02		7-May-03		11-Nov-03	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	3.85	93.32	4.56	92.61	3.75	93.42	3.92	93.25
OW-2	96.88	95.88	3.47	93.41	4.18	92.70	3.42	93.46	3.50	93.38
OW-3	93.39	92.39	1.22	92.17	1.29	92.10	1.22	92.17	1.14	92.25
OW-4	91.24	90.24	0.92	90.32	1.13	90.11	0.94	90.30	0.94	90.30

Well ID	Reference Elevation (m) Top of Casing	Reference Elevation Ground Surface	28-May-04		3-Nov-04		25-May-05		8-Dec-05	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	3.54	93.63	4.30	92.87	3.76	93.41	4.10	93.07
OW-2	96.88	95.88	3.24	93.64	3.87	93.01	3.44	93.44	3.70	93.18
OW-3	93.39	92.39	1.18	92.21	1.19	92.20	1.22	92.17	1.23	92.16
OW-4	91.24	90.24	0.86	90.38	0.98	90.26	0.97	90.27	0.93	90.31

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	18-Apr-06		31-Oct-06		19-Apr-07		20-Nov-07	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	3.38	93.79	4.19	92.98	3.54	93.63	4.55	92.62
OW-2	96.88	95.88	3.15	93.74	3.75	93.13	3.26	93.62	4.18	92.70
OW-3	93.39	92.39	1.12	92.27	1.20	92.20	1.13	92.26	1.24	92.15
OW-4	91.24	90.24	-	-	0.97	90.27	0.69	90.55	0.88	90.36

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	15-Apr-08		7-Oct-08		20-Apr-09		11-Nov-09	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	3.47	93.70	4.38	92.79	3.48	93.69	4.15	93.02
OW-2	96.88	95.88	3.16	93.72	4.04	92.84	3.21	93.67	3.76	93.12
OW-3	93.39	92.39	1.12	92.27	1.35	92.04	1.12	92.27	1.19	92.20
OW-4	91.24	90.24	0.73	90.51	0.95	90.29	0.75	90.49	0.75	90.49

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	7-Apr-10		12-Nov-10		14-Apr-11		1-Nov-11	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	3.89	93.28	4.14	93.03	3.50	93.67	3.95	93.22
OW-2	96.88	95.88	3.49	93.39	3.76	93.12	3.15	93.73	3.51	93.37
OW-3	93.39	92.39	1.10	92.29	1.17	92.22	1.15	92.24	1.15	92.24
OW-4	91.24	90.24	0.68	90.56	0.76	90.48	0.64	90.60	0.73	90.51
OW-5	94.30	93.22	1.31	92.99	1.42	92.88	1.31	92.99	1.41	92.89
OW-6	91.18	90.22	1.01	90.17	1.10	90.08	1.04	90.14	1.09	90.09

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	11-Apr-12		1-Nov-12		15-Apr-13		14-Nov-13	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	3.80	93.37	4.22	92.95	3.59	93.58	3.89	93.28
OW-2	96.88	95.88	3.46	93.42	3.77	93.11	3.23	93.65	3.53	93.35
OW-3	93.39	92.39	1.14	92.25	1.13	92.26	1.15	92.24	1.17	92.22
OW-4	91.24	90.24	0.70	90.54	0.73	90.51	0.64	90.60	0.72	90.52
OW-5	94.30	93.22	1.36	92.94	1.47	92.83	1.33	92.97	1.39	92.91
OW-6	91.18	90.22	1.04	90.14	1.07	90.11	1.04	90.14	1.05	90.13
OW-7S	93.45	92.62	NI	NA	1.05	92.40	1.00	92.45	1.04	92.41
OW-7D	93.33	92.62	NI	NA	1.01	92.32	0.75	92.58	0.95	92.38
OW-8	94.35	93.55	NI	NA	1.31	93.04	0.97	93.38	1.15	93.20
OW-9	91.75	90.79	NI	NA	0.39	91.36	0.52	91.23	0.22	91.53
OW-10S	94.74	93.91	NI	NA	1.09	93.65	0.78	93.96	0.84	93.90
OW-10D	94.54	93.91	NI	NA	1.69	92.85	1.39	93.15	1.49	93.05

**SUMMARY OF GROUNDWATER LEVEL ELEVATIONS
EASTNOR LANDFILL**

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	12-May-14		29-Oct-14		23-Apr-15		29-Oct-15	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	3.51	93.66	4.14	93.03	3.29**	93.88	4.44	92.73
OW-2	96.88	95.88	3.24	93.64	3.78	93.10	3.32	93.56	4.09	92.79
OW-3	93.39	92.39	1.15	92.24	NM	NA	1.15	92.24	1.10	92.29
OW-4	91.24	90.24	0.67	90.57	0.72	90.52	1.38**	89.86	0.68	90.56
OW-5	94.30	93.22	1.33	92.97	1.46	92.84	1.36	92.94	1.43	92.87
OW-6	91.18	90.22	1.04	90.14	1.05	90.13	1.03	90.15	1.06	90.12
OW-7S	93.45	92.62	1.01	92.44	1.08	92.37	1.01	92.44	1.00	92.45
OW-7D	93.33	92.62	0.79	92.54	1.04	92.29	0.80	92.53	1.09	92.24
OW-8	94.35	93.55	1.00	93.35	1.39	92.96	1.08	93.27	1.60	92.75
OW-9	91.75	90.79	0.41	91.34	0.76	90.99	0.57	91.18	0.72	91.03
OW-10S	94.74	93.91	0.79	93.95	1.14	93.60	0.81	93.93	1.57	93.17
OW-10D	94.54	93.91	1.42	93.12	1.68	92.86	1.44	93.10	2.25	92.29
OW-11	94.61	93.66	NI	NA	NI	NA	NI	NA	1.48	93.13
OW-12S	94.52	93.81	NI	NA	NI	NA	NI	NA	1.74	92.78
OW-12D	94.53	93.76	NI	NA	NI	NA	NI	NA	2.27	92.26
OW-13	94.10	93.32	NI	NA	NI	NA	NI	NA	1.35	92.75

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	24-Nov-15		21-Apr-16		1-Nov-16		25-Apr-17	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	4.34	92.83	3.46	93.71	3.96	93.21	3.54	93.63
OW-2	96.88	95.88	4.15	92.73	3.15	93.73	3.69	93.19	3.23	93.65
OW-3	93.39	92.39	1.16	92.24	1.10	92.29	1.16	92.23	1.15	92.24
OW-4	91.24	90.24	0.76	90.48	0.66	90.58	0.73	90.51	1.02	90.22
OW-5	94.30	93.22	1.56	92.74	1.33	92.97	1.45	92.85	1.36	92.94
OW-6	91.18	90.22	1.05	90.14	1.01	90.17	1.12	90.06	1.04	90.14
OW-7S	93.45	92.62	1.11	92.34	1.02	92.43	1.08	92.37	1.01	92.44
OW-7D	93.33	92.62	1.32	92.01	0.81	92.52	0.97	92.36	0.82	92.51
OW-8	94.35	93.55	1.59	92.77	1.08	93.27	1.38	92.97	1.02	93.33
OW-9	91.75	90.79	0.52	91.23	0.23	91.52	0.29	91.46	0.18	91.57
OW-10S	94.74	93.91	1.44	93.30	0.79	93.95	0.93	93.81	1.02	93.72
OW-10D	94.54	93.91	1.99	92.56	1.47	93.07	1.64	92.90	1.50	93.04
OW-11	94.61	93.66	1.26	93.35	0.74	93.87	0.82	93.79	0.70	93.91
OW-12S	94.52	93.81	1.72	92.81	1.12	93.40	1.43	93.09	1.14	93.38
OW-12D	94.53	93.76	2.09	92.44	1.51	93.02	1.74	92.79	1.52	93.01
OW-13	94.10	93.32	1.37	92.74	1.04	93.06	1.21	92.89	1.08	93.02

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	20-Sep-17		8-May-18		20-Nov-18		16-Apr-19	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	4.22	92.95	NM	NA	4.27	92.90	2.44	94.73
OW-2	96.88	95.88	3.89	92.99	NM	NA	3.97	92.91	3.15	93.73
OW-3	93.39	92.39	1.17	92.22	NM	NA	1.19	92.20	1.27	92.12
OW-4	91.24	90.24	0.82	90.42	0.64	90.60	0.77	90.47	0.61	90.63
OW-5	94.30	93.22	1.51	92.79	1.35	92.95	1.55	92.75	1.35	92.95
OW-6	91.18	90.22	1.13	90.05	1.01	90.17	1.08	90.10	1.05	90.13
OW-7S	93.45	92.62	1.29	92.16	1.03	92.42	1.12	92.33	1.02	92.43
OW-7D	93.33	92.62	1.40	91.93	NM	NA	1.23	92.10	0.77	92.56
OW-8	94.35	93.55	1.57	92.78	1.01	93.34	1.50	92.85	0.90	93.45
OW-9	91.75	90.79	0.57	91.19	NM	NA	0.42	91.33	0.10	91.65
OW-10S	94.74	93.91	1.47	93.27	NM	NA	1.36	93.38	0.78	93.96
OW-10D	94.54	93.91	1.65	92.89	NM	NA	1.95	92.59	1.48	93.06
OW-11	94.61	93.66	1.36	93.25	NM	NA	1.19	93.42	0.67	93.94
OW-12S	94.52	93.81	1.63	92.89	NM	NA	1.67	92.85	1.09	93.43
OW-12D	94.53	93.76	2.03	92.50	NM	NA	2.18	92.35	1.66	92.87
OW-13	94.10	93.32	1.35	92.75	NM	NA	1.37	92.73	1.07	93.03

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	22-Oct-19		25-Apr-20		28-Oct-20		4-May-21	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	4.23	92.94	3.80	93.37	4.03	93.14	3.87	93.30
OW-2	96.88	95.88	3.87	93.01	3.44	93.44	3.66	93.22	3.48	93.40
OW-3	93.39	92.39	1.15	92.24	1.16	92.23	1.15	92.24	1.12	92.27
OW-4	91.24	90.24	0.77	90.47	0.65	90.59	0.71	90.53	0.61	90.63
OW-5	94.30	93.22	1.45	92.85	1.36	92.94	1.42	92.88	1.32	92.98
OW-6	91.18	90.22	1.09	90.09	1.09	90.09	1.09	90.09	1.10	90.08
OW-7S	93.45	92.62	1.07	92.38	1.03	92.42	1.08	92.37	1.00	92.45
OW-7D	93.33	92.62	1.22	92.11	0.91	92.42	0.95	92.38	0.87	92.46
OW-8	94.35	93.55	1.49	92.86	1.18	93.17	1.30	93.05	1.15	93.20
OW-9	91.75	90.79	0.41	91.34	0.20	91.55	0.18	91.57	0.10	91.65
OW-10S	94.74	93.91	1.37	93.37	0.86	93.88	0.96	93.78	0.84	93.90
OW-10D	94.54	93.91	1.94	92.60	1.62	92.92	1.65	92.89	1.65	92.89
OW-11	94.61	93.66	1.19	93.42	0.78	93.83	0.92	93.69	NM	N/A
OW-12S	94.52	93.81	1.62	92.90	1.29	93.23	1.48	93.04	1.30	93.22
OW-12D	94.53	93.76	2.14	92.39	1.84	92.69	1.94	92.59	1.88	92.65
OW-13	94.10	93.32	1.34	92.76	1.17	92.93	1.26	92.84	1.17	92.93

SUMMARY OF GROUNDWATER LEVEL ELEVATIONS EASTNOR LANDFILL

Well ID	Reference Elevation Top of Casing	Reference Elevation Ground Surface	6-Oct-21	
			Water Level Measured	Water Level Elevation
OW-1	97.17	96.17	4.22	92.95
OW-2	96.88	95.88	3.87	93.01
OW-3	93.39	92.39	1.18	92.21
OW-4	91.24	90.24	0.79	90.45
OW-5	94.30	93.22	1.50	92.80
OW-6	91.18	90.22	1.14	90.04
OW-7S	93.45	92.62	1.11	92.34
OW-7D	93.33	92.62	1.20	92.13
OW-8	94.35	93.55	1.48	92.87
OW-9	91.75	90.79	0.07	91.68
OW-10S	94.74	93.91	1.39	93.35
OW-10D	94.54	93.91	1.94	92.60
OW-11	94.61	93.66	1.12	93.49
OW-12S	94.52	93.81	1.64	92.88
OW-12D	94.53	93.76	2.23	92.30
OW-13	94.10	93.32	1.34	92.76

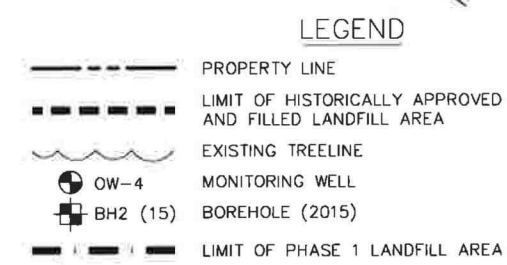
Well ID	Elevation Top of Casing (masl)	Elevation Ground Surface (masl)	26-Apr-22		27-Sep-22		21-Apr-23		28-Nov-23	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	195.57	194.57	3.56	192.01	4.22	191.35	3.57	192.00	4.04	191.53
OW-2	195.28	194.28	3.37	191.91	3.78	191.50	3.28	192.00	3.70	191.58
OW-3	191.79	190.79	1.16	190.63	1.16	190.63	1.14	190.65	1.16	190.63
OW-4	189.64	188.64	1.00	188.64	0.77	188.87	0.61	189.03	0.71	188.93
OW-5	192.70	191.62	1.32	191.38	1.44	191.26	1.33	191.37	1.41	191.29
OW-6	189.58	188.62	1.02	188.56	1.07	188.51	1.00	188.58	1.10	188.48
OW-7S	191.85	191.02	1.01	190.84	1.03	190.82	1.02	190.83	1.05	190.80
OW-7D	191.73	191.02	0.89	190.84	1.18	190.55	0.82	190.91	0.96	190.77
OW-8	192.75	191.95	1.18	191.57	1.41	191.34	1.04	191.71	1.33	191.42
OW-9	190.15	189.19	0.10	190.05	0.38	189.77	0.10	190.05	NM	NA
OW-10S	193.14	192.31	0.96	192.18	1.21	191.93	0.80	192.34	0.93	192.21
OW-10D	192.94	192.31	1.50	191.44	1.90	191.04	1.50	191.44	1.65	191.29
OW-11	193.01	192.06	0.75	192.26	1.01	192.00	0.71	192.30	0.85	192.16
OW-12S	192.92	192.21	1.14	191.78	1.59	191.33	1.12	191.80	1.57	191.35
OW-12D	192.93	192.16	1.75	191.18	2.17	190.76	1.86	191.07	2.03	190.90
OW-13	192.50	191.72	1.08	191.42	1.29	191.21	1.07	191.43	NM	NA

Well ID	Elevation Top of Casing (masl)	Elevation Ground Surface (masl)	30-Apr-24		12-Nov-24	
			Water Level Measured	Water Level Elevation	Water Level Measured	Water Level Elevation
OW-1	195.57	194.57	3.60	191.97	4.19	191.38
OW-2	195.28	194.28	3.25	192.03	3.85	191.43
OW-3	191.79	190.79	1.15	190.64	1.16	190.63
OW-4	189.64	188.64	0.60	189.04	0.78	188.86
OW-5	192.70	191.62	1.33	191.37	1.43	191.27
OW-6	189.58	188.62	1.00	188.58	1.10	188.48
OW-7S	191.85	191.02	1.03	190.82	1.10	190.75
OW-7D	191.73	191.02	0.78	190.95	1.18	190.55
OW-8	192.75	191.95	0.87	191.88	1.41	191.34
OW-9	190.15	189.19	0.09	190.06	0.25	189.90
OW-10S	193.14	192.31	0.78	192.36	1.20	191.94
OW-10D	192.94	192.31	1.50	191.44	1.88	191.06
OW-11	193.01	192.06	0.70	192.31	1.04	191.97
OW-12S	192.92	192.21	1.16	191.76	1.58	191.34
OW-12D	192.93	192.16	1.85	191.08	2.28	190.65
OW-13	192.50	191.72	1.09	191.41	1.30	191.20

Note:

1. All measurements are in metres.
2. Elevations are relative to the assumed benchmark elevation.
3. NI = Not Installed; NA = Not Applicable.
4. Water level elevations that are highlighted and shown in bold represent water levels that are above ground surface.
5. In November 2022 the site was surveyed to reflect UTM derived coordinates and the elevation across the Site was adjusted by 98.4 meters to reflect geodetic elevations.

Appendix E Cross-Sections A-A' through E-E'

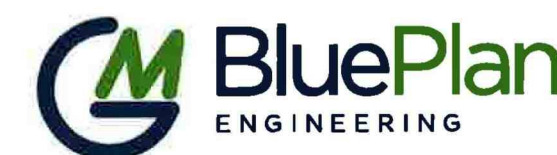


NOTES:

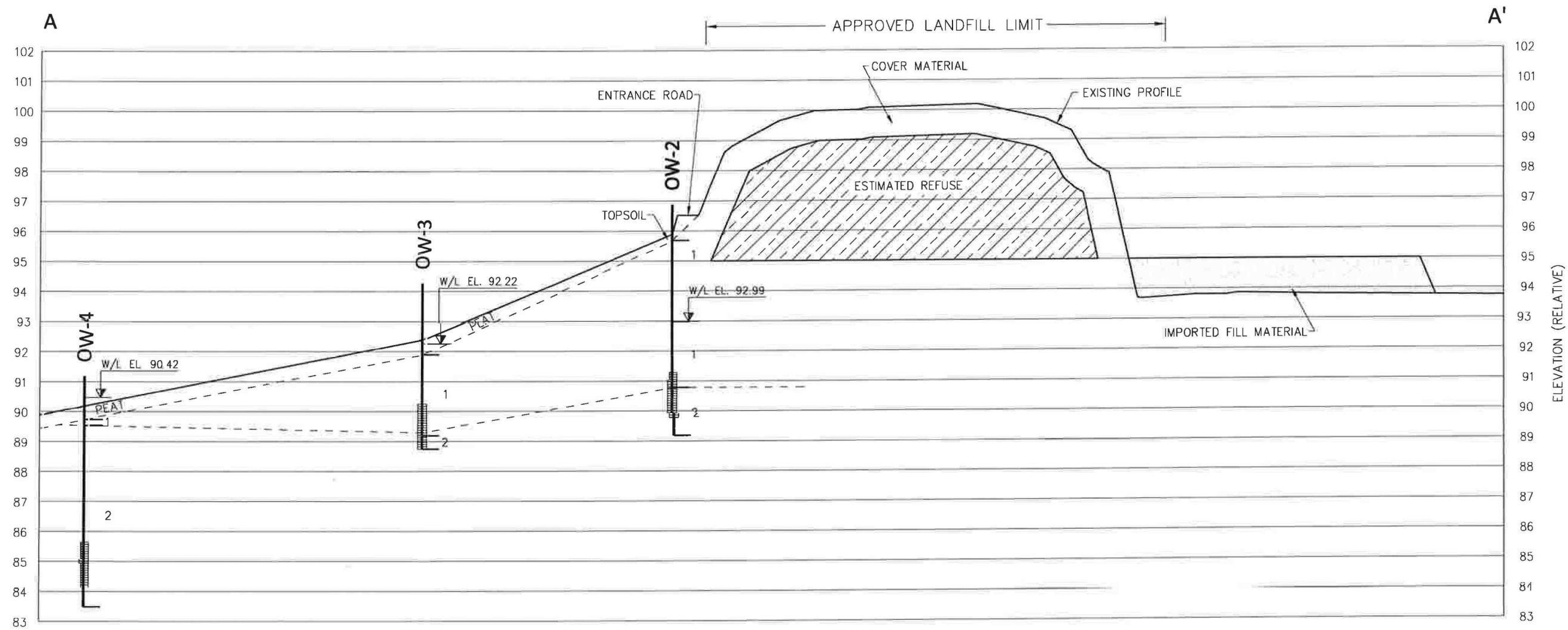
1. THE INFORMATION SHOWN HERE WAS OBTAINED FROM A DRAWING BY PRYDE, SCHROPP, McCOMB INC., DATED FEBRUARY, 2006 AND TOPOGRAPHICAL SURVEY BY GM BLUEPLAN ENGINEERING LIMITED ON DECEMBER 3, 2008.
2. A 0.7 ha PORTION OF THE HISTORICALLY APPROVED 3.3 ha LANDFILL AREA WAS OBSERVED TO CONTAIN NO WASTE. THEREFORE THE HISTORICAL WASTE PLACEMENT IS LIMITED TO AN AREA OF 2.6 ha.
3. STOCKPILES ASSOCIATED WITH SITE OPERATIONS (i.e. COVER MATERIAL) AND SELECT WASTE DIVERSION (i.e. WOOD PILE, SCRAP METAL) ARE MAINTAINED WITHIN THE PREVIOUSLY LANDFILLED AREAS. STOCKPILE LOCATIONS ARE PERIODICALLY ADJUSTED TO MAINTAIN EFFICIENT OPERATIONS AND SITE MANAGEMENT.

EASTNOR LANDFILL

Appendix E1



213288
Hydrogeological Assessment
Lots 17 & 18, Conc. 2 W.B.R.
Municipality of Northern Bruce Peninsula



SECTION A-A'
HORZ. 1:1,500
VERT. 1:150

CROSS-SECTION A-A'

EASTNOR LANDFILL

Appendix E2

LEGEND

BOREHOLE (TOTAL DEPTH)

SCREENED INTERVAL

W/L EL. WATER LEVEL ELEVATION (SEP. 2017)

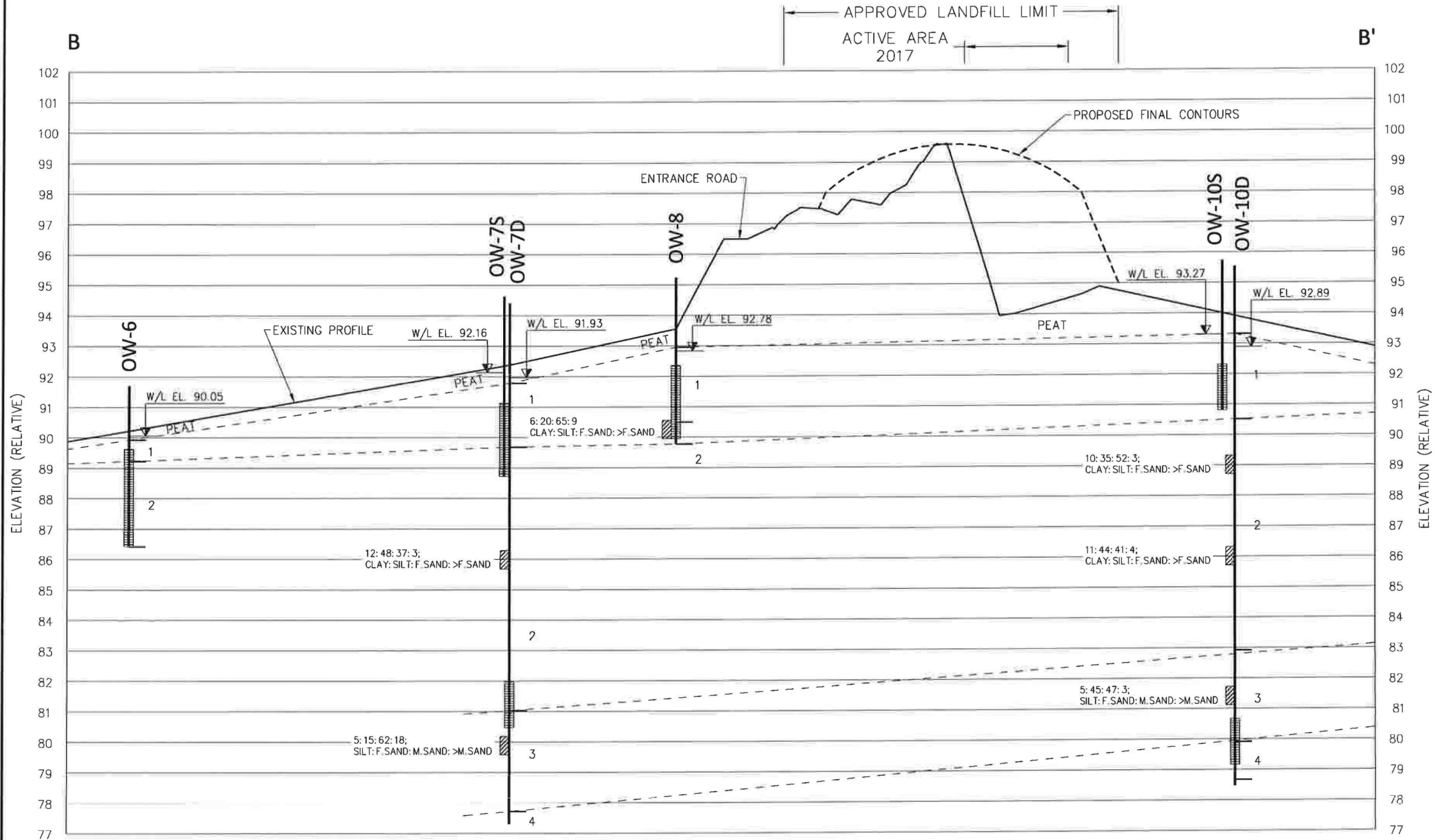
PARTICLE SIZE ANALYSIS SUMMARY
10:35:52:3 (PROPORTION)
CLAY:SILT:SAND:C. SAND (CLASSIFICATION)

Unit No.	Description of Unit Encountered
1	fine to medium SAND
2	silt loam
3	medium to coarse SAND
4	stiff silty clay

Note: Figures were adjusted in 2022 to suit UTM derived coordinates and the elevation across the Site was raised 98.4 meters to reflect geodetic elevations (i.e., masl). Elevations on the cross sections show the former 'relative' elevations.



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LEGEND

- BOREHOLE (TOTAL DEPTH)
- SCREENED INTERVAL
- W/L EL. WATER LEVEL ELEVATION (SEP 2017)
- PARTICLE SIZE ANALYSIS SUMMARY
10:35:52:3 (PROPORTION)
CLAY:SILT:SAND:C. SAND (CLASSIFICATION)

Unit No.	Description of Unit Encountered
1	fine to medium SAND
2	silt loam
3	medium to coarse SAND
4	stiff silty clay

CROSS-SECTION B-B'

EASTNOR LANDFILL

Appendix E3

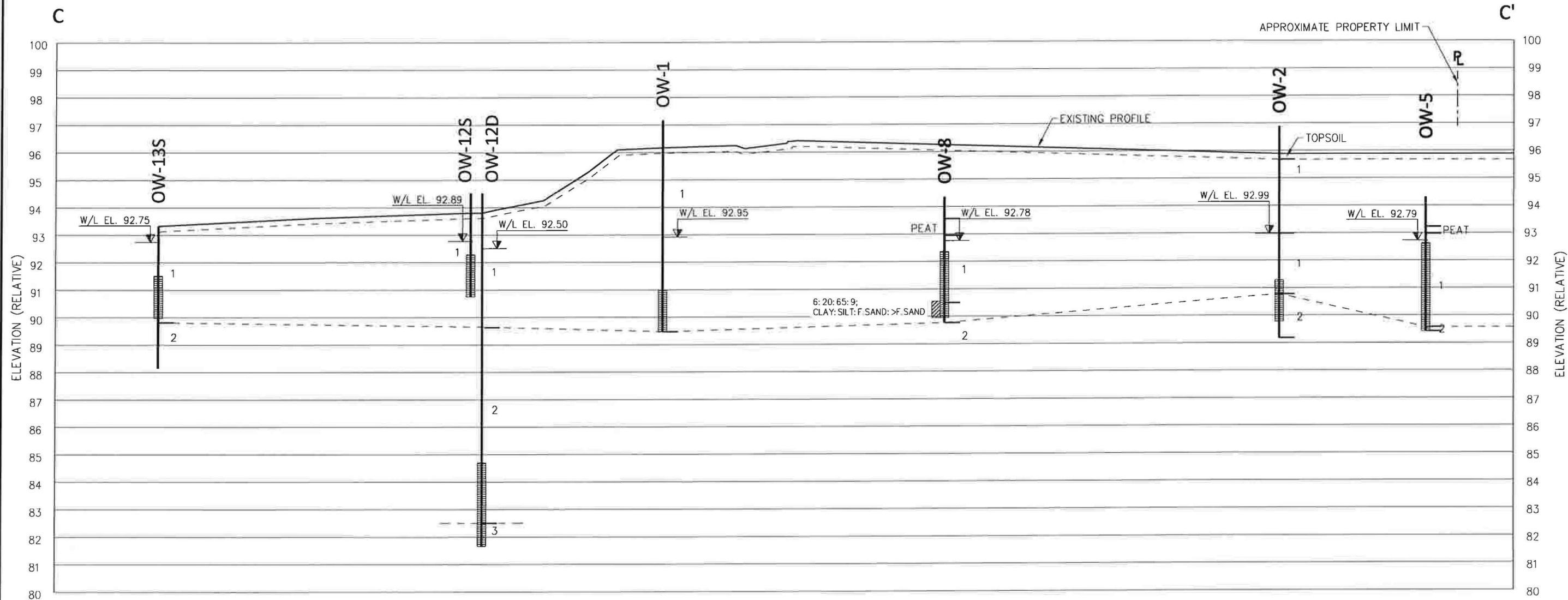


SECTION B-B'

HORZ. 1:1,500
VERT. 1:150

Note: Figures were adjusted in 2022 to suit UTM derived coordinates and the elevation across the Site was raised 98.4 meters to reflect geodetic elevations (i.e., masl). Elevations on the cross sections show the former 'relative' elevations.

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LEGEND

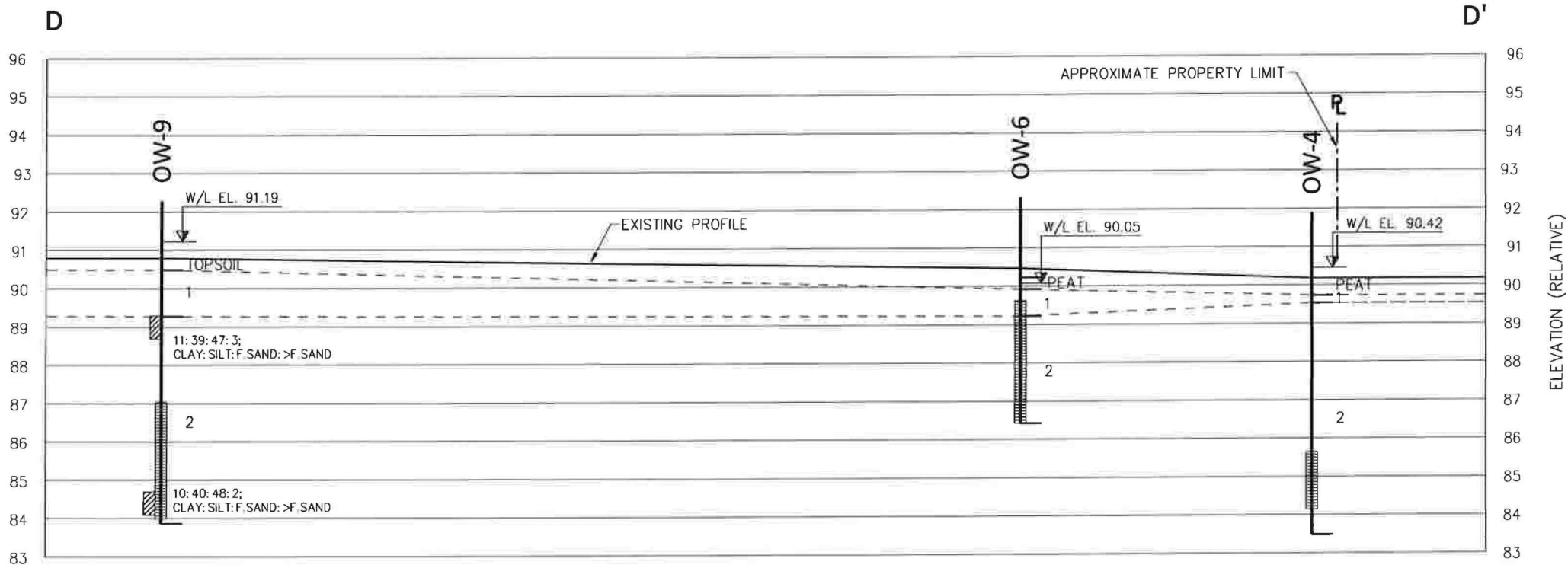
- BOREHOLE (TOTAL DEPTH)
- SCREENED INTERVAL
- W/L EL. WATER LEVEL ELEVATION (SEP 2017)
- PARTICLE SIZE ANALYSIS SUMMARY
10:35:52:3 (PROPORTION)
CLAY:SILT:SAND:C. SAND (CLASSIFICATION)

Unit No.	Description of Unit Encountered
1	fine to medium SAND
2	silt loam
3	medium to coarse SAND
4	stiff silty clay

CROSS-SECTION D-D'

EASTNOR LANDFILL

Appendix E5

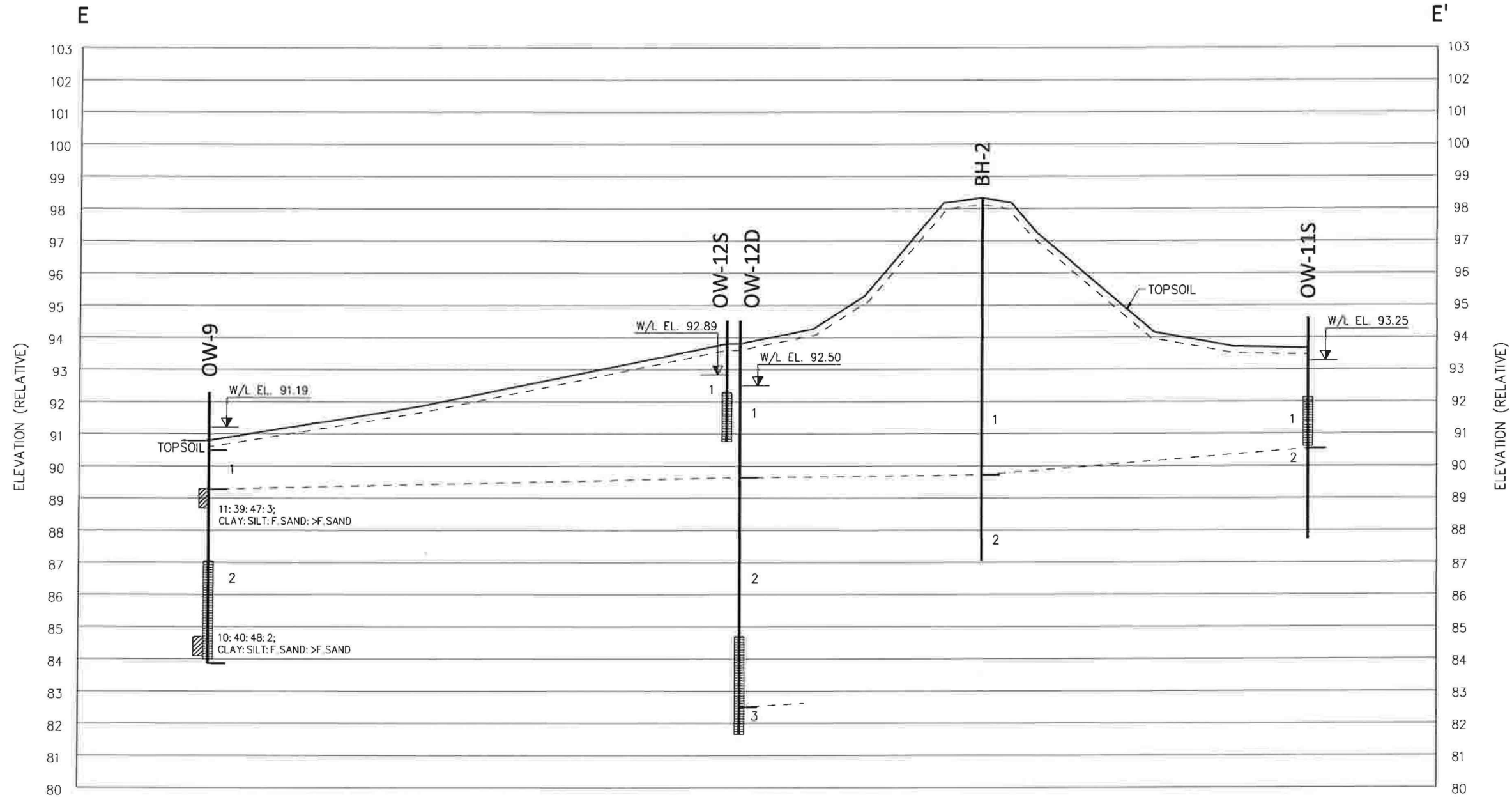


SECTION D-D'

HORZ. 1:1,500
VERT. 1:150

Note: Figures were adjusted in 2022 to suit UTM derived coordinates and the elevation across the Site was raised 98.4 meters to reflect geodetic elevations (i.e., masl). Elevations on the cross sections show the former 'relative' elevations.

213288
Hydrogeological Assessment
Lots 17 & 18, Conc. 2 W.B.R.
Municipality of Northern Bruce Peninsula



LEGEND

- BOREHOLE (TOTAL DEPTH)
- SCREENED INTERVAL
- W/L EL. WATER LEVEL ELEVATION (SEP 2017)
- PARTICLE SIZE ANALYSIS SUMMARY
10:35:52:3 (PROPORTION)
CLAY:SILT:SAND:C. SAND (CLASSIFICATION)

CROSS-SECTION E-E'

EASTNOR LANDFILL

Appendix E6



Note: Figures were adjusted in 2022 to suit UTM derived coordinates and the elevation across the Site was raised 98.4 meters to reflect geodetic elevations (i.e., masl). Elevations on the cross sections show the former 'relative' elevations.

Appendix F Historical Groundwater Quality Results (Tables & Graphs)

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-1 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Jan-01	367	7.54	217	246	3.0	NM	NM	23.15	NM	NM	NM	NM	1.3	NM	1.27	NM		0.12	24.2	1.25
Jun-01	372	7.50	207	237	3.4	0.2	NM	23.7	NM	NM	NM	NM	1.2	NM	1.28	NM		0.08	30.5	1.26
Dec-01	446	7.59	257	246	4.1	NM	NM	24.2	NM	NM	NM	NM	0.9	NM	1.27	NM		0.07	22.3	1.02
Jun-02	479	7.48	247	289	4.5	NM	NM	22.7	NM	NM	NM	NM	1.4	NM	1.94	NM		NM	33.9	2.80
Oct-02	432	7.94	251	264	4.3	0.3	NM	22.0	NM	NM	NM	NM	NM	NM	NM	NM		NM	22.3	1.36
May-03	451	7.84	226	240	3.4	NM	NM	17.5	NM	NM	NM	NM	1.4	NM	0.27	NM		0.34	19.8	0.96
Nov-03	436	NM	222	249	3.6	0.2	NM	16.4	NM	NM	NM	NM	0.9	NM	1.12	NM		0.27	16.6	0.86
May-04	445	7.62	223	257	4.7	NM	NM	16.8	NM	NM	NM	NM	1.0	NM	1.21	NM		0.24	19.5	0.89
Nov-04	NM	NM	234	NM	3.6	0.2	NM	15.9	NM	NM	NM	NM	1.0	NM	1.24	NM		0.28	20.4	NM
Jun-05	437	NM	229	NM	1.19	NM	NM	2.4	NM	NM	NM	NM	1.2	NM	1.20	NM		0.41	NM	NM
Dec-05	377	8.10	226	230	4.0	0.06	0.10	18.0	NM	NM	NM	NM	1.2	NM	1.70	NM		0.52	20.6	9*
Apr-06	389	7.52	186	217	2.12	0.19	<0.05	12.7	NM	NM	NM	NM	1.56	NM	24.6*	NM		0.14	NM	NM
Oct-06	387	8.12	209	223	3.09	0.08	<0.05	17.0	<0.10	0.20	57.7	19.2	1.06	1.44	0.58	0.166		0.21	NM	NM
Apr-07	399	7.57	189	218	2.47	<0.05	<0.05	14.5	<0.10	0.14	56.4	18.8	0.91	0.25	0.51	0.170		0.31	NM	NM
Nov-07	386	7.75	194	238	2.51	0.10	<0.05	13.6	<0.10	0.50	62.1	20.1	0.95	0.35	6.12*	0.382		0.08	NM	NM
Apr-08	396	8.07	203	215	1.99	<0.05	<0.05	13.0	<0.10	0.15	55.8	18.4	1.00	0.39	0.35	0.141		0.42	NM	-
Oct-08	419	8.14	202	232	1.93	<0.05	<0.05	13.5	<0.10	0.18	59.3	20.5	1.14	0.38	0.53	0.160		0.24	NM	NM
Apr-09	398	8.01	197	236	1.77	<0.05	<0.05	13.6	<0.10	0.22	61.0	20.4	1.22	0.34	0.41	0.141		0.06	NM	NM
Nov-09	401	7.95	201	223	3.88	0.06	<0.05	16.7	<0.10	0.31	57.7	19.1	1.37	0.36	0.52	0.155		<0.05	NM	NM
Apr-10	394	8.01	205	237	3.95	0.09	<0.05	20.0	<0.10	NM	61.5	20.3	2.42	0.44	0.18	0.147		0.11	18.7	0.64
Nov-10	383	8.11	209	253	2.21	<0.05	<0.05	18.1	<0.10	0.45	66.5	21.1	1.86	0.54	0.40	0.161		0.17	NM	NM
Apr-11	404	7.93	195	227	2.64	<0.05	<0.05	19.9	<0.10	0.17	59.0	19.3	1.37	0.42	0.48	0.175		0.06	15.5	1.18
Nov-11	322	8.08	194	220	2.85	<0.05	<0.05	18.1	<0.10	<0.05	57.2	18.8	1.56	0.36	0.54	0.153		0.19	15.9	0.78
Apr-12	442	8.08	210	252	5.43	0.07	<0.05	28.5	<0.10	0.13	66.2	21.1	1.59	0.39	0.74	0.156		0.16	17.8	1.16
Nov-12	411	7.93	205	252	5.41	<0.05	<0.05	31.5	<0.10	0.35	67.0	20.6	2.07	0.45	0.76	0.171		0.21	18.8	1.77
Apr-13	426	8.01	195	248	3.58	<0.05	<0.05	29.3	<0.10	0.14	64.8	21.0	1.49	0.37	0.46	0.184		0.11	13.8	1.14
Nov-13	424	8.24	193	253	3.11	<0.05	<0.05	27.1	<0.10	0.30	65.9	21.4	1.46	0.45	0.41	0.163		0.30	NM	NM
May-14	442	8.12	193	239	2.99	0.13	<0.05	29.8	<0.10	0.16	61.7	20.7	1.83	1.24	0.33	0.159		0.28	12.8	1.37
Oct-14	410	7.60	185	233	3.60	<0.10	<0.10	32.8	<0.20	0.29	61.0	19.5	1.55	0.44	0.57	0.171		0.32	15.6	1.20
Apr-15	440	7.93	201	250	3.96	<0.05	<0.05	42.5	<0.10	0.12	65.5	21.1	1.74	1.43	0.54	0.186		0.26	19.9	1.07
Oct-15	450	7.51	201	231	3.66	0.34	<0.10	35.0	<0.20	0.54	61.2	19.1	1.67	0.40	5.07	0.306		0.29	14.6	0.84
Nov-16	398	7.66	191	211	2.62	0.06	<0.05	21.6	<0.10	0.14	55.9	17.3	1.28	0.38	0.35	0.161		0.29	10.8	0.71
Sep-17	487	7.93	226	230	3.37	0.17	<0.05	22.7	<0.10	0.28	59.6	19.8	1.56	0.38	0.24	0.154		0.32	18.7	1.00
Nov-18	466	7.67	249	244	4.10	0.07	<0.05	20.9	<0.10	<0.05	63.9	20.5	2.04	0.49	0.10	0.153	0.018	0.28	17.7	0.75
Oct-19	349	7.95	203	202	2.09	<0.05	<0.05	7.85	<0.10	0.26	52.2	17.4	1.50	0.41	0.27	0.159	<0.010	0.22	10.6	0.50
Oct-20	413	7.88	217	224	5.16	0.20	0.08	16.1	<0.10	0.79	58.2	19.2	1.75	0.35	0.27	0.136	0.062	0.26	15.6	0.99
Oct-21	417	7.73	205	211	3.25	0.11	0.07	15.0	<0.10	0.55	55.3	17.8	1.50	<0.50	0.41	0.012	0.016	0.14	42.7	1.16
Sep-22	434	8.01	210	221	3.77	0.24	<0.05	19.1	<0.10	0.71	58.4	18.2	2.59	<0.05	0.39	0.125	0.017	0.17	21.8	1.39
Nov-23	457	7.58	262	243	3.35	<0.05	<0.05	19.6	<0.10	0.18	64.7	19.8	1.71	<0.50	0.55	0.169	0.027	0.20	14.6	0.76
Nov-24	525	7.70	295	278	3.69	0.05	<0.05	35.2	<0.10	0.14	73.6	22.8	2.22	<0.50	0.34	0.23	0.018	0.29	13.0	0.90
Average	418	7.85	214	237	3.36	0.10	<0.10	20.7	<0.1	0.30	61.0	19.8	1.47	0.52	0.78	0.170	0.023	0.22	19.3	1.10
Std. Dev.	38.9	0.23	23.9	18.3	1.0	0.09	NA	7.91	NA	0.19	4.63	1.30	0.41	0.34	0.85	0.061	0.018	0.11	6.84	0.44

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-2 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Jan-01	2970	7.15	714	1990	257	NM	NM	1320	NM	NM	NM	NM	107	NM	4.33	NM		0.54	20.4	1.58
Jun-01	3100	7.20	763	1760	274	0.2	NM	1390	NM	NM	NM	NM	87.6	NM	3.32	NM		0.34	16.6	1.04
Dec-01	3830	7.31	717	1720	316	NM	NM	1640	NM	NM	NM	NM	125	NM	ND	NM		0.58	17.4	1.36
Jun-02	4480	7.13	822	2350	385	NM	NM	1660	NM	NM	NM	NM	128	NM	2.38	NM		0.36	21	3.12
Oct-02	3500	7.53	968	2640	309	0.3	NM	1540	NM	NM	NM	NM	NM	NM	NM	NM		0.29	19	1.19
May-03	3690	7.39	1020	2200	231	NM	NM	1110	NM	NM	NM	NM	160	NM	4.21	NM		0.27	17	1.04
Nov-03	3670	NM	858	2010	216	NM	NM	1230	NM	NM	NM	NM	120	NM	5.40	NM		0.70	21	1.42
May-04	3130	7.21	848	1810	188	NM	NM	1090	NM	NM	NM	NM	104	NM	3.69	NM		0.33	12.5	1.07
Nov-04	NM	NM	872	NM	139	NM	NM	1000	NM	NM	NM	NM	80.5	NM	2.89	NM		0.58	15.6	NM
Jun-05	3550	NM	916	NM	191	0.1	NM	1210	NM	NM	NM	NM	128	NM	3.6	NM		1.29	NM	NM
Dec-05	2730	7.90	879	1500	136	NM	0.19	1060	NM	NM	NM	NM	99	NM	5.1	NM		0.90	15	4.00
Apr-06	3530	7.40	1030	1840	163	0.27	<0.05	1070	NM	NM	NM	NM	117	NM	8.9	NM		0.85	NM	NM
Oct-06	1160	8.02	427	520	39	0.16	<0.05	210	<0.10	0.23	102	64.5	20.3	61.7	0.25	0.625		0.72	NM	NM
Apr-07	2780	7.42	922	1400	102	0.14	<0.05	725	<0.10	0.44	245	192	76.0	138	0.59	1.44		1.38	NM	NM
Nov-07	2520	7.39	884	1550	84	<0.05	<0.05	718	<0.10	0.44	277	209	66.6	130	6.8	1.58		0.28	NM	NM
Apr-08	2060	7.93	777	1040	89	0.48	<0.05	444	<0.10	0.34	216	121	52.4	58.2	0.72	1.21		0.79	NM	NM
Oct-08	2720	7.72	932	1330	71	0.08	<0.05	607	<0.10	0.26	231	183	66.5	122	0.39	1.17		0.89	NM	NM
Apr-09	2760	7.68	964	1560	75	<0.05	<0.05	701	<0.10	<0.05	296	200	66.4	103	0.03	1.38		0.71	NM	NM
Nov-09	2930	7.77	981	1680	86	<0.05	<0.05	816	<0.10	0.12	303	224	70.2	135	0.02	1.36		0.17	NM	NM
Apr-10	2770	7.82	945	1710	95	0.08	<0.05	899	<0.10	NM	320	221	72.3	121	<0.01	1.69		0.06	12.4	0.94
Nov-10	2600	7.70	940	1850	89	<0.05	<0.05	897	<0.10	0.26	345	240	78.1	118	0.01	1.59		0.12	NM	NM
Apr-11	2990	7.63	950	1750	109	<0.05	<0.05	949	<0.10	0.18	344	216	69.7	104	0.04	1.76		<0.02	12.5	1.07
Nov-11	2550	7.71	982	1790	110	<0.05	<0.05	1100	<0.10	<0.05	303	251	76.2	141	0.07	1.81		0.19	12.9	0.70
Apr-12	3280	8.03	978	1920	118	<0.05	<0.05	1120	<0.10	0.48	351	254	73.8	135	0.02	1.65		0.21	10.5	1.05
Nov-12	3120	7.82	1010	1850	136	<0.05	<0.05	1160	<0.10	0.63	281	279	96.8	171	0.03	1.28		0.30	14.8	0.96
Apr-13	2970	7.95	978	1490	86.4	<1.0	<1.0	806	<2.0	0.15	294	184	62.6	90.5	<0.01	2.20		0.23	8.4	1.38
Nov-13	3000	7.84	933	1450	82.9	<1.0	<1.0	851	<2.0	0.16	254	197	63.3	119	0.01	1.57		0.09	NM	NM
May-14	2990	7.94	962	1570	85.1	<1.0	<1.0	743	<2.0	0.14	268	219	65.8	122	0.02	1.60		0.20	7.7	1.15
Oct-14	3230	7.37	1020	1560	120	<1.0	<1.0	968	<2.0	0.20	248	228	68.6	134	0.02	1.51		0.15	10.6	0.64
Apr-15	3190	7.47	969	1600	144	<0.5	<0.5	891	<1.0	0.13	256	234	83.6	132	0.04	1.71		0.08	9.5	0.71
Oct-15	3540	8.01	1090	1840	168	<1.0	<1.0	1010	<2.0	0.50	265	287	90.6	183	3.87	1.49	1.98	0.04	10.3	0.56
Nov-16	2880	7.89	913	1429	139	<1.0	<1.0	721	NM	0.21	242	201	66.1	118	3.02	1.59	1.11	2.83	9.2	3.57
Sep-17	3650	7.72	1040	1688	192	<0.5	<0.5	954	NM	0.13	265	250	88.1	148	4.13	1.50	1.73	0.06	15.4	0.94
Nov-18	3570	7.87	1040	1711	255	<1.0	<1.0	901	NM	0.51	258	260	120	162	<0.010	1.38	1.44	<0.02	13.3	0.35
Oct-19	2960	7.76	986	1688	149	<1.0	<1.0	893	NM	<0.02	288	236	79.9	139	3.55	1.68	1.55	0.11	9.9	0.79
Oct-20	3160	7.87	1050	1683	162	<1.0	<1.0	875	NM	0.12	278	241	103	143	0.034	1.51	1.59	<0.02	11.7	0.62
Sep-22	2420	7.52	884	1440	52	<0.14	<0.11	627	<0.26	0.23	360	131	52.6	58	0.049	1.30	1.48	<0.02	9.1	0.58
Nov-23	2830	7.49	988	1325	100	<0.07	<0.05	729	NM	1.05	232	181	68.1	128	5.23	1.17	1.54	0.07	13.3	0.56
Nov-24	2830	7.48	822	1048	56.5	<0.14	<0.11	583	NM	0.50	193	138	43.6	105	0.033	0.96	1.62	0.03	23.0	0.60
Average	3043	7.64	917	1657	149	0.25	<1.0	954	<0.10	0.29	271	209	84.1	123	1.97	1.47	1.56	0.48	13.9	1.22
Std. Dev.	556	0.27	121	366	81	0.22	NA	304	NA	0.23	53.6	50.3	27.6	30.6	2.40	0.298	0.23	0.5	4.24	0.90

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-3 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Jan-01	2180	7.09	667	1380	143	NM	NM	715	NM	NM	NM	NM	85.7	NM	9.15	NM		0.82	17.2	1.71
Jun-01	2000	7.51	566	1110	124	NM	NM	656	NM	NM	NM	NM	57.2	NM	12.15	NM		0.75	19.65	1.36
Dec-01	2770	7.29	598	1730	187	NM	NM	1080	NM	NM	NM	NM	83.1	NM	13.60	NM		1.27	19.9	1.86
Jun-02	2300	7.18	577	1360	161	NM	NM	804	NM	NM	NM	NM	68.4	NM	7.49	NM		0.93	16.5	4.75
Oct-02	2430	7.40	678	1710	198	NM	NM	971	NM	NM	NM	NM	NM	NM	NM	NM		1.27	14.5	2.24
May-03	2860	7.43	706	1680	169	0.2	NM	860	NM	NM	NM	NM	99.0	NM	10.2	NM		0.88	22.9	1.68
Nov-03	3090	NM	680	1660	209	0.5	NM	987	NM	NM	NM	NM	93.9	NM	12.2	NM		0.92	16.4	1.45
May-04	3140	7.21	735	1830	237	0.6	NM	1150	NM	NM	NM	NM	122	NM	10.8	NM		0.63	14.8	1.56
Nov-04	NM	NM	808	NM	184	NM	NM	929	NM	NM	NM	NM	104	NM	8.27	NM		0.78	18.0	NM
Jun-05	2490	NM	696	NM	124	0.1	NM	710	NM	NM	NM	NM	87.3	NM	9.43	NM		0.75	NM	NM
Dec-05	2580	8.00	777	1400	175	0.3	0.09	1120	NM	NM	NM	NM	110	NM	9.9	NM		0.78	17.2	3.00
Apr-06	2840	7.60	705	1460	148	0.33	<0.05	823	NM	NM	NM	NM	91.8	NM	29.1	NM		0.46	NM	NM
Oct-06	2160	7.83	678	234	107	<0.05	<0.05	630	<0.10	0.44	40.6	32.3	12.8	17.2	0.52	0.936		1.11	NM	NM
Apr-07	2170	7.59	688	1080	98	<0.05	<0.05	534	<0.10	1.23	180	152	61.1	82.4	0.39	0.654		0.94	NM	NM
Nov-07	2280	7.42	754	1440	109	<0.05	<0.05	602	<0.10	0.44	263	189	75.7	88.7	17.8	1.120		0.20	NM	NM
Apr-08	2240	7.97	818	1200	109	0.05	<0.05	591	<0.10	0.11	214	162	63.2	65.1	0.60	0.850		1.73	NM	NM
Oct-08	2640	7.84	749	1360	119	<0.05	<0.05	648	<0.10	0.32	249	180	72.7	79.6	0.28	0.987		1.95	NM	NM
Apr-09	1650	7.85	553	779	62	0.17	<0.05	259	<0.10	0.08	129	111	38.2	69.0	0.04	0.449		0.46	NM	NM
Nov-09	1800	7.79	610	834	72	<0.05	<0.05	390	<0.10	0.07	151	111	45.6	64.8	0.02	0.529		0.20	NM	NM
Apr-10	1990	7.94	746	1090	76	0.06	<0.05	480	<0.10	NM	184	152	49.9	78.1	<0.01	0.769		<0.05	13.6	1.34
Nov-10	2040	7.65	737	1310	84	<0.05	<0.05	633	<0.10	0.06	261	159	57.0	67.4	0.15	0.995		0.84	NM	NM
Apr-11	2250	7.87	734	1130	86	<0.05	<0.05	608	<0.10	0.13	189	159	48.9	70.8	0.01	0.744		<0.02	10.5	4.26
Nov-11	1910	7.77	725	1290	88	<0.05	<0.05	788	<0.10	<0.05	241	168	59.4	72.2	0.02	0.919		1.34	10.4	2.45
Apr-12	2150	8.22	743	1190	66	<0.05	<0.05	542	<0.10	<0.05	203	167	48.8	76.3	0.01	0.651		0.57	10.3	2.16
Nov-12	2320	7.79	825	1510	101	<0.05	<0.05	767	<0.10	0.40	284	194	71.2	74.9	0.29	1.080		1.11	10.7	2.26
Apr-13	2210	7.88	744	1120	65.4	<1.0	<1.0	503	<2.0	<0.05	197	153	44.6	70.4	<0.01	0.900		0.60	9.8	2.66
Nov-13	2440	8.04	716	1360	82.8	<0.5	<0.5	713	<1.0	0.18	221	196	62.6	85.9	<0.01	0.914		0.83	NM	NM
May-14	2330	7.74	765	1180	72.7	<0.5	<0.5	515	<1.0	0.06	184	174	47.2	86.4	0.02	0.986		1.06	9.7	1.62
Oct-14	2440	7.40	663	1230	88.7	<0.5	<0.5	777	4.6	<0.05	204	175	56.3	72.1	0.01	1.46		0.59	10.8	1.22
Apr-15	2170	7.50	668	1100	81.1	<0.25	<0.25	581	<0.50	0.18	186	154	49.3	77.1	0.04	1.080		0.40	11.7	1.21
Oct-15	2300	7.93	587	1150	76.8	<1.0	<1.0	769	<2.0	0.05	201	157	47.0	73.8	15	0.93		0.85	10.0	1.46
Nov-16	2350	7.82	549	1230	75.1	<0.5	<0.5	841	<1.0	0.06	212	169	44.6	70.2	0.029	0.79		0.57	12.1	1.36
Sep-17	2450	7.83	592	1220	71.0	<0.5	<0.5	756	<1.0	0.29	227	158	41.9	71.4	0.030	1.02		0.80	14.7	1.83
Nov-18	2320	7.90	615	1250	104	0.50	<0.5	773	<1.0	<0.05	218	171	47.3	73.5	<0.010	0.77	0.92	0.18	19.2	0.90
Oct-19	2080	7.73	648	1170	87.8	<0.5	<0.5	639	<2.0	0.08	198	165	47.3	72.8	<0.010	0.94	1.09	0.97	11.0	1.58
Oct-20	2280	7.87	723	1270	97.6	<0.5	<0.5	697	<1.0	0.07	210	180	47.7	75.0	<0.010	0.95	0.99	0.34	12.3	1.22
Oct-21	2320	7.51	715	1200	76.1	<0.14	<0.11	674	<0.26	0.03	207	167	41.8	74.6	0.031	1.12	1.27	0.28	71.5	1.55
Sep-22	2290	7.63	710	1070	80.9	<0.14	<0.11	648	<0.26	0.15	218	127	46.2	89.3	0.033	0.86	0.96	0.24	22.0	1.19
Nov-23	2150	7.83	742	1020	74.6	0.42	<0.05	471	<0.13	0.12	184	136	36.4	59.6	0.025	0.61	0.87	<0.02	11.9	0.18
Nov-24	2590	7.47	831	1150	64.3	<0.14	<0.11	496	<0.26	0.15	209	153	40.9	62.6	<0.020	0.78	1.19	0.17	22.4	0.77
Average	2460	7.55	696	1250	111	0.21	<0.5	703	<1.0	0.18	202	156	61.7	72.2	4.30	0.89	1.04	0.77	16.6	1.82
Std. Dev.	315	0.26	75.4	287	46	0.20	NA	193	NA	0.25	45.3	31.9	23.4	13.1	6.8	0.206	NA	0.41	11.3	0.96

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-4 (Silt Loam Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Jan-01	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM		NM	NM	NM
Jun-01	513	7.72	252	276	3.2	NM	NM	44.4	NM	NM	NM	NM	8.2	NM	4.65	NM		0.19	13.5	0.56
Dec-01	454	7.77	256	1060	1.7	NM	NM	20.9	NM	NM	NM	NM	6.0	NM	1.17	NM		0.21	11.1	0.62
Jun-02	447	7.66	232	254	1.3	NM	NM	12.3	NM	NM	NM	NM	7.8	NM	0.25	NM		0.12	10.1	1.19
Oct-02	420	8.05	238	231	1.3	NM	NM	17.5	NM	NM	NM	NM	NM	NM	NM	NM		0.11	9.8	0.47
May-03	418	7.92	225	216	1.0	NM	NM	8.4	NM	NM	NM	NM	4.7	NM	1.38	NM		0.11	10.7	0.41
Nov-03	446	NM	227	267	7.0	NM	NM	6.9	NM	NM	NM	NM	8.3	NM	0.71	NM		0.05	9.6	0.42
May-04	416	7.81	227	232	1.3	NM	NM	6.6	NM	NM	NM	NM	4.5	NM	1.86	NM		0.15	7.7	0.49
Nov-04	NM	NM	228	NM	0.9	NM	NM	9.9	NM	NM	NM	NM	6.0	NM	0.75	NM		0.13	10.4	NM
Jun-05	395	NM	217	NM	4.12	0.20	NM	10.2	NM	NM	NM	NM	5.6	NM	ND	NM		0.10	NM	NM
Dec-05	378	8.20	239	210	2.0	NM	NM	9.0	NM	NM	NM	NM	5.5	NM	0.21	NM		NM	8.9	2.00
Apr-06	421	7.91	219	228	0.67	<0.05	<0.05	6.91	NM	NM	NM	NM	4.48	NM	4.92	NM		0.08	NM	NM
Oct-06	390	8.34	220	215	1.17	0.11	<0.05	5.7	<0.10	0.79	56.8	17.7	3.39	2.03	0.18	0.022		0.15	NM	NM
Apr-07	431	7.87	217	232	1.93	0.06	<0.05	14.5	<0.10	1.51	61.8	18.9	3.95	1.96	0.15	0.032		0.10	NM	NM
Nov-07	423	7.98	220	245	1.46	<0.05	<0.05	11.0	<0.10	0.64	66.8	19.1	3.43	1.35	6.85	0.247		<0.05	NM	NM
Apr-08	429	8.27	231	232	0.97	<0.05	<0.05	15.3	<0.10	0.42	62.4	18.4	3.38	16.8	0.15	0.043		<0.05	NM	NM
Oct-08	445	8.19	221	218	1.57	<0.05	<0.05	12.4	<0.10	0.46	58.5	17.4	3.18	1.34	0.07	0.056		0.12	NM	NM
Apr-09	436	8.00	211	248	0.79	<0.05	<0.05	20.7	<0.10	0.13	67.0	19.7	3.59	1.59	0.33	0.055		<0.05	NM	NM
Nov-09	428	8.15	227	232	0.79	<0.05	<0.05	8.69	<0.10	0.15	62.1	18.6	3.39	1.33	0.15	0.043		<0.05	NM	NM
Apr-10	415	8.20	225	246	2.00	0.07	<0.05	16.2	<0.10	NM	66.5	19.3	3.56	1.33	<0.01	0.041		<0.05	8.4	0.23
Nov-10	394	8.05	227	257	1.02	<0.05	<0.05	12.8	<0.10	0.33	69.9	20.1	3.87	1.47	<0.01	0.043		<0.05	NM	NM
Apr-11	439	8.08	222	239	1.11	<0.05	<0.05	17.2	<0.10	0.28	64.3	19.0	3.25	1.52	<0.01	0.041		0.04	7.6	0.55
Nov-11	360	8.07	236	236	1.38	<0.05	<0.05	14.3	<0.10	<0.05	63.5	18.9	3.37	1.62	<0.01	0.040		0.06	9.1	0.35
Apr-12	417	8.15	220	230	1.23	<0.05	<0.05	13.4	<0.10	0.06	61.8	18.3	3.19	1.37	0.06	0.035		<0.05	7.6	0.76
Nov-12	389	8.08	223	228	1.32	<0.05	<0.05	7.92	<0.10	0.09	61.2	18.3	3.60	1.28	0.10	0.049		<0.05	9.7	0.46
Apr-13	458	8.03	232	241	1.38	<0.05	<0.05	14.8	<0.10	0.20	64.7	19.3	3.27	1.24	<0.01	0.039		<0.05	7.7	0.47
Nov-13	459	8.24	218	262	1.28	<0.05	<0.05	10.9	<0.10	0.14	70.8	20.8	3.58	1.46	0.10	0.046		<0.05	NM	NM
May-14	459	8.24	235	256	1.42	0.46	<0.05	13.7	<0.10	0.09	67.7	21.0	3.75	2.98	0.02	0.037		0.37	7.6	0.82
Oct-14	10 433	7.84	222	241	1.52	<0.10	<0.10	13.5	<0.20	0.08	64.5	19.3	3.23	1.56	0.22	0.043		0.09	8.9	0.37
Apr-15	413	7.87	218	211	1.40	<0.05	<0.05	13.2	<0.10	0.25	56.5	17.1	3.20	1.58	0.07	0.033		0.03	8.1	0.32
Oct-15	446	7.99	232	231	2.01	<0.10	<0.10	13.5	<0.20	0.09	62.5	18.1	3.26	1.56	3.56	0.168		0.06	8.0	0.32
Apr-16	10 439	8.05	229	231	1.45	<0.05	<0.05	25.7	<0.10	0.05	62.2	18.4	3.30	1.20	0.03	0.030		0.03	8.8	0.40
Nov-16	432	8.01	224	219	1.24	<0.05	<0.05	12.7	<0.10	0.07	59.8	16.9	3.01	1.08	0.21	0.024		<0.02	8.2	0.31
Apr-17	379	7.97	194	206	0.74	<0.05	<0.05	10.0	<0.10	<0.05	55.2	16.6	2.63	1.06	0.57	0.030		0.10	7.5	0.27
Sep-17	477	8.17	235	221	1.47	<0.05	<0.05	10.1	<0.10	0.06	58.5	18.1	3.16	1.17	0.08	0.035		0.07	11.5	0.51
May-18	380	7.97	200	200	1.70	<0.10	<0.010	16.0	<0.010	<0.10	53.0	16.0	2.70	0.97	<0.10	0.014		<0.050	6.9	0.20
Nov-18	455	7.98	233	233	4.41	0.12	<0.05	14.8	<0.10	<0.05	62.5	18.7	4.88	1.35	0.021	0.008	0.031	<0.02	10.8	<0.10
Apr-19	432	7.55	247	216	1.22	<0.05	<0.05	11.2	<0.10	0.08	58.0	17.2	3.17	1.19	0.020	0.030	<0.10	0.06	9.4	0.26
Oct-19	407	7.63	221	229	1.46	0.14	<0.05	12.0	<0.10	0.09	61.0	18.7	3.24	1.32	0.072	0.010	0.085	<0.02	9.6	0.26
Apr-20	510	7.71	230	224	1.66	<0.05	<0.05	13.8	<0.10	0.07	59.7	18.3	3.03	1.14	0.49	0.013	0.035	0.08	11.0	0.41
Oct-20	401	8.06	218	215	1.58	0.18	<0.05	11.0	<0.10	0.10	56.3	18.0	3.10	1.10	0.15	<0.002	0.038	<0.02	10.6	0.33
May-21	449	7.85	218	230	1.63	<0.05	<0.05	11.7	<0.10	0.07	61.6	18.5	3.25	<2.50	1.35	0.024	0.045	0.03	6.7	0.42
Oct-21	434	7.89	224	215	1.29	<0.05	<0.05	10.9	<0.10	0.05	56.9	17.8	2.76	1.01	1.01	0.032	0.033	<0.02	35.9	0.27
Apr-22	472	7.76	204	208	1.35	<0.05	<0.05	13.3	<0.10	<0.02	55.4	17.0	2.95	1.02	0.51	0.023	0.034	<0.02	9.5	0.38
Sep-22	404	8.09	233	257	1.68	<0.05	<0.05	13.0	<0.10	0.03	69.6	20.1	4.12	0.91	0.69	0.025	0.036	0.02	10.3	0.26
Apr-23	457	7.83	221	205	1.73	0.05	<0.05	13.4	<0.10	0.03	53.8	17.1	3.29	1.01	0.56	0.027	0.026	<0.02	10.5	0.21
Nov-23	394	7.76	250	211	1.72	0.11	<0.05	11.5	<0.10	0.05	56.9	16.7	2.79	1.06	0.18	0.008	0.049	<0.02	6.5	<0.10
Apr-24	434	7.88	257	255	1.44	<0.05	<0.05	11.6	<0.10	0.03	66.3	21.8	3.10	1.26	0.12	0.031	0.040	0.05	10.7	0.12
Nov-24	441	7.83	266	216	1.48	<0.05	<0.05	10.5	<0.10	0.11	57.4	17.7	2.92	0.88	<0.020	0.025	0.038	<0.02	10.6	0.26
Average	429	7.97	228	249	1.66	<0.05	<0.05	13.2	<0.10	0.19	61.44	18.46	3.91	1.78	0.74	0.042	0.042	0.07	9.99	0.46
Std. Dev.	31.8	0.18	13.8	123.5	1.06	NA	NA	5.94	NA	0.29	4.66	1.28	1.38	2.60	1.44	0.044	0.015	0.07	4.64	0.34

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-5 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Apr-10	1040	7.98	368	512	103	0.05	<0.05	79.3	<0.10	NM	128	46.7	17.8	11.0	1.47	0.595		0.07	11.1	0.58
Nov-10	1040	7.86	421	613	104	<0.05	<0.05	82.4	<0.10	1.42	155	54.9	18.4	13.0	<0.01	0.597		0.06	NM	NM
Apr-11	955	7.83	376	483	60.4	<0.05	<0.05	82.5	<0.10	2.41	119	45.1	14.8	11.1	0.02	0.474		0.05	6.7	0.74
Nov-11	733	7.81	365	436	34.6	<0.05	<0.05	65.2	<0.10	<0.05	109	39.8	12.9	11.4	<0.01	0.464		0.13	9.0	0.58
Apr-12	618	8.05	266	305	24	<0.05	<0.05	35.3	<0.10	0.50	78	27	9.15	7.63	0.08	0.302		0.09	7.1	0.86
Nov-12	749	7.90	353	420	32	<0.05	<0.05	54.0	<0.10	0.75	107	37	11.9	9.88	<0.01	0.476		<0.05	7.6	0.63
Apr-13	984	7.95	425	497	28.6	<0.25	<0.25	74.5	<0.50	0.22	121	47.3	12.4	11.9	<0.01	0.724		0.06	7.3	0.70
Nov-13	955	8.13	356	512	66.5	<0.25	<0.25	57.4	<0.50	0.51	126	47.9	15.7	14.5	<0.01	0.716		0.14	NM	NM
May-14	1040	8.04	407	509	46.3	<0.25	<0.25	75.0	<0.50	0.36	124	48.3	15.9	12.7	0.04	0.678		0.17	8.3	0.82
Oct-14	996	7.45	376	484	77.3	<0.25	<0.25	65.2	<0.50	0.57	121	44.2	16.6	12.0	0.03	0.565		0.21	7.9	0.53
Apr-15	1170	7.55	397	547	116	<0.25	<0.25	72.6	<0.50	0.39	138	49.1	18.7	13.7	0.03	0.707		0.10	5.6	0.46
Oct-15	1400	7.66	393	627	192	<0.25	<0.25	77.0	<0.50	0.94	163	53.4	22.1	15.1	13.6	1.050		0.06	5.0	0.27
Nov-15	1440	8.14	378	678	233	<0.25	<0.25	58.8	<0.50	0.18	180	55.6	28.1	15.7	<0.010	0.929		0.13	4.4	0.52
Apr-16	961	7.72	349	440	91	<0.25	<0.25	68.1	<0.50	1.7	114	37.7	18.7	10.2	0.03	0.601		0.13	10.0	0.64
Nov-16	1460	7.62	376	627	264	<0.25	<0.25	57.8	<0.50	0.52	167	51.0	27.7	14.0	0.014	0.777		0.10	4.1	0.40
Apr-17	1160	7.93	376	530	161	<0.25	<0.25	48.0	<0.50	1.38	139	44.5	20.3	11.6	0.030	0.444		0.19	12.5	0.44
Sep-17	1380	8.00	341	547	205	<0.25	<0.25	49.2	<0.50	0.10	141	47.3	23.2	13.2	<0.01	0.639		0.10	15.7	0.42
May-18	1300	7.77	370	580	150	<0.10	<0.010	49.0	<0.010	<0.10	150	51.0	26.0	11.0	<0.10	0.710		0.18	4.5	0.27
Nov-18	914	7.85	331	381	94	<0.25	<0.25	43.1	<0.50	<0.05	99	32.6	14.8	8.6	<0.010	0.268	0.51	0.03	11.3	0.47
Apr-19	932	7.76	369	411	83	<0.25	<0.25	37.2	<0.50	0.61	108	34.4	17.1	8.8	<0.01	0.518	0.54	0.09	8.3	0.54
Oct-19	855	7.69	282	418	115	<0.25	<0.25	28.9	<0.50	0.51	110	34.8	13.4	7.8	0.032	0.432	0.33	0.05	9.2	0.27
Apr-20	1280	7.67	341	513	146	<0.25	<0.25	49.8	<0.50	1.19	135	42.8	21.4	9.1	0.035	0.615	0.68	0.16	8.6	0.43
Oct-20	1240	7.90	337	580	212	<0.25	<0.25	55.7	<0.50	0.46	151	49.2	22.8	9.2	<0.010	0.661	0.82	0.08	5.6	0.39
May-21	1050	7.68	299	287	156	<0.25	<0.25	47.6	<0.50	1.03	75.8	23.7	10.6	4.2	2.45	0.516	0.49	<0.02	8.0	0.42
Oct-21	915	7.65	349	469	77.1	<0.05	<0.05	43.1	<0.10	0.77	125	38.1	17.0	7.7	0.016	0.580	0.94	<0.02	65.4	0.41
Apr-22	869	7.70	324	353	34.3	<0.05	<0.05	36.4	<0.10	1.02	95	28.3	12.6	6.0	0.031	0.418	0.61	<0.02	5.6	0.74
Sep-22	837	7.84	380	420	23.7	<0.05	0.38	47.6	<0.10	0.86	120	29.2	10.0	6.9	0.034	0.365	0.43	<0.02	9.3	0.72
Apr-23	789	7.59	353	379	19.3	0.08	<0.05	50.4	<0.10	1.18	103	29.6	8.54	6.24	0.026	0.448	0.34	<0.02	14.0	1.07
Nov-23	794	7.56	414	399	14.7	0.11	<0.05	57.0	<0.10	1.89	110	30.1	6.54	5.28	0.046	0.145	0.35	<0.02	8.2	0.88
Apr-24	952	7.50	485	520	14.2	<0.05	<0.05	74.8	<0.10	1.11	137	43.1	8.75	6.96	<0.020	0.77	0.48	0.40	12.1	1.06
Nov-24	1030	7.53	553	507	12.7	<0.05	<0.05	89.7	<0.10	0.56	137	40.1	9.12	6.34	0.025	0.60	0.55	<0.02	11.7	0.50
Average	1027	7.78	371	483	96.5	<0.25	<0.25	58.5	<0.50	0.77	125	41.4	16.2	10.1	0.59	0.574	0.54	0.12	10.49	0.58
Std. Dev.	219	0.19	54.4	94	71.6	NA	NA	15.9	NA	0.58	24.3	8.91	5.80	3.10	2.47	0.187	NA	0.08	10.96	0.22

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-6 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN	
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV	
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA	
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV	
Apr-10		798	8.29	380	387	34.5	0.91	<0.05	39.6	<0.10	NM	105	30.3	30.2	18.2	1.32	0.028		<0.05	21.2	2.29
Nov-10		697	8.10	379	415	23.6	0.12	<0.05	15.5	<0.10	1.89	114	31.6	16.9	6.69	<0.01	0.532		0.17	NM	NM
Apr-11		772	8.14	363	384	30.6	0.12	<0.05	22.1	<0.10	0.77	105	29.7	19.9	7.28	0.04	3.53		0.02	12.0	1.79
Nov-11		578	8.27	335	366	22.0	<0.05	<0.05	12.5	<0.10	<0.05	100	28.3	15.4	6.06	0.09	1.39		0.26	14.8	1.34
Apr-12		689	8.26	337	345	26.3	0.15	<0.05	15.3	<0.10	0.70	94	26.8	14.6	5.34	0.04	1.84		0.15	11.3	1.37
Nov-12		636	8.07	329	341	27.1	0.11	<0.05	12.8	<0.10	1.66	93	26.7	13.9	4.60	1.02	1.17	0.10	0.13	12.4	1.29
Apr-13		753	8.04	320	346	37.0	0.44	<0.25	22.1	<0.50	9.09	93	27.4	20.5	6.79	1.08	1.67	0.09	1.42	9.6	2.5
Nov-13		736	8.15	325	364	29.4	0.12	<0.10	16.5	<0.20	1.27	99.1	28.3	17.9	5.76	0.02	0.081		0.08	NM	NM
May-14		762	8.11	332	359	30.9	<0.25	<0.25	20.8	<0.50	1.37	96.4	28.7	18.4	5.48	0.01	0.64		0.46	9.3	1.28
Oct-14	10	782	7.68	361	372	35.3	<0.25	<0.25	15.5	<0.50	1.63	102	28.5	23.3	6.35	0.01	0.64		0.17	11.9	0.80
Apr-15		737	7.96	345	364	36.4	<0.25	<0.25	21.0	<0.50	2.90	98.4	28.8	23.5	7.72	0.03	0.42		0.17	10.2	1.07
Oct-15		954	8.08	415	416	56.1	<0.25	<0.25	24.0	<0.50	<0.05	114	31.9	38.3	12.8	62.2	3.97		0.17	10.8	1.01
Apr-16	10	750	8.16	352	367	35.0	<0.25	<0.25	28.5	<0.50	2.86	99.8	28.6	19.5	4.6	0.04	0.10		0.27	15.1	0.96
Nov-16		838	8.14	379	386	34.8	0.91	<0.25	24.4	<0.50	0.87	109	27.6	25.5	7.17	0.02	0.075		<0.02	9.2	0.81
Apr-17		753	8.20	339	385	26.9	<0.25	<0.25	24.2	<0.50	1.30	106	29.2	20.3	6.79	<0.01	0.61		0.72	12.3	1.13
Sep-17		1110	8.15	490	433	44.4	0.27	<0.25	22.4	<0.50	5.21	120	32.4	37.3	20.0	0.020	0.65		0.06	5.5	2.09
Nov-18		823	8.02	388	400	31.9	<0.25	<0.25	34.6	<0.50	<0.05	110	30.5	20.2	6.4	0.017	<0.002	0.16	<0.02	16.1	0.61
Apr-19		791	7.86	411	366	25.2	<0.25	<0.25	28.3	<0.50	0.77	101	27.7	18.9	7.1	<0.01	0.82	0.11	0.21	11.4	1.97
Oct-19		722	7.85	359	376	23.4	<0.10	<0.10	33.2	<0.20	3.04	103	28.9	15.9	7.1	<0.01	0.14	0.18	0.04	13.0	0.72
Apr-20		877	7.79	342	374	23.9	<0.25	<0.25	43.8	<0.50	4.55	101	29.5	13.0	4.9	<0.010	0.076	0.11	0.12	19.5	0.86
Oct-20		739	8.08	366	371	24.7	0.17	<0.10	35.6	<0.20	2.26	99.4	29.7	15.0	6.7	<0.010	0.026	0.16	0.03	20.1	0.70
May-21		725	7.79	325	344	27.2	<0.10	<0.10	22.3	<0.20	1.44	96	25.5	14.4	5.5	3.68	0.65	0.15	0.10	18.0	1.12
Oct-21		785	7.77	367	366	22.7	0.11	<0.05	29.6	<0.10	2.67	100	28.2	15.4	6.4	0.016	0.06	0.23	<0.02	170	0.96
Apr-22		800	7.62	306	339	21.0	0.21	<0.05	30.7	<0.10	1.06	94	25.5	17.3	7.8	0.035	0.25	0.14	0.09	11.3	0.94
Sep-22		814	8.00	388	391	25.8	<0.05	0.36	28.9	<0.10	2.04	105	31.2	15.1	7.2	0.043	0.13	0.20	0.09	16.8	0.73
Apr-23		769	7.73	345	340	21.0	<0.05	<0.05	38.2	<0.10	2.80	92	27.0	11.9	3.80	0.017	0.36	0.08	0.03	14.2	1.77
Nov-23		775	7.85	420	402	21.7	0.09	<0.05	32.9	<0.10	2.02	112	29.8	13.8	4.99	0.036	0.041	0.16	0.03	13.8	4.40
Apr-24		882	7.67	416	419	20.1	<0.05	<0.05	34.6	<0.10	2.49	113	33.2	13.1	4.53	<0.020	0.63	0.11	0.13	18.0	3.55
Nov-24		836	7.77	512	353	23.1	<0.05	<0.05	25.6	<0.10	2.32	97	26.9	14.1	4.95	<0.020	0.041	0.16	<0.02	20.8	1.88
Average		782	7.99	370	375	29.0	0.18	<0.25	26.1	<0.5	2.11	102	28.9	19.1	7.21	2.41	0.73	0.142	0.18	19.6	1.48
Std. Dev.		96.5	0.20	47.6	25.6	7.97	0.22	NA	8.34	NA	1.84	7.39	1.95	6.64	3.68	11.52	0.989	0.041	0.28	30.32	0.90

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-7S (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Nov-12	2110	7.64	1070	929	200	<0.05	<0.05	3.16	<0.10	16.0	245	77.0	158	32.4	11.2	1.66	0.81	9.8	39.7	13.2
Apr-13	1910	7.86	812	668	158	<0.5	<0.5	6.55	<1.0	3.94	182	51.8	116	21.1	9.46	1.14	0.55	15.3	26.2	22.8
Oct-15	2390	7.83	1200	754	97.5	<1.0	<1.0	10.9	<2.0	1.86	203	60.0	115	63.3	35.0	1.66		60.7	30.5	62.1
Apr-16	2170	7.87	1130	720	77.1	<0.5	<0.5	20.4	<1.0	3.22	200	53.6	106	57.1	0.07	0.93		59.3	33.5	59.5
Nov-16	1980	7.73	1040	614	60.1	0.14	<0.05	4.93	<0.10	1.66	173	44.1	71.8	59.5	0.08	0.60		55.3	28.0	56.4
Apr-17	2210	7.72	1120	729	87.6	<0.5	<0.5	7.7	<1.0	1.38	189	62.5	91.2	51.1	0.13	0.68		54.1	34.8	55.0
Sep-17	2130	7.70	1030	497	68.9	<0.25	<0.25	16	0.73	0.06	133	40.0	185	39.5	0.06	0.65		40.0	29.3	45.7
May-18	2000	7.54	950	650	80.0	<0.10	<0.010	<1.0	<0.010	<0.10	180	47.0	84	52.0	<0.10	0.85		45.0	28.0	52.0
Nov-18	1680	7.71	839	539	57.3	<0.25	<0.25	10.1	<1.0	<0.05	158	35.0	122	43.6	0.02	0.49	0.74	32.4	20.6	32.8
Apr-19	1680	7.55	951	600	46.5	<0.25	<0.25	5.46	<0.50	1.10	181	36.0	62.3	37.1	<0.01	0.87	0.80	26.8	21.6	34.0
Oct-19	1640	7.44	879	612	61.3	<0.25	<0.25	4.16	<0.50	2.18	187	35.3	84.3	42.3	0.034	0.88	0.89	42.3	22.0	40.4
Apr-20	2300	7.40	967	653	83.4	<1.0	<1.0	8.90	<2.0	1.34	199	37.9	76.6	46.7	0.102	0.92	1.09	49.1	32.4	48.7
Oct-20	1910	7.63	1020	645	74.6	<0.25	<0.25	2.83	<0.50	0.53	198	36.6	90.1	54.0	0.044	0.69	1.14	53.0	30.0	55.5
May-21	2010	7.22	978	639	63.6	<0.5	<0.5	6.80	<1.0	0.73	198	35.1	71.7	48.5	29.5	0.87	1.17	62.9	31.3	63.8
Oct-21	1920	7.24	972	611	55.1	<0.07	<0.05	1.56	<0.13	1.52	183	37.3	63.9	51.2	0.061	0.96	1.20	50.5	298	59.0
Apr-22	2230	7.26	980	709	76.7	0.38	<0.05	1.99	<0.13	0.18	217	40.6	92.5	47.8	0.055	1.07	1.57	53.3	27	57.1
Sep-22	2180	7.34	1090	549	92.2	<0.14	1.55	<0.38	<0.26	0.84	162	35.1	93.7	59.9	0.096	0.76	1.23	61.0	43	76.5
Apr-23	2360	7.15	1090	609	95.5	<0.14	<0.11	<0.38	<0.26	0.14	185	35.7	128	40.8	0.081	0.75	1.29	60.7	46	61.4
Nov-23	2240	7.25	1170	623	83.0	0.78	<0.05	9.55	<0.13	0.63	191	35.4	85.1	56.1	0.086	1.11	1.44	74.0	27	74.0
Apr-24	3050	6.98	1200	794	128	<0.14	<0.11	2.92	<0.26	0.67	235	50.2	120	62.3	0.15	1.55	1.94	63.5	56.9	66.0
Nov-24	2900	7.03	1220	597	126	<0.14	<0.11	3.08	<0.26	1.03	182	34.7	114	53.3	0.11	1.13	1.63	90.5	51.8	344
Average	2143	7.48	1034	654	89.2	<1.0	<1.0	7.06	<2.0	1.86	190	43.9	101	48.6	4.12	0.96	1.17	50.5	45.6	65.7
Std. Dev.	351	0.27	117	95	37.0	NA	NA	5.03	NA	3.40	24.5	11.5	30.6	10.5	9.9	0.33	0.38	18.6	58.63	65.7

Monitoring Well OW-7D (Deeper Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Nov-12	778	8.10	383	461	19.8	<0.05	<0.05	78.1	<0.10	3.96	122	37.9	12	1.08	2.91	0.155	0.03	0.42	14.6	1.31
Apr-13	856	8.05	387	470	17.0	<0.25	<0.25	61.4	<0.50	4.19	123	39.5	9.77	1.03	2.55	0.130	0.02	0.15	13.8	1.15
Oct-15	893	7.92	405	465	20.3	<0.25	<0.25	74.8	<0.50	2.80	124	37.8	10.5	1.08	15.4	1.20		0.32	14.2	0.87
Nov-16	926	7.92	413	488	20.7	<0.25	<0.25	78.5	<0.50	2.69	132	38.4	11.4	0.95	0.027	0.139		0.28	15.1	0.92
Sep-17	994	8.02	423	472	18.7	<0.25	<0.25	76.0	<0.50	1.01	123	40.1	10.9	0.88	0.030	0.152		0.30	20.2	0.86
Nov-18	963	7.73	427	528	25.8	<0.25	<0.25	101	<0.50	<0.05	139	43.9	14.4	1.35	0.019	0.114	0.041	0.13	18.4	0.66
Oct-19	841	7.64	366	432	26.3	<0.25	<0.25	113	<0.50	1.19	113	36.3	29.0	1.76	<0.010	0.089	0.070	0.16	16.0	0.75
Oct-20	890	7.89	428	499	22.0	<0.10	<0.10	85.2	<0.20	0.78	130	42.3	11.6	0.85	0.015	0.151	0.079	0.24	20.9	1.06
Oct-21	920	7.68	409	473	18.4	<0.05	<0.05	83.4	<0.10	3.08	123	40.4	11.4	<1.00	0.015	0.122	0.033	0.02	150	1.02
Sep-22	959	7.89	373	449	28.0	<0.05	<0.05	126	<0.10	2.59	118	37.6	19.0	0.07	0.027	0.143	0.027	0.11	16.0	1.10
Nov-23	904	7.57	455	481	20.9	<0.05	<0.05	84.4	<0.10	1.50	129	38.5	13.3	0.81	0.035	0.156	0.037	0.17	6.9	2.96
Nov-24	924	7.63	496	250	18.2	<0.05	<0.05	78.9	<0.10	2.87	65.3	21.0	1.65	<0.50	0.022	0.059	0.023	0.10	17.4	0.79
Average	904	7.84	414	456	21.3	<0.25	<0.25	86.7	<0.5	2.22	120	37.8	12.9	0.99	1.76	0.22	0.04	0.20	27.0	1.12
Std. Dev.	58.9	0.18	36.5	69.1	3.54	NA	NA	18.0	NA	1.30	18.53	5.70	6.41	0.43	4.42	0.31	0.02	0.11	38.9	0.61

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-8 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Nov-12	1300	7.78	661	585	97.6	<0.05	<0.05	<0.10	<0.10	3.02	166	41.5	62.4	27.2	5.96	0.737	0.26	13.2	24.7	14.2
Apr-13	1950	7.93	852	785	157	<0.5	<0.5	3.39	<1.0	<0.05	213	61.4	98.6	21.3	5.81	0.654	0.38	9.74	41.0	16.2
May-14	3900	7.54	1630	978	272	<1.0	<1.0	28.5	<2.0	1.27	272	72.6	241	111	0.20	0.756		68.5	52.1	99.5
Oct-14	3560	7.05	1610	874	273	<1.0	<1.0	8.7	<2.0	3.98	238	68.0	204	106	0.46	0.807		160	90.6	168
Apr-15	2940	7.54	1350	728	206	<0.5	<0.5	44.2	<1.0	0.41	186	64.1	185	116	0.43	0.775		104	55.0	108
Oct-15	3690	7.90	1710	951	223	<2.5	<2.5	43.3	<5.0	0.51	249	79.9	219	159	24.9	0.616	2.06	122	55.6	134
Apr-16	3420	7.80	1630	910	213	<1.0	<1.0	57	<2.0	0.46	240	75.5	200	126	0.16	0.439		88.7	53.8	108
Nov-16	2890	7.69	1280	887	166	<0.25	<0.25	109	NM	1.02	250	63.8	153	96.2	23.4	0.568	1.57	88.2	51.3	93.0
Apr-17	2680	7.75	1210	772	114	<0.5	<0.5	80.2	<1.0	1.65	215	57.0	107	94.1	0.10	0.448		92.2	54.2	94.7
Sep-17	3170	7.64	1330	744	127	<0.5	<0.5	148	NM	1.27	197	61.3	130	106	12.9	0.490	1.65	89.0	44.3	100
May-18	3000	7.51	1400	890	120	<0.10	<0.010	93	<0.010	<0.10	240	68.0	130	110	0.13	0.520		86.0	38.0	100
Nov-18	2510	7.62	1160	786	103	<0.25	<0.25	115	NM	1.54	221	57.0	100	85.8	25.6	0.805	1.30	37.6	16.4	53.0
Apr-19	2110	7.67	1070	695	78.2	<0.5	<0.5	128	<1.0	2.44	195	50.5	74.3	68.5	0.05	0.371	0.16	44.7	27.6	58.5
Oct-19	1560	7.53	751	652	79.5	<0.25	<0.25	55.4	NM	1.83	194	40.7	52.1	43.5	1.45	0.541	0.78	27.6	28.5	32.2
Apr-20	2460	7.47	1050	682	89.1	<1.0	<1.0	48.0	<2.0	1.05	206	40.7	70.5	48.1	0.053	0.768	1.26	40.0	34.0	44.0
Oct-20	2000	7.85	1020	746	110	<0.25	<0.25	20.8	NM	0.70	221	47.2	100	54.0	0.065	0.598	1.19	43.5	36.4	49.5
May-21	2220	7.27	1010	685	94.5	<0.5	<0.5	19.5	<1.0	0.42	211	38.5	80.1	55.6	21.4	0.991	1.06	62.1	35.5	79.0
Apr-22	2430	7.37	997	697	98.4	0.82	<0.11	45.8	<0.26	0.97	207	43.7	103	61.0	0.11	0.683	1.99	61.2	34.9	78.0
Sep-22	2000	7.45	932	683	106	<0.07	<0.05	20.3	<0.13	0.80	207	40.4	94.7	46.7	37.3	0.927	1.18	41.4	48.5	58.5
Apr-23	1510	7.21	635	542	103	<0.05	<0.05	51.0	<0.10	0.64	161	34.0	94.4	36.8	0.05	0.624	0.82	21.0	42.8	22.4
Nov-23	2150	7.33	988	677	122	<0.07	<0.05	65.4	----	0.66	219	31.6	112	43.6	40.7	1.160	1.34	48.8	41.4	53.5
Apr-24	2450	7.06	937	679	115	<0.14	<0.11	55.8	<0.26	0.28	198	44.8	103	44.0	0.082	0.812	1.27	30.6	29.8	35.6
Nov-24	2370	7.09	961	597	118	<0.14	<0.11	51.1	----	1.15	179	36.4	109	34.1	0.080	0.889	0.93	30.4	43.3	31.1
Average	2533	7.52	1138	749	138	<1.0	<1.0	58.7	<1.0	1.14	212	53.0	122.7	73.7	8.76	0.695	1.13	61.3	42.6	70.9
Std. Dev.	703	0.26	311	118	58.7	NA	NA	39.0	NA	0.96	27.4	14.4	52.6	37.2	13.15	0.19	0.54	37.5	15.0	39.8

Monitoring Well OW-9 (Silt Loam Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Nov-12	384	8.08	224	216	1.19	<0.05	<0.05	4.04	<0.10	<0.05	60.2	15.9	4.66	3.05	0.03	0.023		1.35	9.2	1.54
Apr-13	426	8.02	233	223	1.16	<0.05	<0.05	1.28	<0.10	13.1	61.3	17.0	4.05	1.71	<0.01	0.014		0.49	9.7	1.62
Average	405	8.05	229	220	1.18	<0.05	<0.05	2.66	<0.10	6.55	61	16.45	4.36	2.38	0.03	0.019		0.92	9.45	1.58
Std. Dev.	29.7	0.04	6.4	4.9	0.02	NA	NA	1.95	NA	NA	0.78	0.78	0.43	0.95	NA	0.01		0.61	0.35	0.06

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-10S (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Nov-12	556	7.94	315	297	7.28	<0.05	<0.05	9.96	<0.10	13.3	84.0	21.3	26.2	1.21	3.96	0.25	0.040	1.72	19.8	2.2
Apr-13	614	8.08	272	332	7.43	<0.10	<0.10	49.8	<0.20	5.4	92.3	24.6	14.8	0.91	2.74	0.26	<0.01	0.75	23.4	2.24
Oct-15	700	7.97	362	295	6.83	0.18	<0.10	16.5	<0.20	2.35	84.6	20.3	43.4	1.53	18.7	1.02		0.50	22.4	1.59
Nov-16	700	7.96	340	283	4.97	<0.25	<0.25	43.5	<0.50	1.85	81.8	19.1	40.0	0.94	0.19	0.27		0.54	26.7	2.08
Sep-17	700	7.81	315	305	5.64	<0.05	<0.05	45.2	<0.10	1.64	86.2	21.7	19.1	0.89	0.18	0.25		0.50	34.3	1.56
Nov-18	592	7.74	272	310	5.84	<0.10	<0.05	49.5	<0.10	<0.05	86.6	22.7	8.62	0.87	0.20	0.28	0.057	0.30	34.1	1.42
Oct-19	598	7.49	294	344	5.07	<0.05	<0.05	54.9	<0.10	3.71	94.7	26.2	8.25	0.92	0.19	0.28	0.082	0.36	33.9	1.48
Oct-20	570	7.82	294	295	6.58	0.05	<0.05	32.3	<0.10	1.82	81.0	22.4	12.8	1.06	0.29	0.30	0.089	0.29	33.4	1.46
Oct-21	590	7.43	276	298	5.30	<0.05	<0.05	35.1	<0.10	1.17	84.9	21.0	6.84	0.86	0.19	0.25	0.057	0.16	109	1.57
Sep-22	542	7.69	273	271	5.49	<0.05	<0.05	19.5	<0.10	1.64	74.1	20.9	10.7	1.00	0.22	0.24	0.065	0.18	34.8	2.42
Nov-23	506	7.26	310	244	4.72	<0.05	<0.05	10.6	<0.10	0.70	66.8	18.7	8.74	0.71	0.24	0.26	0.064	0.20	25.8	3.39
Nov-24	598	7.29	324	280	4.68	<0.05	<0.05	35.5	<0.10	1.10	74.9	22.5	3.85	0.53	0.27	0.26	0.041	0.24	35.9	1.60
Average	606	7.71	304	296	5.82	0.043	<0.10	33.5	<0.10	2.89	82.7	21.8	16.9	0.95	2.28	0.33	0.056	0.48	36.1	1.92
Std. Dev.	64.0	0.28	29.1	26.4	0.98	0.045	NA	15.92	NA	3.57	7.8	2.13	13.0	0.25	5.32	0.22	0.025	0.43	23.6	0.58

Monitoring Well OW-10D (Deeper Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Nov-12	448	8.19	261	276	3.02	<0.05	<0.05	12.5	<0.10	1.2	71.2	23.9	2.07	0.65	0.38	0.029	0.01	<0.05	2.5	0.18
Apr-13	520	8.19	268	276	3.17	<0.05	<0.05	11.6	<0.10	<0.05	69.3	25.0	1.63	0.71	0.38	0.027	0.03	<0.05	2.5	0.16
Oct-15	517	8.06	270	275	4.94	<0.10	<0.10	15.2	<0.20	0.09	70.6	24.0	1.47	0.70	1.29	0.076		0.02	2.0	<0.10
Nov-16	520	8.00	267	274	4.62	<0.05	<0.05	14.0	<0.10	0.05	71.6	23.2	1.46	0.72	0.026	0.030		0.05	2.2	<0.10
Sep-17	579	8.09	285	275	4.47	<0.05	<0.05	13.4	<0.10	0.07	69.3	24.7	1.56	0.70	<0.01	0.035		0.18	4.8	0.34
Nov-18	539	7.90	284	287	4.74	<0.05	<0.05	13.6	<0.10	<0.05	74.5	24.6	1.69	0.82	0.015	0.037	0.015	0.20	5.3	0.24
Oct-19	505	7.80	276	286	4.24	<0.05	<0.05	15.0	<0.10	0.08	72.5	25.6	1.54	0.76	<0.010	0.049	0.030	0.13	2.9	0.23
Oct-20	516	8.03	286	285	4.36	<0.05	<0.05	14.3	<0.10	0.13	71.1	26.1	1.60	0.68	<0.010	0.038	0.019	0.09	3.3	0.24
Oct-21	520	7.80	269	265	3.29	<0.05	<0.05	8.86	<0.10	0.05	68.4	22.9	1.56	0.60	0.22	0.061	0.020	0.24	35.7	0.70
Sep-22	538	8.07	278	294	4.41	<0.05	<0.05	14.6	<0.10	0.36	77.9	24.1	1.47	0.43	0.017	0.049	0.011	0.19	33.4	0.49
Nov-23	552	7.78	323	297	3.97	<0.05	<0.05	13.1	<0.10	0.11	76.5	25.8	1.69	0.63	<0.010	0.038	0.017	0.06	1.7	<0.10
Nov-24	534	7.77	339	253	2.58	<0.05	<0.05	6.45	<0.10	0.70	65.9	21.4	1.72	<0.50	<0.020	0.062	0.022	0.28	9.2	0.54
Average	524	7.97	284	279	3.98	<0.1	<0.1	12.7	<0.10	0.24	71.6	24.3	1.62	0.67	0.33	0.044	0.019	0.12	8.8	0.27
Std. Dev.	31	0.16	23.6	12.2	0.77	NA	NA	2.6	NA	0.36	3.4	1.34	0.17	0.10	0.45	0.015	0.007	0.09	12.2	0.21

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-11 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Sep-17	674	7.78	335	307	4.81	<0.05	<0.05	17.6	NM	0.13	86.3	22.3	7.67	0.33	1.49	0.238	0.019	0.33	39.7	4.08
Nov-18	590	7.26	319	327	6.01	<0.05	<0.05	35.2	<0.10	<0.05	93.3	22.9	5.97	0.48	0.38	0.219	0.014	0.22	40.4	1.57
Oct-19	547	7.72	290	315	4.91	<0.05	<0.05	25.7	<0.10	0.71	89.3	22.3	4.67	0.47	0.56	0.238	0.021	0.26	34.9	1.17
Oct-20	572	7.87	301	322	6.38	0.06	<0.05	29.6	<0.10	0.30	91.0	22.9	3.40	0.54	0.83	0.273	0.028	0.26	36.0	1.49
Oct-21	588	7.64	296	309	4.99	<0.05	<0.05	21.2	<0.10	0.61	87.3	22.2	3.49	<0.50	0.65	0.214	0.010	0.15	83.2	1.85
Sep-22	583	7.88	297	332	4.40	<0.05	<0.05	17.4	<0.10	0.37	95.0	22.9	2.83	<0.05	1.03	0.259	0.015	0.18	35.3	2.30
Nov-23	633	7.17	408	330	5.29	<0.05	<0.05	3.15	<0.10	0.80	91.7	24.5	2.71	<0.50	0.91	0.255	0.020	0.13	34.1	4.43
Nov-24	609	7.52	373	291	2.90	<0.05	<0.05	0.31	<0.10	0.12	82.7	20.4	2.75	<1.00	0.94	0.263	0.021	0.12	38.6	1.20
Average	600	7.61	327	317	4.96	<0.05	<0.05	18.8	<0.10	0.383	89.6	22.6	4.19	0.46	0.85	0.245	0.019	0.21	42.8	2.26
Std. Dev.	39.2	0.27	42.6	13.9	1.06	NA	NA	12.1	NA	0.293	4.02	1.14	1.80	0.09	0.34	0.02	0.005	0.07	16.50	1.29

Monitoring Well OW-12S (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Sep-17	405	8.05	202	180	1.08	<0.05	<0.05	6.86	NM	6.5	47.3	15.0	0.65	0.42	<0.010	0.018	<0.010	0.07	2.0	0.23
Nov-18	369	7.85	198	192	1.28	<0.05	<0.05	6.88	<0.10	<0.05	50.3	16.2	1.22	0.57	<0.010	0.006	<0.010	<0.02	3.0	<0.10
Oct-19	333	7.76	193	191	1.02	<0.05	<0.05	4.34	<0.10	1.67	49.7	16.2	0.91	0.61	<0.010	0.013	0.016	<0.02	3.6	<0.10
Oct-20	360	8.06	207	198	2.42	0.10	<0.05	4.77	<0.10	0.38	50.9	17.3	0.92	0.33	<0.010	0.003	0.033	<0.02	3.0	<0.10
Oct-21	364	7.86	196	191	0.78	<0.05	<0.05	4.21	<0.10	0.94	49.1	16.5	0.67	<0.50	0.015	0.006	<0.010	<0.02	51.1	<0.10
Sep-22	365	8.08	191	194	0.99	<0.05	<0.05	3.77	<0.10	0.27	50.4	16.5	0.78	<0.05	0.027	0.007	<0.010	<0.02	1.7	0.15
Nov-23	369	7.58	238	209	7.12	<0.05	<0.05	4.91	<0.10	0.42	55.4	17.2	1.03	<0.50	<0.010	0.010	<0.010	<0.02	1.4	0.41
Nov-24	341	7.88	234	166	0.74	<0.05	<0.05	4.18	<0.10	0.54	42.6	14.5	0.72	<0.50	<0.020	0.003	<0.010	<0.02	1.9	<0.10
Average	363	7.89	207	190	1.93	<0.05	<0.05	4.99	<0.10	1.34	49.5	16.2	0.86	0.48	<0.01	0.008	0.010	0.018	8.46	0.13
Std. Dev.	21.5	0.17	18.4	12.7	2.16	NA	NA	1.21	NA	2.14	3.60	0.98	0.20	0.13	NA	0.005	0.010	0.021	17.24	0.13

HISTORICAL GROUNDWATER QUALITY DATA

Monitoring Well OW-12D (Deeper Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Sep-17	453	8.08	228	196	1.79	<0.05	<0.05	1.36	NM	<0.05	53.8	15.0	2.39	2.06	0.16	0.113	0.025	0.21	14.7	0.95
Nov-18	388	7.92	212	203	2.16	0.10	<0.05	1.98	<0.10	<0.05	58.7	13.8	2.82	1.95	<0.010	0.174	0.021	0.06	19.6	0.81
Oct-19	340	7.89	196	197	1.71	<0.05	<0.05	0.31	<0.10	0.13	56.6	13.5	2.38	1.04	1.15	0.302	0.027	0.23	18.9	0.55
Oct-20	353	8.00	211	190	3.08	0.08	<0.05	0.48	<0.10	3.17	54.4	13.2	2.33	1.18	0.070	0.141	0.040	0.12	18.0	0.72
Oct-21	362	7.81	196	171	1.62	0.10	<0.05	1.70	<0.10	0.03	48.8	12.0	1.83	1.43	0.031	0.077	0.023	<0.02	230	0.85
Sep-22	371	8.10	197	190	1.95	0.05	0.05	0.92	<0.10	2.41	55.5	12.6	2.81	0.65	0.060	0.089	0.021	0.06	17.6	1.26
Nov-23	338	7.44	234	191	1.93	0.18	<0.05	1.09	<0.10	0.84	54.5	13.4	2.22	1.45	0.018	0.051	0.028	0.08	7.2	2.01
Nov-24	350	7.72	360	171	1.57	0.24	<0.05	0.78	<0.10	3.11	48.6	12.1	1.81	0.71	0.033	0.038	0.020	0.06	18.2	1.14
Average	369	7.87	229	189	1.98	0.10	<0.05	1.08	<0.10	1.218	53.9	13.2	2.32	1.31	0.19	0.123	0.026	0.12	43.0	1.04
Std. Dev.	37.6	0.22	54.8	11.7	0.49	0.08	NA	0.58	NA	1.434	3.54	0.98	0.38	0.52	0.39	0.085	0.007	0.07	75.65	0.45

Monitoring Well OW-13 (Shallow Sand Unit)

Parameter	Conductivity	pH	Alkalinity	Hardness	Chloride	Nitrate	Nitrite	Sulphate	Phosphate	Phosphorus	Calcium	Magnesium	Sodium	Potassium	Iron	Manganese	Boron	Ammonia	DOC	TKN
UNITS	uS/cm	Unitless	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
ODWS	NV	6.5 to 8.5	30 to 500	80 to 100	250	10	1.0	500	NV	NV	NV	NV	200	NV	0.3	0.05	5	NV	5.0	NV
	NA	OG	OG	OG	AO	MAC	MAC	AO	NA	NA	NA	NA	AO	NA	AO	AO	IMAC	NA	AO	NA
RUC	NV	6.5 to 8.5	355	261	127	2.58	0.25	261	NV	NV	NV	NV	101	NV	1.83	0.31	1.26	NV	30.2	NV
Sep-17	471	8.07	237	205	1.16	0.25	<0.05	3.23	NM	2.62	62.9	11.7	0.82	0.28	<0.010	0.003	<0.010	0.11	1.2	0.34
Oct-21	404	7.98	217	202	0.66	0.12	<0.05	1.68	<0.10	1.18	61.5	11.8	0.74	<0.50	<0.010	0.002	<0.010	<0.02	45.6	0.12
Average	438	8.03	227	204	0.91	0.19	<0.05	2.46	<0.10	1.90	62.2	11.8	0.78	0.27	<0.010	0.003	<0.010	0.06	23.4	0.23
Std. Dev.	47.4	0.06	14.1	2.28	0.35	0.09	NA	1.10	NA	1.02	0.99	0.07	0.06	0.02	NA	0.001	NA	0.07	31.4	0.16

Notes:

1. ODWS = Ontario Drinking Water Standards (June 2003, Revised June 2006); RUC = Reasonable Use Criteria (RUC shown in BOLD > ODWS).
2. NA = Not Applicable; NM = Not Monitored; NV = No value specified
3. Results presented in mg/L (milligrams per litre) unless otherwise specified. µS/cm = microsiemens per centimeter.
4. Samples analyzed by AGAT Laboratories Limited.
5. * indicates outlier interpreted as sample or lab error.
6. Data prior to 2006 obtained from Annual Monitoring Report (2005), Henderson, Paddon and Associates, Ltd.
7. Values reported as less than detection limits used as ½ detection limit for calculation of averages and plotting.
8. Values in bold represent results greater than the Reasonable Use Criteria.
9. Shaded values represent results greater than the ODWS.
10. Results reported appear to have been erroneously identified. Based on the analytical data, the results for OW4 and OW6 are assumed to be the reverse of that reported on the COC.

HISTORICAL GROUNDWATER QUALITY DATA (VOCs)

		Well ID			OW-2		OW-3												
Parameter	Units	ODWS		RUC	Nov-23	Nov-24	Jun-05	Apr-08	Oct-08	Apr-09	Apr-10	Apr-11	Nov-11	Apr-12	Nov-12	Apr-13	Nov-13	Oct-14	Apr-15
Dichlorodifluoromethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Chloromethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.80	NM	NM	NM	<0.40	NM	NM	NM	NM	NM
Vinyl Chloride	µg/L	2	MAC	0.5	<0.17	NM	NM	NM	NM	<0.34	NM	NM	NM	<0.17	NM	NM	NM	NM	<0.34
Bromomethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Chloroethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	NM
Trichlorofluoromethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.80	NM	NM	NM	<0.40	NM	NM	NM	NM	<0.80
Acetone	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<2.0	NM	NM	NM	<1.0	NM	NM	NM	NM	<2.0
1,1 Dichloroethylene	µg/L	14	MAC	3.5	NM	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	<0.60
Methylene Chloride	µg/L	50	MAC	12.5	<0.30	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	<0.60
trans- 1,2-dichloroethylene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Methyl tert-butyl ether	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
1,1-Dichloroethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	<0.60
Methyl Ethyl Ketone	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<2.0	NM	NM	NM	<1.0	NM	NM	NM	NM	<2.0
cis- 1,2-Dichloroethylene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Chloroform ⁽⁵⁾	µg/L	100	MAC	25	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
1,2 - Dichloroethane	µg/L	5	IMAC	1.25	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
1,1,1-Trichloroethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	<0.60
Carbon Tetrachloride	µg/L	5	MAC	1.25	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Benzene	µg/L	5	MAC	1.25	<0.20	<0.20	<0.1	<0.04	<0.2	<0.40	<0.2	<0.40	<0.20	<0.20	<0.20	<0.20	<0.80	<0.40	<0.40
1,2-Dichloropropane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Trichloroethylene	µg/L	5	MAC	1.25	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Bromodichloromethane ⁽⁵⁾	µg/L	100	MAC	25	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
cis-1,3-Dichloropropene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Methyl Isobutyl Ketone	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<2.0	NM	NM	NM	<1.0	NM	NM	NM	NM	<2.0
trans-1,3-Dichloropropene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	<0.60
1,1,2-Trichloroethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Toluene	µg/L	24	AO	12	<0.20	<0.20	0.9	<0.04	<0.2	<0.40	<0.2	<0.40	<0.20	<0.20	<0.20	<0.20	<0.80	<0.40	<0.40
2-Hexanone	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	NM
Dibromochloromethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
Ethylene Dibromide	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
Tetrachloroethylene	µg/L	30	MAC	7.5	NM	NM	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
1,1,1,2-Tetrachloroethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
Chlorobenzene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
Ethylbenzene	µg/L	2.4	AO	1.2	NM	<0.10	<0.1	<0.05	<0.1	<0.20	<0.1	<0.20	<0.10	<0.10	<0.10	<0.10	<0.40	<0.20	<0.20
m & p-Xylene	µg/L	NV	NA	NV	NM	<0.20	NM	NM	NM	<0.40	NM	NM	NM	<0.20	NM	NM	NM	NM	<0.40
Bromoform	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
Styrene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
1,1,2,2-Tetrachloroethane	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
o-Xylene	µg/L	NV	NA	NV	NM	<0.10	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
1,3-Dichlorobenzene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
1,4-Dichlorobenzene	µg/L	5	MAC	1.25	<0.10	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
1,2-Dichlorobenzene	µg/L	200	MAC	50	NM	NM	NM	NM	NM	<0.20	NM	NM	NM	<0.10	NM	NM	NM	NM	<0.20
1,2,4-Trichlorobenzene	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	NM
1,3-Dichloropropene (Cis + Trans)	µg/L	NV	NA	NV	NM	NM	NM	NM	NM	<0.60	NM	NM	NM	<0.30	NM	NM	NM	NM	NM
Xylene Mixture (Total)	µg/L	300	AO	150	NM	<0.20	0.1	<0.04	<0.2	<0.40	<0.2	<0.40	<0.20	<0.20	<0.20	<0.20	<0.80	<0.40	<0.40

Notes:

1. ODWS = Ontario Drinking Water Standards (June 2006); AO= Aesthetic Objective and [I]MAC = [Interim] Maximum Acceptable Concentration.
2. µg/L = micrograms per litre; NA = Not Applicable; NM = Not Monitored; NV = No value specified
3. Data prior to 2006 obtained from Annual Monitoring Report (2005), Henderson, Paddon and Associates, Ltd.
4. The ODWS is for trihalomethanes (THMs) based on a four quarter moving annual average of test results. The four most commonly detected THMs in drinking water are chloroform, bromodichloromethane, chlorodibromomethane and bromoform.
5. RUC = Reasonable Use Criteria (background concentration for VOCs assumed to be zero)
6. Shaded values outline detected parameters, values shown in **bold** indicate an exceedence of the RUC.

HISTORICAL GROUNDWATER QUALITY DATA (VOCs)

Parameter	Units	Well ID			OW-8							
		ODWS	RUC		Oct-15	Nov-16	Sep-17	Nov-18	Oct-19	Oct-20	Nov-23	Nov-24
Dichlorodifluoromethane	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	NM
Chloromethane	µg/L	NV	NA	NV	NM	<0.40	NM	NM	<1.60	NM	NM	NM
Vinyl Chloride	µg/L	2	MAC	0.5	<0.68	0.2	NM	NM	<0.68	<0.50	<0.68	NM
Bromomethane	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	NM
Chloroethane	µg/L	NV	NA	NV	NM	2.0	NM	NM	<0.80	NM	NM	NM
Trichlorofluoromethane	µg/L	NV	NA	NV	<1.6	<0.40	NM	NM	<1.60	<1.60	NM	NM
Acetone	µg/L	NV	NA	NV	<4.0	<1.0	NM	NM	<4.0	<4.0	NM	NM
1,1 Dichloroethylene	µg/L	14	MAC	3.5	<1.2	<0.30	NM	NM	<1.20	<0.50	NM	NM
Methylene Chloride	µg/L	50	MAC	12.5	<1.2	<0.30	NM	<1.2	<1.20	<1.20	<1.2	NM
trans- 1,2-dichloroethylene	µg/L	NV	NA	NV	<0.8	0.4	NM	NM	<0.80	<0.80	NM	NM
Methyl tert-butyl ether	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	NM
1,1-Dichloroethane	µg/L	NV	NA	NV	<1.2	<0.30	NM	NM	<1.20	<0.50	NM	NM
Methyl Ethyl Ketone	µg/L	NV	NA	NV	<4.0	<1.0	NM	NM	<4.0	<4.0	NM	NM
cis- 1,2-Dichloroethylene	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	NM
Chloroform ⁽⁵⁾	µg/L	100	MAC	25	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	NM
1,2 - Dichloroethane	µg/L	5	IMAC	1.25	<0.8	0.32	NM	NM	<0.80	<0.50	NM	NM
1,1,1-Trichloroethane	µg/L	NV	NA	NV	<1.2	<0.30	NM	NM	<1.20	<0.50	NM	NM
Carbon Tetrachloride	µg/L	5	MAC	1.25	<0.8	<0.20	NM	NM	<0.80	<0.20	NM	NM
Benzene	µg/L	5	MAC	1.25	2.5	2.4	2.0	2.2	1.6	<0.50	2.24	1.83
1,2-Dichloropropane	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.50	NM	NM
Trichloroethylene	µg/L	5	MAC	1.25	<0.8	<0.20	NM	NM	<0.80	<0.50	NM	NM
Bromodichloromethane ⁽⁵⁾	µg/L	100	MAC	25	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	NM
cis-1,3-Dichloropropene	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	NM
Methyl Isobutyl Ketone	µg/L	NV	NA	NV	<4.0	<1.0	NM	NM	<4.0	<4.0	NM	NM
trans-1,3-Dichloropropene	µg/L	NV	NA	NV	<1.2	<0.30	NM	NM	<1.20	<1.20	NM	NM
1,1,2-Trichloroethane	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.50	NM	NM
Toluene	µg/L	24	AO	12	<0.8	<0.20	<0.80	<0.80	<0.80	<0.80	<0.80	<0.20
2-Hexanone	µg/L	NV	NA	NV	NM	<1.0	NM	NM	<4.0	NM	NM	NM
Dibromochloromethane	µg/L	NV	NA	NV	<0.40	<0.10	NM	NM	<0.40	<0.40	NM	NM
Ethylene Dibromide	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.20	NM	NM
Tetrachloroethylene	µg/L	30	MAC	7.5	<0.8	<0.20	NM	NM	<0.80	<0.50	NM	NM
1,1,1,2-Tetrachloroethane	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	NM
Chlorobenzene	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	NM
Ethylbenzene	µg/L	2.4	AO	1.2	<0.4	0.1	<0.40	<0.40	<0.40	<0.40	NM	<0.10
m & p-Xylene	µg/L	NV	NA	NV	<0.8	<0.20	NM	NM	<0.80	<0.80	NM	<0.20
Bromoform	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	NM
Styrene	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	NM
1,1,1,2,2-Tetrachloroethane	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	NM
o-Xylene	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	<0.10
1,3-Dichlorobenzene	µg/L	NV	NA	NV	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	NM
1,4-Dichlorobenzene	µg/L	5	MAC	1.25	<0.4	<0.10	NM	<0.40	<0.40	<0.40	<0.40	NM
1,2-Dichlorobenzene	µg/L	200	MAC	50	<0.4	<0.10	NM	NM	<0.40	<0.40	NM	NM
1,2,4-Trichlorobenzene	µg/L	NV	NA	NV	NM	<0.30	NM	NM	<1.20	NM	NM	NM
1,3-Dichloropropene (Cis + Trans)	µg/L	NV	NA	NV	<1.2	<0.30	NM	NM	<1.20	NM	NM	NM
Xylene Mixture (Total)	µg/L	300	AO	150	<0.8	<0.20	<0.80	<0.80	<0.80	<0.80	NM	<0.20

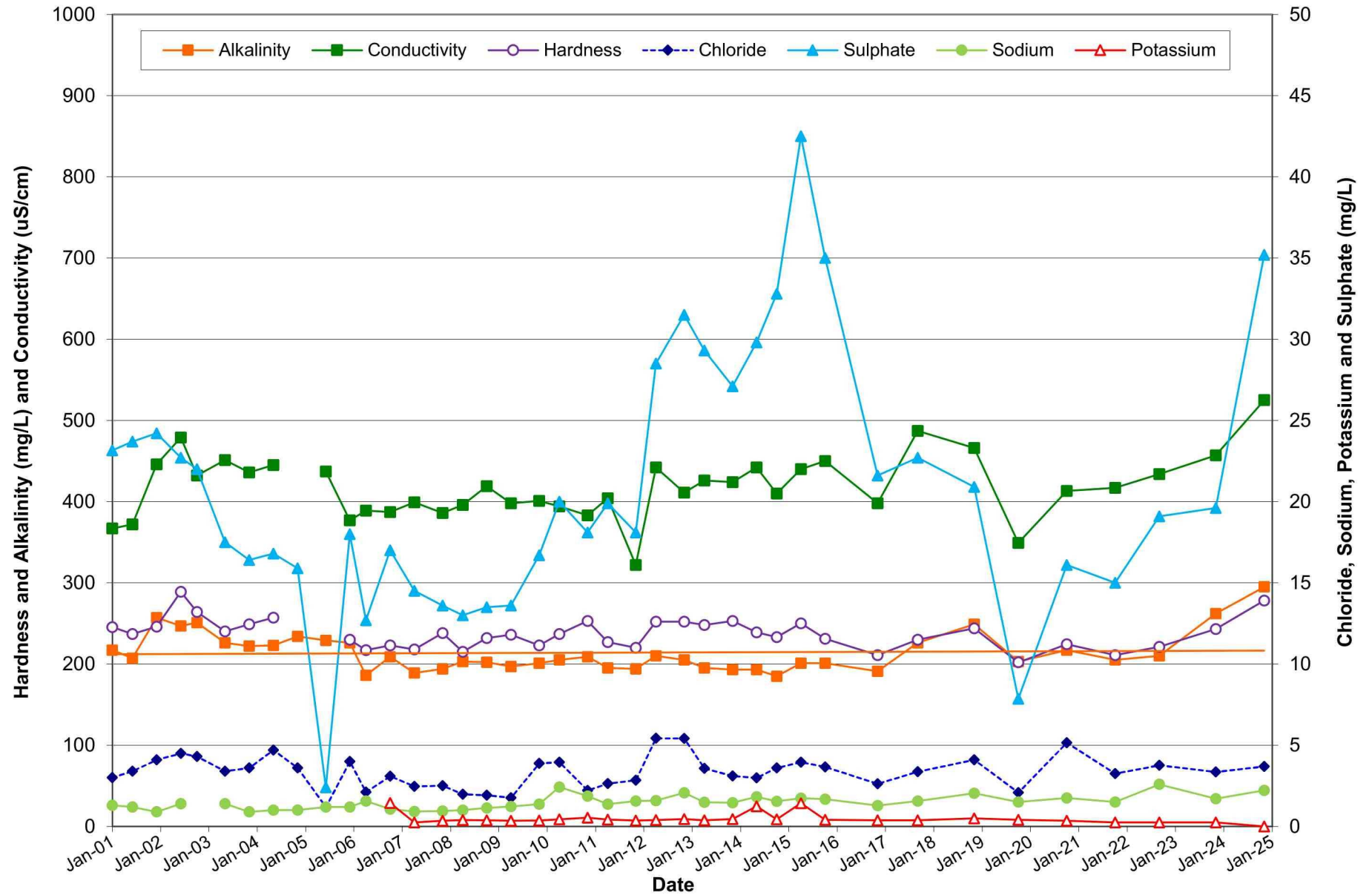
**GROUNDWATER QUALITY DATA
COMPREHENSIVE LIST**

				LEACHATE CHARACTERIZATION														BACKGROUND GW QUALITY					
Well ID				OW-2	OW-2	OW-2	OW-2	OW-2	OW-2	OW-2	OW-2	OW-2	OW-8	OW-8	OW-8	OW-8	OW-8	OW-8	OW-8	OW-11	OW-12S	OW-12D	OW-13
Parameter	Units	ODWS		Oct-15	Nov-16	Sep-17	Nov-18	Oct-19	Oct-20	Nov-23	Nov-24	Oct-15	Nov-16	Sep-17	Nov-18	Oct-19	Oct-20	Nov-23	Nov-24	Sep-17	Sep-17	Sep-17	Sep-17
OTHER INORGANICS																							
Biological Oxygen Demand	mg/L	NV	NA	----	<5	----	<5	----	<5	<6	----	----	13	----	10	----	11	5	----	----	----	----	----
Total Suspended Solids	mg/L	NV	NA	----	638	----	2430	----	513	----	----	----	1530	----	4340	----	916	----	----	----	----	----	----
Total Dissolved Solids	mg/L	500	AO	----	1900	2430	2450	2400	2710	1940	1640	----	1640	1390	1220	888	1120	1090	1100	380	180	258	224
Chemical Oxygen Demand	mg/L	NV	NA	----	22	47	23	9.9	18	58	46	----	135	170	108	28.5	101	152	98	95	8	17	<5
Phenols	mg/L	NV	NA	----	<0.001	<0.001	<0.001	----	0.062	0.013	----	----	0.002	0.002	0.008	----	0.036	0.016	----	<0.001	<0.001	<0.001	<0.001
METALS																							
Aluminum	mg/L	0.1	OG	0.033	----	----	----	----	----	----	----	0.068	----	----	----	----	----	----	----	----	----	----	
Antimony	mg/L	0.006	IMAC	<0.003	----	----	----	----	----	----	----	<0.003	----	----	----	----	----	----	----	----	----	----	
Arsenic	mg/L	0.025	IMAC	<0.003	<0.003	<0.003	<0.003	<0.003	<0.001	<0.001	<0.001	0.007	0.007	0.006	0.009	<0.003	0.002	0.011	0.001	<0.003	<0.003	0.01	<0.003
Barium	mg/L	1.0	MAC	0.086	0.07	0.091	0.067	0.072	0.073	0.055	0.041	0.376	0.250	0.292	0.193	0.081	0.114	0.133	0.086	0.015	0.006	0.047	0.007
Beryllium	mg/L	NV	NA	<0.001	----	----	----	----	----	----	----	<0.001	----	----	----	----	----	----	----	----	----	----	----
Bismuth	mg/L	NV	NA	<0.002	----	----	----	----	----	----	----	<0.002	----	----	----	----	----	----	----	----	----	----	----
Boron	mg/L	5	IMAC	1.98	1.11	1.73	1.44	1.55	1.59	1.54	1.62	2.06	1.57	1.65	1.30	0.78	1.19	1.34	0.93	0.019	<0.010	0.025	<0.010
Cadmium	mg/L	0.005	MAC	<0.001	<0.001	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.0001	<0.0001	<0.0001	<0.002	<0.002	<0.002	<0.002
Chromium	mg/L	0.05	MAC	<0.003	<0.003	0.011	<0.003	<0.003	<0.002	<0.002	<0.002	0.007	0.006	0.011	0.006	<0.003	0.003	0.004	0.003	0.003	<0.003	<0.003	<0.003
Cobalt	mg/L	NV	NA	<0.001	----	----	----	----	----	----	----	0.004	----	----	----	----	----	----	----	----	----	----	----
Copper	mg/L	NV	NA	<0.002	<0.003	<0.003	<0.003	<0.003	0.003	<0.001	0.001	0.008	<0.003	<0.003	<0.003	<0.003	0.006	<0.001	<0.001	<0.003	<0.003	<0.003	<0.003
Iron	mg/L	0.3	AO	3.87	3.02	4.13	<0.010	3.55	0.034	5.23	0.033	24.9	23.4	12.9	25.6	1.45	0.065	40.7	0.08	1.49	<0.010	0.16	<0.010
Lead	mg/L	0.01	MAC	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.002	<0.002	<0.002	<0.002
Lithium	mg/L	NV	NA	<0.010	----	----	----	----	----	----	----	<0.010	----	----	----	----	----	----	----	----	----	----	----
Manganese	mg/L	0.05	AO	1.49	1.59	1.5	1.38	1.68	1.51	1.17	0.956	0.616	0.568	0.49	0.805	0.541	0.598	1.16	0.889	0.238	0.018	0.113	0.003
Molybdenum	mg/L	NV	NA	0.002	----	----	----	----	----	----	----	<0.001	----	----	----	----	----	----	----	----	----	----	----
Mercury	mg/L	0.001	MAC	----	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	----	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Nickel	mg/L	NV	NA	<0.003	----	----	----	----	----	----	----	0.005	----	----	----	----	----	----	----	----	----	----	----
Selenium	mg/L	0.01	MAC	<0.004	----	----	----	----	----	----	----	<0.004	----	----	----	----	----	----	----	----	----	----	----
Silicon	mg/L	NV	NA	4.23	----	----	----	----	----	----	----	7.93	----	----	----	----	----	----	----	----	----	----	----
Silver	mg/L	NV	NA	<0.002	----	----	----	----	----	----	----	<0.002	----	----	----	----	----	----	----	----	----	----	----
Strontium	mg/L	NV	NA	0.784	----	----	----	----	----	----	----	0.899	----	----	----	----	----	----	----	----	----	----	----
Thallium	mg/L	NV	NA	<0.0003	----	----	----	----	----	----	----	<0.0003	----	----	----	----	----	----	----	----	----	----	----
Tin	mg/L	NV	NA	<0.002	----	----	----	----	----	----	----	<0.002	----	----	----	----	----	----	----	----	----	----	----
Titanium	mg/L	NV	NA	0.02	----	----	----	----	----	----	----	0.003	----	----	----	----	----	----	----	----	----	----	----
Uranium	mg/L	NV	NA	0.003	----	----	----	----	----	----	----	<0.002	----	----	----	----	----	----	----	----	----	----	----
Vanadium	mg/L	NV	NA	<0.002	----	----	----	----	----	----	----	0.002	----	----	----	----	----	----	----	----	----	----	----
Zinc	mg/L	5	AO	0.011	0.007	<0.005	0.005	0.006	<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	<0.005	<0.005
Zirconium	mg/L	NV	NA	<0.004	----	----	----	----	----	----	----	<0.004	----	----	----	----	----	----	----	----	----	----	----

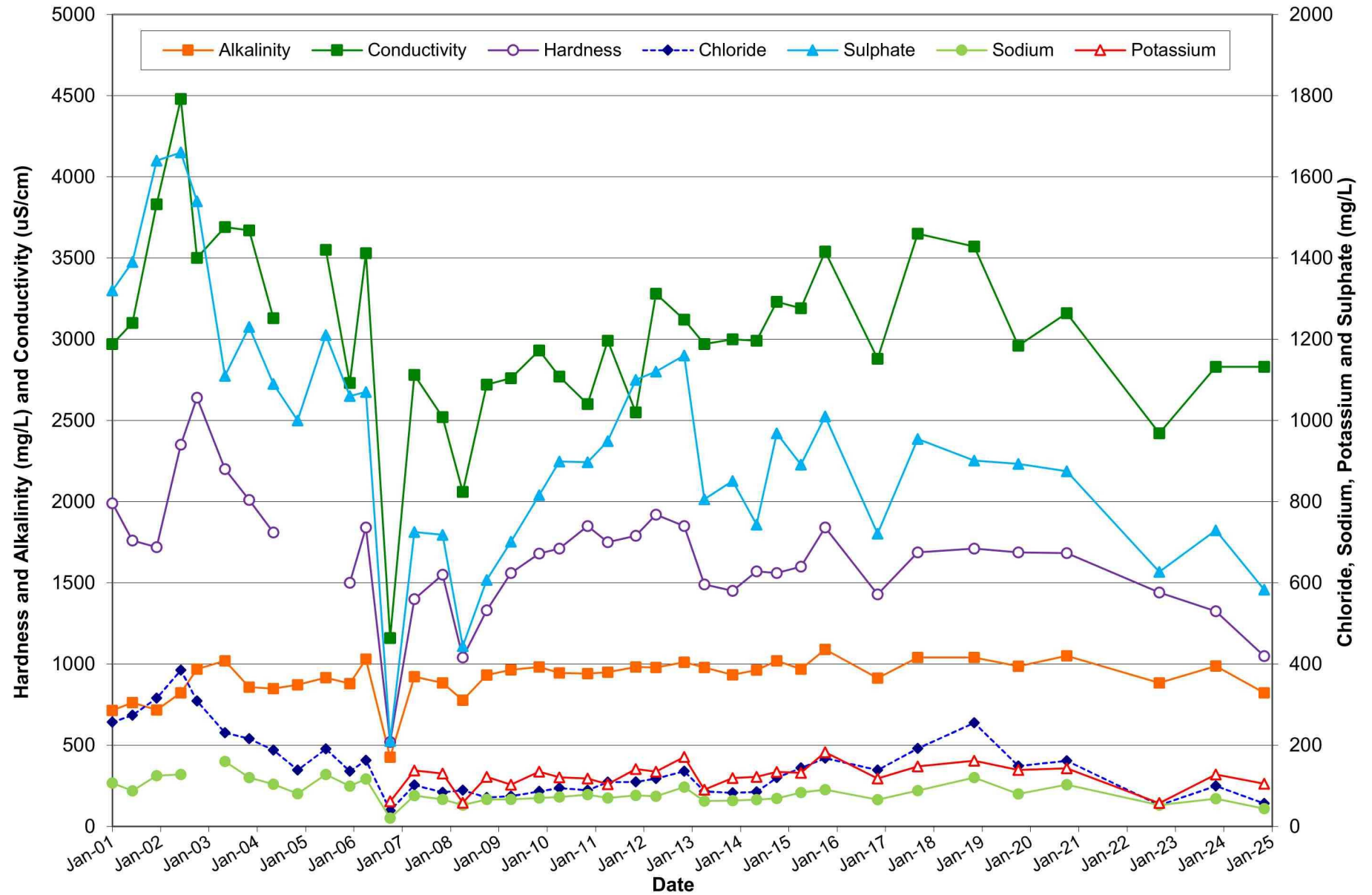
Notes:

1. ODWS = Ontario Drinking Water Standards (June 2003, Revised June 2006); AO= Aesthetic Objective and [I]MAC = [Interim] Maximum Acceptable Concentration.
2. NA = Not Applicable; NM = Not Monitored; NV = No value specified
3. Samples analyzed by AGAT Laboratories Limited.
4. mg/L = milligrams per litre
5. Shaded values exceed the ODWS

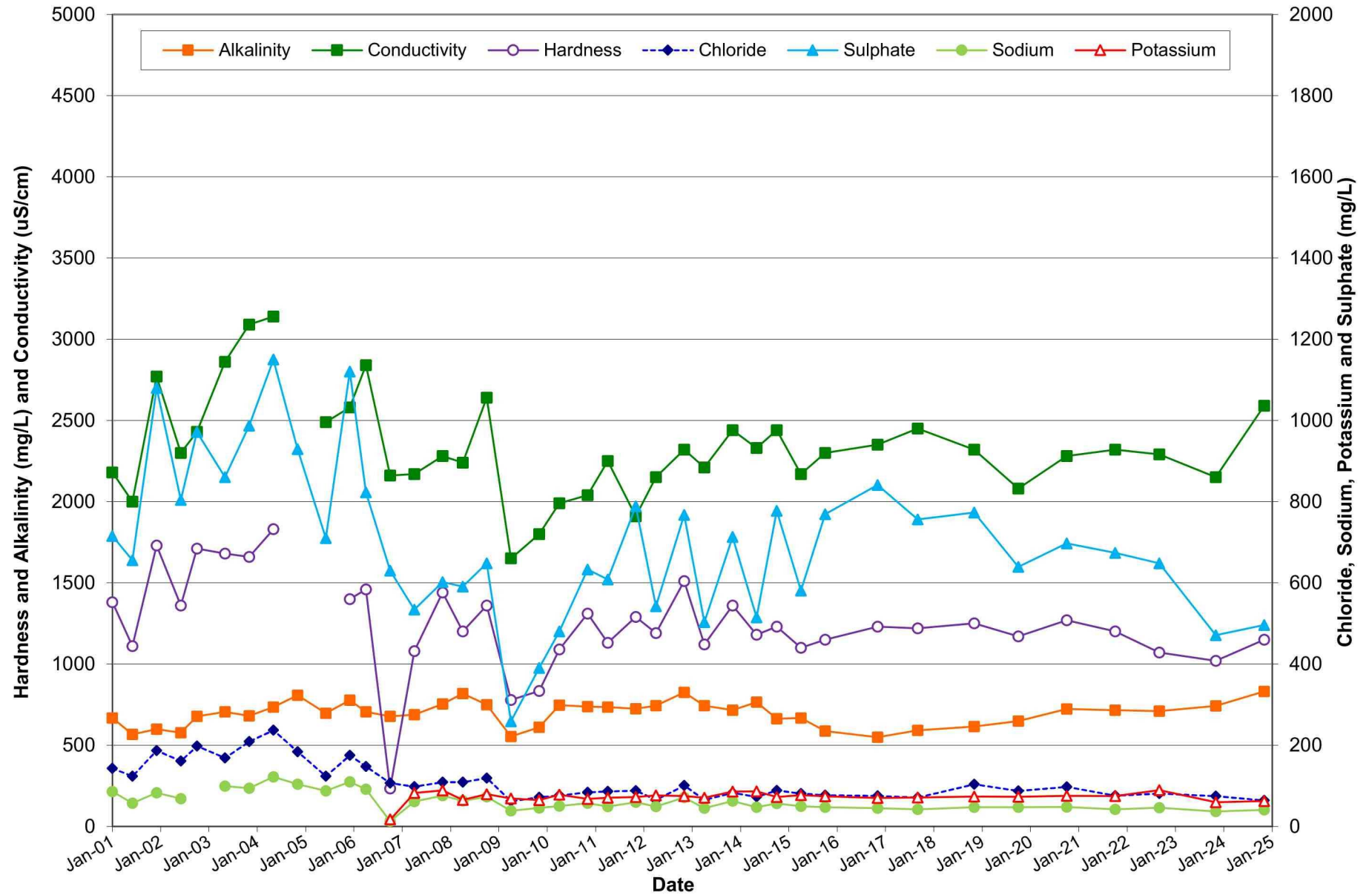
MONITORING WELL OW-1



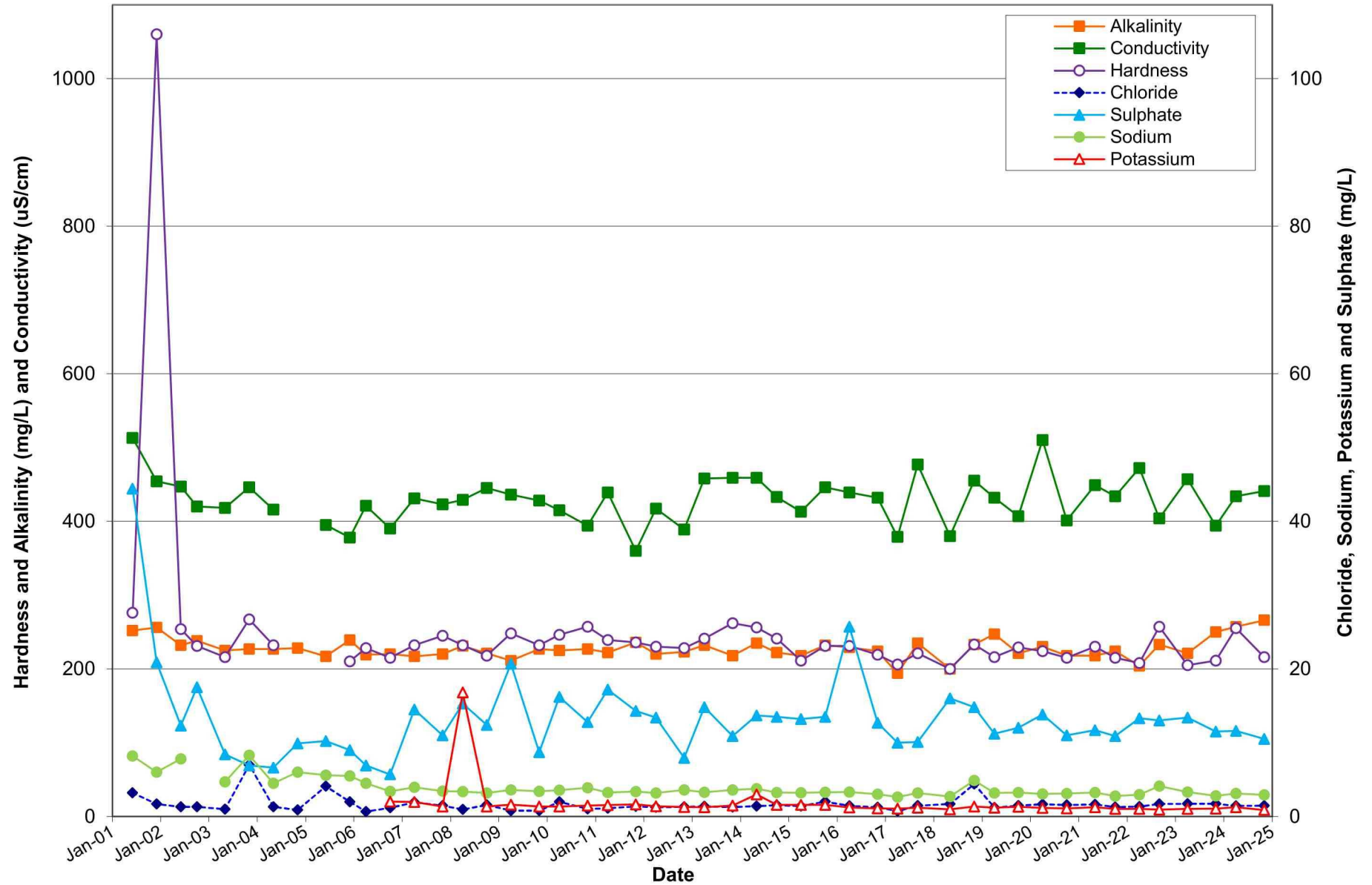
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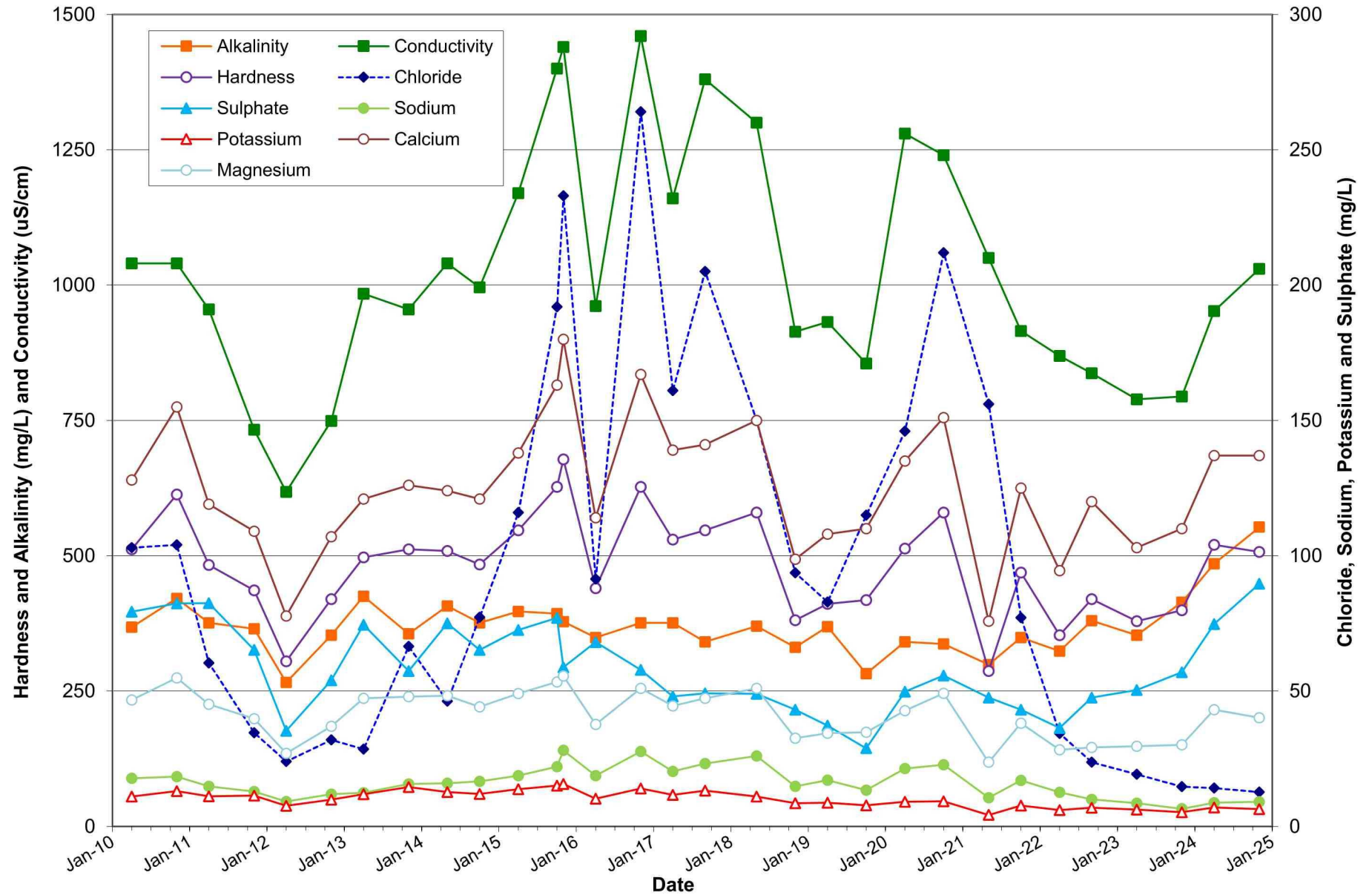
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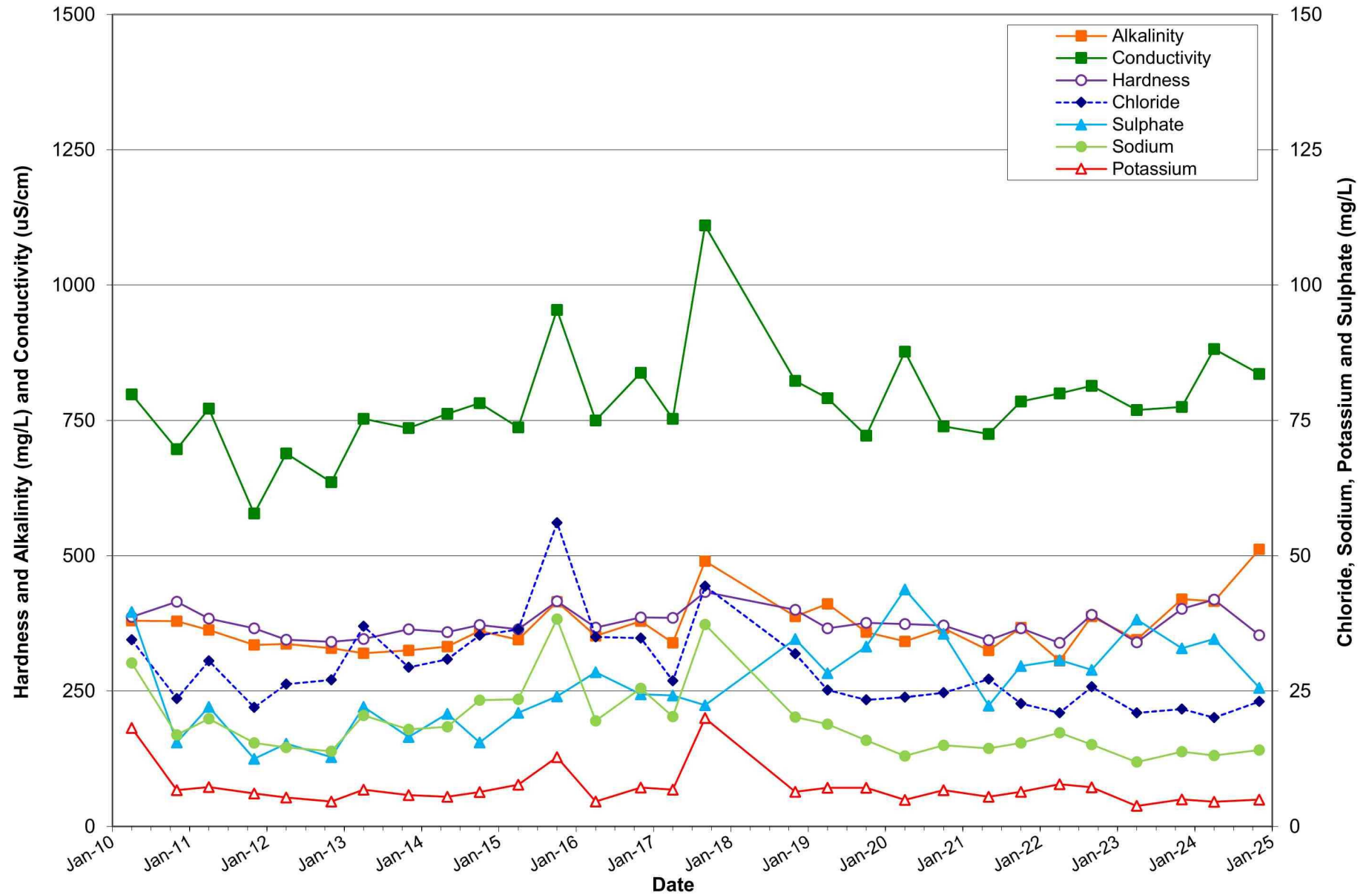
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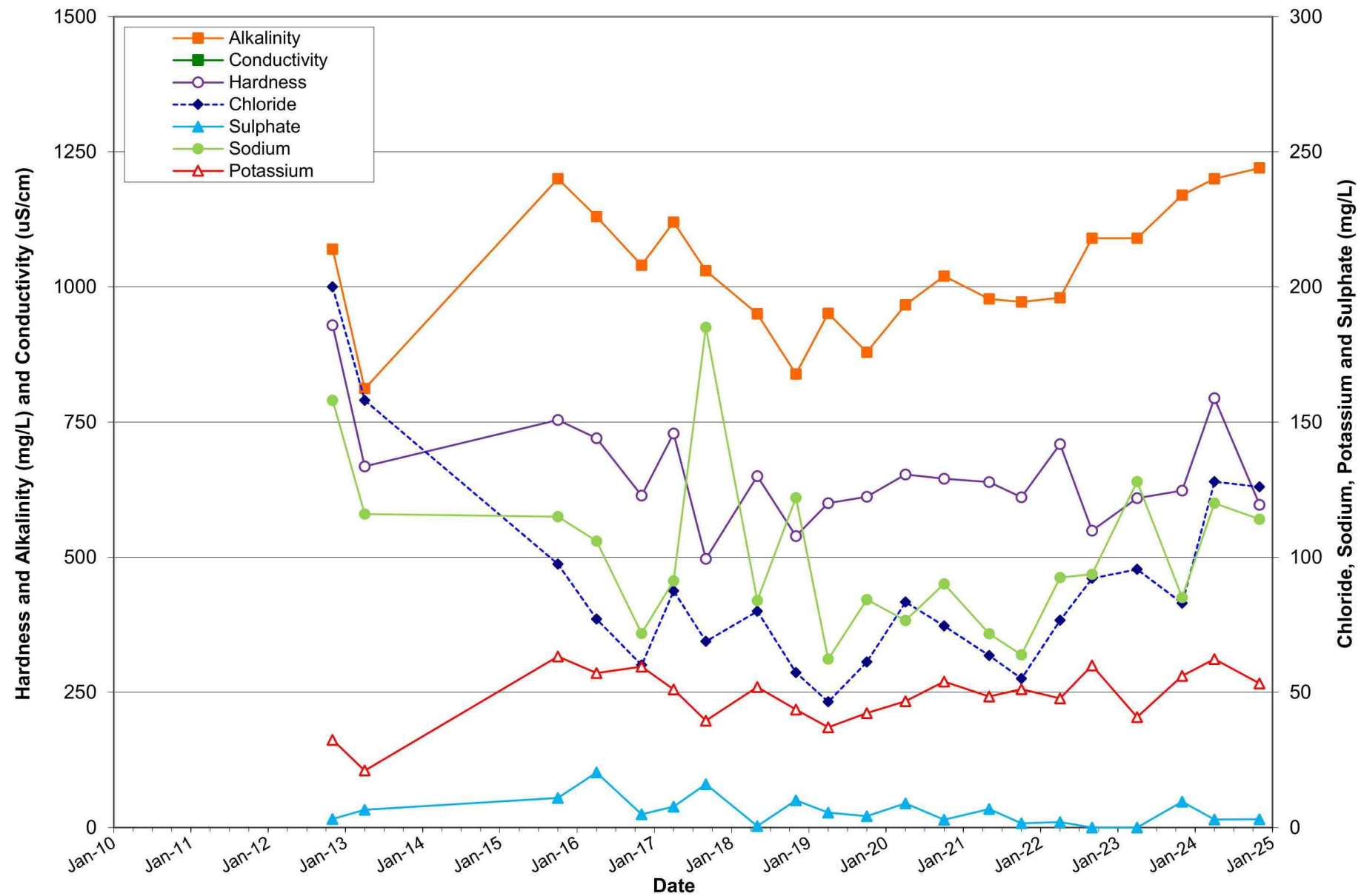
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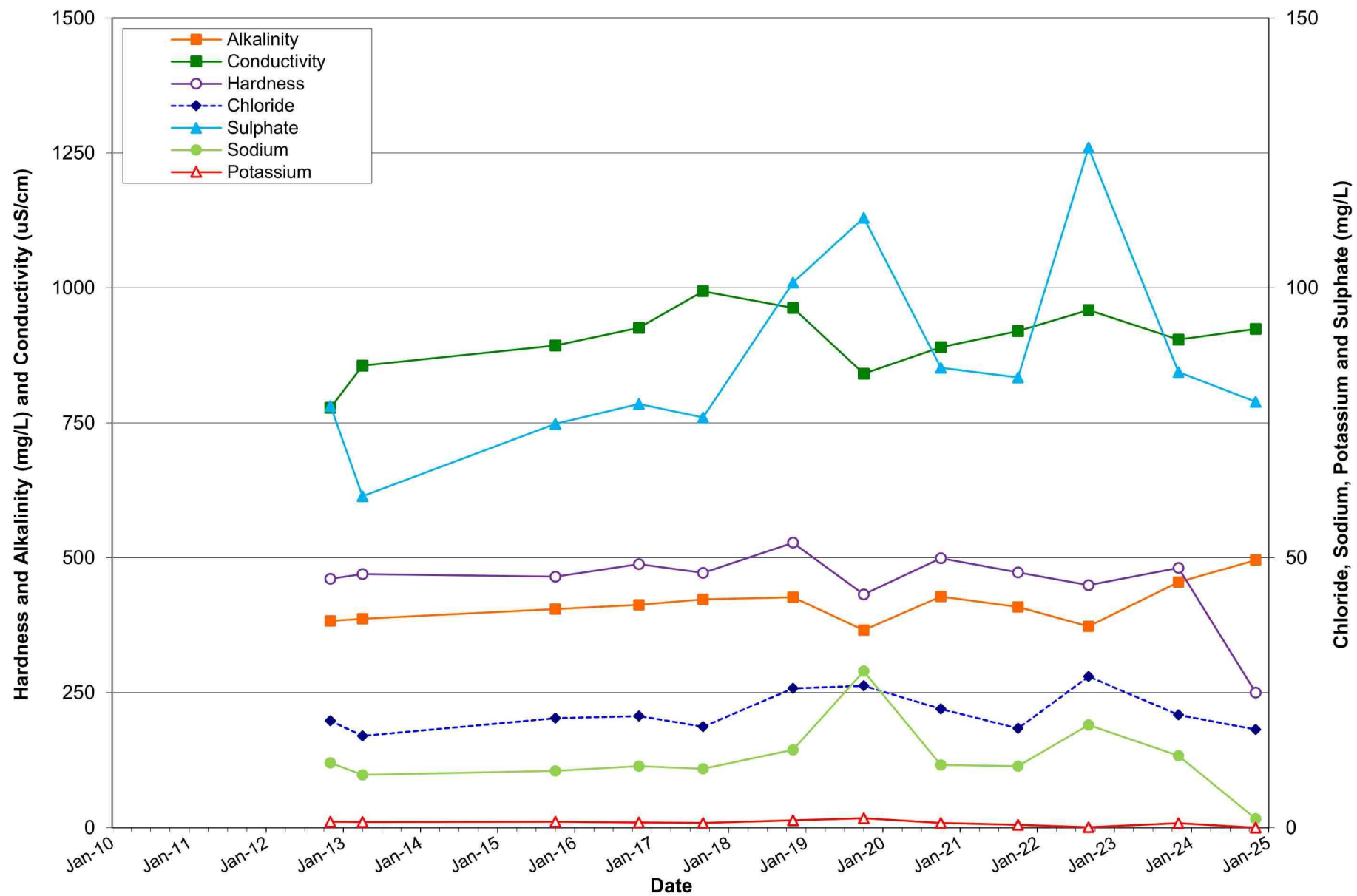
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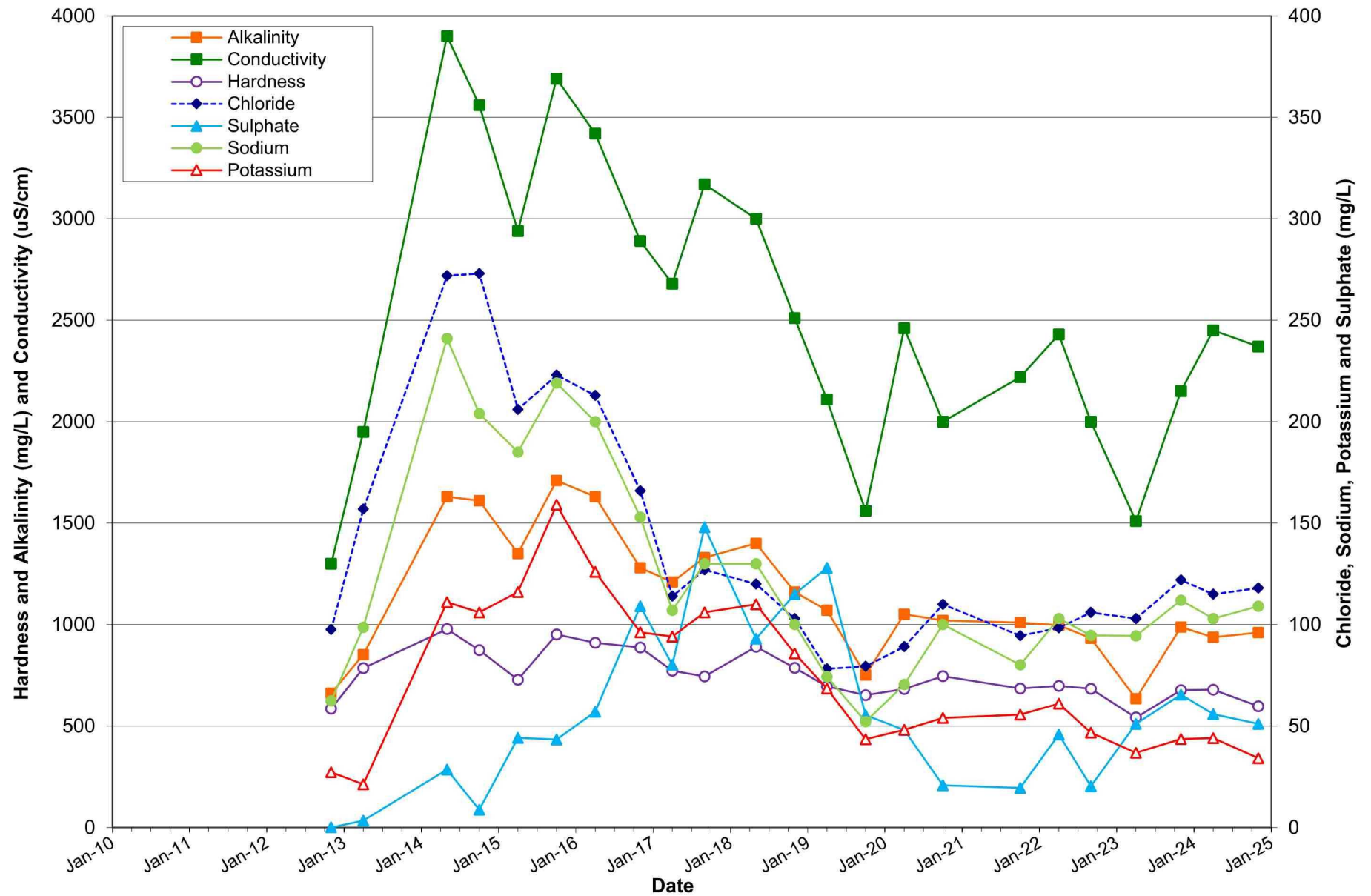
MONITORING WELL OW-7S



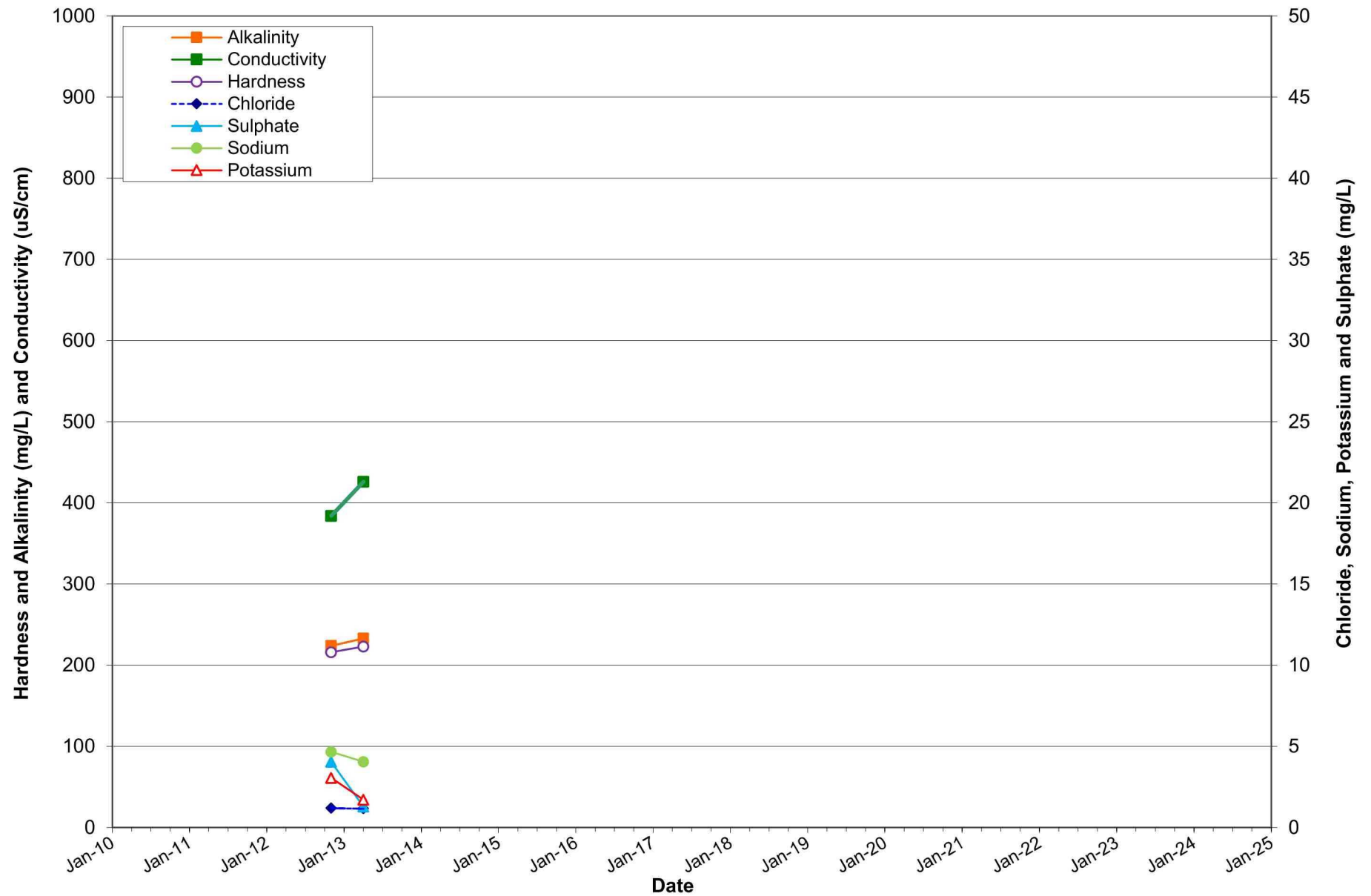
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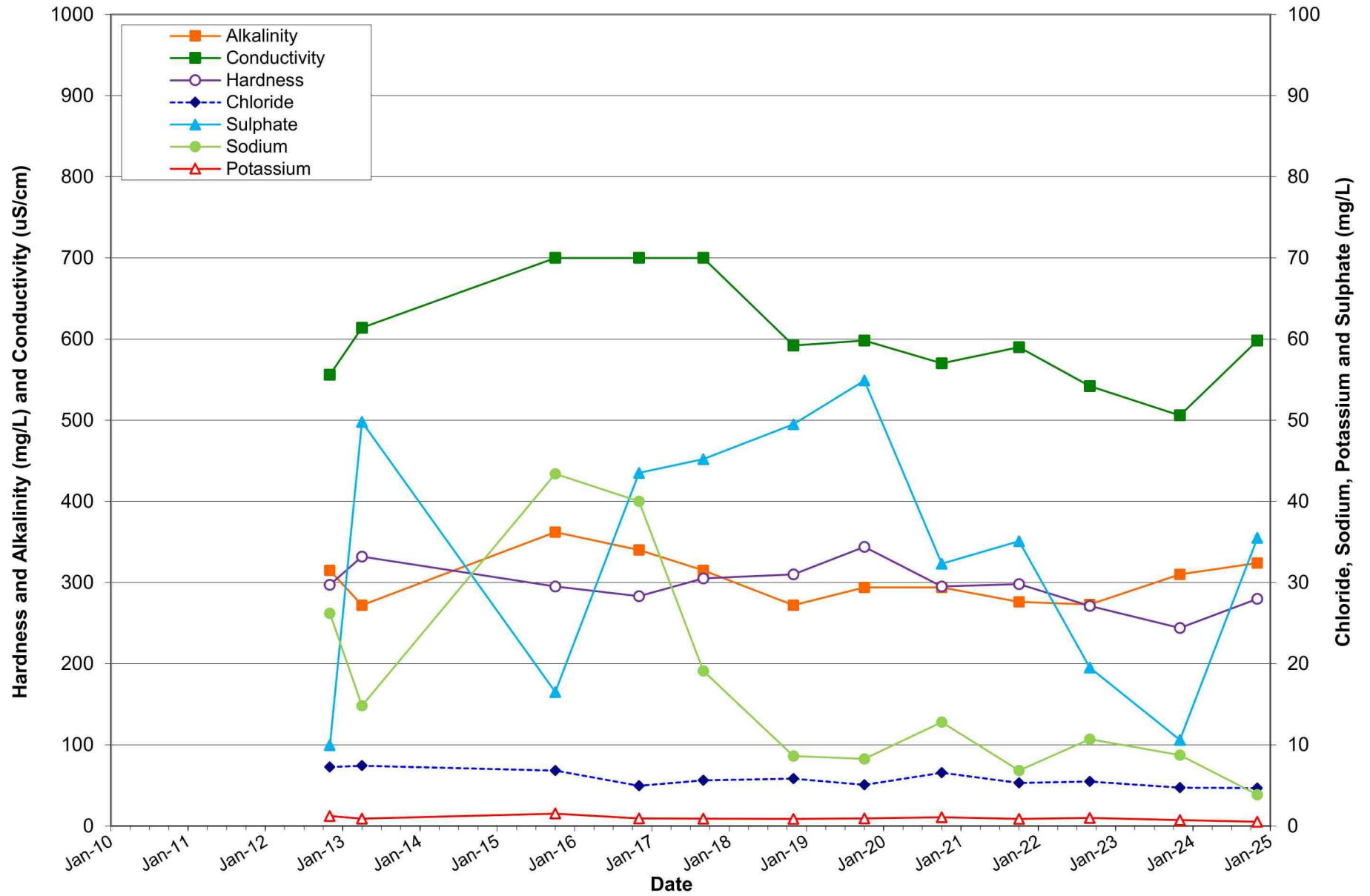
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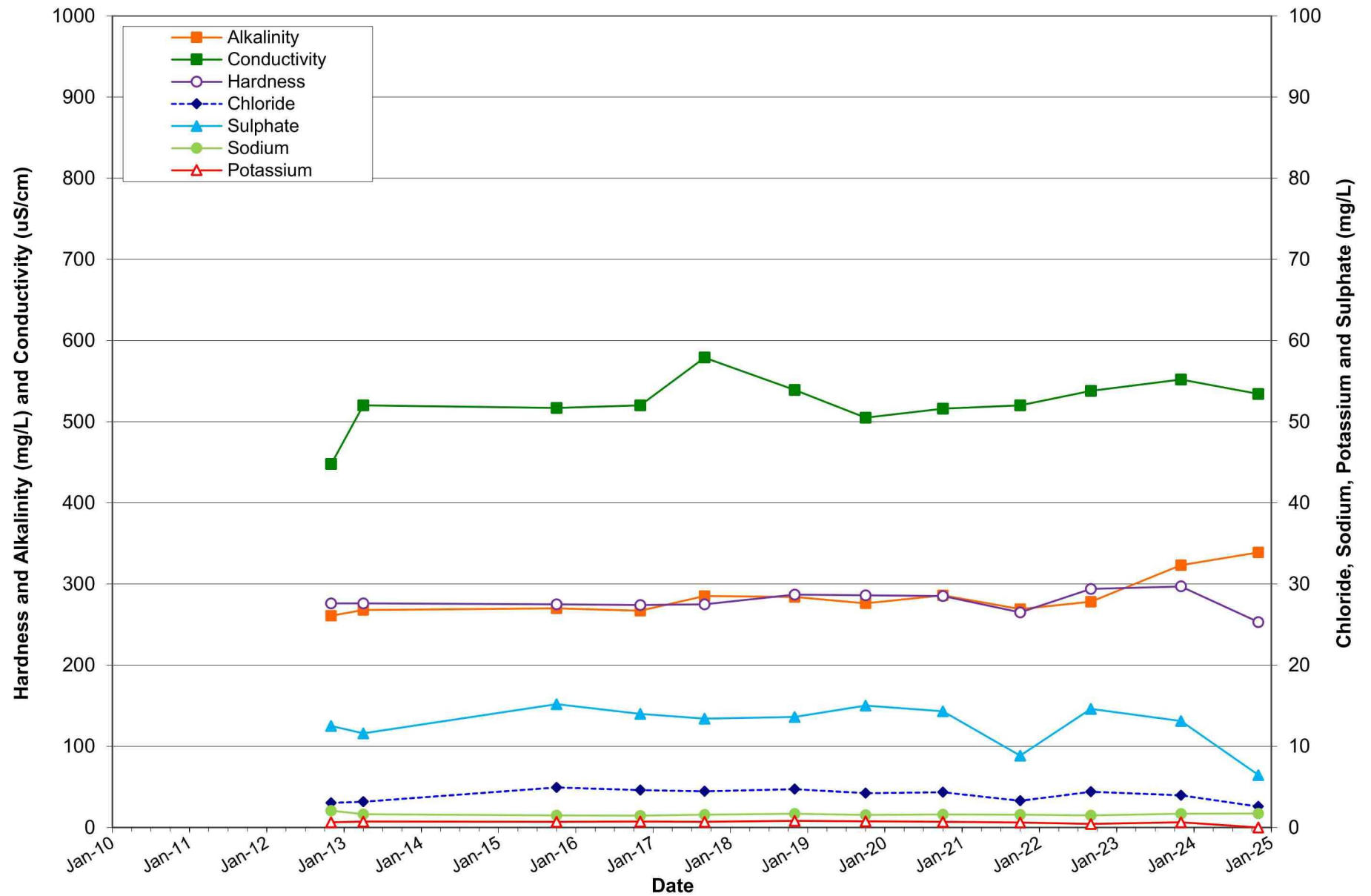
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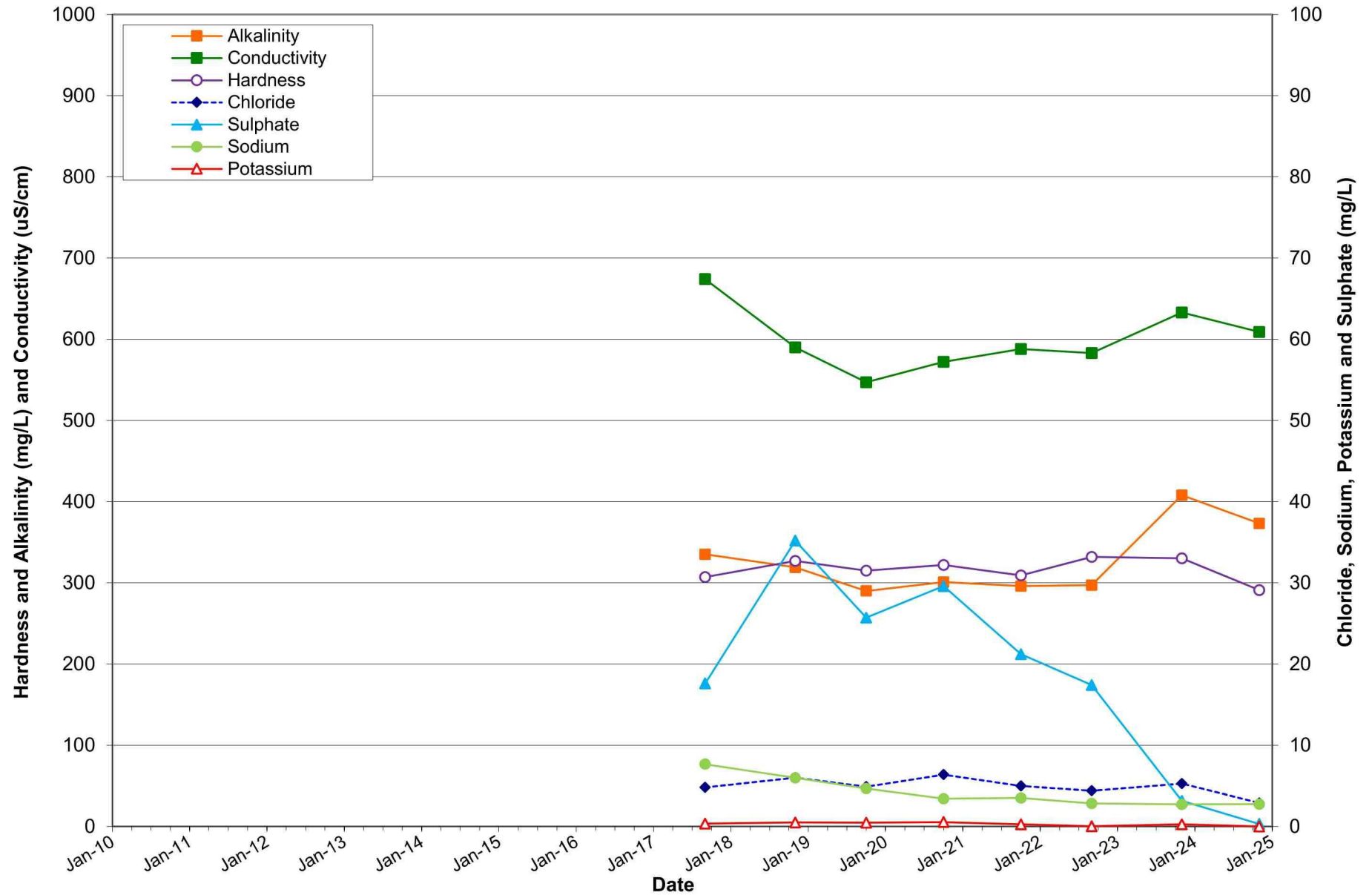
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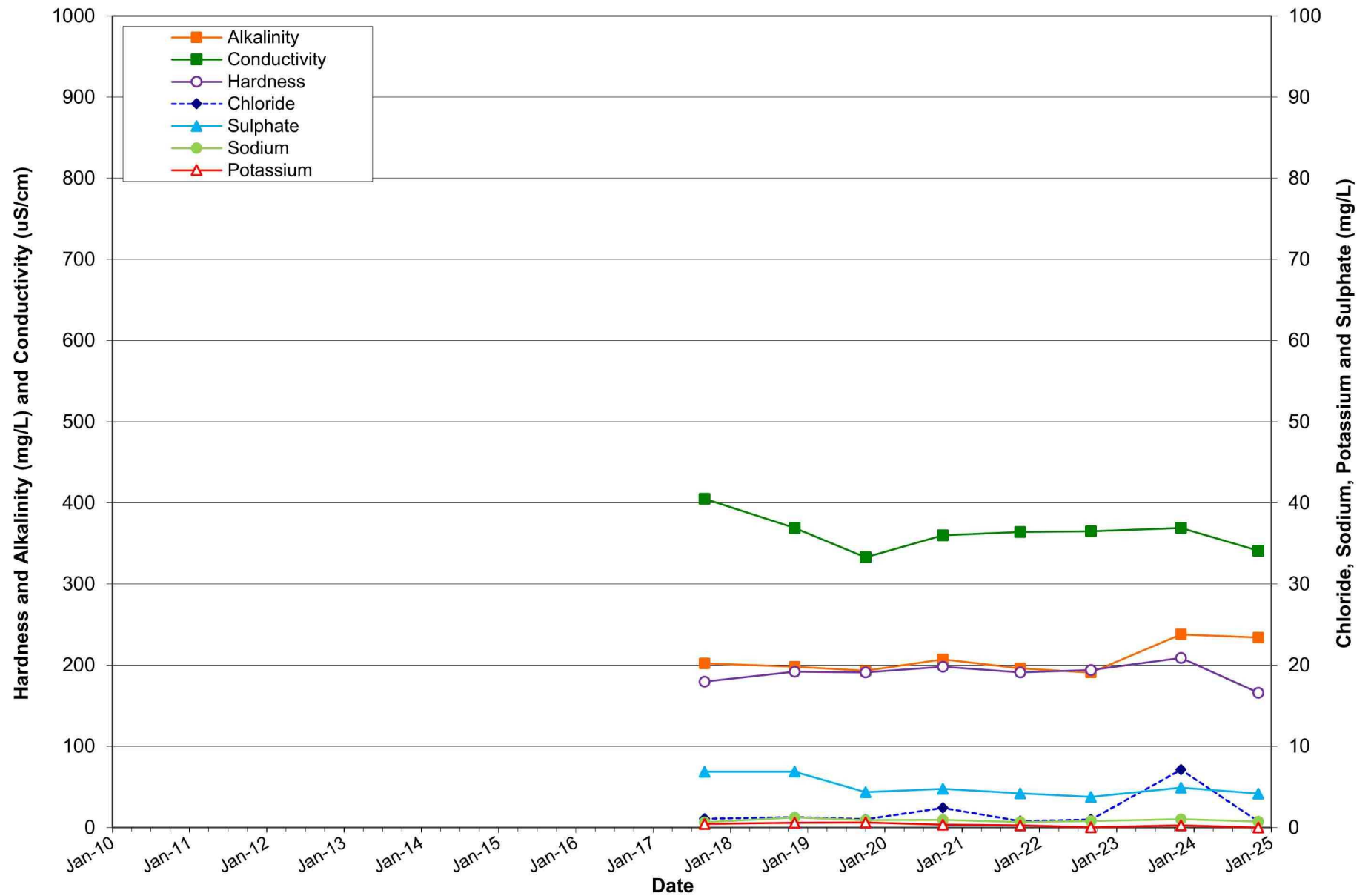
MONITORING WELL OW-10D



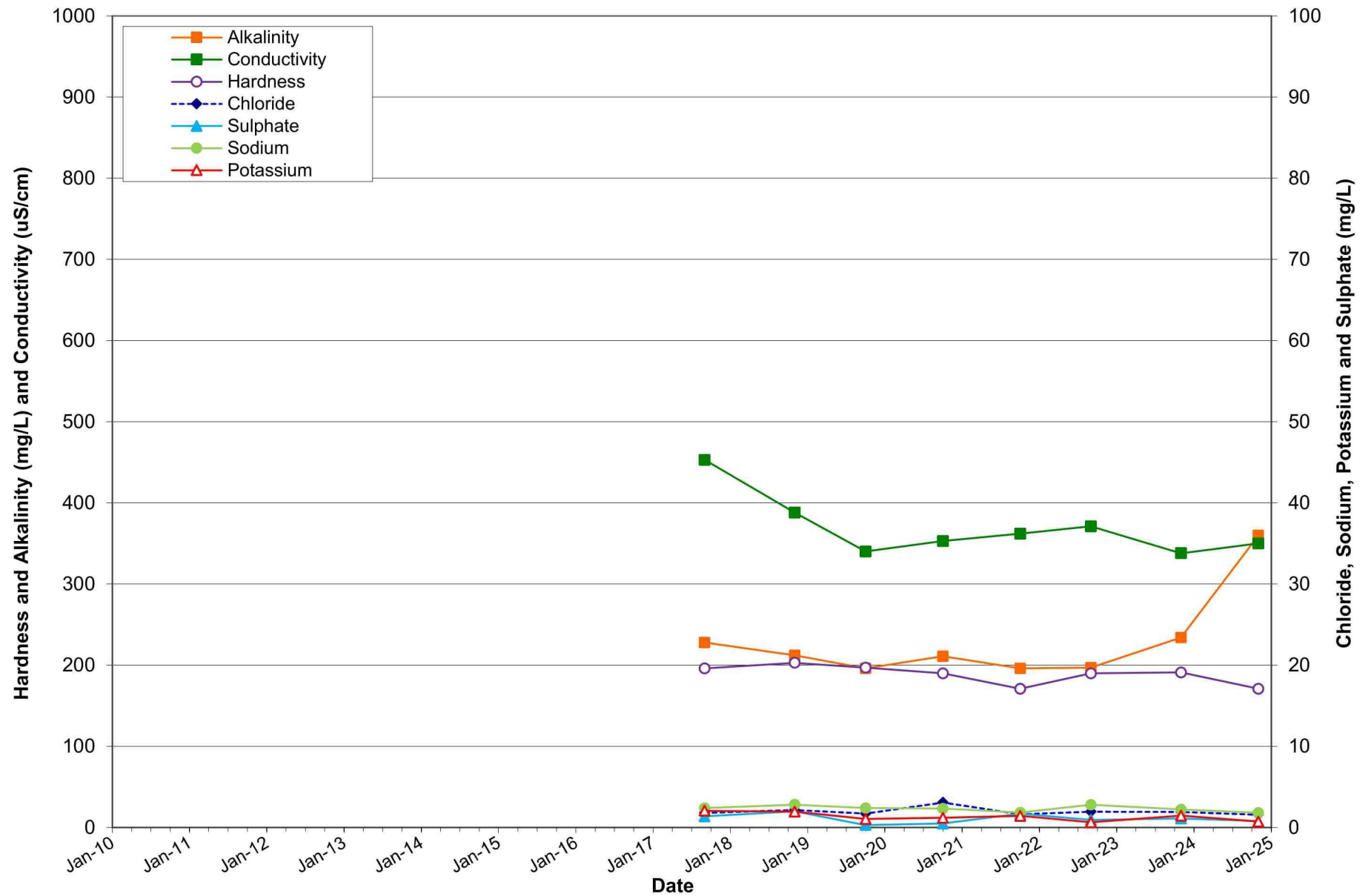
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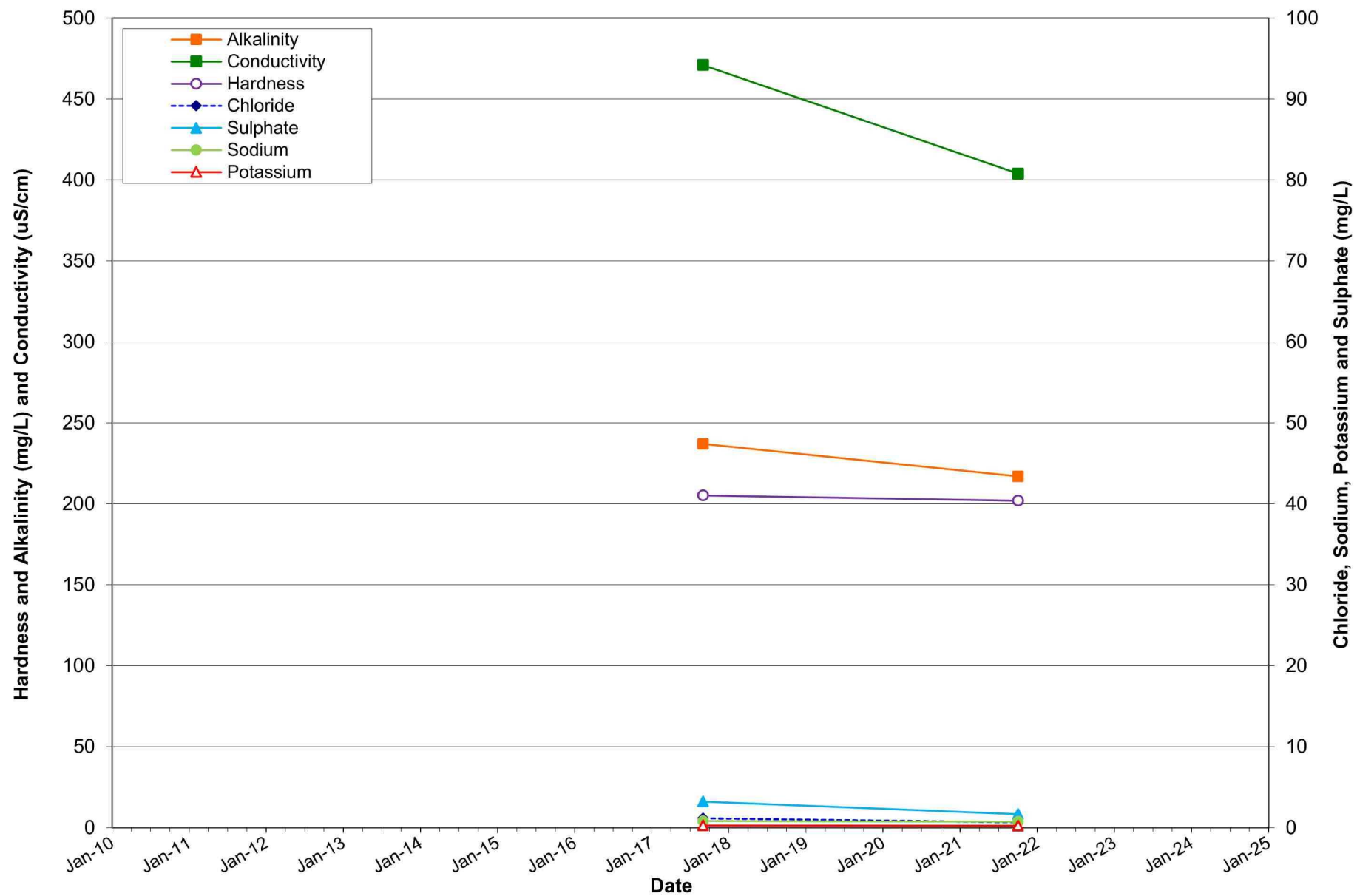
MONITORING WELL OW-12S



MONITORING WELL OW-12D



MONITORING WELL OW-13



Appendix G Laboratory Certificates of Analyses

CLIENT NAME: GM BLUEPLAN**1260 Second Avenue East, Unit 1
OWEN SOUND, ON N4K2J3
(519) 376-1805****ATTENTION TO: Jessica Weller****PROJECT: M1553****AGAT WORK ORDER: 24T144883****WATER ANALYSIS REVIEWED BY: Yris Verastegui, Inorganic Team Lead****DATE REPORTED: May 13, 2024****PAGES (INCLUDING COVER): 7****VERSION*: 1**

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

Notes*Disclaimer:**

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.



Certificate of Analysis

AGAT WORK ORDER: 24T144883

PROJECT: M1553

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

CLIENT NAME: GM BLUEPLAN

SAMPLING SITE: Eastnor

ATTENTION TO: Jessica Weller

SAMPLED BY:

GM BLUEPLAN - Eastnor Groundwater Package

DATE RECEIVED: 2024-05-01

DATE REPORTED: 2024-05-13

SAMPLE DESCRIPTION:				OW-4		OW-5		OW-6		OW-7S		OW-8	
SAMPLE TYPE:				Water		Water		Water		Water		Water	
DATE SAMPLED:				2024-04-30		2024-04-30		2024-04-30		2024-04-30		2024-04-30	
Parameter	Unit	G / S	RDL	5830742	RDL	5830748	5830749	RDL	5830750	RDL	5830751		
Electrical Conductivity	µS/cm		2	434	2	952	882	2	3050	2	2450		
pH	pH Units		NA	7.88	NA	7.50	7.67	NA	6.98	NA	7.06		
Alkalinity (as CaCO3)	mg/L		5	257	5	485	416	5	1200	5	937		
Chloride	mg/L		0.10	1.44	0.12	14.2	20.1	0.49	128	0.49	115		
Nitrate as N	mg/L		0.05	<0.05	0.05	<0.05	<0.05	0.14	<0.14	0.14	<0.14		
Nitrite as N	mg/L		0.05	<0.05	0.05	<0.05	<0.05	0.11	<0.11	0.11	<0.11		
Sulphate	mg/L		0.10	11.6	0.10	74.8	34.6	0.38	2.92	0.38	55.8		
Ortho Phosphate as P	mg/L		0.10	<0.10	0.10	<0.10	<0.10	0.26	<0.26	0.26	<0.26		
Hardness (as CaCO3) (Calculated)	mg/L		0.5	255	0.5	520	419	0.5	794	0.5	679		
Ammonia as N	mg/L		0.02	0.05	0.02	0.40	0.13	0.16	63.5	0.16	30.6		
Total Kjeldahl Nitrogen	mg/L		0.10	0.12	0.10	1.06	3.55	0.36	66.0	0.14	35.6		
Dissolved Organic Carbon	mg/L		0.5	10.7	0.5	12.1	18.0	0.5	56.9	0.5	29.8		
Total Phosphorus	mg/L		0.02	0.03	0.02	1.11	2.49	0.02	0.67	0.02	0.28		
Dissolved Calcium	mg/L		0.05	66.3	0.05	137	113	0.05	235	0.05	198		
Dissolved Magnesium	mg/L		0.05	21.8	0.05	43.1	33.2	0.05	50.2	0.05	44.8		
Dissolved Potassium	mg/L		0.50	1.26	0.50	6.96	4.53	0.50	62.3	0.50	44.0		
Dissolved Sodium	mg/L		0.05	3.10	0.25	8.75	13.1	0.5	120	0.5	103		
Dissolved Boron	mg/L		0.010	0.040	0.010	0.484	0.111	0.010	1.94	0.010	1.27		
Dissolved Iron	mg/L		0.020	0.118	0.020	<0.020	<0.020	0.020	0.153	0.020	0.082		
Dissolved Manganese	mg/L		0.002	0.031	0.002	0.771	0.630	0.002	1.55	0.002	0.812		
Lab Filtration DOC				1		1	1		1		1		
Lab Filtration Metals				1		1	1		1		1		

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

5830742-5830751 Metals analysis completed on a filtered sample.
DOC analysis completed on a filtered sample.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

José Verástegui



Quality Assurance

CLIENT NAME: GM BLUEPLAN

PROJECT: M1553

SAMPLING SITE: Eastnor

AGAT WORK ORDER: 24T144883

ATTENTION TO: Jessica Weller

SAMPLED BY:

Water Analysis

RPT Date: May 13, 2024

DUPLICATE

REFERENCE MATERIAL

METHOD BLANK SPIKE

MATRIX SPIKE

PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
GM BLUEPLAN - Eastnor Groundwater Package															
Electrical Conductivity	5832463		931	941	1.1%	< 2	96%	90%	110%						
pH	5832463		8.04	8.11	0.9%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	5832463		422	428	1.4%	< 5	106%	80%	120%						
Chloride	5830353		27.6	27.8	0.7%	< 0.10	94%	70%	130%	100%	80%	120%	103%	70%	130%
Nitrate as N	5830353		0.72	0.72	0.0%	< 0.05	92%	70%	130%	94%	80%	120%	95%	70%	130%
Nitrite as N	5830353		<0.05	<0.05	NA	< 0.05	94%	70%	130%	96%	80%	120%	96%	70%	130%
Sulphate	5830353		41.3	41.4	0.2%	< 0.10	92%	70%	130%	95%	80%	120%	97%	70%	130%
Ortho Phosphate as P	5830353		<0.10	<0.10	NA	< 0.10	96%	70%	130%	105%	80%	120%	101%	70%	130%
Ammonia as N	5832460		0.03	0.03	NA	< 0.02	105%	70%	130%	103%	80%	120%	93%	70%	130%
Total Kjeldahl Nitrogen	5836990		9.31	9.45	1.5%	< 0.10	102%	70%	130%	88%	80%	120%	NA	70%	130%
Dissolved Organic Carbon	5836165		0.9	0.8	NA	< 0.5	96%	90%	110%	104%	90%	110%	101%	80%	120%
Total Phosphorus	5832532		0.19	0.19	0.0%	< 0.02	104%	70%	130%	97%	80%	120%	83%	70%	130%
Dissolved Calcium	5830017		129	128	0.8%	< 0.05	102%	70%	130%	105%	80%	120%	104%	70%	130%
Dissolved Magnesium	5830017		9.99	9.83	1.6%	< 0.05	104%	70%	130%	111%	80%	120%	113%	70%	130%
Dissolved Potassium	5830017		2.56	2.56	0.0%	< 0.50	102%	70%	130%	105%	80%	120%	107%	70%	130%
Dissolved Sodium	5830742	5830742	3.10	3.06	1.3%	< 0.05	100%	70%	130%	100%	80%	120%	95%	70%	130%
Dissolved Boron	5830017		0.059	0.057	3.4%	< 0.010	98%	70%	130%	122%	80%	120%	126%	70%	130%
Dissolved Iron	5830017		<0.020	<0.020	NA	< 0.010	103%	70%	130%	106%	80%	120%	105%	70%	130%
Dissolved Manganese	5830017		0.004	0.003	NA	< 0.002	101%	70%	130%	107%	80%	120%	107%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

QA Qualifier for metals – Dissolved Boron: For a multi-element scan for lab control standards and matrix spikes, up to 10% of analytes may exceed the quoted limits by up to 10% absolute and it is considered acceptable.

Certified By:

José Verástegui

QC Exceedance

CLIENT NAME: GM BLUEPLAN

AGAT WORK ORDER: 24T144883

PROJECT: M1553

ATTENTION TO: Jessica Weller

RPT Date: May 13, 2024					REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE				
PARAMETER					Sample Id		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

GM BLUEPLAN - Eastnor Groundwater Package

Dissolved Boron	98%	70%	130%	122%	80%	120%	126%	70%	130%
-----------------	-----	-----	------	------	-----	------	------	-----	------

Comments: NA signifies Not Applicable.

Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

QA Qualifier for metals – Dissolved Boron: For a multi-element scan for lab control standards and matrix spikes, up to 10% of analytes may exceed the quoted limits by up to 10% absolute and it is considered acceptable.

Method Summary

CLIENT NAME: GM BLUEPLAN

PROJECT: M1553

SAMPLING SITE: Eastnor

AGAT WORK ORDER: 24T144883

ATTENTION TO: Jessica Weller

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Alkalinity (as CaCO ₃)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Hardness (as CaCO ₃) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Ammonia as N	INOR-93-6059	modified from SM 4500-NH ₃ H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Dissolved Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Dissolved Calcium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Dissolved Potassium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Lab Filtration DOC	SR-78-9001		FILTRATION
Lab Filtration Metals	SR-78-9001		FILTRATION

CLIENT NAME: GEI CONSULTANTS**1260 Second Avenue East, Unit 1
OWEN SOUND, ON N4K2J3
(519) 376-1805****ATTENTION TO: Jessica Weller****PROJECT: M1553 - Eastnor****AGAT WORK ORDER: 24T220810****TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist****WATER ANALYSIS REVIEWED BY: Yris Verastegui, Inorganic Team Lead****DATE REPORTED: Nov 25, 2024****PAGES (INCLUDING COVER): 14****VERSION*: 1**

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

Notes*Disclaimer:**

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information is available on request from AGAT Laboratories, in accordance with ISO/IEC 17025:2017, ISO/IEC 17025:2005 (Quebec), DR-12-PALA and/or NELAP Standards.
- This document is signed by an authorized signatory who meets the requirements of the MELCCFP, CALA, CCN and NELAP.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 24T220810

PROJECT: M1553 - Eastnor

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

CLIENT NAME: GEI CONSULTANTS

SAMPLING SITE: EASTNOR

ATTENTION TO: Jessica Weller

SAMPLED BY:

O. Reg. 153(511) - BTEX (Water)

DATE RECEIVED: 2024-11-14

DATE REPORTED: 2024-11-25

		SAMPLE DESCRIPTION:		OW-2	OW-8
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2024-11-12	2024-11-12
Parameter	Unit	G / S	RDL	6323194	6323203
Benzene	µg/L		0.20	<0.20	1.83
Toluene	µg/L		0.20	<0.20	<0.20
Ethylbenzene	µg/L		0.10	<0.10	<0.10
m & p-Xylene	µg/L		0.20	<0.20	<0.20
o-Xylene	µg/L		0.10	<0.10	<0.10
Xylenes (Total)	µg/L		0.20	<0.20	<0.20
Surrogate	Unit	Acceptable Limits			
Toluene-d8	% Recovery	50-140		93	93
4-Bromofluorobenzene	% Recovery	50-140		118	124

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

6323194-6323203 Results relate only to the items tested.

Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene + o-Xylene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.

Analysis performed at AGAT Toronto (unless marked by *)

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MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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CLIENT NAME: GEI CONSULTANTS

SAMPLING SITE: EASTNOR

ATTENTION TO: Jessica Weller

SAMPLED BY:

Eastnor Comprehensive Groundwater Package

DATE RECEIVED: 2024-11-14

DATE REPORTED: 2024-11-25

Parameter	Unit	SAMPLE DESCRIPTION:		OW-2		OW-8	
		SAMPLE TYPE:		Water		Water	
		DATE SAMPLED:		2024-11-12		2024-11-12	
		G / S	RDL	6323194	RDL	6323203	
Electrical Conductivity	uS/cm		2	2830	2	2370	
pH	pH Units		NA	7.48	NA	7.09	
Total Dissolved Solids	mg/L		10	1640	10	1100	
Alkalinity (as CaCO ₃)	mg/L		5	822	5	961	
Chloride	mg/L		0.49	56.5	0.49	118	
Nitrate as N	mg/L		0.14	<0.14	0.14	<0.14	
Nitrite as N	mg/L		0.11	<0.11	0.11	<0.11	
Sulphate	mg/L		0.38	583	0.38	51.1	
Chemical Oxygen Demand	mg/L		5	46	5	98	
Ammonia as N	mg/L		0.02	0.03	0.06	30.4	
Total Kjeldahl Nitrogen	mg/L		0.10	0.60	0.14	31.1	
Dissolved Organic Carbon	mg/L		0.5	23.0	0.5	43.3	
Total Phosphorus	mg/L		0.02	0.50	0.02	1.15	
Dissolved Calcium	mg/L		0.05	193	0.05	179	
Dissolved Magnesium	mg/L		0.05	138	0.05	36.4	
Dissolved Potassium	mg/L		0.50	105	0.50	34.1	
Dissolved Sodium	mg/L		0.05	43.6	0.05	109	
Dissolved Arsenic	mg/L		0.001	<0.001	0.001	0.001	
Dissolved Barium	mg/L		0.002	0.041	0.002	0.086	
Dissolved Boron	mg/L		0.010	1.62	0.010	0.925	
Dissolved Cadmium	mg/L		0.0001	<0.0001	0.0001	<0.0001	
Dissolved Chromium	mg/L		0.002	<0.002	0.002	0.003	
Dissolved Copper	mg/L		0.001	0.001	0.001	<0.001	
Dissolved Iron	mg/L		0.020	0.033	0.020	0.080	
Dissolved Lead	mg/L		0.0005	<0.0005	0.0005	<0.0005	
Dissolved Manganese	mg/L		0.002	0.956	0.002	0.889	
Dissolved Mercury	mg/L		0.0001	<0.0001	0.0001	<0.0001	
Dissolved Zinc	mg/L		0.005	<0.005	0.005	<0.005	
Lab Filtration DOC				1		1	
Lab Filtration Metals				1			

Certified By:

José Verástegui



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 24T220810

PROJECT: M1553 - Eastnor

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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CLIENT NAME: GEI CONSULTANTS

SAMPLING SITE: EASTNOR

ATTENTION TO: Jessica Weller

SAMPLED BY:

Eastnor Comprehensive Groundwater Package

DATE RECEIVED: 2024-11-14

DATE REPORTED: 2024-11-25

		SAMPLE DESCRIPTION:		OW-2		OW-8
		SAMPLE TYPE:		Water		Water
		DATE SAMPLED:		2024-11-12		2024-11-12
Parameter	Unit	G / S	RDL	6323194	RDL	6323203
Lab Filtration mercury				1		

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

6323194-6323203 Metals analysis completed on a filtered sample.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

José Verástegui



Certificate of Analysis

AGAT WORK ORDER: 24T220810

PROJECT: M1553 - Eastnor

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MISSISSAUGA, ONTARIO
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CLIENT NAME: GEI CONSULTANTS

SAMPLING SITE: EASTNOR

ATTENTION TO: Jessica Weller

SAMPLED BY:

Eastnor Groundwater Package

DATE RECEIVED: 2024-11-14

DATE REPORTED: 2024-11-25

		SAMPLE DESCRIPTION:		OW-1		OW-3		OW-4		OW-5		OW-6	
		SAMPLE TYPE:		Water		Water		Water		Water		Water	
		DATE SAMPLED:		2024-11-12		2024-11-12		2024-11-12		2024-11-12		2024-11-12	
Parameter	Unit	G / S	RDL	6323085	RDL	6323181	RDL	6323182	RDL	6323183	RDL	6323184	RDL
Electrical Conductivity	uS/cm		2	525	2	2590	2	441	2	1030		836	
pH	pH Units		NA	7.70	NA	7.47	NA	7.83	NA	7.53		7.77	
Alkalinity (as CaCO ₃)	mg/L		5	295	5	831	5	266	5	553		512	
Chloride	mg/L		0.10	3.69	0.49	64.3	0.10	1.48	0.12	12.7		23.1	
Nitrate as N	mg/L		0.05	0.05	0.14	<0.14	0.05	<0.05	0.05	<0.05		<0.05	
Nitrite as N	mg/L		0.05	<0.05	0.11	<0.11	0.05	<0.05	0.05	<0.05		<0.05	
Sulphate	mg/L		0.10	35.2	0.38	496	0.10	10.5	0.10	89.7		25.6	
Ortho Phosphate as P	mg/L		0.10	<0.10	0.26	<0.26	0.10	<0.10	0.10	<0.10		<0.10	
Hardness (as CaCO ₃) (Calculated)	mg/L		0.5	278	0.5	1150	0.5	216	0.5	507		353	
Ammonia as N	mg/L		0.02	0.29	0.02	0.17	0.02	<0.02	0.02	<0.02		<0.02	
Total Kjeldahl Nitrogen	mg/L		0.10	0.90	0.10	0.77	0.10	0.26	0.10	0.50		1.88	
Dissolved Organic Carbon	mg/L		0.5	13.0	0.5	22.4	0.5	10.6	0.5	11.7		20.8	
Total Phosphorus	mg/L		0.02	0.14	0.02	0.15	0.02	0.11	0.02	0.56		2.32	
Dissolved Calcium	mg/L		0.05	73.6	0.05	209	0.05	57.4	0.05	137		97.0	
Dissolved Magnesium	mg/L		0.05	22.8	0.05	153	0.05	17.7	0.05	40.1		26.9	
Dissolved Potassium	mg/L		0.50	<0.50	0.50	62.6	0.50	0.88	0.50	6.34		4.95	
Dissolved Sodium	mg/L		0.05	2.22	0.05	40.9	0.05	2.92	0.05	9.12		14.1	
Dissolved Boron	mg/L		0.010	0.018	0.010	1.19	0.010	0.038	0.010	0.553		0.158	
Dissolved Iron	mg/L		0.020	0.341	0.020	<0.020	0.020	<0.020	0.020	0.025		<0.020	
Dissolved Manganese	mg/L		0.002	0.233	0.002	0.775	0.002	0.025	0.002	0.595		0.041	
Lab Filtration DOC				1		1		1		1		1	
Lab Filtration Metals				1		1		1		1		1	

Certified By:

José Verástegui



Certificate of Analysis

AGAT WORK ORDER: 24T220810

PROJECT: M1553 - Eastnor

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

CLIENT NAME: GEI CONSULTANTS

SAMPLING SITE: EASTNOR

ATTENTION TO: Jessica Weller

SAMPLED BY:

Eastnor Groundwater Package

DATE RECEIVED: 2024-11-14

DATE REPORTED: 2024-11-25

		SAMPLE DESCRIPTION:		OW-7S		OW-7D		OW-10S		OW-10D		OW-11	
		SAMPLE TYPE:		Water		Water		Water		Water		Water	
		DATE SAMPLED:		2024-11-12		2024-11-12		2024-11-12		2024-11-12		2024-11-12	
Parameter	Unit	G / S	RDL	6323185	RDL	6323186	RDL	6323187	6323188	RDL	6323189		
Electrical Conductivity	uS/cm		2	2900	2	924	2	598	534	2	609		
pH	pH Units		NA	7.03	NA	7.63	NA	7.29	7.77	NA	7.52		
Alkalinity (as CaCO ₃)	mg/L		5	1220	5	496	5	324	339	5	373		
Chloride	mg/L		0.49	126	0.12	18.2	0.10	4.68	2.58	0.10	2.90		
Nitrate as N	mg/L		0.14	<0.14	0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05		
Nitrite as N	mg/L		0.11	<0.11	0.05	<0.05	0.05	<0.05	<0.05	0.05	<0.05		
Sulphate	mg/L		0.38	3.08	0.10	78.9	0.10	35.5	6.45	0.10	0.31		
Ortho Phosphate as P	mg/L		0.26	<0.26	0.10	<0.10	0.10	<0.10	<0.10	0.10	<0.10		
Hardness (as CaCO ₃) (Calculated)	mg/L		0.5	597	0.5	250	0.5	280	253	0.5	291		
Ammonia as N	mg/L		0.16	90.5	0.02	0.10	0.02	0.24	0.28	0.02	0.12		
Total Kjeldahl Nitrogen	mg/L		0.72	344	0.10	0.79	0.10	1.60	0.54	0.10	1.20		
Dissolved Organic Carbon	mg/L		0.5	51.8	0.5	17.4	0.5	35.9	9.2	0.5	38.6		
Total Phosphorus	mg/L		0.02	1.03	0.02	2.87	0.02	1.10	0.70	0.02	0.12		
Dissolved Calcium	mg/L		0.05	182	0.05	65.3	0.05	74.9	65.9	0.10	82.7		
Dissolved Magnesium	mg/L		0.05	34.7	0.05	21.0	0.05	22.5	21.4	0.10	20.4		
Dissolved Potassium	mg/L		0.50	53.3	0.50	<0.50	0.50	0.53	<0.50	1.00	<1.00		
Dissolved Sodium	mg/L		0.05	114	0.05	1.65	0.05	3.85	1.72	0.10	2.75		
Dissolved Boron	mg/L		0.010	1.63	0.010	0.023	0.010	0.041	0.022	0.010	0.021		
Dissolved Iron	mg/L		0.020	0.106	0.020	0.022	0.020	0.273	<0.020	0.040	0.937		
Dissolved Manganese	mg/L		0.002	1.13	0.002	0.059	0.002	0.259	0.062	0.004	0.263		
Lab Filtration DOC				1		1		1	1		1		
Lab Filtration Metals				1		1		1	1		1		

Certified By:

José Verástegui



Certificate of Analysis

AGAT WORK ORDER: 24T220810

PROJECT: M1553 - Eastnor

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
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CLIENT NAME: GEI CONSULTANTS

SAMPLING SITE: EASTNOR

ATTENTION TO: Jessica Weller

SAMPLED BY:

Eastnor Groundwater Package

DATE RECEIVED: 2024-11-14

DATE REPORTED: 2024-11-25

		SAMPLE DESCRIPTION:		OW-12S	OW-12D
		SAMPLE TYPE:		Water	Water
		DATE SAMPLED:		2024-11-12	2024-11-12
Parameter	Unit	G / S	RDL	6323190	6323191
Electrical Conductivity	uS/cm		2	341	350
pH	pH Units		NA	7.88	7.72
Alkalinity (as CaCO ₃)	mg/L		5	234	360
Chloride	mg/L		0.10	0.74	1.57
Nitrate as N	mg/L		0.05	<0.05	0.24
Nitrite as N	mg/L		0.05	<0.05	<0.05
Sulphate	mg/L		0.10	4.18	0.78
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10
Hardness (as CaCO ₃) (Calculated)	mg/L		0.5	166	171
Ammonia as N	mg/L		0.02	<0.02	0.06
Total Kjeldahl Nitrogen	mg/L		0.10	<0.10	1.14
Dissolved Organic Carbon	mg/L		0.5	1.9	18.2
Total Phosphorus	mg/L		0.02	0.54	3.11
Dissolved Calcium	mg/L		0.05	42.6	48.6
Dissolved Magnesium	mg/L		0.05	14.5	12.1
Dissolved Potassium	mg/L		0.50	<0.50	0.71
Dissolved Sodium	mg/L		0.05	0.72	1.81
Dissolved Boron	mg/L		0.010	<0.010	0.020
Dissolved Iron	mg/L		0.020	<0.020	0.033
Dissolved Manganese	mg/L		0.002	0.003	0.038
Lab Filtration DOC				1	1
Lab Filtration Metals				1	1

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

6323085-6323191 Metals analysis completed on a filtered sample.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

José Verástegui

Quality Assurance

CLIENT NAME: GEI CONSULTANTS

PROJECT: M1553 - Eastnor

SAMPLING SITE: EASTNOR

AGAT WORK ORDER: 24T220810

ATTENTION TO: Jessica Weller

SAMPLED BY:

Trace Organics Analysis

RPT Date: Nov 25, 2024

RPT Date: Nov 25, 2024			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

O. Reg. 153(511) - BTEX (Water)

Benzene	6323433		<0.20	<0.20	NA	< 0.20	112%	50%	140%	114%	60%	130%	87%	50%	140%
Toluene	6323433		<0.20	<0.20	NA	< 0.20	119%	50%	140%	115%	60%	130%	105%	50%	140%
Ethylbenzene	6323433		<0.10	<0.10	NA	< 0.10	112%	50%	140%	111%	60%	130%	95%	50%	140%
m & p-Xylene	6323433		<0.20	<0.20	NA	< 0.20	120%	50%	140%	118%	60%	130%	105%	50%	140%
o-Xylene	6323433		<0.10	<0.10	NA	< 0.10	97%	50%	140%	117%	60%	130%	105%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:





Quality Assurance

CLIENT NAME: GEI CONSULTANTS

PROJECT: M1553 - Eastnor

SAMPLING SITE: EASTNOR

AGAT WORK ORDER: 24T220810

ATTENTION TO: Jessica Weller

SAMPLED BY:

Water Analysis

RPT Date: Nov 25, 2024			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Eastnor Groundwater Package

Electrical Conductivity	6323184	6323184	836	834	0.2%	< 2	104%	80%	120%						
pH	6322928		7.67	7.80	1.7%	NA	100%	90%	110%						
Alkalinity (as CaCO3)	6322928		412	412	0.0%	< 5	106%	80%	120%						
Chloride	6323184	6323184	23.1	22.9	0.6%	< 0.10	91%	70%	130%	97%	80%	120%	98%	70%	130%
Nitrate as N	6323184	6323184	<0.05	<0.05	NA	< 0.05	91%	70%	130%	93%	80%	120%	93%	70%	130%
Nitrite as N	6323184	6323184	<0.05	<0.05	NA	< 0.05	91%	70%	130%	88%	80%	120%	96%	70%	130%
Sulphate	6323184	6323184	25.6	25.5	0.5%	< 0.10	91%	70%	130%	94%	80%	120%	92%	70%	130%
Ortho Phosphate as P	6323184	6323184	<0.10	<0.10	NA	< 0.10	93%	70%	130%	101%	80%	120%	98%	70%	130%
Ammonia as N	6328086		<0.02	<0.02	NA	< 0.02	97%	70%	130%	112%	80%	120%	72%	70%	130%
Total Kjeldahl Nitrogen	6323085	6323085	0.90	0.90	0.2%	< 0.10	101%	70%	130%	94%	80%	120%	84%	70%	130%
Dissolved Organic Carbon	6323085	6323085	13.0	13.9	6.3%	< 0.5	101%	90%	110%	94%	90%	110%	NA	80%	120%
Total Phosphorus	6323194	6323194	0.50	0.53	5.8%	< 0.02	100%	70%	130%	101%	80%	120%	96%	70%	130%
Dissolved Calcium	6330877		337	314	7.3%	< 0.05	107%	70%	130%	105%	80%	120%	99%	70%	130%
Dissolved Magnesium	6330877		122	109	10.7%	< 0.05	107%	70%	130%	106%	80%	120%	96%	70%	130%
Dissolved Potassium	6330877		8.71	8.04	8.0%	< 0.50	106%	70%	130%	97%	80%	120%	85%	70%	130%
Dissolved Sodium	6330877		358	334	7.0%	< 0.05	108%	70%	130%	109%	80%	120%	95%	70%	130%
Dissolved Boron	6330877		0.066	0.060	8.6%	< 0.010	102%	70%	130%	111%	80%	120%	109%	70%	130%
Dissolved Iron	6330877		0.085	0.071	NA	< 0.010	98%	70%	130%	98%	80%	120%	108%	70%	130%
Dissolved Manganese	6330877		0.554	0.489	12.5%	< 0.002	98%	70%	130%	97%	80%	120%	99%	70%	130%

Eastnor Comprehensive Groundwater Package

Electrical Conductivity	6323184	6323184	836	734	13.0%	< 2	104%	80%	120%						
pH	6323184	6323184	7.77	7.81	0.5%	NA	100%	90%	110%						
Total Dissolved Solids	6322927		1220	1220	0.0%	< 10	98%	80%	120%						
Alkalinity (as CaCO3)	6323184	6323184	512	497	3.0%	< 5	116%	80%	120%						
Chloride	6323184	6323184	23.1	22.9	0.9%	< 0.10	91%	70%	130%	97%	80%	120%	98%	70%	130%
Nitrate as N	6323184	6323184	<0.05	<0.05	NA	< 0.05	91%	70%	130%	93%	80%	120%	93%	70%	130%
Nitrite as N	6323184	6323184	<0.05	<0.05	NA	< 0.05	91%	70%	130%	88%	80%	120%	96%	70%	130%
Sulphate	6323184	6323184	25.6	25.5	0.4%	< 0.10	91%	70%	130%	94%	80%	120%	92%	70%	130%
Chemical Oxygen Demand	6318548		55	56	1.8%	< 5	100%	80%	120%	97%	90%	110%	NA	70%	130%
Ammonia as N	6323190	6323190	<0.02	<0.02	NA	< 0.02	97%	70%	130%	112%	80%	120%	94%	70%	130%
Total Kjeldahl Nitrogen	6323085	6323085	0.90	0.90	0.0%	< 0.10	101%	70%	130%	94%	80%	120%	84%	70%	130%
Dissolved Organic Carbon	6323085	6323085	13.0	13.9	6.7%	< 0.5	101%	90%	110%	94%	90%	110%	NA	80%	120%
Total Phosphorus	6323194	6323194	0.50	0.53	5.8%	< 0.02	96%	70%	130%	98%	80%	120%	96%	70%	130%
Dissolved Calcium	6326578		34.8	35.5	2.0%	< 0.05	95%	70%	130%	93%	80%	120%	87%	70%	130%
Dissolved Magnesium	6326578		1.07	1.19	10.6%	< 0.05	94%	70%	130%	95%	80%	120%	88%	70%	130%
Dissolved Potassium	6326578		<0.50	<0.50	NA	< 0.50	88%	70%	130%	89%	80%	120%	82%	70%	130%
Dissolved Sodium	6326578		1.17	1.20	2.5%	< 0.05	97%	70%	130%	95%	80%	120%	89%	70%	130%
Dissolved Arsenic	6326578		<0.001	<0.001	NA	< 0.001	96%	70%	130%	102%	80%	120%	105%	70%	130%
Dissolved Barium	6326578		0.004	0.004	NA	< 0.002	94%	70%	130%	94%	80%	120%	91%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

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AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

Quality Assurance

CLIENT NAME: GEI CONSULTANTS

PROJECT: M1553 - Eastnor

SAMPLING SITE: EASTNOR

AGAT WORK ORDER: 24T220810

ATTENTION TO: Jessica Weller

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Nov 25, 2024			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Dissolved Boron	6326578		<0.010	<0.010	NA	< 0.010	105%	70%	130%	105%	80%	120%	103%	70%	130%
Dissolved Cadmium	6326578		<0.0001	<0.0001	NA	< 0.0001	100%	70%	130%	99%	80%	120%	99%	70%	130%
Dissolved Chromium	6326578		<0.002	<0.002	NA	< 0.002	104%	70%	130%	106%	80%	120%	103%	70%	130%
Dissolved Copper	6326578		0.007	0.008	13.3%	< 0.001	104%	70%	130%	102%	80%	120%	102%	70%	130%
Dissolved Iron	6326578		<0.020	<0.020	NA	< 0.010	101%	70%	130%	109%	80%	120%	99%	70%	130%
Dissolved Lead	6326578		<0.0005	<0.0005	NA	< 0.0005	96%	70%	130%	90%	80%	120%	88%	70%	130%
Dissolved Manganese	6326578		0.006	0.006	NA	< 0.002	103%	70%	130%	105%	80%	120%	101%	70%	130%
Dissolved Mercury	6324169		<0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	103%	80%	120%	93%	70%	130%
Dissolved Zinc	6326578		<0.005	<0.005	NA	< 0.005	102%	70%	130%	100%	80%	120%	106%	70%	130%

Comments: NA signifies Not Applicable.

Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:



Method Summary

CLIENT NAME: GEI CONSULTANTS

PROJECT: M1553 - Eastnor

SAMPLING SITE:EASTNOR

AGAT WORK ORDER: 24T220810

ATTENTION TO: Jessica Weller

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Benzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
m & p-Xylene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
o-Xylene	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA SW-846 5030C & 8260D	(P&T)GC/MS
Toluene-d8	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: GEI CONSULTANTS
PROJECT: M1553 - Eastnor
SAMPLING SITE: EASTNOR
AGAT WORK ORDER: 24T220810
ATTENTION TO: Jessica Weller
SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684, ON MOECC E3139, SM 2540B, C, D	BALANCE
Alkalinity (as CaCO ₃)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chemical Oxygen Demand	INOR-93-6042	modified from SM 5220 A and SM 5220 D	SPECTROPHOTOMETER
Ammonia as N	INOR-93-6059	modified from SM 4500-NH ₃ H	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Dissolved Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Dissolved Calcium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Dissolved Potassium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Sodium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP/MS
Dissolved Arsenic	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Barium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Boron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Cadmium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Chromium	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Copper	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Iron	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Lead	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Manganese	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Dissolved Zinc	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Lab Filtration DOC	SR-78-9001		FILTRATION
Lab Filtration Metals	SR-78-9001		FILTRATION
Lab Filtration mercury	SR-78-9001		FILTRATION
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Hardness (as CaCO ₃) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION