Prepared By:

BluePlan ENGINEERING

# Municipality of West Grey

# Annual Monitoring Report (2022) - Bentinck Landfill Site Certificate of Approval No. A261301

**GMBP File: 213085**

**March 2023**

GUELPH | OWEN SOUND | LISTOWEL | KITCHENER | LONDON | HAMILTON | GTA

1260-2ND AVE. E., UNIT 1, OWEN SOUND ON N4K 2J3 P: 519-376-1805
WWW.GMBLUEPLAN.CA

# TABLE OF CONTENTS



# TABLES

# FIGURES



# APPENDICES

**ANNUAL MONITORING REPORT (2022) - BENTINCK LANDFILL SITE**

**MUNICIPALITY OF WEST GREY**

**MARCH 2023**

**GMBP FILE: 213085**

## 1. INTRODUCTION & BACKGROUND INFORMATION

The Bentinck Landfill Site is located approximately 8 kilometres northeast of Hanover on the east side of Grey Road 3. The landfill site is located on part of Lots 16 & 17, Concession 7, in the former Township of Bentinck, Municipality of West Grey, County of Grey, as shown on Figure No. 1.

An Application for a Waste Disposal Site was submitted to the Ministry of the Environment Conservation and Parks (MECP) for approval in 1972. Landfilling operations were reportedly initiated in 1974 using the trenching method of landfilling, which continues to date. On April 12, 1990, Provisional Certificate of Approval (C of A) No. A261301 was issued to the Municipality by the MECP, licensing a 20.2 hectare (50 acre) landfilling site. In 1997, an additional 12.2 ha (30.1 acres) of buffer land was obtained by the Municipality located along the southern boundary of the landfill site. As referenced in the amended C of A, the Site now comprises an area of 32.4 ha (80.1 acres). In addition to the lands recognized within the C of A, the Municipality owns additional buffer lands located directly east and adjacent to the landfill Site, which consists of a property that comprises an area of 6.97 hectares (17.2 acres) as shown on Figure 2.

The Environmental Compliance Approval (formerly C of A) was amended and re-issued on May 20, 2005, September 29, 2005, October 16, 2008, and April 14, 2020. A Plan of Development and Operations (PDO) for the Site was completed in August of 1988. The PDO was updated and submitted for acceptance by the MECP in 2006. The updated PDO, dated December 18, 2006 is referenced in Schedule “A” of the Environmental Compliance Approval (ECA). A copy of the ECA and the associated amendments is provided in Appendix “A”. This annual monitoring report is being submitted to meet the conditions of the ECA.

## 2. SITE USAGE

The approved service area for the waste disposal site includes residents from the entire Municipality of West Grey. Refuse delivered to the Site primarily originates from full time and seasonal residents situated within the former Township of Bentinck. The population of the former Township of Bentinck, before amalgamation occurred in 2000, was 3,422 based on the 1999 Ontario Municipal Directory. The contributing population is expected to be generally consistent with the pre-amalgamation population within the service area.

Based on a review of previous Annual Reports and the 2006 PDO, operations at the Site have completed filling all trenches and progressed to above-grade filling using the area ramp method in the current monitoring period. Active landfilling is currently proceeding in the northeast portion of the landfill Site to the north of the receiving area. It is recommended to continue landfilling in this area until complete. The 2006 PDO indicates that Phase I of the Site consists of completing all trenches within Phase I, to be followed by the commencement of landfilling using the area ramp method.

During the current monitoring period, trenching in Phase I was completed and operations have progressed to above-grade filling using the ramp method specified in the approved PDO.

Interim soil cover should be applied to the active area weekly. The excavated earth from the trenches should be satisfactory for cell cover material. The existing site conditions and the active area are presented on Figure 3.

## 3. SITE LIFE EXPECTANCY

The amended ECA provides for a total site area of approximately 32.4 ha with a currently approved landfill footprint of 20.2 ha and an approved operational capacity of 227,400 $m^3$ including daily and intermediate cover but not including final cover and capping materials. Based on the 2006 PDO, the theoretical approved volumetric capacity for the Site is 923,140 $m^3$. Prior to utilizing the additional theoretical airspace capacity, Condition 20.3 of the ECA requires that an updated PDO and Hydrogeological Assessment be completed for submission and acceptance by the MECP.

In the past, topographical surveys have been completed every two years to monitor site development and evaluate the remaining site capacity. The most recent capacity determination survey at the landfill was completed in November 2022. By comparing the survey in the active landfill area between the surveys, and by considering the previous excavated cell dimensions, it is assumed that approximately 90% of the 2022 surveyed area can be considered active. Based on the active surveyed area, a fill rate of 6,080 $m^3$/year was calculated for the 2022 monitoring year. This represents a higher volume than typical annual average. However, it is noted that in 2020, the volume filled was significantly greater than the typical annual average, and in 2019 the volume filled was significantly lower than the typical annual average. The combined volume of 7,450 $m^3$ filled in 2019 and 2020 represents a two-year average fill rate of 3,725 $m^3$, which is within the typical annual range. Comparatively, the two-year average fill rate for 2021 and 2022 is 4,240 $m^3$, which is within the typical annual range.

**We recommend that a topographic survey be completed at the site in the fall of 2023 in order to update the annual landfill rate at the Site and to confirm the remaining airspace capacity and site life.** Since the landfill operations have progressed to the next phase of approved waste placement as per the PDO, and since waste placement is now completed above-grade using the area ramp method, the completion of annual topographic surveys will be key in assessing the volumetric capacity used and the remaining site life.

Based on a review of available information, the reported remaining airspace capacity for waste and daily cover at the beginning of the 2022 operating year was 164,801 $m^3$. Based on the annual fill rate of 6,080 $m^3$ in 2022, the Site has a remaining airspace capacity of 158,721 $m^3$ for waste and daily cover, and 31,500 $m^3$ for final cover. Landfill capacity calculations are presented in the attached Table 1. At the average fill rate observed over the last five years (i.e., 4,086 $m^3$), the remaining volumetric capacity provides for an approximate site life of 39 years. The 2006 PDO provides a scenario where the entire Municipality of West Grey could be contributing to the Bentinck Waste Disposal Site at an approximate hypothetical annual fill rate of 9,120 $m^3$/year. Under this scenario, the Site would have capacity for approximately 17 years as indicated in Table 1.

The Bentinck Landfill Site began the use of a scale on September 22, 2018. New fees came into effect at that time as well. The new fees were adopted under By Law No. 112-2018 and are provided within Appendix “B”. The Municipality reported that the entrance and diversion area underwent renovations to accommodate the scale and scale house including the installation of traffic lights, internet tower, cameras, diversion bins and roadways. The updated receiving area and associated changes are provided on Figure 3. Based on the weigh scale reports, approximately 2,034 tonnes of waste were brought to the site for the reporting period.

## 4. BURNING OPERATIONS

Based on the current Environmental Compliance Approval (ECA) requirements, only segregated clean, dry wood wastes such as brush, trees and untreated lumber may be burned at the site. Supervised burning of wood waste is to occur on clear, dry, windless days when the site is closed to the public. The Site Attendant is responsible for removing any non-wood wastes from the pile prior to burning, and to regularly remove cold ashes from the burn area for disposal in the active landfill area.

The operating authority is responsible to maintain appropriate burning operations at the site. Appropriate operations include the burning of appropriate wood wastes, which are separated from refuse and stockpiled in a designated burn area that is located a minimum distance of 30 metres from the active fill area and is within view of the Site Attendants building. Burning is to be completed under direct supervision of the operator and is to be conducted as frequently as necessary to maintain a burn pile that measures no greater than 6m by 6m in area and 3m in height. Cold ashes are to be removed from the burn area and placed directly in the active area following each burn.

The Municipality reports that approximately 570 tonnes of wood waste was burned at the Bentinck Landfill during the reported monitoring period. Inspections by staff of GM BluePlan Limited during the monitoring period noted that the wood pile was well maintained. Care should be taken to keep the burn pile to a minimum to reduce clutter and keep the site aesthetically acceptable. The Municipality should continue to ensure that the responsibilities of the Site Attendant to only burn the appropriate wood wastes specified in the ECA and in the burning regulation (Appendix “C”) are being carried out on a consistent basis.

## 5. RECYCLING/WASTE REDUCTION

Waste Management was contracted to collect curbside recyclable goods from households and to collect the accumulation of recyclables from the landfill site. All Ontario Recycling was contracted to collect and remove accumulations of scrap metal and tires from the site. Recyclable goods not accepted as part of the blue box program, such as scrap metal, tires, used propane tanks, waste electrical and electronic equipment, and vehicle batteries are stockpiled and hauled from the landfill site as required.

Waste tires were the first divertible material to be transitioned to the individual producer responsibility (IPR) framework under the recent waste diversion legislation, the Waste-Free Ontario Act. The Municipality continues to accept used tires, to a maximum of 10 tire units per person per day. As a registered collector, the Municipality accepts used tires free of charge 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 2,654 tire units [2,358 passenger/light truck (PLT), 274 medium truck tires (MT), and 22 Agricultural/Logger/Skidder tires (AG/LS)] weighing approximately 38.82 tonnes were received by the Municipality in the current reporting period.

As per the requirements of Reg. 347/90-Section 6 (i.e. The General Waste Management Regulation) of the Environmental Protection Act (EPA) and consistent with the requirements of the ECA, continued attention should be given to the size of the tire stockpile to ensure that there are fewer than 5,000 tire units at any given time.

Municipal records, received from Waste Management, provide the total recycling tonnage diverted from within the entire Municipality of West Grey for the current reporting period.

The following approximate quantities of recyclables were diverted from the landfill in 2021 and 2022:

| Diversion Stream | 2021 | 2022 |
|---|---|---|
| Onsite Depot & Curbside Recycling Program for entire Municipality (tonnes) | 766.02 | 595.30 |
| Scrap metal (tonnes) | 85.91 | 105.58 |
| Tires [tonnes (10kg/unit)] | 42.20 | 38.82 |
| Waste Electrical and Electronic Equipment (WEEE) (tonnes) | 10.91 | 15.03 |
| Wood Waste (tonnes) | 110 | 1,320 |
| Furniture/mattresses (units) | 534 | 259 |
| Appliances (units) | 116 | 127 |
| Appliances (with Freon) (units) | 102 | 65 |

The reported recycling and waste diversion totals are generally comparable to historical totals. Based on the totals reported in 2022, the diversion totals indicate a slight decrease in onsite and curbside recycling but are consistent with previous totals for the site. It is important that the Municipality continue to remove stockpiles of recyclable goods on a regular basis to further reduce the volume of waste entering the landfill, to prevent clutter, and to maintain an aesthetically acceptable site.

# 6. GENERAL OPERATIONS

## 6.1 Site Controls

The site is open on Wednesdays from 8:00 A.M. to 5:00 P.M. and on Saturday from 8:00 A.M. to 4:00 P.M. each week. A sign at the access gate notes the hours of operation and specifies the acceptable wastes that are received at the Site. When the landfill is closed to the public, a locked gate across the entrance road controls access to the site. Although signs are not posted at all of the various disposal locations, designated areas for waste, recyclable materials, and wood waste are clearly visible. The site is located in a secluded setting and is set well back from Grey Road 3. The landfill is adequately screened from the public view by low hills and heavy tree cover.

## 6.2 Site Cleanliness

The most important aspect of site cleanliness is to ensure that all landfilled wastes are adequately covered and compacted immediately following waste placement so that refuse is not exposed at the surface. The application and compaction of an appropriate soil cover immediately following waste disposal decreases blowing litter and reduces surface water infiltration vertically through the refuse to reduce leachate production at the site.

**A consistent effort should be made to ensure wastes are adequately covered and blown litter is collected on a routine basis**. The Site Operator is responsible for compaction and covering of refuse and for collecting blown litter. **We recommend that waste continue to be compacted and covered and that litter is collected on the same day following waste disposal to maintain an acceptable site appearance.** General duties of Site Supervisors and Site Attendants are included as Appendix "C".

Another important aspect of site cleanliness is to ensure that accumulations of recyclable materials are regularly removed from the site and that appropriate wood wastes are burned regularly to maintain a manageable pile. Designated areas for recyclable goods appear to be organized and generally well managed.

## 6.3 Active Landfill Area

Waste compaction and covering operations are reportedly achieved with a rubber tire loader and a tow-behind sheepsfoot roller. Previous Annual monitoring Reports indicate that the Municipality has typically achieved reasonably adequate waste compaction and covering in the active trench/area.

Currently, the active landfilling operations are being conducted in of the northeast portion of Phase 1 as per the 2006 PDO, which describes landfilling using the trenching method until such time that it becomes feasible to implement the area ramp method. It is noted that during the current monitoring period, operations using the Area-Ramp method in the northeast portion of the landfill footprint have been initiated.

**Areas of the landfill that have been filled to capacity or have reached final contours should be capped and progressively closed using a minimum 600 mm of low-permeability silty clay material and 150 mm of topsoil seeded to grass.**

**Interim cover should be applied to the active area weekly so that no waste is exposed.**

# 7. ENVIRONMENTAL MONITORING

The current ECA requires the submission of an annual monitoring report summarizing the environmental conditions at the landfill site and a statement with regard to Site compliance in accordance to the Reasonable Use Concept, MECP Guideline B-7 (RUC). Based on the MECP requirements specified in the ECA, the report must address the results of the groundwater and/or surface water monitoring programs and assess the environmental conditions at the site to ensure compliance with the RUC and with the requirements of the Provincial Water Quality Objectives (PWQO).

Recent historical water quality data indicates the presence of locally impacted groundwater in the shallow overburden deposit in the vicinity of the landfill, which is slowly migrating in a south to south-easterly direction. Previously completed annual monitoring reports concluded that leachate impacted groundwater is being contained to the subject property and that the landfill site was in compliance with the criteria specified in MECP Guideline B-7.

**It is proposed to continue the established annual monitoring program at the site on a semi-annual basis according to the analytical parameters outlined in Table 2.** Monitoring locations are shown on the Monitoring Well Location Plan presented on Figure 4.

**Table 2 - Monitoring Locations & Analytical Requirements**

| MONITORING WELL LOCATION | GROUNDWATER SAMPLING FREQUENCY | SURFACE WATER LOCATION | SURFACE WATER SAMPLING FREQUENCY |
|---|---|---|---|
| TH-2 | Spring & Fall | SW-2 | Spring & Fall |
| TH-3 | Spring & Fall | SW-2A | Spring & Fall |
| TH-5A | Spring & Fall | SW-4 | Spring & Fall |
| TH-5B | Spring & Fall | SW-5 | Spring & Fall |
| TH-6 | Spring & Fall | | |
| TH-7 | Spring & Fall | | |
| TH-8 | Spring & Fall | | |
| TH-9 | Spring & Fall | | |
| TH-10 | Spring & Fall | | |
| TH-11 | Spring & Fall | | |
| TH-12 | Spring & Fall | | |
| *TH-13 | Spring & Fall | | |
| *TH-14 | Spring & Fall | | |
| TP-3 | Spring & Fall | | |
| TP-5 | Spring & Fall | | |

**ANALYTICAL PARAMETERS (GROUNDWATER & SURFACE WATER)**

- Alkalinity
- Ammonia, Total Kjeldahl Nitrogen (TKN), Phenols
- Hardness
- Conductivity, TDS (*Surface Water Only*)
- Metals – Calcium, Iron, Magnesium, Manganese, Phosphorus, Potassium, Sodium
- Anions – Chloride, Nitrate, Nitrite, Phosphate, Sulphate
- Dissolved Organic Carbon (DOC)
- pH

Notes:
* Monitoring Wells TH-13 and TH-14 were installed at the Site in the fall of 2013 as per MECP recommendation. Well logs for the new monitors are presented in Appendix “H”. It should be noted that well installation details from wells installed by others were not provided in historical reports and thus there are currently no well logs for TP-3, TP-5 and TH-6 to TH-12 available for review. A tabulated summary of the monitoring well locations and construction details are provided in Table 3.

## 7.1 Sampling Procedures and Requirements

Groundwater quality is monitored at the site by twice-annual sampling at the above noted network of monitoring wells. It is standard procedure to measure the static groundwater level prior to purging three (3) casing volumes of stagnant water from each test well. Wells are allowed to recharge with fresh groundwater before sampling. Groundwater samples are collected using dedicated inertial-type pumps, are kept chilled, and are sent within 24 hours of the sampling event to an accredited laboratory for appropriate analyses.

MECP Guideline B-7 establishes the basis for determining what constitutes the reasonable use of groundwater on properties adjacent to landfill sites. The potential use of groundwater in this region will typically be for domestic consumption. Therefore, the allowable concentrations presented within the Ontario Drinking Water Standards (ODWS) are utilized to determine the site-specific Reasonable Use Criteria through the application of MECP Guideline B-7. MECP Procedure B-7-1 provides technical details for the application of MECP Guideline B-7. 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 Ontario Drinking Water Standards for *non-health related* parameters, and;

ii) Quality is not degraded by more than 25% of the difference between background concentrations and the Ontario Drinking Water Standards for *health-related* parameters.

Background concentrations are considered to be, the quality of the groundwater prior to influence or impact from landfill related activities.

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

## 7.2 Summary & Comparison of Background Groundwater Quality

The background groundwater quality at the site is determined by calculating the average concentrations from the groundwater samples collected at TH-9. Monitoring Well TH-9 is located in proximity to the north property boundary and is located hydraulically upgradient of the landfill site. The well monitors the quality of groundwater in the shallow overburden unit where there is no evidence of influence by landfill leachate.

Based on a review of information provided in previous annual monitoring reports completed by others, it appears that the background groundwater quality was historically determined by calculating average concentrations from the shallow groundwater samples collected at TP-5. It must be noted that TP-5 is a test well that was initially installed in a shallow, excavated testpit with an approximate total depth of 1.4 metres. Additionally, TP-5 is centrally located on the landfill property and is approximately 100 metres south of the North (i.e., hydraulically upgradient) property boundary. Based on a review of the available historical groundwater data, it is also apparent that TP-5 is commonly dry and that samples have only periodically been collected at this location. Comparatively, TH-9 is situated in close proximity to the north property boundary where influence from landfill leachate is considered to be lowest. TH-9 is screened in the overburden soils at an approximate depth of 4.5 metres and groundwater samples are routinely collected as part of the established monitoring program.

A comparison of the background groundwater quality determined from the TH-9 analytical data indicates that the average concentrations are generally consistent with the historical average concentrations that were determined through the previous calculations and would not significantly alter the reasonable use calculations when compared to previous monitoring programs.

Based on the current and historical groundwater data from the background monitoring well, the concentrations of hardness (as $CaCO_3$), DOC, Iron, and Manganese in the natural groundwater are elevated and the reported concentrations consistently exceed the criteria identified in the ODWS. The historical groundwater data is tabulated and presented in Appendix "D". These parameters are considered to be naturally occurring and are elevated due to the typical mineralization of the natural groundwater in the area of the site. In general, the background groundwater quality at the site is considered to be good with relatively low levels of typical anions, metals, and nutrient parameters. The concentrations of leachate indicator parameters remain stable over time with low concentrations of parameters such as chloride (i.e., <10 mg/L), hardness and alkalinity (around 300 mg/L, respectively), and conductivity (ranging from 500 to 600 umho/cm).

## 7.3 Summary of Hydrogeologic Setting

The site is located in an area where surficial silty sand and gravel deposits are found to an approximate depth of 35 to 40 metres below ground surface (mbgs). Underlying the upper layer of silty sand and gravel is a thick layer of compact, relatively low-permeability silty clay till overlying the shale and dolostone bedrock of the Salina formation. At the time of the initial hydrogeological assessment, the silt and clayey soils were encountered at an approximate depth of 11 metres and extended to the surface of the bedrock (i.e., at 35 to 40 metres). The relatively low-permeability till unit likely acts as an aquitard that separates the shallow overburden aquifer from the underlying bedrock aquifer. This confining layer may also account for the relatively high water table, onsite swampy areas, and significant ponding of local surface waters observed in the area.

Onsite, the relatively low permeability silt till layer ranges in thickness from about 25 m to 30 m and is underlain by the bedrock aquifer, which is used for domestic water supplies in the area. The underlying bedrock is inferred to be dolomitic limestone of the Salina Formation.

The topography of the landfill property slopes moderately downward from the relatively flat area of the landfill footprint to the adjacent low-lying swampy areas to the southeast and southwest, as well as toward the Styx River located to the southeast of the Site. An onsite swampy area is also centrally located on the landfill property, which separates the current active area of landfilling from the historic area of waste placement in the west portion of the Site (as presented on the attached Figures). Based on current and historic water level data for the site, the groundwater is inferred to flow primarily in a southerly direction with minor seasonal fluctuations to the southeast and southwest. Ultimately, it is reasonable to expect that the shallow groundwater or a major component thereof, discharges to the Styx River located to the south/southeast of the landfill Site. The interpreted groundwater flow direction for the current monitoring year is presented on Figure 4 and the historic groundwater elevations are tabulated and presented in Appendix "G".

The observation wells located onsite were installed at varying depths to facilitate the monitoring of groundwater quality within the shallow sand and gravel / silty sand deposits, and the underlying clayey silt till layer, respectively. The hydraulic conductivity (K) of the shallow overburden soils is generally estimated to be in the range of $1 \times 10^{-3}$ cm/s to $1 \times 10^{-5}$ cm/s.

## 7.4 Leachate Production

The current and historical analytical results collected through the established monitoring program indicate that there is evidence of leachate influence to the shallow groundwater at onsite monitoring wells TH-3 and TH-6 where elevated concentrations of chloride, conductivity, hardness, alkalinity, DOC, and ammonia have consistently been reported for several years. The chloride concentrations reported at these locations have historically ranged between 50 to 180 mg/L. However, the concentrations have generally been lower and indicate a more stable to decreasing trend in recent monitoring years. TH-3 is located immediately south and downgradient of the refuse trenches and does not represent the quality of groundwater leaving the subject property. TH-6 is located adjacent to the access road on the south boundary of the landfill footprint. However, the groundwater at this well does not represent groundwater quality flowing offsite as the municipally owned buffer lands are located further downgradient of the monitoring well and extend an additional distance of approximately 150 metres to the south. Additionally, the groundwater downgradient of TH-6 is monitored at the location of TH-10, which is situated within the municipal buffer lands. The analytical results indicate that the concentrations of leachate indicator parameters at TH-10 are significantly lower than the concentrations at TH-6 and have decreased consistently since 2006/2007. The analytical data indicates that the leachate indicator parameter concentrations decrease with distance from the landfill footprint.

A new monitoring well (TH-14) was installed as a leachate characterization well within the area of historical waste as per previous recommendations made by the MECP. TH-14 was installed in September of 2013 and the initial sampling was conducted during the fall monitoring program. The reported analytical results from the initial sampling event indicate elevated concentrations of hardness, alkalinity, conductivity, ammonia, and DOC at the location of TH-14. An ongoing evaluation and trend analysis of analytical results from the leachate well will be completed to more accurately characterize the leachate, evaluate the potential for radial flow/mounding, and to discern long-term attenuation and leachate quality trends.

An ongoing evaluation of the analytical results from the shallow and deep overburden monitors continues to indicate that leachate impacts remain primarily in the upper and higher permeability soils within the overburden. The relatively thick layer (i.e., 25 to 30 metres) of lower permeability clayey silt till overlying the bedrock surface is expected to provide a level of hydraulic separation between the shallow overburden unit and the underlying bedrock aquifer.

## 7.5 Annual Monitoring Program

A groundwater monitoring program was reportedly initiated at the site in about 1982 to satisfy MECP conditions at that time. Currently, there are a total of 16 monitoring wells located at the site, which intercept the groundwater in two different geologic units.

In addition to the groundwater monitoring program, surface water sampling is also conducted as part of the annual monitoring program. Surface water samples are collected from four locations including from the Styx River, and from the tributary/intermittent creek that flows across the south portion of the property within the southerly buffer lands.

Groundwater and surface water samples were collected from the site in the spring and fall of the current monitoring period. Water samples were submitted to Bureau Veritas Laboratories Inc. (BV Labs) in Mississauga for analysis of the established analytical parameter list, as outlined below. Copies of the laboratory Certificates of Analyses are presented in Appendix “F”.

The following is a detailed summary of the Environmental Monitoring Program for the current monitoring year.

**Summary of Annual Monitoring Program**

| GROUNDWATER | ANALYTICAL PARAMETERS |
|---|---|
| TH-2, TH-3, TH-5A, TH-5B, TH-6, TH-7, TH-8, TH-9, TH-10, TH-11 TH-12, TH-13, TH-14, TP-3, TP-5 | Alkalinity, Ammonia, TKN, Phenols, Hardness, Conductivity, Calcium, Iron, Magnesium, Manganese, Phosphorus, Potassium, Sodium, Chloride, Nitrate, Nitrite, Phosphate, Sulphate, DOC, pH |
| **SURFACE WATER** | **ANALYTICAL PARAMETERS** |
| SW-2, SW-2A, SW-4, SW-5 | Alkalinity, Ammonia, TKN, Phenols, Hardness, Conductivity, Calcium, Iron, Magnesium, Manganese, Phosphorus, Potassium, Sodium, Chloride, Nitrate, Nitrite, Phosphate, Sulphate, DOC, pH |

## 7.6 Groundwater Quality Review

**North Boundary Condition (Upgradient)**

The north property boundary is located approximately 50 metres upgradient of the landfill footprint. Groundwater quality in proximity to the north property line is monitored at TP-5, TH-5A, TH-5B, and TH-9. Although TP-5 is not located at the north boundary, it is situated in the north portion of the property and has historically been used to represent general background groundwater conditions. The leachate indicator parameters measured along the north property boundary indicate that there is no landfill related impact to the groundwater located hydraulically upgradient of the subject property. The average background chloride concentration at the above noted locations is less than 10 mg/L, which has been interpreted to generally reflect background groundwater quality as per the criteria of Guideline B-7.

The shallow overburden well TH-5A, previously displayed some minor evidence of leachate influence and a temporary increasing trend in indicator parameter concentrations between 2018 and 2019 but have since displayed a sharp decreasing trend between 2019 and the current reporting period. As expected, the concentrations of hardness, alkalinity, conductivity, ammonia, chloride and DOC have been slightly elevated compared to the background concentrations since 2017. However, as reported above, the concentrations have displayed a decreasing trend in the last few years. In the current monitoring period, concentrations of hardness, and alkalinity exceeded the RUC. It should also be noted that the deep overburden well TH-5B has not shown the same elevated concentrations of the leachate indicator parameters.

The groundwater quality at TH-9 (i.e., the background monitoring location) was previously discussed in detail in Section 7.2. In summary, the groundwater quality at TH-9 is described as being mineralized with elevated levels of hardness (as $CaCO_3$), alkalinity, DOC, Iron, and Manganese. As previously reported, the background water quality is considered to be typical of shallow groundwater conditions in a carbonate-rich system.

It is noted that during the current monitoring year, TH-5A and TH-5B were not sampled. TH-5A was dry in the spring and inaccessible in the fall. TH-5B was inaccessible in both the spring and fall.

**East Boundary Condition**

The groundwater quality along the east property line is monitored at TH-7 and TH-8, which are considered to be cross-gradient to downgradient of the landfill footprint. The analytical data indicates that the groundwater quality at these monitoring locations is generally consistent with the groundwater in the upgradient/background monitoring wells. An evaluation of the historical groundwater results and long-term trends indicate that the concentrations of leachate indicator parameters have generally decreased in recent years and currently exhibit stable trends.

Based on historical trends, there appears to have been some leachate influence to groundwater at TH-7 and TH-8 prior to 2000, which may have been related to landfilling activities in the easterly landfill trenches. Since that period, a review of the long-term analytical trends for both monitoring locations indicate very stable to decreasing trends over time.

The current analytical results indicate that, in general, the concentrations of hardness, alkalinity, manganese, and nitrate were slightly elevated. This is consistent with recent monitoring trends and no apparent upward trend is visible. The historical data indicates that the concentrations of these parameters have consistently been reported above the criteria of MECP Guideline B-7 and the ODWS. The east property boundary is considered to be hydraulically cross-gradient and the Municipality owns an additional 6.97 hectares (17.2 acres) of property to the east of the landfill Site which extends to the Styx River. Therefore, leachate influence and/or impact to the east property boundary is considered to be further limited. The groundwater quality at TH-7 and TH-8 will continue to be monitored as part of the established groundwater monitoring program to discern if a more pronounced long-term trend becomes apparent.

**South Boundary Condition (Downgradient)**

The downgradient property boundary is monitored by monitoring wells TP-3, TH-6, TH-10, and TH-11. TH-10 and TH-11 are located in the additional buffer lands owned by the Municipality to the south of the landfill property. TP-3 is located to the east of the diversion bins, east of TH-6. TP-3 appears to have been destroyed in the fall of 2018 when work was done to the diversion area. Based on a review of the well installation details, it is a test well that was initially installed in a shallow, excavated testpit with an approximate total depth of 1.7 metres. The groundwater in the vicinity of TP-3 is also monitored by TH-6 and TH-10. **The condition of TP-3 has been investigated and confirmed to have been destroyed. Therefore, it is recommended that the well should be removed from the Monitoring Program, pending approval from the MECP and decommissioned as per the requirements of Regulation 903.**

TH-6 is located south of the active trenching area and is situated on the south boundary of the landfill property. However, the buffer lands to the south of the landfill property comprise an additional distance of approximately 150 metres from the location of TH-6. Considering the additional 150 metres of downgradient buffer lands owned by the Municipality beyond the south limit of the landfill, the quality of groundwater measured at these wells does not represent the actual quality of groundwater flowing offsite.

The analytical findings suggest that there is some leachate influence to the groundwater at the location of TH-6 located onsite to the south of the landfill footprint. However, the long-term analytical trends for lachate indicator parameters at TH-6 remain very stable over time with evident decreasing trends since the early 2000's. The groundwater is monitored further south at TH-10 and TH-11. The downgradient observation wells TH-10 and TH-11 continue to have concentrations of leachate indicator parameters below the criteria of MECP Guideline B-7. The elevated hardness and alkalinity concentrations identified at the downgradient monitoring wells are consistent with the historical range of background values and a trend analysis indicates stable long-term trends.

Thus, the current and historical analyses suggest that the groundwater that is influenced by leachate above the RUC remains onsite and does not cause impact to groundwater leaving the subject property that exceeds MECP Guideline B-7. Exceedances of MECP Guideline B-7 are summarized by location in Table 5.

Based on the observed direction of groundwater flow and the measured leachate impacts adjacent to the south edge of the landfill footprint, obtaining consistent groundwater samples from monitoring locations located to the south of historically placed wastes, and at or near the south property boundary (i.e., TH-6, TH-10 and TH-11) will be critical in assessing site compliance to MECP Guideline B-7.

**West Boundary Condition**

The landfill is essentially divided into east and west areas of waste placement that are separated by the onsite treed swampy feature and an area of planted mature conifers. Waste placement in the west portion of the Site reportedly occurred prior to 1990 and the landfilled trenches are located approximately 150 metres west of the current active area of the Site. The historical waste trenches in this portion of the Site appear to be approximately 10 to 15 metres from the west property boundary at its closest point. The onsite groundwater quality to the west of the landfill is monitored by wells TH-12, and TH-13. Prior to 2006 the groundwater to the west of the landfill was also monitored by TH-1. However, TH-1 was consistently dry, and as a result was replaced in the monitoring program by monitoring at TH-12. Based on the direction of groundwater flow at the site, the groundwater at TH-12 is considered to be hydraulically cross-gradient of the landfill footprint. The groundwater at TH-13 (installed in 2013) is considered to monitor groundwater directly downgradient of the historical west portion of the landfill (refer to the attached Figures).

A review of the historical groundwater quality for TH-1, prior to being removed from the monitoring program, indicates that the groundwater quality at this location is consistent with background conditions with low concentrations of leachate indicator parameters. Groundwater monitoring has been completed at TH-12 since 2006, at which time the monitoring well was added to the monitoring program. The analytical results for TH-12 indicate that the concentrations are analogous to background conditions with an average chloride concentration of <5 mg/L.

Sampling at TH-13 was initiated in the fall of 2013 and twice annual sampling has been completed at this location since that time. The monitoring well was installed at the south edge of the closed west portion of waste placement to provide a downgradient monitor of the westerly landfill trenches. Based on the analytical results to date, there is no indication of leachate impact at the location of TH-13, where the concentrations of all parameters are consistent with background concentrations. Based on a reported closure date in 1990 (i.e., over 25 years), the long-term trends are expected to be stable in this portion of the Site.

**The continuation of the sampling program at the westerly monitoring wells is recommended to evaluate the groundwater conditions downgradient of the closed west landfill trenches and to continue the ongoing trend analysis.**

## 7.7 Surface Water Quality Review

### 7.7.1 Regulatory Framework

The purpose of surface water quality management at the Site is to achieve the requirements established in the Provincial Water Quality Objectives (PWQO) set out by the MECP. The criteria established by the PWQO ensure that surface waters are of a quality that is satisfactory for aquatic life and recreation. Areas that have water quality that meet the PWQO requirements are to be maintained at or below the applicable objectives. Areas that have water quality that does not presently meet the PWQO are not to be degraded any further and are to be upgraded if practicable.

Currently, the surface water quality monitoring program at the Site evaluates water quality within the Styx River and the intermittent tributary that flows through the south portion of the buffer lands to the south of the landfill property, which discharges to the Styx River.

As previously discussed, the existing surface water monitoring program consists of four (4) sampling locations including SW-2, SW-2A, SW-4 and SW-5. The results of the most recent surface water monitoring and compliance with the PWQO are provided in Table 6. A summary of the historical surface water sampling data, compared to the PWQO, is provided in both tabular and graphical form in Appendix “E”.

### 7.7.2 Surface Water Quality Summary

The reported surface water quality results for the current monitoring program indicate that there are no exceedances of the PWQO. Sampling location SW-2A represents the background surface water quality in the intermittent tributary that is flowing upstream of the landfill property. Sampling locations SW-4 and SW-5 represent off-site conditions within the Styx River where surface waters discharge into the river downstream of the landfill Site. There is no direct surface water flow path from the landfill trenches / active areas to the surface water bodies. The extensive historic surface water monitoring data indicates that the surface water quality at the downstream locations is consistent with the background conditions at SW-2A and does not indicate impact from landfill leachate.

**The continuation of twice annual monitoring of the surface waters adjacent to the Site is recommended to continue as part of the annual monitoring program**.

## 8. CLOSED AREAS

A significant portion of the landfill has been filled and closed. The closed portions of the Site include the landfill trenches in the west portion of the landfill property adjacent to the west property boundary. Additionally, in the east portion of the Site, Trenches 1 through 17 have primarily been filled and temporarily closed to date including the application of interim cover.

Upon completion of landfilling in a designated portion of the landfill footprint, sufficient cover material should be progressively applied from the existing stockpiles of cover. Progressive covering and grading of the finished areas should be conducted in such a manner as to promote runoff and reduce infiltration, thus reducing the generation of landfill leachate at the site.

**As noted in Section 6.3, during the current monitoring period, initiation of landfilling using the area ramp method has commenced on top of the trenched areas.**

## 9. CERTIFICATE OF APPROVAL

The waste disposal site operates under Environmental Compliance Approval (ECA, formerly C of A) Number A261301, which was issued by the MECP on April 12, 1990. The ECA for the site is based on the original application made in January 13, 1972 (see Appendix "A") and the former Plan of Development and Operation completed in 1988.

A copy of the ECA and the associated amendments, dated May 20 and September 29, 2005, October 16, 2008, and April 14, 2020 are provided in Appendix “A”.

## 10. CONCLUSIONS

1) The approved landfill footprint specified within the original C of A covers a total area of 32.4 ha (80.1 acres). In addition to the lands recognized within the C of A, the Municipality owns additional buffer lands located directly east and adjacent to the landfill Site, which consists of a property that comprises an area of 6.97 hectares (17.2 acres). Currently, the total approved capacity for waste and daily cover is 227,400 $m^3$.

2) Landfill operations continue to proceed in the northeast portion of of Phase I. During the current monitoring period, landfilling has progressed to the area ramp method as per the requirements of the updated PDO. The approved landfill footprint in the east portion of the site has been surveyed and the corners laid out including the placement of boundary markers to provide direction to the operators.

3) The estimated average annual fill rate over the past five operating years is 4,086 $m^3$/year and the maximum observed fill rate is 6,100 $m^3$/year. Based on a review of previous annual reports by others, the 2006 PDO provides a theoretical annual fill rate of 9,120 $m^3$/year under a scenario where the entire Municipality is contributing waste to the Bentinck Site.

4) The landfill has about 158,721 $m^3$ of remaining capacity for waste and daily cover. At the average five-year annual fill rate of 4,086 $m^3$/year, the remaining site life is approximately 39 years. At the theoretical annual fill rate referenced within the 2006 PDO for general planning purposes, the landfill would have sufficient capacity for approximately 17 years.

5) The groundwater monitoring program indicates that leachate impacts are being contained to the shallow overburden at the landfill site and that there is a level of hydraulic separation between the shallow overburden soils and the underlying low-permeability silt till (i.e., that is approximately 25 metres in thickness), which is further underlain by the limestone bedrock.

6) Based on a review and evaluation of the analytical findings, there is currently no apparent impact to the groundwater leaving the subject property above the Reasonable Use Criteria as referenced in MECP Guideline B-7.

7) The surface water monitoring program indicates that the surface water quality downstream of the landfill property is consistent with the surface water quality in the upstream background sampling location. The surface water monitoring results indicate that there are no PWQO exceedances reported for the 2022 monitoring program.

## 11. RECOMMENDATIONS

The following actions are recommended for the upcoming monitoring year(s):

1) We recommend that a topographic survey be completed at the site in the fall of 2023 in order to update the annual landfill rate at the Site and to confirm the remaining airspace capacity and site life.

2) It is important that the Municipality continue to remove stockpiles of recyclable goods on a regular basis to further reduce the volume of waste entering the landfill, to prevent clutter, and to maintain an aesthetically acceptable site.

3) Areas of the landfill that have been filled to capacity or have reached final contours should be capped and progressively closed using a minimum of 600 mm of low-permeability silty clay material and 150 mm of topsoil seeded to grass.

4) It is recommended to continue landfilling on top of the former Trench No. 1 using the Area-Ramp method.

5) It is recommended that the Municipality compact and cover waste on the same day following waste disposal, or as soon as practical, to prevent blowing litter, reduce leachate production, and maintain site aesthetics.

6) All future capping operations should be completed using a low permeability clayey silt material, or equivalent cover (as per the PDO), to reduce surface water infiltration.

7) TP-3 is confirmed to be destroyed. It is recommended that the well be removed from the monitoring program and be decommissioned as per the requirements of Regulation 903.

8) We recommend continuing the established monitoring program on a semi-annual basis as outlined below:

| GROUNDWATER | ANALYTICAL PARAMETERS |
|---|---|
| TH-2, TH-3, TH-5A, TH-5B, TH-6, TH-7, TH-8, TH-9, TH-10, TH-11 TH-12, TH-13, TH-14, TP-3, TP-5 | Alkalinity, Ammonia, TKN, Phenols, Hardness, Conductivity, Calcium, Iron, Magnesium, Manganese, Phosphorus, Potassium, Sodium, Chloride, Nitrate, Nitrite, Phosphate, Sulphate, DOC, pH |

| SURFACE WATER | ANALYTICAL PARAMETERS |
|---|---|
| SW-2, SW-2A, SW-4, SW-5 | Alkalinity, Ammonia, TKN, Phenols, Hardness, Conductivity, Calcium, Iron, Magnesium, Manganese, Phosphorus, Potassium, Sodium, Chloride, Nitrate, Nitrite, Phosphate, Sulphate, DOC, pH |

All of which is respectfully submitted,

GM BLUEPLAN ENGINEERING LIMITED.

Per:

K. Charpontier, C.E.T.

Per:

A.W. Bringleson, B.E.S., C. E. T.

Per:

M.D. Nelson, P.Eng., P.Geo

# TABLES

## Table 1 - Landfill Volume Capacity ($m^3$) - Bentinck Landfill

| | | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|
| **Total Approved Capacity** | | | | | | |
| Total Capacity for Waste and Daily Cover | | 227400 | 227400 | 227400 | 227400 | 227400 |
| Total Capacity for Final Cover | | 31500 | 31500 | 31500 | 31500 | 31500 |
| Total Air space Capacity | | 258900 | 258900 | 258900 | 258900 | 258900 |
| **Volume Filled to Beginning of Year** | | | | | | |
| Volume of Waste and Daily Cover | | 48249 | 52749 | 54099 | 60199 | 62599 |
| Volume of Final Cover | | 0 | 0 | 0 | 0 | 0 |
| Total Volume Filled | | 48249 | 52749 | 54099 | 60199 | 62599 |
| **Available Capacity at Beginning of Year** | | | | | | |
| Capacity for Waste and Daily Cover | | 179151 | 174651 | 173301 | 167201 | 164801 |
| Capacity for Final Cover | | 31500 | 31500 | 31500 | 31500 | 31500 |
| Total Available Capacity | | 210651 | 206151 | 204801 | 198701 | 196301 |
| **Capacity Used During Year** | | | | | | |
| Capacity Used for Waste and Daily Cover | | 4500 | 1350 | 6100 | 2400 | 6080 |
| Capacity Used for Final Cover | | 0 | 0 | 0 | 0 | 0 |
| Total Capacity Used | | 4500 | 1350 | 6100 | 2400 | 6080 |
| **Volume Filled at End of Year** | | | | | | |
| Volume of Waste and Daily Cover | | 52749 | 54099 | 60199 | 62599 | 68679 |
| Volume of Final Cover | | 0 | 0 | 0 | 0 | 0 |
| Total Volume Filled | | 52749 | 54099 | 60199 | 62599 | 68679 |
| **Remaining Capacity at End of Year** | | | | | | |
| Capacity for Waste and Daily Cover | | 174651 | 173301 | 167201 | 164801 | 158721 |
| Capacity for Final Cover | | 31500 | 31500 | 31500 | 31500 | 31500 |
| Total Remaining Capacity | | 206151 | 204801 | 198701 | 196301 | 190221 |
| **Remaining Site Life (years)** | | | | | | |
| At 5 year Average Fill Rate | 4086 | 42.7 | 42.4 | 40.9 | 40.3 | 38.8 |
| At Maximum Observed Fill Rate | 6100 | 28.6 | 28.4 | 27.4 | 27.0 | 26.0 |
| At Fill Rate Specified in 2006 PDO | 9120 | 19.2 | 19.0 | 18.3 | 18.1 | 17.4 |

## TABLE 3:
## SUMMARY OF MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS

| BOREHOLE ID [WELL ID] | LOCATION (relative to refuse pile) | DATE INSTALLED | ELEVATION | | DEPTH TO BOTTOM OF MW |
|---|---|---|---|---|---|
| | | | Ground | Top of Casing* | |
| **TH-1** | West Boundary | 1984 | 99.21 | 99.78 | 3.40 |
| **TH-2** | Downgradient of Historic Cells | 1984 | 99.54 | 100.13 | 5.63 |
| **TH-3** | In Footprint - Downgradient of Cells | 1984 | 102.91 | 103.52 | 6.84 |
| **TH-4** | Northeast Corner | 1984 | 103.88 | 104.33 | 7.86 |
| **TH-5A** | Upgradient - In Footprint | 1984 | 102.88 | 102.88 | 8.42 |
| **TH-5B** | Upgradient - In Footprint | 1984 | 102.90 | 103.19 | 12.56 |
| **TH-6** | Downgradient Edge of Footprint | 1988 | 101.42 | 102.31 | 8.23 |
| **TH-7** | Downgradient Edge of Footprint | 1988 | 96.80 | 97.92 | 4.23 |
| **TH-8** | East Edge of Footprint | 1988 | 103.08 | 103.75 | 8.20 |
| **TH-9** | Upgradient Boundary | 1988 | 98.96 | 99.80 | 4.50 |
| **TH-10** | Downgradient -Buffer Lands | 1989 | 95.60 | 96.10 | 3.20 |
| **TH-11** | Downgradient - Buffer Lands | 1989 | 96.25 | 97.51 | 2.84 |
| **TH-12** | West Boundary | 2006 | 98.25 | 99.00 | 12.00 |
| **TH-13** | Downgradient - SW Corner | 2013 | 97.08 | 98.11 | 5.49 |
| **TH-14** | In Refuse Pile (Leachate Well) | 2013 | 104.00 | 105.26 | 9.91 |
| **TP-3** | Downgradient - In Footprint | 1988 | 97.50 | 97.80 | 1.67 |
| **TP-5** | Upgradient - In Footprint | 1988 | 97.71 | 98.12 | 1.37 |

**NOTES:**

1. All depths measured in mbgs = approximate depth in metres below ground surface
2. na = Not Available.
3. Detailed borehole logs are provided in the Appendices.
4. Screened interval includes screen and sandpack up to the bentonite seal.
5. Elevations measured in mASL = meters above sea level.
6. Depth in meters below ground surface.
7. TBS: To Be Surveyed

**Table 4:**
**REASONABLE USE CRITERIA - OBJECTIVE LEVELS**

| Parameter | Background Concentration (Cb) | Maximum Concentration (Cr) | Objective Level (Cm) |
|---|---|---|---|
| Alkalinity(as CaCO3) | 299 | 30 - 500 [OG] | 400 |
| Ammonia(as N) | 1.0 | nv | nv |
| Calcium | 82.14 | nv | nv |
| Chloride | 2.8 | 250 [AO] | 126 |
| Conductivity (umho/cm) | 549 | nv | nv |
| Dissolved Organic Carbon(DOC) | 20.69 | 5.0 [AO] | 13 |
| Hardness(as CaCO3) | 316 | 80-100 [OG] | 208 |
| Iron | 1.0 | 0.3 [AO] | 0.7 |
| Magnesium | 27.8 | nv | nv |
| Manganese | 0.25 | 0.05 (AO) | 0.3 |
| Nitrate(as N) | 0.17 | 10 (MAC) | 3 |
| Nitrite(as N) | 0.04 | 1 (MAC) | 0.28 |
| Orthophosphate(as P) | 0.06 | nv | nv |
| pH | 7.69 | 6.5-8.5 [OG] | 6.5 to 8.5 |
| Phenols | 0.082 | nv | nv |
| Phosphorus, Total (as P) | 0.332 | nv | nv |
| Potassium | 0.502 | nv | nv |
| Sodium | 1 | 200 [AO] | 101 |
| Sulphate | 15 | 500 [AO] | 258 |
| Total Kjeldahl Nitrogen(as N) | 2.02 | nv | nv |

**Notes:**
***** The background concentrations for these parameters exceed the ODWS. Therefore, the RUC is set at the maximum measured naturally occurring concentration in the background well
AO = Aesthetic Objective
OG = Operational Guideline
MAC = Maximum Acceptable Concentration
Background Concentrations are Based on Concentrations Reported from TH-9 from 1993 to 2020.

**MOE Procedure B-7-1**

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

Where:

**Cm** = Maximum Concentration Acceptable in Groundwater at Property Line
**Cb** = Background Concentration from TH-9 from 1993 to Present
**Cr** = Maximum Concentration Acceptable in Groundwater as per Ontario Drinking Water Standards (ODWS)
**x** = A Constant; Being 0.5 for Non-Health related Parameters, and 0.25 for Helath Related Parameters

**Table 5:**
**Summary of Groundwater Quality and Comparison to RUC**

## SPRING - 2022

| Sample Date | Ontario Drinking Water Standards (ODWS) | MOE Guideline B-7 Reasonable Use Criteria | Sample Identification And Monitoring Well Location | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3-May-22 | | | | | | | | | | | | | | |
| MW Location | | | North - Upgradient | | | Background | East Boundary | | South Boundary - Downgradient | | | | Western Boundry | | Onsite | | |
| Sample ID | (mg/L) | (mg/L) | TH-5A | TH-5B | TP-5 | TH-9 | TH-7 | TH-8 | TP-3 | TH-6 | TH-10 | TH-11 | TH-12 | TH-13 | TH-2 | TH-3 | TH-14 |
| **Parameter** | | | | | | | | | | | | | | | | | |
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 400 | Dry | No Sample | 230 | 300 | **550** | **520** | Well Damaged | **820** | 360 | 210 | 170 | 280 | 280 | **540** | **590** |
| Ammonia(as N) | nv | nv | | | 0.12 | <0.050 | 2.3 | 0.06 | | 17 | 0.3 | <0.050 | 0.13 | <0.050 | <0.050 | 8.8 | 16 |
| Calcium | nv | nv | | | 58 | 81 | 160 | 160 | | 150 | 110 | 46 | 42 | 70 | 66 | 140 | 160 |
| Chloride | 250 [AO] | 126 | | | <1.0 | 6.7 | 18 | 3.8 | | 45 | 33 | 2.0 | <1.0 | 3.4 | 2.8 | 15 | 17 |
| Conductivity (umho/cm) | nv | nv | | | 430 | 560 | 1100 | 970 | | 1800 | 770 | 400 | 480 | 540 | 530 | 1000 | 1100 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 13 | | | 0.67 | **19** | 1.8 | 2.4 | | **8.4** | 1.5 | 1.1 | <0.40 | 1.2 | 0.64 | 3.9 | **6.6** |
| Hardness(as CaCO3) | 80-100 [OG] | 208 | | | **230** | **310** | **560** | **540** | | **770** | **410** | **200** | **210** | **300** | **290** | **510** | **540** |
| Iron | 0.3 [AO] | 0.67 | | | <0.1 | **140** | <0.1 | <0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | nv | nv | | | 21 | 27 | 36 | 34 | | 94 | 29 | 21 | 26 | 30 | 30 | 38 | 30 |
| Manganese | 0.05 (AO) | 0.28 | | | <0.002 | 0.0035 | 0.01 | **0.062** | | **3.0** | **0.17** | <0.002 | 0.0076 | <0.002 | <0.002 | **0.11** | **0.26** |
| Nitrate(as N) | 10 (MAC) | 2.6 | | | <0.10 | 0.15 | **5.9** | 1.1 | | 0.49 | 0.58 | 0.13 | 0.24 | 1.19 | 1.44 | <0.1 | <0.10 |
| Nitrite(as N) | 1 (MAC) | 0.28 | | | <0.010 | <0.010 | 0.016 | <0.010 | | 0.013 | 0.01 | <0.010 | 0.023 | <0.010 | <0.01 | <0.010 | <0.010 |
| Orthophosphate(as P) | nv | nv | | | 0.036 | <0.010 | <0.010 | <0.010 | | <0.010 | 0.011 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 6.5 to 8.5 | | | 8.06 | 8.04 | 7.51 | 7.73 | | 7.53 | 7.73 | 8.07 | 8.09 | 7.95 | 8.14 | 7.65 | 7.38 |
| Phenols | nv | nv | | | NV | NV | NV | NV | | NV | NV | NV | NV | NV | NV | NV | NV |
| Phosphorus, Total (as P) | nv | nv | | | NV | NV | NV | 0.06 | | NV | NV | NV | NV | NV | <0.10 | 0.37 | NV |
| Potassium | nv | nv | | | <0.2 | 0.25 | 8 | 1.9 | | 60 | 3.1 | 0.26 | 1.2 | 0.38 | 0.56 | 12 | 15 |
| Sodium | 200 [AO] | 101 | | | 0.36 | 0.80 | 18 | 1.7 | | 53 | 23 | 0.68 | 13 | 1.1 | 1.3 | 9.1 | 11 |
| Sulphate | 500 [AO] | 258 | | | <1.0 | <5.0 | 12 | 28 | | 130 | 11 | 2 | 81 | 5.2 | 5.1 | 6.4 | 5.3 |
| Total Kjeldahl Nitrogen(as N) | nv | nv | | | NV | NV | NV | 0.21 | | NV | NV | NV | NV | NV | <0.10 | 9.4 | NV |

## FALL - 2022

| Sample Date | Ontario Drinking Water Standards (ODWS) | MOE Guideline B-7 Reasonable Use Criteria | Sample Identification And Monitoring Well Location | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 29-Sep-22 | | | | | | | | | | | | | | |
| MW Location | | | North - Upgradient | | | Background | East Boundary | | South Boundary - Downgradient | | | | Western Boundry | | Onsite | | |
| Sample ID | (mg/L) | (mg/L) | TH-5A | TH-5B | TP-5 | TH-9 | TH-7 | TH-8 | TP-3 | TH-6 | TH-10 | TH-11 | TH-12 | TH-13 | TH-2 | TH-3 | TH-14 |
| **Parameter** | | | | | | | | | | | | | | | | | |
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 400 | No Sample | No Sample | Dry | 290 | 430 | **580** | Well Damaged | **780** | 130 | 230 | 170 | 260 | DRY | **520** | **420** |
| Ammonia(as N) | nv | nv | | | | <0.050 | <0.050 | <0.050 | | 19 | 0.22 | <0.050 | 0.26 | <0.050 | | 9.7 | 1.3 |
| Calcium | nv | nv | | | | 82 | 130 | 210 | | 160 | 40 | 62 | 43 | 71 | | 140 | 120 |
| Chloride | 250 [AO] | 126 | | | | 6.4 | 11 | 8.5 | | 80 | 13 | 24 | 1.4 | 3.3 | | 16 | 15 |
| Conductivity (umho/cm) | nv | nv | | | | 540 | 870 | 1100 | | 1800 | 310 | 500 | 470 | 480 | | 990 | 810 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 13 | | | | **16** | 1.8 | 4.1 | | **8.4** | 2 | 1.5 | 0.42 | 1.4 | | 3.0 | 2.7 |
| Hardness(as CaCO3) | 80-100 [OG] | 208 | | | | **310** | 460 | 690 | | **780** | **140** | **260** | **220** | **290** | | **510** | **450** |
| Iron | 0.3 [AO] | 0.67 | | | | 0.27 | <0.1 | <0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | <0.1 | <0.1 |
| Magnesium | nv | nv | | | | 27 | 36 | 43 | | 95 | 11 | 27 | 27 | 29 | | 36 | 36 |
| Manganese | 0.05 (AO) | 0.28 | | | | 0.025 | 0.021 | **0.095** | | **2.9** | 0.026 | <0.002 | 0.0084 | <0.002 | | **0.11** | **0.19** |
| Nitrate(as N) | 10 (MAC) | 2.6 | | | | 0.24 | 6.96 | 1.73 | | 1.36 | 1.80 | 0.59 | 0.22 | 0.72 | | <0.1 | <0.10 |
| Nitrite(as N) | 1 (MAC) | 0.28 | | | | 0.011 | <0.010 | <0.010 | | 0.016 | 0.02 | <0.010 | 0.018 | <0.010 | | <0.010 | <0.010 |
| Orthophosphate(as P) | nv | nv | | | | <0.010 | <0.010 | <0.010 | | <0.010 | 0.13 | 0.033 | <0.010 | <0.010 | | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 6.5 to 8.5 | | | | 8.09 | 7.79 | 7.65 | | 7.56 | 7.83 | 8.13 | 8.21 | 8.29 | | 7.77 | 7.82 |
| Phenols | nv | nv | | | | <0.0010 | <0.0010 | <0.0010 | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | nv | nv | | | | 0.098 | <0.020 | 0.15 | | 0.19 | 0.067 | 0.13 | 0.04 | 0.70 | | 0.5 | 0.054 |
| Potassium | nv | nv | | | | 0.3 | 3.1 | 2.4 | | 60 | 1.6 | 0.46 | 1.2 | 0.44 | | 10 | 1.9 |
| Sodium | 200 [AO] | 101 | | | | 0.93 | 15 | 4.3 | | 51 | 7.2 | 4.2 | 14 | 0.96 | | 7.5 | 6.7 |
| Sulphate | 500 [AO] | 258 | | | | <1.0 | 16 | 42 | | 110 | 2.3 | 2.1 | 74 | 5.4 | | 7.2 | 11 |
| Total Kjeldahl Nitrogen(as N) | nv | nv | | | | 0.45 | 0.25 | 0.25 | | 18 | 0.49 | <0.1 | 0.29 | <0.10 | | 10 | 1.4 |

**Notes:**
1. Analytical results are reported in mg/L unless otherwise noted. Analysis completed by Maxxam Analytics Inc.
2. Reasonable Use Criteria are calculated using MOE Procedure B-7-1
3. Background Concentrations are based on concentrations measured at TH-9 from 1993 to present
4. AO: Aesthetic Objective; OG = Operational Guideline; MAC = Maximum Acceptable Concentration; IMAC = Interim Maximum Acceptable Concentration.
5. Values in **bold** are greater than the ODWS
6. Shaded values are greater than the Reasonable Use Criteria

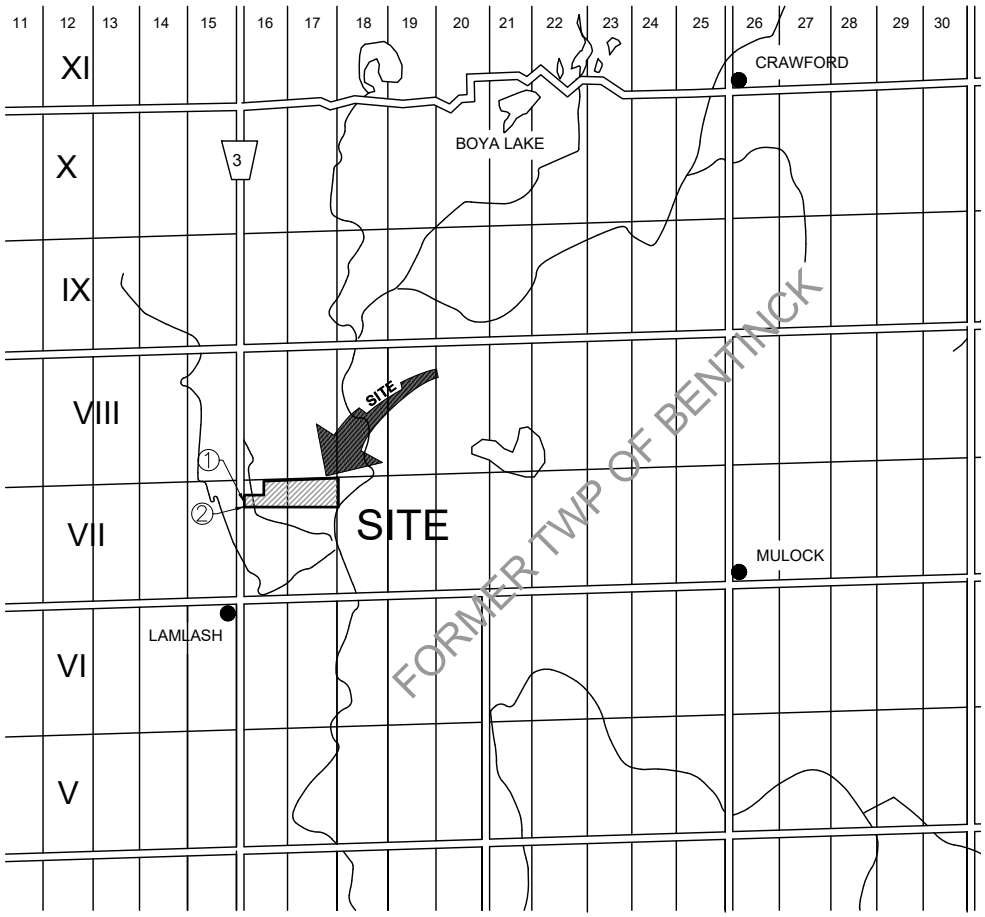
**Table 6:**
**Summary of Surface Water Quality and Comparison to PWQO**

| Parameter | PWQO (mg/L) | Spring Monitoring - 2022 | | | | Fall Monitoring - 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | SW-2 (Downstream) | SW-2A (Background) | SW-4 (Downstream) | SW-5 (Downstream) | SW-2 (Downstream) | SW-2A (Background) | SW-4 (Downstream) | SW-5 (Downstream) |
| Alkalinity(as CaCO3) | ** | 240 | 230 | 250 | 250 | 250 | 240 | 230 | 230 |
| Ammonia(as N) | 20 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calcium | NV | 56 | 53 | 59 | 64 | 76 | 64 | 59 | 57 |
| Chloride | NV | 20 | 18.0 | 7.0 | 7.0 | 29 | 23 | 8.5 | 8.6 |
| Conductivity @25øC (µmho/cm) | NV | 500 | 470 | 490 | 490 | 550 | 510 | 470 | 470 |
| Dissolved Organic Carbon(DOC | NV | 6.2 | 6.8 | 3.1 | 3.1 | 10.0 | 10 | 5.0 | 4.9 |
| Hardness(as CaCO3) | NV | 230 | 220 | 250 | 260 | 290 | 270 | 260 | 260 |
| Iron | 0.3 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | NV | 22 | 21 | 26 | 27 | 26 | 24 | 27 | 27 |
| Manganese | NV | 0.0170 | 0.017 | 0.012 | 0.01 | 0.024 | 0.017 | 0.0082 | 0.0068 |
| Nitrate(as N) | NV | 0.13 | 0.15 | 0.59 | 0.6 | <0.10 | <0.10 | 0.35 | 0.35 |
| Nitrite(as N) | NV | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | NV | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 8.19 | 8.13 | 8.31 | 8.4 | 8.21 | 8.22 | 8.32 | 8.36 |
| Phenols | NV | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | 0.03 | 0.005 | <0.004 | 0.004 | 0.004 | 0.007 | 0.006 | <0.004 | 0.005 |
| Potassium | NV | 1.4 | 1.4 | 0.79 | 0.78 | 1.8 | 2.0 | 0.89 | 0.83 |
| Sodium | NV | 9.5 | 8.9 | 3.3 | 3.3 | 16 | 11 | 4.1 | 4 |
| Sulphate | NV | <1.0 | <1.0 | 9.9 | 9.7 | <1.0 | <1.0 | 17 | 19 |
| TDS (ion sum calc.) | NV | 185 | 195 | 190 | 265 | 300 | 275 | 215 | 200 |
| Total Kjeldahl Nitrogen(as N) | NV | 0.26 | 0.27 | 0.15 | 0.24 | 0.3 | 0.34 | 0.2 | 0.23 |

**Notes:**
1. Analytical results are reported in mg/L unless otherwise noted
2. PWQO: Provincial Water Quality Objective
3. NV: No Value
4. na: Not Available
5. ****** Alkalinity should not be decreased by more than 25% of the natural concentration.
6. Values in **BOLD** and shaded indicate exceedance of PWQO.

# FIGURES

# 213085
# Annual Monitoring Report
# Bentinck Landfill
# Part Lots 16 & 17, Conc. 7
# Municipality of West Grey
# (Former Twp. of Bentinck)





① -Entrance UTM
502 140 E
4896 755 N

② -SW Property Corner UTM
502 140 E
4896 755 N

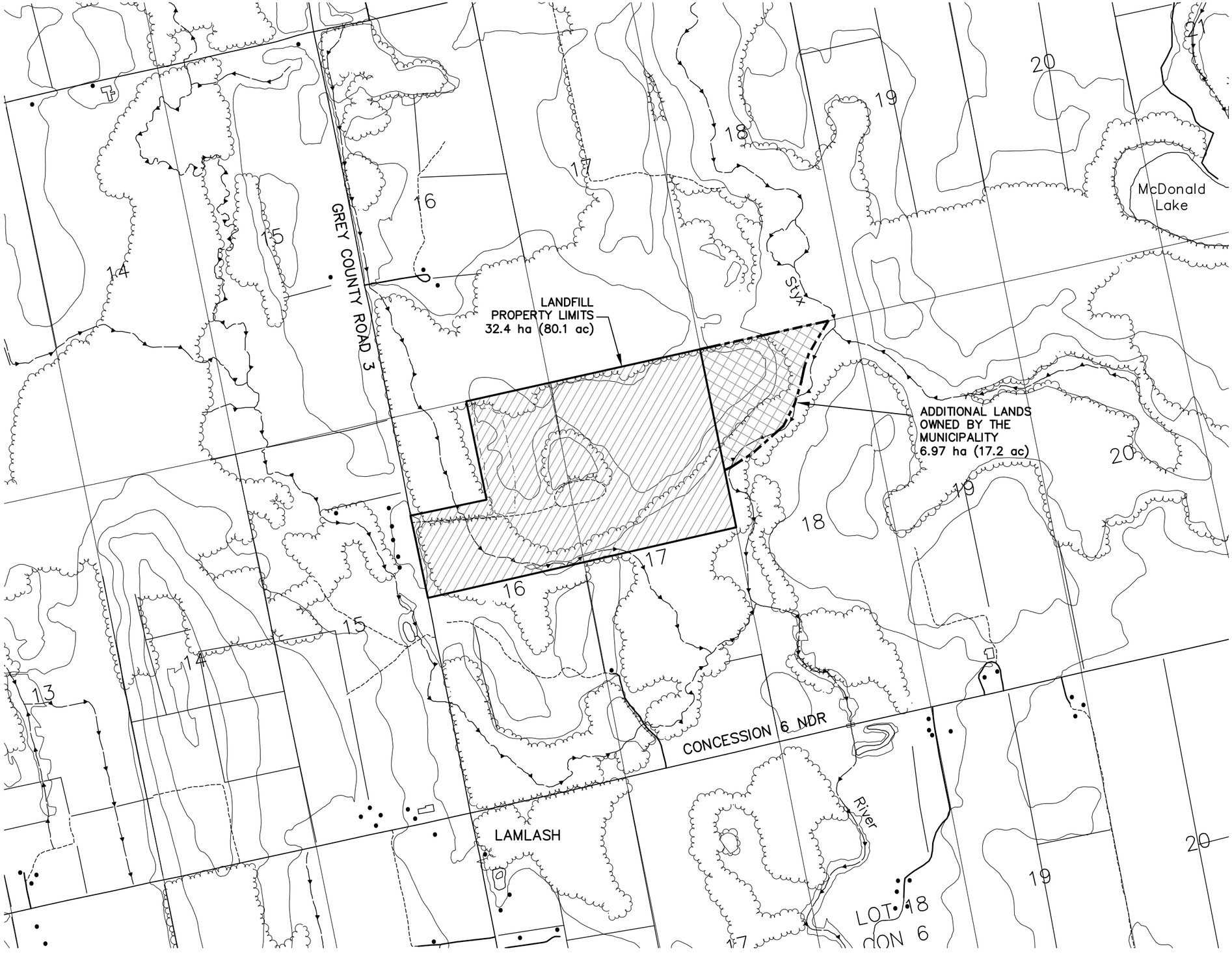
Not To Scale
MARCH 2023

## SITE LOCATION MAP

Figure No. 1

BluePlan ENGINEERING

213085
Annual Monitoring Report
Bentinck Landfill
Part Lots 16 & 17, Conc. 7
Municipality of West Grey
(Former Twp. of Bentinck)




Legend

LICENCED LANDFILL PROPERTY

ADDITIONAL LANDS OWNED BY THE MUNICIPALITY

Scale = 1:10,000
MARCH 2023

SITE LAYOUT PLAN

Figure No. 2

BluePlan ENGINEERING

# 213085
# Annual Monitoring Report
# Bentinck Landfill
# Part Lots 16 & 17, Conc. 7
# Municipality of West Grey
# (Former Twp. of Bentinck)

CONCESSION VIII, LOT 16

CONCESSION VIII, LOT 17

CONCESSION VII, LOT 16

CONCESSION VII, LOT 18

CONCESSION VII, LOT 17

BUSH

609.6 m

259.1 m

320.0 m

195.1 m

61.0 m

804.7 m

A

A

TH-1
GR. EL. = 298.51
TOC = 299.08

TH-2
GR. EL. = 298.84
TOC = 299.43

TH-3
GR. EL. = 302.21
TOC = 302.82

TH-4
GR. EL. = 303.18
TOC = 303.63

TH-5
GR. EL. = 297.01
TOC = 297.42

TH-5A
GR. EL. = 302.18
TOC = 302.49

TH-5B
GR. EL. = 302.18
TOC = 302.49

TH-6
GR. EL. = 300.72
TOC = 301.61

TH-7
GR. EL. = 296.10
TOC = 297.22

TH-8
GR. EL. = 302.33
TOC = 303.05

TH-9
GR. EL. = 296.36
TOC = 299.10

TH-10
GR. EL. = 294.90
TOC = 295.40

TH-11
GR. EL. = 295.55
TOC = 296.81

TH-12
GR. EL. = 297.55
TOC = 298.30

TH-13
GR. EL. = 296.38
TOC = 297.11

TH-14
GR. EL. = 303.
TOC = 304.56
TOP = 304.42

TP-3
GR. EL. = 296.90
TOC = 297.10

ACTIVE AREA

275m TO SW-5

ADDITIONAL LANDS OWNED BY THE MUNICIPALITY

ADDITIONAL LANDS OWNED BY THE MUNICIPALITY

WHITE PINE PLANTING (1988)

SWAMP AND BUSH

SWAMP W/L 96.70

SW-1 (DISCONTINUED)

SW-2A

SW-2

SW-3 (DISCONTINUED)

SW-4

TIRE PILE

COVER MATERIAL STOCKPILE

SOIL STOCKPILE

SAND STOCKPILES

BINS

WHITE GOODS

SCRAP METAL

INERT WASTE / CONSTRUCTION DEBRIS

HP

SCALE

HISTORIC TRENCH CLOSED PRIOR TO 1985

BENCHMARK ELEV. = 298.31 m (GEODETIC)

LAG BOLT IN SOUTH FACE OF HYDRO POLE

INTERMITTENT CREEK

EXISTING LANE

CONCRETE CULVERT

STYX RIVER

GREY COUNTY ROAD No. 3

ERSKINE WELL

## Legend

- TH — MONITORING WELL LOCATION
- TP — TEST PIT LOCATION
- TOC — TOP OF CASING ELEVATION
- SW-2 — SURFACE WATER SAMPLE LOCATION
- LIMITS OF LICENCED AREA
- CONCESSION LINE BOUNDARY AND LOT LINE BOUNDARY
- CLOSED LANDFILL TRENCHES

## Notes

CONTOURS FROM TOPOGRAPHICAL SURVEY BY GMBP ENGINEERING ON NOVEMBER 17, 2022.

Scale = 1:3000

MARCH 2023

## EXISTING CONDITIONS PLAN

Figure No. 3

BluePlan ENGINEERING

FILE:W:\OwenSound\Owen Sound\213-2013\213085 AMR - Bentinck Landfill\Drawings\213085 Figures.dwg LAYOUT:FIG 3
LAST SAVED BY:Kcharpontier, 3/27/2023 11:28:31 AM PLOTTED BY:Kate Charpontier - GM BluePlan 3/27/2023 11:30:45 AM

# 213085
# Annual Monitoring Report
# Bentinck Landfill
# Part Lots 16 & 17, Conc. 7
# Municipality of West Grey
# (Former Twp. of Bentinck)

CONCESSION VIII, LOT 16

CONCESSION VIII, LOT 17

CONCESSION VII, LOT 16

CONCESSION VII, LOT 18

CONCESSION VII, LOT 17

GREY COUNTY ROAD No. 3

ERSKINE WELL

BUSH

609.6 m

259.1 m

610 m

195.1 m

804.7 m

320.0 m

SWAMP AND BUSH

WHITE PINE PLANTING (1985)

TH-1
GR. EL. = 298.51
TOC = 299.08
W/L = DRY
C/L = DRY(S), DRY(F)

TH-2
GR. EL. = 298.84
TOC = 299.43
W/L = 295.60(S), 295.31(F)
CL = 2.8(S), N/A(F)

TH-3
GR. EL. = 298.80
TOC = 297.10
W/L = DRY(S), DRY(F)
CL = N/A(S), N/A(F)

TH-4
GR. EL. = 302.33
TOC = 303.05
W/L = 296.42(S), 295.96(F)
CL = 3.8(S), 8.5(F)

TH-5A
GR. EL. = 302.18
TOC = 302.45
W/L = DRY(S), N/A(F)
CL = N/A(S), N/A(F)

TH-5B
GR. EL. = 302.18
TOC = 302.49
W/L = 295.99(S), N/A(F)
CL = N/A(S), N/A(F)

TP-5
GR. EL. = 297.01
TOC = 297.42
W/L = 297.42(S), DRY(F)
CL = <1.0(S), N/A(F)

TH-6
GR. EL. = 300.72
TOC = 301.61
W/L = 295.93(S), 295.43(F)
CL = 45(S), 80(F)

TH-7
GR. EL. = 303.18
TOC = 303.63
W/L = 296.63(S), 296.18(F)
CL = N/A(S), N/A(F)

TH-9
GR. EL. = 298.30
TOC = 298.70
W/L = 295.71(S), 296.32(F)
CL = 6.7(S), 6.4(F)

TH-10
GR. EL. = 294.90
TOC = 295.40
W/L = 293.55(S), N/A(F)
CL = 33(S), 13(F)

TH-11
GR. EL. = 295.55
TOC = 296.81
W/L = N/A(S), 294.96(F)
CL = 2.0(S), 24(F)

TH-12
GR. EL. = 297.55
TOC = 298.30
W/L = 295.49(S), 295.25(F)
CL = <1.0(S), 1.4(F)

TH-13
GR. EL. = 296.38
TOC = 297.41
TOR = 297.26
W/L = 296.15(S), 2954.98(F)
CL = 3.4(S), 3.3(F)

TH-14
GR. EL. = 303.21
TOC = 304.56
W/L = 296.96(S), 296.16(F)
CL = 17(S), 16(F)

TH-15
GR. EL. = 303.21
TOC = 302.82
W/L = 296.4(S), 296.38(F)
CL = 15(S), 16(F)

TH-17
GR. EL. = 298.10
TOC = 297.22
W/L = 295.31(S), 295.15(F)
CL = 16(S), 11(F)

SW-1 (DISCONTINUED)

SWAMP, W/L 96.70

SW-2A

SW-2

SW-3 (DISCONTINUED)

SW-4

HISTORIC TRENCH CLOSED PRIOR TO 1985

ACTIVE AREA

COVER MATERIAL STOCKPILE

SOIL STOCKPILE

SAND STOCKPILES

TIRE PILE

WHITE GOODS

SCRAP METAL

BINS

INERT WASTE / CONSTRUCTION DEBRIS

275m TO SW-5

ADDITIONAL LANDS OWNED BY THE MUNICIPALITY

BENCHMARK ELEV. = 298.31 m (GEODETIC)
LAG BOLT IN SOUTH FACE OF HYDRO POLE

INTERMITTENT CREEK

EXISTING LANE

CONCRETE CULVERT

STYX RIVER

SCALE

96.0

97.0

95.0

## Legend

| | |
|---|---|
| TH | MONITORING WELL LOCATION |
| TP | TEST PIT LOCATION |
| TOC | TOP OF CASING ELEVATION |
| W/L | GROUNDWATER LEVEL |
| CL | CHLORIDE CONCENTRATION |
| (S)/(F) | SPRING/FALL MONITORING ROUND |
| SW-2 | SURFACE WATER SAMPLE LOCATION |
| | LIMITS OF LICENCED AREA |
| | CONCESSION LINE BOUNDARY AND LOT LINE BOUNDARY |
| | CLOSED LANDFILL TRENCHES |
| | INFERRED DIRECTION OF GROUNDWATER FLOW |

## Notes

GROUNDWATER LEVELS SHOWN RECORDED ON SEPTEMBER 29, 2022. CONTOURS FROM TOPOGRAPHICAL SURVEY BY GMBP ENGINEERING ON NOVEMBER 17, 2022.

Scale = 1:3000

MARCH 2023

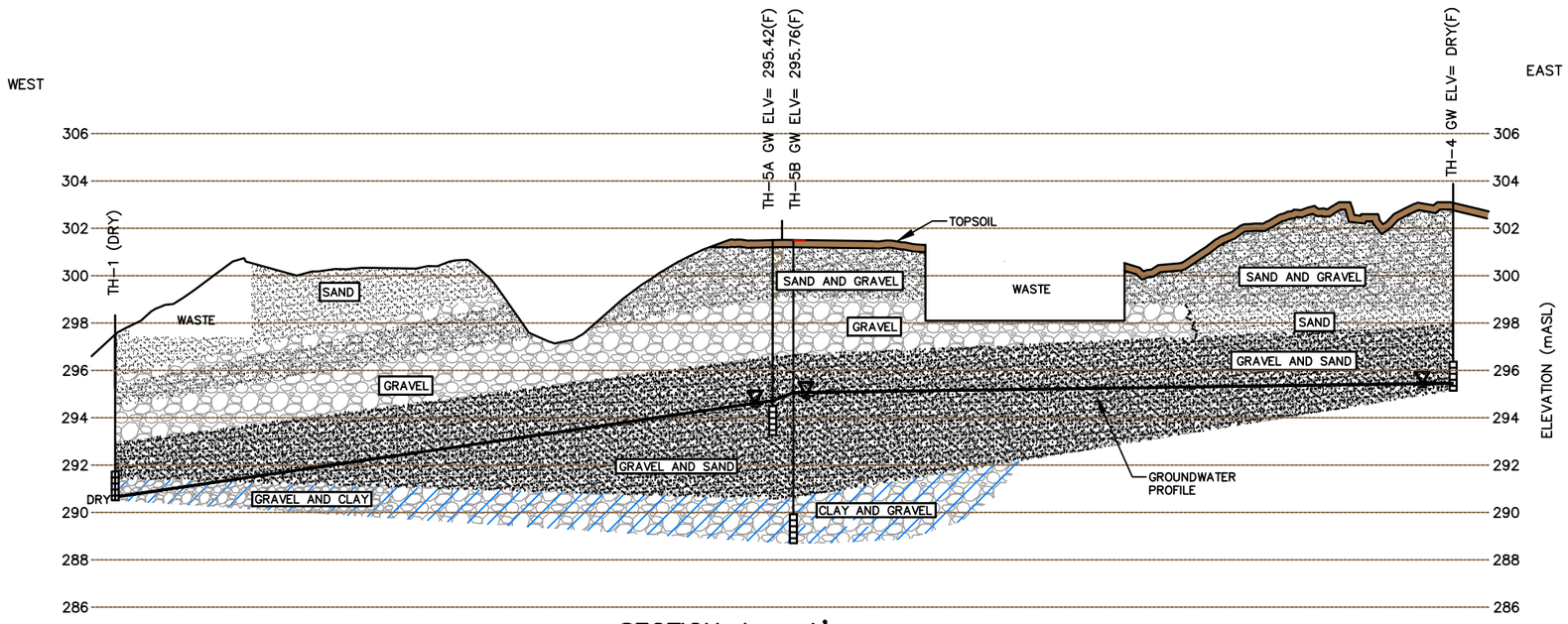
## MONITORING LOCATIONS AND GROUNDWATER CONTOUR PLAN

Figure No. 4

BluePlan ENGINEERING

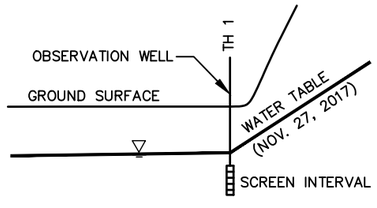
FILE:W:\OwenSound\Owen Sound\213-2013\213085 AMR - Bentinck Landfill\Drawings\213085 Figures.dwg LAYOUT:FIG 4
LAST SAVED BY:Kcharpontier, 3/27/2023 11:28:31 AM PLOTTED BY:Kate Charpontier - GM BluePlan 3/27/2023 11:30:51 AM

# 213085
# Annual Monitoring Report
# Bentinck Landfill
# Part Lots 16 & 17, Conc. 7
# Municipality of West Grey
# (Former Twp. of Bentinck)




## SECTION A – A'

SCALES :
1 : 2,500 HORIZONTAL
1 : 250 VERTICAL




TYPICAL WELL DETAIL
NTS

NOTES :

1. FOR LOCATION OF SECTION A–A' SEE FIGURE 3
2. GROUNDWATER PROFILE SHOWN IS BASED ON MONITORING DATA OBTAINED OCTOBER 7, 2021.
3. CROSS–SECTION BASED ON WELL LOGS PREPARED BY HIGHLAND WELL DRILLING FEBRUARY, 1984.
4. GROUND PROFILE BASED ON FIELD SURVEY DATA OBTAINED BY GENIVAR INC. ON NOVEMBER 22, 2013.
5. WASTE LIMITS ARE APPROXIMATE ONLY.

Legend

- TOPSOIL
- SAND
- SAND AND GRAVEL
- GRAVEL
- GRAVEL AND SAND
- CLAY AND GRAVEL
- GRAVEL AND CLAY
- WATER ELEVATION (OCTOBER 7, 2021)

Scale As Noted
MARCH 2023

## CROSS-SECTION A-A'

Figure No. 5

BluePlan ENGINEERING

# APPENDIX A:
# CERTIFICATE OF APPROVAL NO. A261301

Ontario

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

*AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL*
*WASTE DISPOSAL SITE*
*NUMBER A261301*
*Notice No. 1*

The Corporation of the Municipality of West Grey
Rural Route, No. 2
Durham, Ontario
N0G 1R0

Site Location: Bentinck Landfill Site
Part of Lots 16 & 17, Concession 1
West Grey Municipality, County of Grey

*You are hereby notified that I have amended Provisional Certificate of Approval No. A261301 issued on April 12, 1990 for 32.4 ha landfilling site , as follows:*

1. The following definitions have been added:

a. "Certificate" means this Provisional Certificate of Approval No. A261301, dated April 12, 1990, as amended from time to time, including all schedules attached to and forming part of this Certificate;

b. "Director" means the one or more persons who from time to time are so designated for the purpose of Section 37 of the *Environmental Protection Act*;

c. "District Manager" means the District Manager, Owen Sound District Office, South Western Region, Ministry of Environment;

d. "*EPA*" mean the *Environmental Protection Act*, R.S.O. 1990, C. E-19 as amended;

e. "Notice" means this Notice of Amendment to the Provisional Certificate of Approval No. A261301, as amended from time to time, including all schedules attached to and forming part of this Certificate;

f. "Ministry" means the Ministry of the Environment;

g. "O.Reg. 347" means Ontario Regulation 347 (General-Waste Management Regulation), R.R.O. 1990, as amended;

h. "O.Reg. 558" means Ontario Regulation 558/00 issued to amend O.Reg. 347;

i. "Owner" means The Corporation of the Municipality of West Grey;

j. "Site" means the Bentinck Landfill Site, located on Part Lots 16 & 17, Concession 1, in the former Township of Bentinck, with its associated buildings and storage facilities;

k. "Guideline B-7" means the Ministry's Guideline B-7 entitled "Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities", dated April 1994, as amended; and

l. "Regional Director" means the Regional Director of the Southwestern Region of the Ministry.

2. The following conditions have been added:

**GENERAL**

7. The Site shall be developed, operated and maintained in accordance with all of the plans and specifications in the documents listed in Schedule "A". Should there be discrepancies between the documents listed in Schedule "A" and the conditions in the Certificate , the conditions shall take precedence. Should there be discrepancies between the documents listed in Schedule "A", the document bearing the most recent date shall take precedence.

8. Requirements specified in this Certificate are minimum requirements and do not abrogate the need to take all reasonable steps to avoid violating the provisions of other applicable legislation. The Owner shall ensure compliance with all the terms and conditions of this Certificate. Any noncompliance constitutes a violation of the *EPA* and is grounds for enforcement.

9. The requirements of this Certificate are severable. If any requirements of this Certificate to any circumstances is held invalid, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected thereby.

10. The Owner shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to this Provisional Certificate of Approval No. 261301.

**NOTIFICATION OF CHANGES**

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

(a) change of Owner or Operator of the Site or both;

(b) change of address or address of the new Owner;

(c) change of partners where the Owner or Operator is or at any time becomes a partnership, and a copy of the most recent declaration filed under the *Business Names Act*, 1991 shall be included in the notification to the Director;

(d) any change of name of the corporation where the Owner or Operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (Form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the *Corporations Information Act* shall be included in the notification to the Director; and

(e) change in directors or officers of the corporation where the Owner or Operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 11(d), supra.

12. In the event of any changes in ownership of the Site, the Owner shall notify, in writing, the succeeding owner of the existence of this Certificate, and a copy of such written notice shall be forwarded to the Director and the District Manager.

**INSPECTIONS**

13. 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 Sections 156, 157 or 158 of the *EPA*, Sections 15, 16 or 17 of the *Ontario Water Resources Act*, R.S.O. 1990, or Sections 19 or 20 of the *Pesticides Act*, R.S.O. 1990, as amended from time to time, of any place to which this Certificate relates, and

without restricting the generality of the foregoing to:

(b) (i) enter upon the premises or the location where the records required by the conditions of this Certificate are kept;

(ii) have access to and copy, at any reasonable time, 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.

**RELEASE OF INFORMATION**

14. (a) The Owner shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the *EPA*), furnish any information requested by such persons with respect to compliance with the 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 be the Ministry of any act omission of the Owner relating to the Information, amounting to noncompliance with this Certificate or any statute or regulation.

15. 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.

**CERTIFICATE OF PROHIBITION**

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

17. The Owner shall:

(a) within sixty (60) days of the date of this Notice, submit to the Director for the Director's signature two copies of a completed Certificate of Prohibition containing a registerable description of the property that the Site is on, in accordance with Form 1 of Ontario Regulation 14/92 and

(b) within ten (10) calendar days of receiving the Certificates of Prohibition signed by the Director, register the Certificate of Prohibition in the appropriate Land Registry Office on title to the property that the Site is on and shall submit to the Director immediately following registration the duplicate registered copy.

**SERVICE AREA**

18. The approved service area for the Site is the Municipality of West Grey.

**WASTE TYPES**

19. Only solid non-hazardous waste shall be accepted at the Site for landfilling. No liquid industrial wastes or hazardous wastes as defined under O.Reg. 347 and O.Reg. 558 shall be landfilled at the Site.

**SITE LIFE and CAPACITY**

20. By December 31, 2006, the Owner shall determine the actual capacity of the Site and shall provide the justifying documentation. The capacity estimate should include the waste, daily cover and intermediate cover, but should exclude the final cover. Based on the anticipated disposal rates of disposal Site life must also be estimated.

**WASTE PLACEMENT**

21. By December 31, 2006, the Owner shall provide a Site plan delineating the proposed footprint of the waste and its final contours. The Site plan must also show the property lines in all directions and the necessary buffer areas around the waste fill area.

**DESIGN AND OPERATIONS REPORT**

22. By December 31, 2006, the Owner shall submit for the Director's approval, a revised Design and Operations Report that includes as a minimum the following information:

(a) waste types to be landfilled at the site, the service area and handling of the waste received at the site but unacceptable for landfilling or the recycling activities;
(b) location and description of the access road, the on-site roads at the Site and the impact of the increased traffic to the Site;
(c) description and location of the fencing and the gate(s);
(d) details of the signs required at the Site, including the sign at the front gate and the signs at the various locations throughout the Site;
(e) screening of the Site from the public, both visual and the protection from the noise impact;
(f) details of the clean surface water drainage from the Site and any works required to prevent extraneous surface water from contacting the active working face;
(g) description of the fill method, the equipment used at the Site, the areas used for various fill methods of landfilling, and timelines for various phases of the Site development;
(h) the operating hours of the Site and the hours for the various activities to be undertaken at the Site, including waste compaction, waste coverage, clean wood burning and removal of wastes collected for transfer;
(i) details on winter operations;
(j) thickness of the daily cover, frequency of the application, characteristics of the material and its source and the method of application;
(k) thickness of the intermediate cover, frequency of the application, characteristics of the material and its source and the method of application;
(l) the equipment used, the frequency and the procedures used for waste compaction;

(m) details on Site supervision and monitoring of the activities at the Site, including inspections of the incoming wastes;
(n) details on handling of other wastes, including the types and amounts of wastes handled, storage locations, storage facility design/description and the frequency of removal from the Site;
(o) details on housekeeping practices undertaken to control noise, dust, litter, odour, rodents, insects and other disease vectors, scavenging birds or animals;
(p) location of the clean wood burning area and the procedures for the burning, including frequency, supervision and measures to keep the unacceptable waste from the burn area;
(q) details on the closure of the Site, including the description of the final cover and its estimated permeability, its thickness, the source of the final cover material, the thickness of the top soil and the vegetation proposed for the closed waste mound, as well as the timeframe for the progressive waste coverage;
(r) monitoring program for the surface and groundwater;
(s) site-specific trigger mechanism program for the implementation of the groundwater and surface water contingency measures and a description of such measures;
(t) landfill gas control or management required at the Site;
(v) maintenance activities proposed for the Site and for the monitoring well network, including the type of the activities, the frequency of the activities and the personnel responsible for them;
(w) inspection activities proposed for the Site, including the frequency of the activities and the personnel responsible for them;
(x) details of training provided for the personnel responsible for the activities at the Site;
(y) contingency plans for the emergency situations that may occur at the Site;
(z) storm water management, including the location and the design of any works required;
(aa) any other information relevant to the design and operation of the Site or the information required by the District Manager.

**COMPLIANCE LIMITS**

23. The Site shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the Site;

(b) 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 or limits set by the Regional Director, for the protection of the surface water at the Site.

**SITE CLOSURE**

24. At least two (2) years prior to the anticipated date of closure of the landfill at this Site or the date when 90 per cent of the total waste disposal volume is reached, whichever occurs first, the Owner shall submit to the Director for approval, with a copy to the District Manager, a detailed Site Closure Plan pertaining to the termination of the landfilling operations at the Site, post-closure inspection, maintenance and monitoring and the end use. The plan shall include, but not be limited to the following:

(a) a plan showing Site appearance after closure;

(b) a description of the proposed end use for the Site;

(c) descriptions of the procedures for closure of the Site, including but not be limited to, the following:

(i) advance notification of the public of the Site closure;
(ii) posting a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
(iii) completion, inspection and maintenance of the final cover and landscaping;
(iv) Site security after closure;
(v) removal of unnecessary landfill-related structures, buildings and facilities; and

(vi) final construction of any necessary control, treatment, disposal and monitoring facilities for ground and surface water and for landfill gas.

(d) description of the procedures for post-closure care of the Site, including:

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

(e) an assessment of the adequacy of and need to implement the contingency plans; and

(f) an estimate of the contaminating life span of the Site, based on the results of the monitoring programs to-date.

The following document has been added to Schedule "A":

4. Letter to Ian Parrott, Ontario Ministry of the Environment, dated February 12, 2004 from Ken Gould, Public Works Manager, The Corporation of the Municipality of West Grey, requesting the service area to be increased to include the entire Municipality of West Grey and to increase the size of the site from 20.2 ha to 32.4 ha.

5. Letter to Margaret Wojcik, Ontario Ministry of the Environment, dated April 13, 2005 from Brian R. Scott, Henderson Paddon & Associates Limited, requesting December 31, 2006 as the deadline for the submission of the necessary documentation.

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

1. Condition 7 is included to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

2. Conditions 8, 9 and 10 are included to clarify the legal rights and responsibilities of the Owner.

3. Conditions 11 and 12 are included to require the Owner to notify the Ministry of any changes to the legal ownership of the Site.

4. Conditions 13 and 14 are included to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site, which are approved under this Certificate. Condition 13 is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *EPA*, the *Ontario Water Resources Act*, and the *Pesticides Act*, as amended.

5. Condition 15 is included to ensure that the Owner is aware of the rights of the public with respect to any information submitted with the application.

6. Conditions 16 and 17 are included, pursuant to subsection 197(1) of the *EPA*, to ensure that any persons having an interest in the site are aware that the land has been approved and used for the purposes of waste disposal.

7. Condition 18 is included to specify the approved service area for the Site.

8. Condition 19 is included to specify the approved types of waste that may be accepted for disposal at the Site.

9. Conditions 20 and 21 are included to require the Owner to determine the disposal capacity of the Site and to delineate the fill area and the final contours, so that the landfilling can proceed in a controllable manner to minimize the environmental impacts.

10. Condition 22 is included to require the Owner to submit an up-dated Design and Operations Report to incorporate the changes to the design and operations of the Site into a complete document that can used to assess compliance with the Ministry's requirements.

11. Condition 23 is included to provide the groundwater and surface water limits to prevent water pollution at the Site.

12. Condition 24 is included to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure long-term protection of the natural environment.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A261301 dated April 12, 1990**

*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 May, 2005

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

MW/

c: District Manager, MOE Owen Sound
Brian Scott. P.Eng., Henderson, Paddon & Associates Limited

Ontario

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

*AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL*
*WASTE DISPOSAL SITE*
*NUMBER A261301*
*Notice No. 2*
*Issue Date: September 29, 2005*

The Corporation of the Municipality of West Grey
Rural Route, No. 2
Durham, Ontario
N0G 1R0

Site Location: Bentinck Waste Disposal Site
Part of Lots 16 & 17, Concession 7, Former Township of Bentinck
West Grey Municipality, County of Grey

*You are hereby notified that I have amended Provisional Certificate of Approval No. A261301 issued on April 12, 1990 for* a *32.4 ha landfilling site, as follows:*

The site location mentioned in Notice No. 1, dated May 20, 2005, has been changed as follows:

**FROM** Bentinck Landfill Site
Part of Lots 16 & 17, Concession 1
West Grey Municipality, County of Grey

**TO:** Bentinck Waste Disposal Site
Part of Lots 16 & 17, Concession 7, Former Township of Bentinck
West Grey Municipality, County of Grey

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

all in accordance with the letter dated July 19, 2005, from Ian C. Johnson, of Dunlop, Johnson & Pust, Barristers & Solicitors, 21 Main Street East, Box 433, Markdale, Ontario NOC 1H0.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A261301 dated April 12, 1990**

*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 29th day of September, 2005

Ian Parrott, P.Eng.
Director
Section 39, *Environmental Protection Act*

BR/
c: District Manager, MOE Barrie District Office
Area Supervisor, MOE, Owen Sound Area Office
Ian C. Johnson, Dunlop, Johnson & Pust
Brian Scott, P.Eng., Henderson, Paddon & Associates Limited

Ontario

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

**AMENDMENT TO PROVISIONAL CERTIFICATE OF APPROVAL**
**WASTE DISPOSAL SITE**
NUMBER A261301
Notice No. 3
Issue Date: October 16, 2008

The Corporation of the Municipality of West Grey
Rural Route, No. 2
Durham, Ontario
N0G 1R0

Site Location: Bentinck Waste Disposal Site
Lot 16 & 17, Concession 7
West Grey Municipality, County of Grey

*You are hereby notified that I have amended Provisional Certificate of Approval No. A261301 issued on April 12, 1990 and amended on May 20, 2005 and September 29, 2005 for the use and operation of 20.2 hectare landfilling/recycling site within a total site area of 32.4 hectares, as follows:*

The following conditions are added to the Certificate:

20.1 The calculated theoretical maximum volumetric capacity of the Site, consisting of the waste, daily cover and intermediate cover, but excluding the final cover is 923,140 cubic metres.

20.2 This approval is for the design, operation and use of 227,400 cubic meters (this volume includes the daily and intermediate cover) of the calculated theoretical maximum volumetric capacity of 923,140 cubic metres, as described in Items 6 and 7 of Schedule "A".

20.3 The Owner may utilize the remaining calculated theoretical maximum volumetric capacity of the Site with the approval of the Director. The Owner shall submit to the Director for Director's approval at least two (2) years prior to utilizing the capacity under approved as per Condition 20.2, a design and operation plan with up to date engineering and environmental standards and a detailed hydrogeological assessment for proper and safe development of the remainder of the Site. Or a closure plan as per condition 24 shall be submitted.

**25. WASTE DIVERSION**

25.1 The Owner shall ensure that:

(a) all bins and waste storage areas are clearly labelled;
(b) all lids or doors on bins shall be kept closed during non-operating hours and during the high wind events; and
(c) if necessary to prevent litter, waste storage areas shall be covered during the high winds events.

25.2 The Owner shall provide a segregated area for the storage of *Refrigerant Appliances* so that the following are ensured:

(a) all *Refrigerant Appliances* have been tagged to indicate that the refrigerant has been removed by a licensed technician. The tag number shall be recorded in the log book and shall remain affixed to the appliance until transferred from the *Site;* **or**
(b) all *Refrigerant Appliances* accepted at the *Site,* which have not been tagged by a licensed technician to

verify that the equipment no longer contains refrigerants, are stored segregated, in a clearly marked area, in an upright position and in a manner which allows for the safe handling and transfer from the *Site* for removal of refrigerants as required by O.Reg. 189; and
(c) all *Refrigerant Appliances* received on-site shall either have the refrigerant removed prior to being transferred from the *Site* or shall be shipped off-site only to facilities where the refrigerants can be removed by a licensed technician in accordance with O.Reg. 189.

25.3 Propane cylinders shall be stored in a segregated area in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

25.4 The Owner shall transfer waste and recyclable materials from the *Site* as follows:

(a) recyclable materials shall be transferred off-site once their storage bins are full;
(b) scrap metal shall be transferred off-site at least twice a year;
(c) tires shall be transferred off-site as soon as a load for the contractor hired by the Owner has accumulated or as soon as the accumulated volume exceeds the storage capacity of its bunker; and
(d) immediately, in the event that waste is creating an odour or vector problem.

25.7 The Owner shall notify the appropriate contractors that waste and recyclable wastes that are to be transferred off the *Site* are ready for removal. Appropriate notice time, as determined by the contract shall be accommodated in the notification procedure.

**26. CHANGES TO THE MONITORING PLAN**

26.1 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.

26.2 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.

26.3 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 of Approval.

**27. SITE ACCESS**

27.1 Waste shall only be accepted at the *Site* during the following time periods:

Monday to Friday: 8:00 a.m. to 7:00 p.m.
Saturday: 8:00 a.m. to 4.00 p.m.

27.2 On-site equipment used for daily site preparation and closing activities shall be operated one (1) hour after the hours of operation approved by this *Certificate.*

27.3 With the prior written approval from the *District Manager,* the time periods may be extended to accommodate seasonal or unusual quantities of waste.

**28. GROUNDWATER and SURFACE WATER MONITORING PLAN and, TRIGGER MECHANISMS AND CONTINGENCY PLANS**

28.1 The Owner shall revise groundwater and surface water monitoring plan, trigger mechanism and contingency plans in

consultation with the Technical Support Unit, West Central Region, Ministry of the Environment.

28.2 The Owner shall submit the plans required as per Condition 28.1 to the District Manager with the 2008 annual monitoring report.

28.3 The Owner shall follow procedure in Conditions 26.1 and 26.2 to amend the Certificate of Approval to incorporate plans required by Condition 28.1 into the Certificate of Approval.

**29.0 GROUNDWATER WELLS AND MONITORS**

29.1 The *Owner* shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

29.2 Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells and the wells shall be properly re-secured.

29.3 Any groundwater monitoring wells 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 within a two (2) year period.

(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.

**SCHEDULE "A"**

6. The report titled "Development and Operations Report, Bentinck Landfill, Municipality of West Grey" dated December 18, 2006 and prepared by Henderson Paddon & Associates Limited.

7. Revised Drawing numbers 101805-101, 101805-102, 101805-103, 101805-104 and 101805-105 dated and signed by Peter Brodzikowski, P.Eng., Henderson Paddon & Associates Limited.

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

1. This amendment is to approve the design and operation proposed by the Owner.

2. Conditions 20.1, 20.2 and 20.3 are included to specify the approved amounts of waste that may be accepted for disposal at the *Site,* based on the *Owner*'s application and supporting documentation.

3. Conditions 26.1, 26.2 and 26.3 are included to streamline approval of the changes to the monitoring plan.

4. Condition 27 is included to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.

5. Condition 28 is included to require the Owner to revise the monitoring plans, trigger mechanisms and contingency plans for groundwater and surface water.

6. Condition 29 is included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

**This Notice shall constitute part of the approval issued under Provisional Certificate of Approval No. A261301 dated April 12, 1990 as amended**

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

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

*The Notice should also include:*

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

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

*This Notice must be served upon:*

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

AND

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

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

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

DATED AT TORONTO this 16th day of October, 2008

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

RM/
c: District Manager, MOE Owen Sound
Frank Ford, Henderson Paddon & Associates Limited

**AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL**
NUMBER A261301
Issue Date: April 14, 2020

The Corporation of the Municipality of West Grey
402812 Grey Road 4 (RR#2)
West Grey, Ontario
N0G 1R0

Site Location: Bentinck Landfill Site
114079 Grey Road 3
West Grey Municipality, County of Grey
N4N 3B8

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

the use and operation of 20.2 hectare landfilling/recycling site within a total site area of 32.4 hectares.

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

- "Approval" means this Environmental Compliance Approval and any Schedules to it, including the application and supporting documentation listed in Schedule "A";
- "Contaminating Life Span" means contaminating life span as defined in Ontario Regulation 232/98;
- "Director" means any Ministry employee appointed in writing by the Minister pursuant to section 5 of the EPA as a Director for the purposes of Part II.1 of the EPA;
- "District Manager" means the District Manager of the local district office of the Ministry in which the Site is geographically located;
- "EPA" or "Act" means Environmental Protection Act, R.S.O. 1990, c. E. 19, as amended;
- "HHW Depot" means household hazardous waste depot;
- "Ministry" means the Ontario Ministry of the Environment, Conservation and Parks;

- "NMA" means Nutrient Management Act, 2002, S.O. 2002, c. 4, as amended;

- "Ontario Drinking Water Quality Standards" means Ontario Regulation 169/03 (Ontario Drinking Water Quality Standards), as amended;

- "Operator" means any person, other than the Owner's employees, authorized by the Owner as having the charge, management or control of any aspect of the Site and includes its successors or assigns;

- "Owner" means any person that is responsible for the establishment or operation of the Site being approved by this Approval, and includes The Corporation of the Municipality of West Grey and its successors and assigns;

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

- "PA" means the Pesticides Act, R.S.O. 1990, c. P-11, as amended;

- "Provincial Officer" means any person designated in writing by the Minister as a provincial officer pursuant to Section 5 of the OWRA, Section 5 of the EPA, Section 17 of the PA, Section 4 of the NMA, or Section 8 of the SDWA;

- "Refrigerant Appliances" means household appliances which use, or may use refrigerants, and which include, but is not restricted to, refrigerators, freezers and air-conditioning systems;

- "Regional Director" means the Regional Director of the local Regional Office of the Ministry in which the Site is located;

- "Regulation 232" means Ontario Regulation 232/98 (New Landfill Standards) made under the EPA, as amended from time to time;

- "Regulation 347" or "Reg. 347" means Regulation 347, R.R.O. 1990, made under the EPA, as amended;

- "O. Reg. 463/10" means Ontario Regulation 463/10, Ozone Depleting Substances and Other Halocarbons, made under the EPA, as amended;

- "Regulation 903" means Regulation 903, R.R.O. 1990, made under the OWRA, as amended;

- "SDWA" means Safe Drinking Water Act, 2002, S.O. 2002, c. 32, as amended;

- "Site" means the entire waste disposal site, including the buffer lands, and contaminant attenuation zone at Bentinck Landfill Site, 114079 Grey Road 3, West Grey Municipality, County of Grey, N4N 3B8; and

- "Trained Personnel" means personnel knowledgeable in the following through instruction and/or practice:
  - relevant waste management legislation, regulations and guidelines;
  - major environmental concerns pertaining to the waste to be handled;
  - occupational health and safety concerns pertaining to the processes and wastes to be handled;
  - management procedures including the use and operation of equipment for the processes and wastes to be handled;
  - emergency response procedures;
  - specific written procedures for the control of nuisance conditions;
  - specific written procedures for refusal of unacceptable waste loads; and
  - the requirements of this Approval.

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

**TERMS AND CONDITIONS**

**1. GENERAL**

**Compliance**

(1) The Owner and Operator shall ensure compliance with all the conditions of this Approval and shall ensure that any person authorized to carry out work on or operate any aspect of the Site is notified of this Approval and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(2) Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Approval.

**In Accordance**

(3) Except as otherwise provided by this Approval, the Site shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A".

(4) Construction and installation of the aspects of the HHW Depot defined and approved in this Approval must be completed within 5 years of the later of:

(a) the date this Approval; or

(b) if there is a hearing or other litigation in respect of the issuance of this Approval, the date that this hearing or litigation is disposed of, including all appeals.

(5) This Approval ceases to apply in respect of the aspects of the HHW Depot defined and approved in this Approval that have not been constructed or installed before the later of the dates identified in Condition 1(4) above.

**Interpretation**

(6) Where there is a conflict between a provision of any document listed in Schedule "A" in this Approval, and the conditions of this Approval, the conditions in this Approval shall take precedence.

(7) Where there is a conflict between the application and a provision in any document listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the Ministry approved the amendment.

(8) Where there is a conflict between any two documents listed in Schedule "A", the document bearing the most recent date shall take precedence.

(9) The conditions of this Approval are severable. If any condition of this Approval, or the application of any condition of this Approval to any circumstance, is held invalid or unenforceable, the application of such condition to other circumstances and the remainder of this Approval shall not be affected thereby.

**Other Legal Obligations**

(10) The issuance of, and compliance with, this Approval does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner and Operator to furnish any further information related to compliance with this Approval.

**Adverse Effect**

(11) The Owner and Operator shall take steps to minimize and ameliorate any adverse effect on the natural environment or impairment of water quality resulting from the Site, including such accelerated or additional monitoring as may be necessary to determine the nature and extent of the effect or impairment.

(12) Despite an Owner, Operator or any other person fulfilling any obligations imposed by this Approval the person remains responsible for any contravention of any other condition of this Approval or any applicable statute, regulation, or other legal requirement resulting from any act or omission that caused the adverse effect to the natural environment or impairment of water quality.

**Change of Ownership**

(13) The Owner shall notify the Director, in writing, and forward a copy of the notification to the District Manager, within 30 days of the occurrence of any changes in the following information:
   (a) the ownership of the Site;
   (b) the Operator of the Site;
   (c) the address of the Owner or Operator; and
   (d) the partners, where the Owner or Operator is or at any time becomes a partnership and a copy of the most recent declaration filed under the Business Names Act, R. S. O. 1990, c. B.17, shall be included in the notification.

(14) 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 and sufficient financial assurance is deposited with the Ministry to ensure that these conditions will be carried out.

(15) In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Approval, and the Owner shall provide a copy of the notification to the District Manager and the Director.

**Registration on Title Requirement**

(16) Prior to dealing with the property in any way, the Owner shall provide a copy of this Approval and any amendments, to any person who will acquire an interest in the property as a result of the dealing.

(17) (a) Within thirty (30) calendar days from the date of issuance of this Approval, the Owner shall submit to the Director a completed Certificate of Requirement which shall include:
   (i) a plan of survey prepared, signed and sealed by an Ontario Land Surveyor, which shows the area of the Site where waste has been or is to be deposited at the Site;
   (ii) proof of ownership of the Site;
   (iii) a letter signed by a member of the Law Society of Upper Canada or other qualified legal practitioner acceptable to the Director, verifying the legal description provided in the Certificate of Requirement;
   (iv) the legal abstract of the property; and
   (v) any supporting documents including a registerable description of the Site.

   (b) Within fifteen (15) calendar days of receiving a 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; and
   (ii) submit to the Director and the District Manager, written verification that

the Certificate of Requirement has been registered on title.

**Inspections by the Ministry**

(18) No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the OWRA, the EPA, the PA, the SDWA or the NMA, of any place to which this Approval relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved works are located, or the location where the records required by the conditions of this Approval are kept;

(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Approval;

(c) to inspect the Site, related equipment and appurtenances;

(d) to inspect the practices, procedures, or operations required by the conditions of this Approval; and

(e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Approval or the EPA, the OWRA, the PA, the SDWA or the NMA.

**Information and Record Retention**

(19) (a) Except as authorized in writing by the Director, all records required by this Approval shall be retained at the Site for a minimum of two (2) years from their date of creation.

(b) The Owner shall retain all documentation listed in Schedule "A" for as long as this Approval is valid.

(c) All monthly summary reports of waste records collected are to be kept at the Site until they are included in the Annual Report.

(d) The Owner shall retain employee training records as long as the employee is working at the Site.

(e) The Owner shall make all of the above documents available for inspection upon request of Ministry staff.

(20) The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action under this Approval or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(a) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Approval or any statute, regulation or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

(21) The Owner shall ensure that a copy of this Approval, in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the Site at all times.

(22) Any information related to this Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, RSO 1990, CF-31.

## 2. SITE OPERATION

### Operation

(1) The Site shall be operated and maintained at all times including management and disposal of all waste, in accordance with the EPA, Regulation 347, and the conditions of this Approval. At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

### Signs

(2) The Owner shall install and maintain a sign at the entrance to the Site. The sign shall be visible and readable from the main road leading to the Site. The following information shall be included on the sign:

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

(3) The Owner shall install and maintain signs to direct vehicles to working face and waste diversion areas.

(4) The Owner shall provide signs at waste diversion area informing users what materials are acceptable and directing users to appropriate storage areas.

### Vermin, Vectors, Dust, Litter, Odour, Noise and Traffic

(5) The Site shall be operated and maintained such that the vermin, vectors, dust, litter, odour, noise and traffic do not create a nuisance.

**Burning Waste Prohibited**

(6) (a) Burning of waste at the Site is prohibited.

(b) Notwithstanding Condition 2. (6) (a) above, burning of segregated, clean wood and brush at the landfill may be carried out in strict compliance with the Ministry of the Environment Document titled "Guideline C-7, Burning at Landfill Sites" dated April 1994.

**Site Access**

(7) Waste shall only be accepted during the following time periods:

Monday to Friday: 8:00 a.m. to 7:00 p.m.
Saturday: 8:00 a.m. to 4.00 p.m.

(8) On-site equipment used for daily site preparation and closing activities may be operated one (1) hour before and one (1) hour after the hours of operation approved by this Approval.

(9) With the prior written approval from the District Manager, the time periods may be extended to accommodate seasonal or unusual quantities of waste.

**Site Security**

(10) No waste shall be received, landfilled or removed from the Site unless a site supervisor or an attendant is present and supervises the operations during operating hours. The Site shall be closed when a site attendant is not present to supervise landfilling operations.

(11) The Site shall be operated and maintained in a safe and secure manner. During non-operating hours, the Site entrance and exit gates shall be locked and the Site shall be secured against access by unauthorized persons.

## 3. EMPLOYEE TRAINING

(1) A training plan for all employees that operate any aspect of the Site shall be developed and implemented by the Owner or the Operator. Only Trained Personnel shall operate any aspect of the Site or carry out any activity required under this Approval.

## 4. COMPLAINTS RESPONSE PROCEDURE

(1) If at any time the Owner receives complaints regarding the operation of the Site, the Owner shall respond to these complaints according to the following procedure:

(a) The Owner shall record and number each complaint, either electronically or in a

log book, and shall include the following information: the nature of the complaint, the name, address and the telephone number of the complainant if the complainant will provide this information and the time and date of the complaint;

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

## 5. EMERGENCY RESPONSE

(1) All Spills as defined in the EPA shall be immediately reported to the **Ministry's Spills Action Centre at 1-800-268-6060** and shall be recorded in the log book as to the nature of the emergency situation, and the action taken for clean-up, correction and prevention of future occurrences.

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

(3) All wastes resulting from an emergency situation shall be managed and disposed of in accordance with Reg. 347.

(4) All equipment and materials required to handle the emergency situations shall be:
(a) kept on hand at all times that waste landfilling and/or handling is undertaken at the Site; and
(b) adequately maintained and kept in good repair.

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

## 6. INSPECTIONS, RECORD KEEPING AND REPORTING

**Daily Log Book**

(1) A daily log shall be maintained in written or electronic format and shall include the following information:
(a) the type, date and time of arrival, hauler, and quantity (tonnes) of all waste and cover material received at the Site;
(b) the area of the Site in which waste disposal operations are taking place;
(c) a record of litter collection activities and the application of any dust suppressants;

(d) a record of the daily inspections; and
(e) a description of any out-of-service period of any control, treatment, disposal or monitoring facilities, the reasons for the loss of service, and action taken to restore and maintain service.

(2) Any information requested, by the Director or a Provincial Officer, concerning the Site and its operation under this Approval, including but not limited to any records required to be kept by this Approval shall be provided to the Ministry, upon request.

**Daily Inspections and Log Book**

(3) An inspection of the entire Site and all equipment on the Site shall be conducted each day the Site is in operation to ensure that: the Site is secure; that the operation of the Site is not causing any nuisances; that the operation of the Site is not causing any adverse effects on the environment and that the Site is being operated in compliance with this Approval. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed**.**

(4) A record of the inspections shall be kept in a daily log book that includes:
(a) the name and signature of person that conducted the inspection;
(b) the date and time of the inspection;
(c) the list of any deficiencies discovered;
(d) the recommendations for remedial action; and
(e) the date, time and description of actions taken.

(5) A record shall be kept in the daily log book of all refusals of waste shipments, the reason(s) for refusal, and the origin of the waste, if known.

**Annual Report**

(6) A written report on the development, operation and monitoring of the Site, shall be completed annually (the "Annual Report"). The Annual Report shall be submitted to the District Manager, by March 31st of the year following the period being reported upon.

(7) The Annual Report shall include but not be limited to the following information:

(a) the results and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs;
(b) an assessment of the operation and performance of all engineered facilities, the need to amend the design or operation of the Site, and the adequacy of and need to implement the contingency plans;
(c) site plans showing the existing contours of the Site; areas of landfilling operation during the reporting period; areas of intended operation during the next reporting period; areas of excavation during the reporting period; the progress of final

cover, vegetative cover, and any intermediate cover application; facilities existing, added or removed during the reporting period; and site preparations and facilities planned for installation during the next reporting period;

(d) calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Site during the reporting period and a calculation of the total volume of Site capacity used during the reporting period;

(e) a calculation of the remaining capacity of the Site and an estimate of the remaining Site life;

(f) a summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Site;

(g) a summary of any complaints received and the responses made;

(h) a discussion of any operational problems encountered at the Site and corrective action taken;

(i) any changes to the Design and Operations Report and the Closure Plan that have been approved by the Director since the last Annual Report;

(j) a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903; and

(k) any other information with respect to the Site which the District Manager may require from time to time.

## 7. LANDFILL DESIGN AND DEVELOPMENT

### Approved Waste Types

(1) Only municipal waste as defined under Reg. 347 being solid non-hazardous shall be accepted at the Site for landfilling.

(2) The Owner shall develop and implement a program to inspect waste to ensure that the waste received at the Site is of a type approved for acceptance under this Approval.

(3) The Owner shall ensure that all loads of waste are properly inspected by Trained personnel prior to acceptance at the Site and that the waste vehicles are directed to the appropriate areas for disposal or transfer of the waste. The Owner shall notify the District Manager, in writing, of load rejections at the Site within one (1) business day from their occurrence.

### Capacity

(4) The calculated theoretical maximum volumetric capacity of the Site, consisting of the waste, daily cover and intermediate cover, but excluding the final cover is 923,140 cubic metres.

(5) This approval is for the design, operation and use of 227,400 cubic meters (this volume includes the daily and intermediate cover) of the calculated theoretical maximum volumetric capacity of 923,140 cubic metres, as described in Items 6 and 7 of Schedule

"A".

(6) The Owner may utilize the remaining calculated theoretical maximum volumetric capacity of the Site with the approval of the Director. The Owner shall submit to the Director for Director's approval at least two (2) years prior to utilizing the capacity approved in accordance with the Condition 7(4), a design and operation plan with up to date engineering and environmental standards and a detailed hydrogeological assessment for proper and safe development of the remainder of the Site.

**Service Area**

(7) Only waste that is generated within the boundaries of the Municipality of West Grey.may be accepted at the Site.

**Cover**

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

(a) Control of blowing litter, odours, dust, landfill gas, gulls, vectors, vermin and fires;
(b) Provision for an aesthetic condition of the landfill during the active life of the Site;
(c) Provision for vehicle access to the active tipping face; and
(d) Compatibility with the design of the Site for groundwater protection, leachate management and landfill gas management.

(9) Cover material shall be applied as follows:

(a) **Weekly** Cover - Weather permitting, deposited waste shall be covered **weekly** in a manner acceptable to the District Manager so that no waste is exposed to the atmosphere;
(b) Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 millimetre of soil cover or an approved thickness of alternative cover material shall be placed; and
(c) Final Cover - In areas where landfilling has been completed to final contours, a minimum 600 millimetre thick layer of soil of medium permeability and 150 millimetres of top soil (vegetative cover) shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

**Design and Operations Report**

(10) The Design and Operations Report to be submitted under the condition 7(6) shall include as a minimum the following information:

(a) proposed landfill design including the footprint, final contours, capacity and an estimate of the amount of existing waste;
(b) an estimate of waste types and quantities to be landfilled at the site and recycling and resource recovering activities at the Site;
(c) location and description of the access road and the on-site roads at the Site;
(d) description and location of the fencing and the gate(s);
(e) screening of the Site from the public, both visual and the protection from the noise impact;
(f) details of the clean surface water drainage from the Site and any works required to prevent extraneous surface water from contacting the active working face;
(g) description of the fill method, the equipment used at the Site, the areas used for various fill methods of landfilling, and timelines for various phases of the Site development;
(h) the operating hours of the Site and the hours for the various activities to be undertaken at the Site, including waste compaction, waste coverage and other activities within the Site;
(i) details on winter operations;
(j) the equipment used and the procedures used for waste deposition, spreading and covering;
(k) details on supervision and monitoring of the activities at the Site;
(l) details on handling of other wastes, including the types and amounts of wastes handled, storage locations, storage facility design/description and the frequency of removal from the Site;
(m) details on housekeeping practices undertaken to control noise, dust, litter, odour, rodents, insects and other disease vectors, scavenging birds or animals;
(n) details on the closure of the Site, including the description of the final cover and its estimated permeability, its thickness, the source of the final cover material, the thickness of the top soil and the vegetation proposed for the closed waste mound, as well as the timeframe for the progressive waste coverage;
(o) monitoring program for the surface and ground water;
(p) site-specific trigger mechanism program for the implementation of the groundwater and surface water, contingency measures and a description of such measures;
(q) landfill gas control or management required at the Site;
(r) maintenance activities proposed for the Site and for the monitoring well network, including the type of the activities, the frequency of the activities and the personnel responsible for them;
(s) inspection activities proposed for the Site, including the frequency of the activities and the personnel responsible for them;
(t) details of training provided for the personnel responsible for the activities at the Site;
(u) contingency plans for the emergency situations that may occur at the Site;
(v) storm water management, including the location and the design of any works

required; and

(w) any other information relevant to the design and operation of the Site or the information required by the District Manager.

## 8. LANDFILL MONITORING

### Landfill Gas

(1) The Owner shall ensure that any buildings or structures at the Site contain adequate ventilation systems to relieve any possible landfill gas accumulation to prevent methane concentration reaching the levels within its explosive range. 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.

### Compliance

(2) The Site shall be operated in such a way as to ensure compliance with the following:

(a) Reasonable Use Guideline B-7 for the protection of the groundwater at the Site; and

(b) 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 or limits set by the Regional Director, for the protection of the surface water at and off the Site.

### Surface Water and Groundwater

(3) The Owner shall monitor surface water and ground water in accordance with the monitoring programs outlined in documents listed in the attached Schedule "A".

(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 is 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 Director for abandonment, shall be decommissioned by the Owner, as required, in accordance with O.Reg. 903, to 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) The Owner shall revise groundwater and surface water monitoring plan, trigger mechanism and contingency plans in consultation with the Technical Support Unit, South West Region of the Ministry.

(9) The Owner shall submit the plans required as per Condition 8 (8) to the District Manager with the 2020 annual monitoring report.

(10) The Owner shall follow procedure in Conditions 8(13) and 8(14) to amend the Approval.

(11) 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 exceedances;
(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 Director for approval; and
(c) The contingency measures shall be implemented by the Owner upon approval by the Director.

(12) The Owner shall ensure that any proposed changes to the site-specific trigger levels for leachate impacts to the surface water or groundwater, are approved in advance by the Director via an amendment to this Approval.

**Changes to the Monitoring Programs, Trigger Mechanisms and Contingency Plans**

(13) The Owner may request to make changes to the monitoring program(s), trigger mechanisms and/or contingency plan to the District Manager in accordance with the

recommendations of the annual report. The Owner shall make clear reference to the proposed changes in a separate letter that shall accompany the annual report.

(14) 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, trigger mechanisms and/or contingency plans, 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 Director requesting the Approval be amended to approve the proposed changes to the environmental monitoring plan prior to implementation.

## 9. CLOSURE PLAN

(1) At least two (2) years prior to closure, the Owner shall submit to the Director for approval, with copies to the District Manager, a detailed Site closure plan pertaining to the termination of landfilling operations at this Site, post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following as a minimum but not limited to:

- (a) a plan showing Site appearance after closure;
- (b) a description of the proposed end use of the Site, that shall include a discussion on the Environmental Assessment commitments (if applicable) to dedicate portion of the lands within the Site that are not required for site post-closure operations and monitoring, to be used for community recreational purpose;
- (c) A description of how pollinator friendly plants were considered in the final vegetative cover for the landfill and/or in the landscaping within the Site;
- (d) a description of the procedures for closure of the Site:
  - (i) advance notification of the public of the landfill closure;
  - (ii) posting a sign at the Site entrance indicating the landfill is closed and identifying any alternative was disposal arrangements;
  - (iii) completion, inspection and maintenance of the final cover and landscaping;
  - (iv) site security;
  - (v) removal of unnecessary landfill-related structures, buildings and facilities; and
  - (vi) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
- (e) a schedule indicating the time-period for implementing sub-conditions (i) to (vi) above.
- (f) descriptions of the procedures for post-closure care of the Site, including:
  - (i) Operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
  - (ii) Record keeping and reporting; and
  - (iii) Complaint contact and response procedures;

(g) an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
(h) an updated estimate of the Contaminating Life Span of the Site, based on the results of the monitoring programs to date.

(2) The Site shall be closed in accordance with the closure plan as approved by the Director.

## 10. WASTE DIVERSION

(1) The Owner shall ensure that:
(a) all bins and waste storage areas are clearly labelled;
(b) all lids or doors on bins shall be kept closed during non-operating hours and during the high wind events; and
(c) if necessary to prevent litter, waste storage areas shall be covered during the high winds events.

(2) The Owner/Operator shall remove the refrigerant as defined in O. Reg. 463/10 in accordance with the following:
(a) all White Goods containing refrigerants which have not been tagged by a licensed technician to verify that the equipment no longer contains refrigerants, shall be stored in a separate area in an upright position; and

(b) White Goods containing refrigerants received at the Site shall be shipped off-Site in order to have the refrigerants removed by a licensed technician in accordance with O. Reg. 463/10; or

(c) the refrigerant shall be removed at the Site by a licensed technician, in accordance with O. Reg. 463/10, prior to shipping White Goods off-Site; and

(d) a detailed log of all White Goods containing refrigerants received shall be maintained. The log shall include the following:
(i) date of the record;
(ii) types, quantities and source of White Goods containing refrigerants received;
(iii) details on removal of refrigerants as required by O. Reg. 463/10; and
(iv) the quantities and destination of the White Goods and/or refrigerants transferred from the Site.

(3) Propane cylinders shall be stored in a segregated area in a manner which prevents cylinders from being knocked over or cylinder valves from breaking.

(4) The Owner shall transfer waste and recyclable materials from the Site as follows:
(a) recyclable materials shall be transferred off-site once their storage bins are full;
(b) scrap metal shall be transferred off-site at least twice a year;
(c) tires shall be transferred off-site as soon as a load for the contractor hired by the

Owner has accumulated or as soon as the accumulated volume exceeds the storage capacity of its bunker; and

(d) immediately, in the event that waste is creating an odour or vector problem.

(5) The Owner shall notify the appropriate contractors that waste and recyclable wastes that are to be transferred off-site are ready for removal. Appropriate notice time, as determined by the contract shall be accommodated in the notification procedure.

## 11. HHW TRANSFER STATION

(1) Mobile Municipal Hazardous or Special Waste (MHSW) Collection Unit as proposed by the Owner is hereby approved subject to the following conditions:

(a) Maximum volume of waste to be stored at the HHW Depot shall be 31 cubic meters.

(b) The Owner shall provide a minimum of 7700 litres of secondary containment within the storage unit.

(b) All waste shall be removed from the Mobile MHSW collection unit prior to moving to the Durham Waste Disposal Site.

(2) No radioactive, pathological or biomedical wastes or contaminated radioactive, pathological or biomedical wastes shall be accepted at this Site.

## SCHEDULE "A"

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

2. "Township of Bentinck Development and Operations Plan Sanitary Landfill Site" dated August, 1988 submitted by Fieldholme Engineering Inc.

3. Resolution of Council included in letter from the Township of Bentinck dated April 10, 1989 adopting the consulting engineering report.

4. Letter to Ian Parrott, Ontario Ministry of the Environment, dated February 12, 2004 from Ken Gould, Public Works Manager, The Corporation of the Municipality of West Grey, requesting the service area to be increased to include the entire Municipality of West Grey and to increase the size of the site from 20.2 ha to 32.4 ha.

5. Letter to Margaret Wojcik, Ontario Ministry of the Environment, dated April 13, 2005 from Brian R. Scott, Henderson Paddon & Associates Limited, requesting December 31, 2006 as the deadline for the submission of the necessary documentation.

6. The report titled "Development and Operations Report, Bentinck Landfill, Municipality of West Grey" dated December 18, 2006 and prepared by Henderson Paddon & Associates Limited.

7. Revised Drawing numbers 101805-101, 101805-102, 101805-103, 101805-104 and 101805-105 dated and signed by Peter Brodzikowski, P.Eng., Henderson Paddon & Associates Limited.

8. Environmental Compliance Approval Application dated June 6, 2019 and signed Brent Glasier, Director of Infrastructure & Public Works
The Corporation of the Municipality of West Grey, including the attached supporting documentation.

9. Electronic mail dated March 12, 2020 (8:54 a.m.) from Al Bringleson - GM Blue Plan to Ranjani Munasinghe, Ministry of the Environment, Conservation and Parks responding to the information request letter dated February 21, 2020.

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

- The reason for Conditions 1(1), (2), (6), (7), (8), (9), (10), (11), (12), (19), (20) and (21) is to clarify the legal rights and responsibilities of the Owner and Operator under this Approval.

- The reasons for Condition 1(3), 1(4), 1(5) and 7 (10) Condition for D&O submission) are 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 reasons for Condition 1(13) are to ensure that the Site is operated under the corporate name which appears on the application form submitted for this approval and to ensure that the Director is informed of any changes.

- The reasons for Condition 1(14) are to restrict potential transfer or encumbrance of the Site without the approval of the Director and to ensure that any transfer of encumbrance can be made only on the basis that it will not endanger compliance with this Approval.

- The reason for Condition 1(15) is to ensure that the successor is aware of its legal responsibilities.

- The reasons for Conditions 1(16) and (17) are that the Part II.1 Director is an individual with authority pursuant to Section 197 of the Environmental Protection Act to require registration on title and provide any person with an interest in property before dealing with the property in any way to give a copy of the Approval to any person who will acquire an interest in the property as a result of the dealing.

- The reason for Condition 1(18) is to ensure that appropriate Ministry staff has ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Act, the OWRA, the PA, the NMA and the SDWA.

- Condition 1 (22) has been included in order to clarify what information may be subject to the Freedom of Information Act.

**SITE OPERATION**

- The reasons for Conditions 2(1), 2(5) and 6(3) are to ensure that the Site is operated, inspected and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

- The reason for Conditions 2 (2), 2(3) and 2(4) is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations and access under this Approval.

- The reasons for Condition 2(6) are open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance effects, and the potential fire hazard and to make sure burning of brush and wood are carried out in accordance with Ministry guidelines.

- The reasons for Condition 2(7), 2(8) and 2(9) are to specify the hours of operation for the landfill site and a mechanism for amendment of the hours of operation, as required.

- The reasons for Condition 2(10) and 2(11) are to ensure that the Site is supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person and to ensure the controlled access and integrity of the Site by preventing unauthorized access when the Site is closed and no site attendant is on duty.

**EMPLOYEE TRAINING**

- The reason for Condition 3(1) is to ensure that the Site is supervised and operated by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any person.

**COMPLAINTS RESPONSE PROCEDURE**

- The reason for Condition 4(1) is to ensure that any complaints regarding landfill operations at this Site are responded to in a timely and efficient manner.

**EMERGENCY RESPONSE**

- Conditions 5(1) and 5(2) are included to ensure that emergency situations are reported to the Ministry to ensure public health and safety and environmental protection.

- Conditions 5(3), 5(4) and 5(5) are included to ensure that emergency situations are handled in a manner to minimize the likelihood of an adverse effect and to ensure public health and safety and environmental protection.

**RECORD KEEPING AND REPORTING**

- The reason for Conditions 6(1) and 6(2) is to ensure that accurate waste records are maintained to ensure compliance with the conditions in this Approval (such as fill rate, site capacity, record keeping, annual reporting, and financial assurance requirements), the EPA and its regulations.

- The reason for Conditions 6(4) and 6(5) is to ensure that detailed records of Site inspections are recorded and maintained for inspection and information purposes.

- The reasons for Conditions 6(6) and 6(7) are to ensure that regular review of site development, operations and monitoring data is documented and any possible improvements to site design, operations or monitoring programs are identified. An annual report is an important tool used in

reviewing site activities and for determining the effectiveness of site design.

**LANDFILL DESIGN AND DEVELOPMENT**

- The reason for Conditions 7(1) to 7(7) inclusive 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.

- Condition 7(8) is to provide the Owner the process for getting the approval for alternative daily and intermediate cover material.

- The reasons for Condition 7(9) are to ensure that daily/weekly and intermediate cover are used to control potential nuisance effects, to facilitate vehicle access on the Site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the Site.

**LANDFILL MONITORING**

- Reasons for Condition 8(1) are to ensure that 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.

- Condition 8(2) is included to provide the groundwater and surface water limits to prevent water pollution at the Site.

- Conditions 8(3) and 8(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.

- Conditions 8(5), 8(6) and 8(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.

- Conditions 8(8) to 8(12) 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.

- Conditions 8(13) and 8(14) are included to streamline the approval of the changes to the monitoring plans and trigger mechanisms and contingency plans.

**CLOSURE PLAN**

- The reasons for Condition 9 are to ensure that final closure of the Site is completed in an

aesthetically pleasing manner, in accordance with Ministry standards, and to ensure the long-term protection of the health and safety of the public and the environment.

**WASTE DIVERSION**

- Condition 10 is included to ensure that the recyclable materials are stored in their temporary storage location and transferred off-site in a manner as to minimize a likelihood of an adverse effect or a hazard to the natural environment or any person.

**HHW TRANSFER STATION**

- The reasons for the Condition 11 are to approve collection of household hazardous waste and to ensure that the wastes are managed in a manner that protects the environment and the health and safety of the public.

**Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A261301 issued on April 12, 1990 as amended.**

*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 14th day of April, 2020

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

RM/

c: District Manager, MECP Owen Sound
Alen Bringleson, GM BluePlan Engineering
Vance Czerwinski, Operations Manager

# APPENDIX B:
# CORRESPONDENCE

**The Corporation of the Municipality of West Grey**

**By-law Number 112 - 2018**

**Being,** a By-law to regulate the handling and collection of garbage, rubbish, and other waste materials and confirm the schedule of fees for the use of the Municipality of West Grey Waste Disposal Sites;

**Whereas**, the Municipal Act, S.O. 2001, C.25, section 11 (1) and 11 (2) provides that lower-tier municipalities may pass by-laws within certain spheres of jurisdiction, including waste management;

**And whereas**, Council deems it to be in the public interest to establish a system for such collection, removal and disposal of garbage and other refuse, which includes a requirement to separate recyclable waste from other forms of garbage and refuse prior to its collection, as per Ministry of the Environment guidelines to reduce waste;

**Now therefore, the Council of the Corporation of the Municipality of West Grey hereby enacts as follows:**

## Section 1 – Definitions

1.1 In this by-law:

a) "Apartment Building" means a building which consists of more than five dwelling units, but the term shall not include a group of dwellings;

b) "Blue Box Items" means CLEAN old newspapers and inserts, magazines, glass bottles and jars, food and beverage cans, plastic soft drink bottles, small and large mouth plastic tubs, bottles and containers, box board, and such other items as the Municipality may be directed, from time to time by its service contractor, Waste Management, by resolution, authorize for collection within its blue box program;

c) "By-law Enforcement Officer" means the person or persons appointed to that position by the Council of the Corporation of the Municipality of West Grey, or any other person appointed by the Municipality from time to time for purposes of enforcement of this by-law;

d) "Commercial" means buildings or structures located in the commercial zones as outlined in the Municipality's zoning by-law or used for any retail or business use;

e) "Construction Waste" means discarded building material, concrete, stones, earth from excavations or grading and all other refuse material resulting from the erection, repair or demolition of buildings, structures or other improvements of property;

f) "Corrugated Cardboard" means clean, non-contaminated, non-waxed layered cardboard with a rippled middle layer;

g) "Council" means the Council of the Corporation of the Municipality of West Grey;

h) "Garden Waste" means all wastes generated from a garden, and includes all vegetable waste whether generated from a garden or otherwise;

i) "Hazardous Waste" means waste and materials as may be defined from time to time by the Ministry of the Environment as hazardous and shall include but not be limited to the following: flammable or incendiary materials and liquids, incinerator ash; explosives; offal; sewage; drugs and medicines, chemical wastes, dry cell and wet cell batteries, paint containers,

pathological waste including syringes, needles, dressings, tissues, medical instruments and other such items as may or could reasonable contain pathogenic bacteria or micro-organisms; dead animals, motor oil, propane tanks; radioactive materials; and other similar materials that may be hazardous or dangerous to the public health, safety or environment;

j) "Household Waste" means all rejected, abandoned or discarded household waste of food, packaging material, unusable clothing; sweepings, and does not include items for which the Municipality makes provision for disposal other than burial in a landfill site;

k) "Householder" means any owner, occupant, lessee, tenant, or any person having use, occupation and/or charge of any dwelling, apartment house, townhouse or any portion thereof, or any other premises;

l) "Industrial" means buildings or structures located in the industrial zones as outlined in the Municipality's zoning by-law or used for any industrial, production or manufacturing use;

m) "Industrial Waste" means waste materials from any one or more industrial or manufacturing process, or waste from any property assessed for industrial or manufacturing uses;

n) "Institutional" means any public building, hospital, nursing home, school, as outlined in the Municipality's zoning by-law;

o) "Landfill Area" means that operative area of a municipal waste disposal site, which is designated as an area for the disposal of waste by the deposition, or dumping of waste and subsequent covering by earth fill.

p) "Landfill Site Attendant" means any person designated by the Municipality of West Grey or the municipality in which the landfill site is located, having control and authority over the site,

q) "Large Garbage" includes mattresses, crates, packing material, large appliances usually operated by gas or electricity, household furnishings, and other large or bulky items normally used in a home;

r) "Manufacture and Trade or Industrial Waste" means any abandoned, condemned or rejected product or by-product, builders' and contractors' refuse and garbage, and service station waste.

s) "Municipal Waste Disposal Site" means a waste disposal site designated and operated by the Corporation of the Municipality of West Grey for the disposal or transfer of waste in accordance with the provisions of this by-law and the terms and conditions of a certificate of approval issued by the Ministry of the Environment;

t) "Municipality" means the Corporation of the Municipality of West Grey;

u) "Municipality of West Grey Garbage Tag/Bag Tag" shall mean a tag or sticker purchased from the Municipality or its authorized agents, at a fee approved by Council, to be affixed to each bag inside the waste container, or bag set out for curb side collection only by the Municipality,

v) "Premises" means a full, self-contained dwelling unit or, in the case of commercial, industrial or institutional establishments, fully self-contained units, each with a separate external access;

w) "Director" shall mean the Director of Infrastructure and Public Works appointed to that position by the Council or the Corporation of the Municipality of West Grey;

x) "Recyclable" means those materials and items, which are accepted by the Municipality at the municipal waste disposal sites for collection, transfer and processing at a recycling centre or third party re-user;

y) "Street" means any public highway, road, lane, alley, square, place, thoroughfare or way within the Municipality of West Grey;

z) "Townhouse Complex" means a residential detached building or buildings in a development that has frontage on a private or public road and that consists of three or more attached dwelling units each of which has a separate entrance and which do not share a common internal hallway;

aa) "Yard Waste" means all leaves, grass clippings, twigs and brush.

## Section 2 – Authority of Municipal Waste Management

2.1 All collection of waste and recyclable materials by employees of the Municipality or by contractors engaged by the Municipality shall be under the direction of the Director and the Municipality may determine the frequency of each type of collection provided, fee to be charged for collection, and the manner in which the fee is to be levied.

2.2 The Municipality shall have full authority to collect such waste and recyclable materials, as it considers appropriate, either by its own staff or by hired contractor, to enter into contracts for collection of such waste and recyclable materials, and to provide such collection service to such class or classes of premises as the Municipality, in its sole discretion, deems advisable.

2.3 The Municipality shall have full authority to prohibit certain types and classes of waste from being deposited at the landfill site, to require separation of materials, as it considers appropriate, and to levy fees for the depositing of certain types, classes and quantities of waste at the landfill site.

## Section 3 – Collection Procedures

3.1 The collection of household waste in, by and on behalf of the Municipality shall be made bi-weekly in all areas of West Grey unless otherwise designated by Council. Collection of leaf and yard waste shall take place annually as deemed necessary by the Director. .

3.2 Collection of clean blue box items only shall be made bi-weekly, per residence, on the days and at the times to be determined, and published from time to time by the Municipality and/or contractor, subject to the provisions of this by-law. At the discretion of West Grey or its service contractor, contaminated recyclable products will not be collected and will be considered waste.

3.3 All waste other than household waste and blue box items shall not be collected, but shall be separated according to the type of waste, delivered to the landfill site and placed in the appropriate location as directed by the landfill site attendant.

3.4 The collector shall collect only CLEAR or TRANSPARENT bags with bag tags attached.

3.5 The Municipality will not collect any quantities of waste material from apartment buildings, which shall have centralized storage and collection facilities and which shall make private arrangements for collection of waste.

3.6 Except by order of the Director, no garbage collection vehicles owned by or under contract to the Municipality shall enter a privately owned driveway or roadway or lane or other private property for the purpose of collecting garbage or waste material. Such order shall not be given unless it is feasible and economical for the Municipality contracted haulers to so enter private property.

3.7 Every plastic clear or transparent bag either inside accepted containers or alone, shall be securely tied to prevent spillage and shall be of sufficient thickness to eliminate tearing and the weight of the contents shall not cause breakage of the bag.

3.8 Every plastic clear or transparent bag must have attached and clearly visible a tag provided by the Municipality. The tag shall be securely wrapped around the bag and shall be attached end to end in order for the contractor to clearly recognize the lettering.

## Section 4 – Materials Not Collected by the Municipality

4.1 All materials not collected by the Municipality shall be disposed of as directed by the Director and at the expense of the consignee or owner of such materials so abandoned, condemned or rejected. The decision of the Director shall be final as to the quantities and class of material in question.

4.2 The following materials shall not be collected by the Municipality:

a) Any item which is eligible for collection in the blue box program;
b) Swill or other organic matter not properly drained or wrapped;
c) Liquid waste and pathogenic wastes from hospitals;
d) Hay, straw or manure;
e) Septic Sludge;
f) Any material which has become frozen to the receptacle and cannot be removed by shaking;
g) Industrial or trade waste including any abandoned, condemned or rejected product or by-product or waste material, builders' and contractors' refuse, and the stock of any wholesale or retail merchant;
h) Discarded truck and automobile parts and accessories from automotive service stations or similar automotive establishments or any other premises, apartment buildings or townhouse complexes;
i) Any material in receptacles or bundles which do not conform to the specifications set out in Section 5 of this by-law;
j) Discarded furniture or appliances,
k) Hot ashes or any waste materials capable of starting fires;
l) Explosive or highly combustible materials;

m) Carcasses or parts thereof of any dog, cat, fowl or any other creature, with the exception of bona fide kitchen waste.

n) Any recyclable materials placed in blue boxes that are considered not clean by West Grey or its service contractor.

## Section 5 – Receptacles for Household Waste

5.1 All garbage or other refuse to be collected by or on behalf of the Municipality must be in clear or transparent plastic bags and may be placed and kept in receptacles or containers in accordance with the regulations of this by-law.

5.2 Except as otherwise provided, every householder shall provide sufficient receptacles of not more than 20 gallon/100 litre capacity which, with the contents shall weigh not more than 40 lbs/ 20kg., and which are satisfactory to the Director for the deposit of household wastes.

5.3 Receptacles shall be covered, watertight containers, with suitable handles.

5.4 Non-returnable clear or transparent plastic bags, maximum size of 26" x 36" (66cm x 91cm), capable of being lifted with 40 lbs./ 20kg. of contents, shall be used.

5.5 Receptacles which are smaller at the top than the bottom, paper boxes, five-gallon paint cans, oil drums, lard cans, and other similar containers shall not be used.

5.6 All waste not authorized for collection by or on behalf of the Municipality shall be placed in a container suitable for pickup by private hauler and kept covered and in a good state of repair, or shall be delivered to the landfill site for disposal in accordance with the instructions of the landfill site attendant.

## Section 6 – Preparation of Garbage for Collection

6.1 Garbage receptacles and or clear transparent plastic bags and all waste emanating from any building shall, at all times, be kept on a portion of the property owner's premises. All such waste shall be placed at such points to be served on the days of collection as may be authorized by the Director in order to facilitate collection.

## Section 7 – Placing Receptacles for Collection

7.1 Collection of garbage or other waste materials, by or on behalf of the Municipality, shall be made only in the areas and on the days, which are designated by the Director.

7.2 Material set out for collection shall, unless otherwise instructed by the Director , be placed as close as possible to the edge of the roadway without obstructing the roadway, sidewalk or footpath. ( to right of driveway when exiting)

7.3 Material for collection shall be placed at the prescribed location for collection not later than 7:00 a.m. in all areas of the Municipality.

7.4 Stat Holidays – garbage and recycling is not collected on the following stat holidays: Christmas Day, New Years Day, Canada Day and Good Friday. Please refer to the Garbage and Recycling Schedule mailed each year with the first interim tax notice for the alternate collection dates.

7.5 Empty receptacles and all material, which the collector refuses, shall be removed from the street or from public property by the occupant of the premises from which it was taken before 8:00 p.m. on the day of collection.

**Section 8 – Landfill Sites**

8.1 Access to the landfill sites shall be restricted to the following:

a) Residents within the Municipality;
b) Building Contractors under contract to private property owners within the Municipality doing major renovations, construction, roofing etc.;
c) Industrial, Commercial institutions either by owner or by contractor/hauler under contract;

8.2 All access shall be within the normal hours of operation of the site or during a time arranged with the Director outside of normal hours of operation upon payment of the required fee.

8.3 A contractor/hauler who is collecting garbage and disposing of it in the Municipality landfill sites may operate only under the terms of a written contract between the Municipality and the collector/hauler.

8.4 All refuse must conform to Ministry of Environment Guidelines, must be separated and disposed of in accordance with the requirements of the Municipality and will be accepted at the sole discretion of the Municipality.

8.5 The Municipal Waste Disposal Sites referred to herein are located at the following locations:
Bentinck - #114079 Grey Road 3
Durham - 540 Park Street
Normanby - #221291 Grey Road 9
The hours of operation are outlined in Schedule "A".

8.6 No person shall dispose of or cause to be disposed, waste at the Municipal Waste Disposal Sites that originates or is generated from a location or use outside of the municipal boundaries of the Municipality.

8.7 Persons shall dispose of permitted waste at the Municipal Waste Disposal Sites in accordance with the directions of the Landfill Attendant and in accordance with the provisions of this By-Law and Ministry of Environment.

8.8 No person shall deposit or cause to be deposited waste of any kind on any land, highway or street, watercourse, private or public property, in the Municipality, other than at the Municipal Waste Disposal Sites. Any person guilty of an infraction will be subject to the provisions under the Municipality of West Grey's Littering By-law.

**Section 9 – Penalties & Enforcement**

9.1 The By-Law Enforcement Officer is hereby authorized and empowered to enforce the provisions of this By-Law.

9.2 This By-Law shall not be effective to relieve, reduce or mitigate Health Act or Environmental Protection Act or any regulations or order prescribed by the Medical Officer of Health or the Ministry of the Environment.

9.3 Any person guilty of an infraction or any provisions of this by-law shall, on conviction, pay a fine or penalty not exceeding five thousand ($5,000.00) exclusive of costs, for each and every offence and such penalty shall be recoverable under the Provincial Offences Act. Upon conviction for any breach of the provisions of this by-law, the court of jurisdiction may make an order prohibiting the continuation or repetition of the offence by the offender and the offender may be denied entrance into the Municipal Waste Disposal Sites.

**Section 10 – Schedule of Fees**

10.1 The Waste Disposal fee rates outlined in Schedule "A", shall be applicable to all persons using the Municipal Waste Disposal Sites, unless specifically exempted by a resolution of Council. Such fees will be subjected to review annually to determine if any increase is warranted.

10.2 Fees levied at the Municipal Disposal Sites shall be payable at the corresponding waste disposal site, unless alternative arrangements are agreed upon by municipal office staff. Receipts will be issued by the Landfill Attendant for the charge levied to the operator of each vehicle using the facility and the duplicate copy along with the fees collected shall be submitted to the Municipal Office on a regular basis.

10.3 Where applicable if charge accounts remain unpaid after 30 days of billing, a statement of the outstanding amount will be issued from the office of the Treasurer. If the said fees remain unpaid at the end of the following month, interest at the rate of 1.25% will be added onto the original amount, and will continue to be added on the first day of each month thereafter, until the account is paid in full. If the account remains unpaid at December 31st of the year in which it was incurred it shall be added, in the following year, onto the tax roll of the property owner who incurred the debt.

**Section 11 – Implementation**

11.1 Schedule "A" and notations thereon attached hereto, are hereby declared to form part of this by-law.

11.2 That By-Law Number 68-2015 is hereby repealed.

11.3 The short title of this by-law shall be "Waste Disposal By-Law".

11.4 This by-law shall be deemed to come into full force and effect retroactive to the 5th day of September, 2018.

**Read** a first and second time this 1st day of October, 2018.

**Read** a third time and finally passed this 1st day of October, 2018.

Mayor – Kevin Eccles

Clerk – Mark Turner

# APPENDIX C:
# DUTIES OF SITE SUPERVISOR & SITE ATTENDANT

Attachment 1

Duties of Site Supervisor

(1) Knowledge of the Plan of Operation for the site.

(2) Responsible for site access control.

(3) Ensures deposition of waste in designated areas.

(4) Ensures all burning on-site consists of clean dry wood waste of manageable size which does not adversely impact on neighbouring property owners at any time.

(5) Ensures litter pickup on and off site on a weekly basis.

Where required by Council, the site supervisor shall also:

(6) Ensure proper compaction and cover of material at the specified frequency;

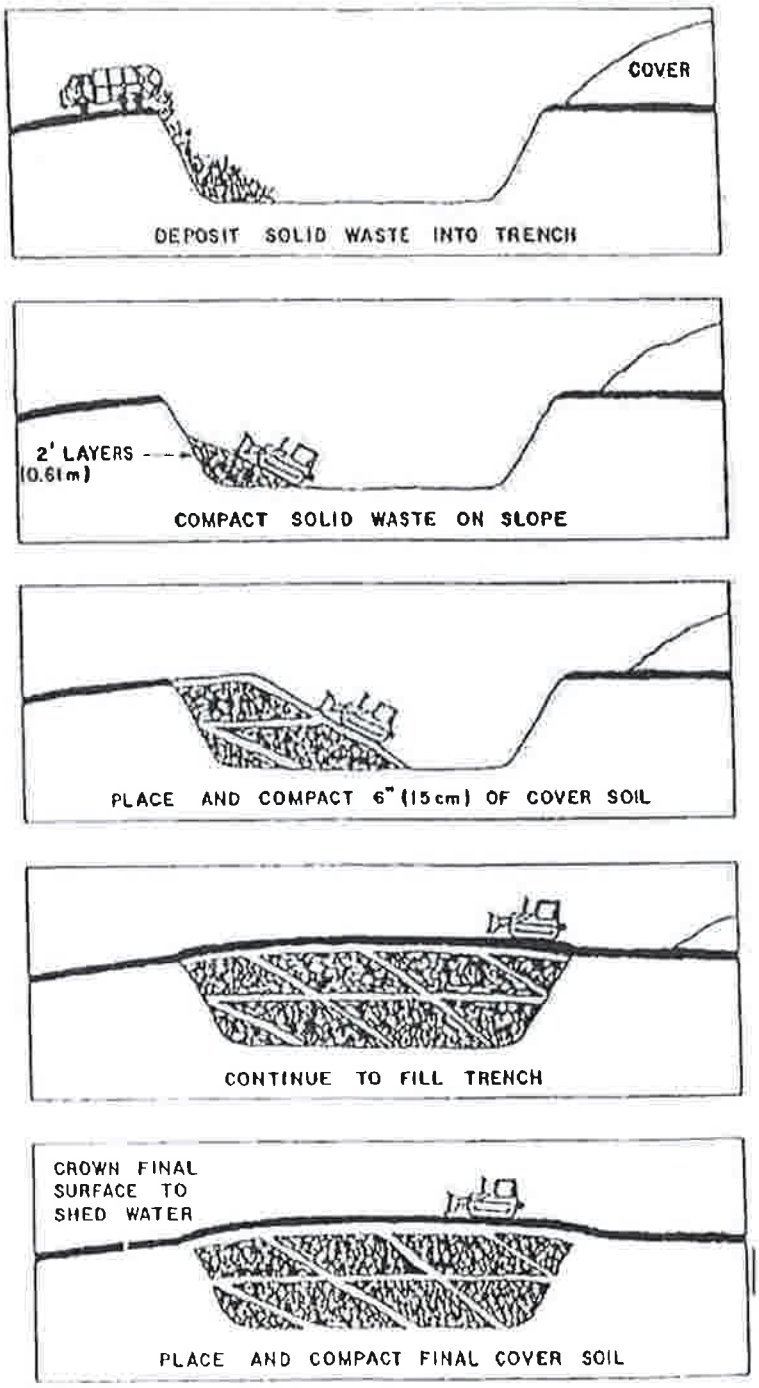
(7) Record volumes and types of waste material;

(8) Maintain monitoring well security;

(9) Identify on-site road maintenance problems to Council;

(10) Discuss with Council waste site problems with respect to site users, types of waste etc.

112701




TRENCH METHOD

COMPACTION EFFORT

| COMPACTION | EQUIPMENT | METHOD | DENSITY |
|---|---|---|---|
| Poor | None | Wastes dumped into trench | 100 - 200 $\frac{lb}{yd^3}$<br>60 - 120 $\frac{kgm}{m^3}$ |
| Minimal | Tracked Machine | Waste dumped into trench. Equipment compacts surface of wastes | 200 - 500 $\frac{lb}{yd^3}$<br>120 - 300 $\frac{kgm}{m^3}$ |
| Moderate | Tracked Machine | Wastes spread in layers. Each layer is compacted with one pass of the machine | 500 - 800 $\frac{lb}{yd^3}$<br>300 - 475 $\frac{kgm}{m^3}$ |
| Good | Tracked Machine | Waste spread in thin layers. Each layer compacted with three to five passes of the machine | 800 - 1000 $\frac{lb}{yd^3}$<br>475 - 600 $\frac{kgm}{m^3}$ |
| Excellent | Steel Wheeled Compactor | Wastes spread in thin layers. Each layer compacted with the machine with up to five passes | over 1000 $\frac{lb}{yd^3}$ |

GUIDELINE C-7
(formerly 14-08)

# Burning at Landfill Sites

**Legislative Authority:**

*Environmental Protection Act, RSO 1990*, Sections 6, 14 and 27
*Ontario Regulation 347*, Sections 1 and 12.1

**Responsible Director:**

Director, Program Development Branch

**Last Revision Date:**

April, 1994

Table of Contents

**SYNOPSIS**

The primary purpose of this guideline is to provide a set of operational requirements for the orderly burning of segregated clean wood and brush in a safe and environmentally- acceptable manner at appropriate landfill sites. This guideline is intended for use by landfill operators in their operation of a landfill site, and by Ministry staff during their review and inspection of landfill operations. The operational requirements are provided in Section 4-21, "Open Burning of Waste", of Procedure C-8-1: "Guidance Manual for Landfill Sites Receiving Municipal Waste" (C-8-1).

The guideline shall be enforced by including appropriate conditions on a Certificate of Approval for a landfill site, and by the Regions during the normal course of their activities.

## 1.0 Introduction

The burning of municipal waste, except for a limited number of specific materials, is prohibited by O. Regulation 347, Section 12.1. Segregated clean wood and brush, however, may be burned at certain sites, subject to certain requirements. These requirements are detailed in Section 4.21 of Procedure C-8-1: "Guidance Manual for Landfill Sites Receiving Municipal Waste".

## 2.0 General Requirements

As part of an overall program to maximize waste capacity at existing landfill sites, thereby extending their life, burning of clean wood and brush may be allowed under strictly controlled conditions.

### 2.1 Other Agencies

The Ministry of Natural Resources and local municipal authorities shall be consulted to obtain any necessary permits. Specific regulations enforced by the Ministry of Natural Resources shall be complied with for burning wood and brush at landfills located north of Ontario's fire line.

### 2.2 Certificate of Approval

Burning of any kind is not permitted at new landfill sites unless specifically allowed in the Certificate of Approval.

## 3.0 Operational Requirements

The operational requirements are detailed under Section 4.21.3 of the guidance manual under the headings of:

(a) Weather and Atmospheric Conditions,
(b) Supervision,
(c) Environmental Controls,
(d) Extinguishing Requirements,
(e) Access Control, and
(f) Resolution of Complaints.

### 4.21.3 Operational Requirements

**a) Weather and Atmospheric Conditions**

Burning should be carried out only when prevailing weather and atmospheric conditions are suitable. Burning should not be carried out when:

i) the area has a high Air Quality Index (AQI);
ii) rain or fog are present, since smoke cannot disperse properly and may be concentrated in one particular area; and
iii) wind speeds are high or wind directions are changing frequently, because these conditions allow fires to spread rapidly.

**b) Supervision**

i) Dry brush and clean wood wastes should be segregated and subsequently burned on a designated, cleaned area of the site, under supervision of the site operator.

ii) The fire should be supervised continuously until completely extinguished.

iii) The site operator should clear residual ashes from a fire and dispose of the ash with normal incoming waste as soon as practically possible. The ashes must be cold prior to mixing with waste. Residual ashes should not be allowed to accumulate at the designated burning area.

**c) Environmental Controls**

i) Petroleum products, plastics, rubber or any other material that will cause excessive smoke or noxious fumes must not be mixed with or contaminate the wood or brush that may be burned.

ii) Burning should not be carried out if there is sensitive land-use adjacent to the landfill site or if the nearest dwelling is less than 150 metres from the site.

iii) A 30 metre fire break should be provided around the burning area.

iv) Ontario Regulation 308, made under the EPA, contains provisions dealing with air pollution. Owners and site operators are advised to apprise themselves of the provisions contained therein.

**d) Extinguishing Requirements**

The area of burning on the landfill site must be restricted in order to enable the operator to extinguish the fire immediately if necessary due to a change in weather or other conditions or if so ordered by MOEE or Ministry of Natural Resources staff. The operator must also provide proof of this ability (i.e., on-site equipment or written agreement with local fire control agency) to extinguish the fire.

**e) Access Control**

i) Access to the landfill site by the public and other unauthorized personnel must be restricted when burning is carried out.

ii) Appropriate signs should be posted at all entrances to the site used by the public and waste haulers advising them of restricted access due to burning of waste.

**f) Resolution of Complaints**

i) Complaints from local residents regarding smoke or odour emissions will have to be resolved by the operator. If this is not corrected satisfactorily, the operator would be required to stop burning.

ii) When persistent problems are encountered with burning at existing sites, the operator may be requested either to stop burning or make a satisfactory proposal to control burning for incorporation in the Certificate of Approval for the site. This may involve a request for amendment of a current Certificate of Approval. If the operator does not comply voluntarily with such a request, formal action to halt burning may be taken under provisions of the EPA.

## 4.21 OPEN BURNING OF WASTE

### 4.21.1 Rationale

The burning of municipal waste, except a limited number of specific material, is prohibited by regulation in Ontario. Open burning of waste at a landfill site creates

a) air emission concerns;
b) public and environmental hazards;
c) lack of site operational control;
d) fire hazard; and
e) nuisance.

Segregated, clean wood and brush, however, may be burned at certain isolated sites, subject to weather and atmospheric conditions and supervision requirements.

### 4.21.2 General Requirements

a) As part of an overall program to maximize waste capacity at existing landfill sites, thereby extending their life, open burning of clean wood and brush may be allowed under strictly controlled conditions as discussed in this subsection.

The Ministry of Natural Resources and local municipal authorities should be consulted in order to obtain any necessary permits for burning. These agencies may require specific details on safety precautions and fire prevention measures that will be taken. Landfill site owner/operators are also advised to check for any municipal by-laws enforced by the local police and fire departments. Specific regulations enforced by the Ministry of Natural Resources must be complied with for burning north of Ontario's fire line. The fire line runs east from Lake Huron across the bottom of Georgian Bay and the top of Lake Simcoe down to Gananoque, then north and west to meet the Ottawa River north of Renfrew.

b) Burning is not permitted at new landfill sites unless specifically allowed in the Certificate of Approval, usually conditional on the compliance with various environmental and safety considerations. Any permit to burn waste at new landfill sites would also be conditional on compliance with local municipal by-laws, and specific requirements of The Ministry of Natural Resources.

### 4.21.3 Operational Requirements

a) Weather and Atmospheric Conditions

Burning should be carried out only when prevailing weather and atmospheric conditions are suitable. Burning should not be carried out when:

i) the area has a high Air Quality Index (AQI);
ii) rain or fog are present, since smoke cannot disperse properly and may be concentrated in one particular area; and
iii) wind speeds are high or wind directions are changing frequently, because these conditions allow fires to spread rapidly.

b) Supervision

i) Dry brush and clean wood wastes should be segregated and subsequently burned on a designated, cleaned area of the site, under supervision of the site operator.

ii) The fire should be supervised continuously until completely extinguished.

iii) The site operator should clear residual ashes from a fire and dispose of the ash with normal incoming waste as soon as practically possible. The ashes must be cold prior to mixing with waste. Residual ashes should not be allowed to accumulate at the designated burning area.

c) Environmental Controls

i) Petroleum products, plastics, rubber or any other material that will cause excessive smoke or noxious fumes must not be mixed with or contaminate the wood or brush that may be burned.

ii) Burning should not be carried out if there is sensitive land-use adjacent to the landfill site or if the nearest dwelling is less than 150 metres from the site.

iii) A 30 metre fire break should be provided around the burning area.

iv) Ontario Regulation 308, made under the EPA, contains provisions dealing with air pollution. Owners and site operators are advised to apprise themselves of the provisions contained therein.

d) **Extinguishing Requirements**

The area of burning on the landfill site must be restricted in order to enable the operator to extinguish the fire immediately if necessary due to a change in weather or other conditions or if so ordered by MOEE or Ministry of Natural Resources staff. The operator must also provide proof of this ability (i.e., on-site equipment or written agreement with local fire control agency) to extinguish the fire.

e) **Access Control**

i) Access to the landfill site by the public and other unauthorized personnel must be restricted when burning is carried out.

ii) Appropriate signs should be posted at all entrances to the site used by the public and waste haulers advising them of restricted access due to burning of waste.

f) **Resolution of Complaints**

i) Complaints from local residents regarding smoke or odour emissions will have to be resolved by the operator. If this is not corrected satisfactorily, the operator would be required to stop burning.

ii) When persistent problems are encountered with burning at existing sites, the operator may be requested either to stop burning or make a satisfactory proposal to control burning for incorporation in the Certificate of Approval for the site. This may involve a request for amendment of a current Certificate of Approval. If the operator does not comply voluntarily with such a request, formal action to halt burning may be taken under provisions of the EPA.

# APPENDIX D:
# HISTORICAL GROUNDWATER QUALITY

# Historic Groundwater Quality at Test Well TH 1

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 1 7-Nov-94 | TH 1 9-Nov-99 | TH 1 11-Jul-01 | TH 1 18-Oct-01 | TH 1 18-Jun-02 | TH 1 22-Oct-02 001 | TH 1 20-May-03 | TH 1 1-Oct-03 005 | TH 1 (dup) 1-Oct-03 006 | TH 1 29-Sep-04 | TH 1 21-Sep-05 | TH 1 25-Sep-06 | TH 1 9-Oct-07 | TH 1 15-Apr-08 | TH 1 17-Sep-08 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 366 | 171 | DRY | DRY | NO | 159 | NO | 164 | 166 | DRY | DRY | DRY | DRY | DRY | DRY |
| Ammonia(as N) | | 0.005 | 0.16 | | | | 0.22 | | 0.18 | 0.18 | | | | | | |
| Calcium | | 166 | | | | | 50.2 | | 44.5 | 44.7 | | | | | | |
| Chloride | 250 [AO] | 2 | 11.7 | | | | 1.4 | | 1.2 | 1.2 | | | | | | |
| Conductivity @25øC (mho/cm) | | 846 | 431 | | | | 481 | | 491 | 483 | | | | | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 8.4 | | | | | 0.5 | | 4 | 21 | | | | | | |
| Hardness(as CaCO3) | 80-100 [OG] | 493 | 295 | | | | 245 | | 227 | 228 | | | | | | |
| Iron | 0.3 [AO] | 0.01 | 0.01 | | | | 0.06 | | 0.009 | 0.007 | | | | | | |
| Magnesium | | 18.4 | | | | | 29.1 | | 28.1 | 28.3 | | | | | | |
| Manganese | 0.05 [AO] | 0.005 | | | | | <0.01 | | 0.009 | 0.009 | | | | | | |
| Nitrate(as N) | 10 | 3.5 | 0.91 | | | | 0.1 | | 0.1 | 0.1 | | | | | | |
| Nitrite(as N) | 1 | 0.02 | 0.05 | | | | <0.1 | | <0.1 | <0.1 | | | | | | |
| Orthophosphate(as P) | | | | | | | <0.01 | | <0.01 | <0.01 | | | | | | |
| pH | 6.5-8.5 [OG] | 6.78 | 7.94 | | | | 8.41 | | 8.45 | 8.43 | | | | | | |
| Phenols | | <0.0010 | | | | | <0.001 | | <0.001 | <0.001 | | | | | | |
| Phosphorus, Total (as P) | | 0.029 | | | | | 0.35 | | 29.3 | 4.75 | | | | | | |
| Potassium | | 0.066 | | | | | 0.8 | | 1.3 | 1.3 | | | | | | |
| Sodium | 200 [AO] | 0.4 | 16 | | | | 14.1 | | 14.2 | 14.3 | | | | | | |
| Sulphate | 500 [AO] | 10.2 | 76.6 | | | | 97 | | 109 | 98 | | | | | | |
| Total Kjeldahl Nitrogen(as N) | | 0.33 | 2.5 | | | | 0.21 | | 7.37 | 1.73 | | | | | | |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 1

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 1 30-Apr-09 | TH 1 1-Oct-09 | TH 1 12-May-10 | TH 1 9-Nov-10 | TH 1 2-May-11 | TH 1 21-Sep-11 | TH 1 12-Apr-12 | TH 1 23-Nov-12 | TH 1 7-May-13 | TH 1 26-Nov-13 | TH 1 1-May-14 | TH 1 4-Nov-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY |
| Ammonia(as N) | | | | | | | | | | | | | |
| Calcium | | | | | | | | | | | | | |
| Chloride | 250 [AO] | | | | | | | | | | | | |
| Conductivity @25øC (mho/cm) | | | | | | | | | | | | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | | | | | | | | | | | |
| Hardness(as CaCO3) | 80-100 [OG] | | | | | | | | | | | | |
| Iron | 0.3 [AO] | | | | | | | | | | | | |
| Magnesium | | | | | | | | | | | | | |
| Manganese | 0.05 [AO] | | | | | | | | | | | | |
| Nitrate(as N) | 10 | | | | | | | | | | | | |
| Nitrite(as N) | 1 | | | | | | | | | | | | |
| Orthophosphate(as P) | | | | | | | | | | | | | |
| pH | 6.5-8.5 [OG] | | | | | | | | | | | | |
| Phenols | | | | | | | | | | | | | |
| Phosphorus, Total (as P) | | | | | | | | | | | | | |
| Potassium | | | | | | | | | | | | | |
| Sodium | 200 [AO] | | | | | | | | | | | | |
| Sulphate | 500 [AO] | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen(as N) | | | | | | | | | | | | | |

# Historic Groundwater Quality at Test Well TH 2

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 2 27-May-93 | TH 2 4-Oct-93 | TH 2 13-Jun-94 | TH 2 7-Nov-94 | TH 2 19-Jun-95 | TH 2 30-Oct-95 | TH 2 15-Nov-96 | TH 2 15-Nov-96 Replicate | TH 2 19-Dec-97 | TH 2 18-Dec-98 | TH 2 18-Dec-98 Replicate | TH 2 21-Dec-00 | TH 2 21-Dec-00 Replicate | TH 2 18-Oct-01 009 | TH 2 22-Oct-02 DRY | TH 2 1-Oct-03 DRY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 280 | 280 | 293 | 254 | 263 | 268 | 262 | 262 | 253 | 258 | 253 | 292 | 298 | 275 | | |
| Ammonia(as N) | | 0.243 | 0.062 | 0.025 | 0.286 | <0.05 | 0.1 | 0.16 | | 0.04 | nd | nd | 0.05 | 0.05 | 0.37 | | |
| Calcium | | 68 | 74.2 | 57.8 | 75.2 | 58.9 | 59.6 | 70.2 | 70.5 | 66 | 67.1 | 66.3 | 67.1 | 66.8 | 69.1 | | |
| Chloride | 250 [AO] | 2.4 | 6.3 | 2.1 | 1.8 | 2.3 | 2.9 | 2.78 | 2.78 | 2.98 | 2.67 | 2.66 | 2.7 | 2.7 | 3.8 | | |
| Conductivity @25øC (µmho/cm) | | 537 | 524 | 560 | 558 | 561 | 548 | 500 | 502 | | 499 | 490 | 493 | 493 | 533 | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.8 | 1.1 | 7.9 | 5.8 | 14.9 | 2.9 | 1.2 | | 1.1 | 1.8 | 1.4 | 2 | 2 | | | |
| Hardness(as CaCO3) | 80-100 [OG] | 292 | 312 | 259 | 327 | 275 | 275 | 301 | 295 | 292 | 287 | 283 | 286 | 286 | 297 | | |
| Iron | 0.3 [AO] | 0.04 | 0.1 | <0.01 | 0.01 | 0.29 | 0.09 | 0.022 | 0.016 | 0.01 | 0.08 | 0.08 | 0.08 | 0.08 | <0.01 | | |
| Magnesium | | 29.5 | 30.7 | 27.8 | 33.7 | 31.1 | 30.7 | 29.9 | 30 | 30.7 | 29 | 28.7 | 28.8 | 28.8 | 30.3 | | |
| Manganese | 0.05 [AO] | | | 0.071 | 0.079 | 0.022 | 0.038 | 0.033 | 0.034 | 0.026 | nd | nd | 0.007 | 0.007 | | | |
| Nitrate(as N) | 10 | 0.1 | 1.7 | 3.3 | 0.4 | 4.5 | 3.4 | 3.98 | 4.04 | 3.63 | 1.67 | 1.66 | 2.9 | 2.8 | 1.4 | | |
| Nitrite(as N) | 1 | <0.01 | 0.01 | <0.01 | 0.05 | 0.01 | 0.04 | <0.03 | <0.03 | | nd | nd | nd | nd | <0.1 | | |
| Orthophosphate(as P) | | | | | | | | <0.05 | <0.05 | | nd | nd | nd | nd | | | |
| pH | 6.5-8.5 [OG] | 7.92 | 7.64 | 7.74 | 7.55 | 7.89 | 7.9 | 7.6 | 7.61 | 7.77 | 8.21 | 8.13 | 7.84 | 7.88 | 7.69 | | |
| Phenols | | 0.003 | 0.008 | 0.006 | <0.0010 | <0.0010 | <0.0010 | <0.001 | | | 0.001 | 0.001 | nd | nd | | | |
| Phosphorus, Total (as P) | | 0.014 | 0.01 | 0.008 | 0.009 | 0.01 | 0.03 | 0.03 | | 0.09 | nd | nd | | | | | |
| Potassium | | | | 0.9 | 0.75 | 1.26 | 1.06 | 1.6 | 1.7 | | 1.2 | nd | nd | nd | | | |
| Sodium | 200 [AO] | | | 1.1 | 1.1 | 1.5 | 1.4 | 1.66 | 1.69 | 1.36 | 1.3 | 1.2 | 11.4 | 11.3 | 1.3 | | |
| Sulphate | 500 [AO] | | | 17.9 | 15.5 | 14.3 | 16.6 | 15 | 15.2 | 14.6 | 14.5 | 14.4 | 12.1 | 12 | 13.2 | | |
| Total Kjeldahl Nitrogen(as N) | | 1.23 | 0.43 | 0.6 | 0.33 | 0.62 | 0.81 | 0.56 | | 0.39 | 0.22 | 0.2 | 0.16 | 0.18 | 1.18 | | |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 2

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 2 29-Sep-04 | TH 2 21-Sep-05 | TH 2 25-Sep-06 | TH 2 9-Oct-07 | TH 2 17-Sep-08 | TH 2 1-Oct-09 | TH 2 9-Nov-10 | TH 2 21-Sep-11 | TH 2 23-Nov-13 | TH 2 26-Nov-13 | TH 2 1-May-14 | TH 2 4-Nov-14 | TH-2 20-Apr-15 | TH-2 3-Nov-15 | TH-2 26-Oct-16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 290 | 280 | 282 | 286 | 294 | 280 | 267 | 271 | 278 | 260 | 260 | 260 | 260 | 260 | 270 |
| Ammonia(as N) | | 0.05 | 0.04 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.05 | ND | 0.078 | 0.055 | <0.050 | <0.050 |
| Calcium | | 69.1 | 67.4 | 72.7 | 70.2 | 74 | 62.1 | 66.8 | 73.0 | 72.5 | | 67 | 73 | 72 | 65 | 62 |
| Chloride | 250 [AO] | 2.4 | 2.6 | 3.2 | 3.4 | 3.1 | 3.4 | 3.7 | 3.7 | 2.8 | 3 | 3 | 3 | 3 | 3.1 | 2.3 |
| Conductivity @25øC (µmho/cm) | | 487 | 528 | 513 | 543 | 555 | 551 | 555 | 587 | 530 | 530 | 520 | 530 | 530 | 520 | 520 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.7 | 4.4 | 2.6 | 1.6 | 1.2 | 1.3 | 1.2 | 1.4 | 3.1 | 0.8 | 0.66 | 0.77 | 1.2 | 0.87 | 1.5 |
| Hardness(as CaCO3) | 80-100 [OG] | 299 | 285 | 307 | 297 | 307 | 266 | 293 | 309 | 308 | 280 | 280 | 310 | 300 | 280 | 270 |
| Iron | 0.3 [AO] | <0.005 | <0.005 | <0.005 | 0.009 | <0.005 | <0.005 | <0.005 | 0.006 | <0.005 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 30.6 | 28.3 | 30.6 | 29.7 | 29.6 | 26.9 | 30.6 | 30.8 | 30.8 | 28 | 26 | 31 | 30 | 28 | 27 |
| Manganese | 0.05 [AO] | 0.002 | <0.001 | <0.001 | 0.001 | <0.001 | 0.005 | <0.001 | <0.001 | <0.001 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrate(as N) | 10 | 1.5 | 1 | 2.8 | 3.6 | 4.2 | 4.2 | 5.3 | 4.4 | 2.7 | 3.9 | 4.79 | 3.27 | 2.78 | 2.4 | 2.01 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | <0.1 | <0.1 | | | <0.1 | <0.1 | <0.1 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.10 | <0.010 | <0.10 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.59 | 7.73 | 7.69 | 7.29 | 7.52 | 7.51 | 7.22 | 7.81 | 7.93 | 8.08 | 8.11 | 8.1 | 7.99 | 8.07 | 8.09 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 1.56 | 1.75 | 1.23 | 2.42 | 2.17 | 2.64 | 0.96 | 0.95 | 1.79 | 0.73 | 0.29 | 1.7 | 0.54 | 0.19 | <0.1 |
| Potassium | | 0.6 | 0.5 | 0.5 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.54 | 0.63 | 0.59 | 0.62 | 0.53 |
| Sodium | 200 [AO] | 1.2 | 1.1 | 1.1 | 1.6 | 1.8 | 1.2 | 1.1 | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 | 1.6 | 1.6 | 1.4 |
| Sulphate | 500 [AO] | 8 | 8 | 8 | 9 | 11 | 11 | 11 | 11 | 9 | 8 | 9 | 16 | 9 | 11 | 6.9 |
| Total Kjeldahl Nitrogen(as N) | | 1.54 | 1.6 | 1.45 | 1.77 | 2.01 | 3.2 | 0.82 | 0.94 | 1.24 | 1.1 | 2.2 | 3.8 | 0.9 | <0.50 | 0.21 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 2

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH-2 16-May-17 | TH-2 7-Dec-17 | TH-2 10-Apr-18 | TH-2 15-Nov-18 | TH-2 24-Apr-19 | TH-2 20-Nov-19 | TH-2 13-May-20 | TH-2 12-Nov-20 | TH-2 8-Apr-21 | TH-2 7-Oct-21 | TH-2 3-May-22 | TH-2 29-Sep-22 No Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 280 | 290 | 290 | 270 | 230 | 290 | 280 | 280 | 270 | 280 | 280 | |
| Ammonia(as N) | | <0.050 | <0.050 | 0.12 | 0.068 | <0.050 | 0.1 | 0.14 | <0.050 | <0.050 | <0.050 | <0.050 | |
| Calcium | | 64 | 64 | 68 | 64 | 73 | 67 | 75 | 65 | 65 | 69 | 66 | |
| Chloride | 250 [AO] | 2.7 | 2.4 | 2.3 | 2.3 | 3.4 | 3 | 2.4 | 2.1 | 2.5 | 2.5 | 2.8 | |
| Conductivity @25øC (µmho/cm) | | 550 | 550 | 540 | 510 | 530 | 540 | 540 | 510 | 500 | 500 | 530 | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.58 | 0.96 | 0.78 | 1 | 0.78 | 0.76 | 0.97 | 0.92 | 0.99 | 0.85 | 0.64 | |
| Hardness(as CaCO3) | 80-100 [OG] | 280 | 280 | 290 | 280 | 310 | 290 | 310 | 270 | 280 | 290 | 290 | |
| Iron | 0.3 [AO] | <0.10 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| Magnesium | | 29 | 28 | 29 | 29 | 31 | 29 | 31 | 27 | 28 | 29 | 30 | |
| Manganese | 0.05 [AO] | <0.0002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.03 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | |
| Nitrate(as N) | 10 | 2.26 | 2.15 | 1.63 | 1.61 | 2.35 | 2.18 | 2.09 | 1.14 | 0.9 | 0.86 | 1.44 | |
| Nitrite(as N) | 1 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.026 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.013 | <0.010 | <0.010 | <0.010 | <0.010 | |
| pH | 6.5-8.5 [OG] | 7.99 | 7.89 | 8.04 | 7.8 | 8.13 | 8 | 8.12 | 8.14 | 8.21 | 8.07 | 8.14 | |
| Phenols | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 0.0019 | 0.001 | <0.0010 | <0.0010 | <0.0010 | NV | |
| Phosphorus, Total (as P) | | 0.069 | <0.1 | 0.63 | 0.095 | <0.10 | 0.098 | 0.064 | 2.3 | 0.062 | NV | <0.10 | |
| Potassium | | 0.52 | 0.57 | 0.55 | 0.57 | 0.63 | 0.84 | 0.63 | 0.54 | 0.55 | 0.83 | 0.56 | |
| Sodium | 200 [AO] | 1.4 | 1.5 | 1.4 | 1.4 | 1.7 | 1.4 | 1.3 | 1.2 | 1.3 | 1.3 | 1.3 | |
| Sulphate | 500 [AO] | 5.6 | 6.5 | 6.6 | 6.6 | 6.6 | 6.8 | 7 | 6.8 | 4.8 | 4.7 | 5.1 | |
| Total Kjeldahl Nitrogen(as N) | | 0.4 | 0.46 | 0.86 | 0.22 | <0.10 | 0.37 | 0.2 | <0.10 | 0.12 | 0.23 | <0.10 | |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 3

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 3 27-Apr-93 | TH 3 4-Oct-93 | TH 3 13-Jun-94 | TH 3 7-Nov-94 | TH 3 19-Jun-95 | TH 3 30-Oct-95 | TH 3 15-Nov-96 | TH 3 9-May-97 | TH 3 19-Dec-97 | TH 3 13-May-98 | TH 3 13-May-98 (dup) | TH 3 18-Dec-98 | TH 3 11-Jul-00 | TH 3 11-Jul-00 (dup) | TH 3 21-Dec-00 | TH 3 11-Jul-01 005 | TH 3 18-Oct-01 003 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 290 | 246 | 386 | 309 | 350 | 456 | 791 | 818 | 1040 | 1060 | 1070 | 987 | 966 | 933 | 988 | 996 | 955 |
| Ammonia(as N) | | 0.072 | 0.099 | 0.075 | 0.51 | <0.5 | 0.2 | 0.06 | 0.41 | 8.5 | 27 | 28 | 19.9 | 36.1 | 37 | 27 | 11.9 | 26.7 |
| Calcium | | 70.9 | 66.4 | 59.6 | 73.4 | 73.9 | 103 | 76.9 | 151 | 193 | 174 | 173 | 145 | 171 | 170 | 154 | 207 | 161 |
| Chloride | 250 [AO] | 1.1 | 2.2 | 4.2 | 3.1 | 6.5 | 32.6 | 79.6 | 86.5 | 110 | 128 | 131 | 134 | 82.5 | 82.3 | 81.2 | 74.7 | 66.2 |
| Conductivity @25øC (µmho/cm) | | 550 | 591 | 721 | 618 | 712 | 1022 | 1530 | 1660 | 1740 | 2040 | 2060 | 1840 | 1640 | 1640 | 1470 | 1850 | 1785 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.1 | 1.3 | 9.4 | 9 | 15.6 | 5.6 | 79 | 126 | 1.4 | 25.3 | 26.3 | 22.7 | 20.1 | 20.4 | 12.9 | | |
| Hardness(as CaCO3) | 80-100 [OG] | 301 | 299 | 329 | 360 | 343 | 492 | 830 | 869 | 925 | 818 | 813 | 742 | 761 | 758 | 708 | 933 | 740 |
| Iron | 0.3 [AO] | 0.02 | 0.02 | 0.24 | 0.63 | 0.02 | 0.15 | 3.29 | 9.56 | 15.4 | 18.1 | 18.2 | 0.73 | 13.6 | 13.6 | 7.15 | 1.32 | 0.88 |
| Magnesium | | 30 | 32.3 | 43.8 | 42.9 | 38.4 | 56.8 | 161 | 120 | 108 | 93.3 | 93.5 | 92 | 81 | 80.7 | 78.4 | 101 | 82.2 |
| Manganese | 0.05 [AO] | | | 0.423 | 0.352 | 0.282 | 0.399 | 0.055 | 0.052 | 0.053 | 0.058 | 0.058 | 0.07 | 1.39 | 1.38 | 0.589 | | |
| Nitrate(as N) | 10 | 1.8 | 4.1 | 0.5 | 0.2 | 3.1 | 0.1 | <0.03 | | 0.05 | 0.11 | 0.1 | nd | 0.2 | 0.2 | 0.4 | <0.1 | <0.1 |
| Nitrite(as N) | 1 | <0.01 | 0.01 | 0.01 | 0.01 | 0.09 | 0.02 | <0.03 | | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | | | | | | | <0.05 | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | | |
| pH | 6.5-8.5 [OG] | 7.09 | 7.69 | 7.72 | 7.46 | 7.77 | 7.67 | 7.4 | 7.38 | 7.54 | 7.01 | 7.04 | 7.6 | 7.29 | 7.3 | 7.58 | 7.35 | 7.5 |
| Phenols | | 0.0125 | <0.001 | 0.0047 | <0.001 | <0.0022 | <0.001 | 0.067 | 64 | 0.005 | 0.03 | 0.03 | 0.019 | 0.003 | 0.003 | 0.002 | | |
| Phosphorus, Total (as P) | | 0.008 | 0.005 | 0.023 | 0.011 | 0.01 | 0.03 | 0.03 | 1.1 | 42.8 | 0.09 | 0.09 | 0.07 | 0.3 | 0.2 | | | |
| Potassium | | | | 0.5 | 0.41 | 0.85 | 1.0 | <1 | | | 48.1 | 49.9 | 48.1 | 44 | 43 | 43 | | |
| Sodium | 200 [AO] | | | 5.2 | 1.6 | 1.5 | 13.5 | 62.5 | 60.6 | 102 | 102 | 104 | 100 | 67.6 | 67.6 | 52.5 | 84.2 | 61.2 |
| Sulphate | 500 [AO] | | | 12.5 | 17.8 | 13.7 | 13.9 | 0.15 | 0.38 | 0.14 | 0.86 | 0.78 | 1.4 | 2 | 1.9 | 1.6 | <1.0 | <1.0 |
| Total Kjeldahl Nitrogen(as N) | | 0.53 | 0.59 | 0.71 | 0.56 | 0.47 | 0.62 | 1.05 | 2.64 | 11.1 | 26 | 25 | 20.5 | 45 | 45 | 27.3 | 19.7 | 27.4 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 3

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 3 18-Jun-02 DRY | TH 3 22-Oct-02 DRY | TH 3 20-May-03 005 | TH 3 1-Oct-03 DRY | TH 3 5-May-04 | TH 3 29-Sep-04 015 | TH 3 6-Apr-05 004 | TH 3 21-Sep-05 013 | TH 3 4-Apr-06 005 | TH 3 25-Sep-06 DRY | TH 3 13-Apr-07 007 | TH 3 9-Oct-07 DRY | TH 3 15-Apr-08 011 | TH 3 17-Sep-08 DRY | TH 3 30-Apr-09 | TH 3 1-Oct-09 DRY | TH 3 12-May-10 DRY | TH 3 9-Nov-10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | | | 855 | | 800 | 880 | 835 | 853 | 865 | | 835 | | 815 | | 830 | | | 769 |
| Ammonia(as N) | | | | 22.4 | | 18.5 | 17.8 | 19.3 | 28.7 | 23.5 | | 35.2 | | 20.8 | | 33.7 | | | 19.1 |
| Calcium | | | | 158 | | 157 | 149 | 158 | 158 | 158 | | 148 | | 165 | | 177 | | | 166 |
| Chloride | 250 [AO] | | | 53.8 | | 46.1 | 60.4 | 41.1 | 60.2 | 49.7 | | 42 | | 35.6 | | 34 | | | 29.4 |
| Conductivity @25øC (µmho/cm) | | | | 1560 | | 1090 | 1460 | 1560 | 1690 | 1500 | | 1470 | | 1550 | | 1440 | | | 1460 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | | 11.3 | | 10.4 | 12 | 13.1 | 31.4 | 22.9 | | 11 | | 11 | | 11.2 | | | 12.6 |
| Hardness(as CaCO3) | 80-100 [OG] | | | 665 | | 658 | 672 | 694 | 684 | 692 | | 627 | | 685 | | 731 | | | 648 |
| Iron | 0.3 [AO] | | | 3.07 | | 7.91 | 12.1 | 13.1 | 1.11 | 10.8 | | 0.631 | | 8.03 | | 6.65 | | | 10 |
| Magnesium | | | | 65.7 | | 64.7 | 73.1 | 73 | 70.6 | 72.6 | | 62.6 | | 66.5 | | 69.8 | | | 56.6 |
| Manganese | 0.05 [AO] | | | 0.06 | | 0.055 | 0.051 | 0.061 | 0.04 | 0.061 | | 0.064 | | 0.054 | | 0.064 | | | 0.051 |
| Nitrate(as N) | 10 | | | 0.2 | | <0.1 | 0.1 | 0.3 | 0.1 | 0.2 | | 0.4 | | 0.1 | | 0.2 | | | 0.2 |
| Nitrite(as N) | 1 | | | <0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | <0.1 | | | | | | | <0.1 |
| Orthophosphate(as P) | | | | <0.01 | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | | <0.01 | | <0.01 | | <0.01 | | | <0.01 |
| pH | 6.5-8.5 [OG] | | | 7.23 | | 7.51 | 7.12 | 7.1 | 7.29 | 7.54 | | 7.09 | | 6.78 | | 6.56 | | | 6.53 |
| Phenols | | | | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | | <0.001 | | <0.001 | | <0.001 | | | <0.001 |
| Phosphorus, Total (as P) | | | | 6.79 | | 2.09 | 1.15 | 2.61 | 3.45 | 3.81 | | 4.35 | | 2.19 | | 3.21 | | | 4.05 |
| Potassium | | | | 31.9 | | 37.3 | 25.8 | 24.5 | 47.9 | 36.5 | | 39 | | 32.6 | | 32.2 | | | 21.5 |
| Sodium | 200 [AO] | | | 63.3 | | 50.6 | 52.6 | 61.2 | 65.6 | 51.2 | | 54 | | 47.3 | | 46.3 | | | 40.7 |
| Sulphate | 500 [AO] | | | <1.0 | | <1.0 | <1 | <1 | <1 | <1 | | 4 | | 4 | | <1 | | | 2 |
| Total Kjeldahl Nitrogen(as N) | | | | 27.2 | | 20 | 20.2 | 23.8 | 47.9 | 23.5 | | 40.8 | | 24.7 | | 37.4 | | | 22.1 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 3

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 3 2-May-11 | TH 3 21-Sep-11 DRY | TH 3 12-Apr-12 | TH 3 23-Nov-12 | TH 3 7-May-13 | TH 3 26-Nov-13 | TH 3 1-May-14 | TH 3 4-Nov-14 | TH 3 20-Apr-15 | TH 3 3-Nov-15 | TH-3 20-Apr-16 | TH 3 26-Oct-16 | TH-3 16-May-17 | TH 3 7-Dec-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 694 | | 729 | 730 | 720 | 680 | 670 | 710 | 690 | 660 | 510 | 570 | 280 | 720 |
| Ammonia(as N) | | 13.3 | | 10.3 | 12.4 | 27 | 16 | 12 | 8.2 | 13 | 31 | 31 | 28 | 15 | 7.5 |
| Calcium | | 163 | | 190 | 175 | 160 | 160 | 160 | 190 | 160 | 130 | 140 | 120 | 53 | 17 |
| Chloride | 250 [AO] | 19.8 | | 20.9 | 15.9 | 19 | 19 | 20 | 16 | 19 | 22 | 16 | 12 | 15 | 16 |
| Conductivity @25øC (µmho/cm) | | 1290 | | 1340 | 1260 | 1400 | 1300 | 1200 | 1300 | 1300 | 1300 | 1000 | 1100 | 1200 | 1300 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 7.9 | | 7.0 | 8.5 | 6.9 | 6.8 | 5.9 | 5.9 | 7.2 | 7.7 | 6.8 | 6.9 | 5.6 | 5.2 |
| Hardness(as CaCO3) | 80-100 [OG] | 623 | | 700 | 637 | 550 | 610 | 620 | 730 | 610 | 510 | 500 | 450 | 600 | 650 |
| Iron | 0.3 [AO] | 5.05 | | 12.9 | 2.83 | <0.1 | <0.1 | ND | <0.1 | 0.34 | <0.1 | <0.1 | <0.1 | <0.10 | <0.1 |
| Magnesium | | 52.6 | | 54.5 | 48.8 | 40 | 51 | 50 | 58 | 49 | 42 | 39 | 36 | 47 | 53 |
| Manganese | 0.05 [AO] | 0.058 | | 0.052 | 0.058 | 0.048 | 0.055 | 0.047 | 0.62 | 0.058 | 0.05 | 0.017 | 0.057 | 0.078 | 0.074 |
| Nitrate(as N) | 10 | 0.1 | | <0.1 | 0.6 | <0.1 | <0.1 | ND | <0.10 | <0.10 | <0.10 | 0.42 | <0.10 | <0.10 | <0.10 |
| Nitrite(as N) | 1 | <0.1 | | <0.1 | <0.1 | <0.01 | 0.01 | ND | <0.010 | <0.010 | <0.010 | <0.010 | 0.013 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | | <0.01 | <0.01 | <0.01 | <0.01 | ND | 0.011 | <0.010 | 0.011 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.47 | | 7.36 | 7.53 | 7.53 | 7.63 | 7.65 | 7.52 | 7.44 | 7.77 | 7.89 | 7.82 | 7.5 | 7.63 |
| Phenols | | <0.001 | | <0.001 | <0.001 | 0.0012 | 0.0018 | ND | <0.001 | 0.0017 | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0050 |
| Phosphorus, Total (as P) | | 3.71 | | 1.20 | 2.70 | 0.21 | 1.10 | 1.70 | 0.53 | 0.35 | 1 | 0.026 | <0.1 | 0.06 | <0.1 |
| Potassium | | 15.8 | | 12.1 | 15.1 | 15 | 11 | 12 | 8.5 | 15 | 16 | 22 | 20 | 16 | 1.1 |
| Sodium | 200 [AO] | 31.1 | | 27.7 | 25.0 | 22 | 29.0 | 21 | 23.0 | 24 | 23 | 19 | 13 | 13 | 14 |
| Sulphate | 500 [AO] | 9 | | 6 | 6 | 8 | 1 | 7 | 8 | 9 | 2.5 | 39 | 3 | 4.2 | 3.3 |
| Total Kjeldahl Nitrogen(as N) | | 14.3 | | 9.31 | 15.9 | 26 | 16 | 14 | 7.1 | 14 | 31 | 32 | 29 | 18 | 8 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 3

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH-3 10-Apr-18 | TH 3 15-Nov-18 | TH-3 24-Apr-19 | TH 3 20-Nov-19 | TH-3 13-May-20 | TH 3 12-Nov-20 DRY | TH-3 8-Apr-21 | TH 3 7-Oct-21 | TH-3 3-May-22 | TH 3 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 700 | 710 | 650 | 650 | 640 | | 570 | 570 | 540 | 520 |
| Ammonia(as N) | | 5.4 | 5.8 | 8.1 | 18 | 20 | | 12 | 13 | 8.8 | 9.7 |
| Calcium | | 160 | 160 | 170 | 140 | 160 | | 140 | 140 | 140 | 140 |
| Chloride | 250 [AO] | 9.3 | 14 | 13 | 12 | 10 | | 11 | 11 | 15 | 16 |
| Conductivity @25øC (µmho/cm) | | 1200 | 1200 | 1300 | 1200 | 1200 | | 1100 | 1000 | 1000 | 990 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 3.9 | 4.2 | 4.9 | 4.9 | 4.3 | | 4.5 | 3.9 | 3.9 | 3.0 |
| Hardness(as CaCO3) | 80-100 [OG] | 650 | 640 | 650 | 550 | 590 | | 520 | 530 | 510 | 510 |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 59 | 59 | 57 | 49 | 44 | | 39 | 41 | 38 | 36 |
| Manganese | 0.05 [AO] | 0.039 | 0.05 | 0.071 | 0.07 | 0.079 | | 0.089 | 0.082 | 0.11 | 0.11 |
| Nitrate(as N) | 10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | | 0.15 | 0.1 | <0.1 | <0.1 |
| Nitrite(as N) | 1 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.72 | 7.46 | 7.75 | 7.46 | 7.86 | | 7.59 | 7.72 | 7.65 | 7.77 |
| Phenols | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 1.6 | 1.5 | 0.32 | 1.8 | 0.61 | | 0.38 | NV | 0.37 | 0.50 |
| Potassium | | 7.7 | 7.6 | 10 | 12 | 19 | | 12 | 14 | 12 | 10 |
| Sodium | 200 [AO] | 12 | 15 | 17 | 16 | 10 | | 13 | 11 | 9.1 | 7.5 |
| Sulphate | 500 [AO] | 2.9 | 2 | <1.0 | <1.0 | 10 | | 2.9 | 4.2 | 6.4 | 7.2 |
| Total Kjeldahl Nitrogen(as N) | | 6.3 | 5.9 | 8 | 19 | 21 | | 12 | 16 | 9.4 | 10 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 4

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 4 27-Apr-93 | TH 4 4-Oct-93 | TH 4 13-Jun-94 | TH 4 7-Nov-94 | TH 4 19-Jun-95 | TH 4 18-Dec-98 | TH 4 18-Oct-01 | TH 4 22-Oct-02 | TH 4 1-Oct-03 | TH 4 29-Sep-04 | TH 4 21-Sep-05 | TH 4 25-Sep-06 | TH 4 13-Apr-07 | TH 4 9-Oct-07 | TH 4 15-Apr-08 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 776 | | 590 | 881 | 737 | | DRY | DRY | DRY | DRY | DRY | DRY | DRY | No Sample | DRY |
| Ammonia(as N) | | 35 | | 31.9 | 29.9 | 25.2 | | | | | | | | | | |
| Calcium | | 80.5 | | 102 | 121 | 119 | 169 | | | | | | | | | |
| Chloride | 250 [AO] | 87.5 | | 32.6 | 26.9 | 19.8 | 17.5 | | | | | | | | | |
| Conductivity @25øC (µmho/cm) | | 1830 | 1390 | 1730 | 1690 | 1480 | | | | | | | | | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 58 | 15.5 | 23 | >20 | 16.8 | | | | | | | | | | |
| Hardness(as CaCO3) | 80-100 [OG] | 594 | | 569 | 687 | 586 | 710 | | | | | | | | | |
| Iron | 0.3 [AO] | 0.1 | 0.25 | 0.19 | 10.3 | 7.83 | 0.92 | | | | | | | | | |
| Magnesium | | 95.4 | | 76 | 92.8 | 69.9 | 69.6 | | | | | | | | | |
| Manganese | 0.05 [AO] | | | 0.122 | 0.142 | 0.159 | 0.11 | | | | | | | | | |
| Nitrate(as N) | 10 | 2.5 | | 0.1 | 1.2 | <0.1 | nd | | | | | | | | | |
| Nitrite(as N) | 1 | <0.01 | | <0.01 | 0.04 | <0.01 | nd | | | | | | | | | |
| Orthophosphate(as P) | | | | | | | nd | | | | | | | | | |
| pH | 6.5-8.5 [OG] | 7.72 | 8.12 | 7.2 | 6.61 | 6.9 | | | | | | | | | | |
| Phenols | | 0.02 | 0.042 | 0.0346 | | 0.0198 | | | | | | | | | | |
| Phosphorus, Total (as P) | | <0.10 | | 0.055 | 0.05 | 0.02 | | | | | | | | | | |
| Potassium | | | | 54.3 | 69.2 | 54.2 | 49.4 | | | | | | | | | |
| Sodium | 200 [AO] | | | 29.2 | 28.9 | 21.5 | 17.1 | | | | | | | | | |
| Sulphate | 500 [AO] | | | 9.4 | 11.7 | 17.7 | 17.2 | | | | | | | | | |
| Total Kjeldahl Nitrogen(as N) | | 45.5 | | 36 | 39.7 | 32.4 | | | | | | | | | | |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 4

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 4 17-Sep-08 | TH 4 30-Apr-09 | TH 4 1-Oct-09 | TH 4 12-May-10 | TH 4 9-Nov-10 | TH 4 2-May-11 | TH 4 21-Sep-11 | TH 4 12-Apr-12 | TH 4 22-Nov-12 | TH 4 7-May-13 | TH 4 26-Nov-13 | TH 4 1-May-14 | TH 4 4-Nov-14 | TH 4 20-Apr-15 | TH 4 3-Nov-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | DRY | 660 | DRY | DRY | DRY |
| Ammonia(as N) | | | | | | | | | | | | | 12 | | | |
| Calcium | | | | | | | | | | | | | 200 | | | |
| Chloride | 250 [AO] | | | | | | | | | | | | 20 | | | |
| Conductivity @25øC (µmho/cm) | | | | | | | | | | | | | 1200 | | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | | | | | | | | | | | 8.9 | | | |
| Hardness(as CaCO3) | 80-100 [OG] | | | | | | | | | | | | 600 | | | |
| Iron | 0.3 [AO] | | | | | | | | | | | | ND | | | |
| Magnesium | | | | | | | | | | | | | 25 | | | |
| Manganese | 0.05 [AO] | | | | | | | | | | | | 0.027 | | | |
| Nitrate(as N) | 10 | | | | | | | | | | | | ND | | | |
| Nitrite(as N) | 1 | | | | | | | | | | | | 0.05 | | | |
| Orthophosphate(as P) | | | | | | | | | | | | | ND | | | |
| pH | 6.5-8.5 [OG] | | | | | | | | | | | | 7.65 | | | |
| Phenols | | | | | | | | | | | | | ND | | | |
| Phosphorus, Total (as P) | | | | | | | | | | | | | 1.7 | | | |
| Potassium | | | | | | | | | | | | | 1.1 | | | |
| Sodium | 200 [AO] | | | | | | | | | | | | 0.46 | | | |
| Sulphate | 500 [AO] | | | | | | | | | | | | 6 | | | |
| Total Kjeldahl Nitrogen(as N) | | | | | | | | | | | | | 16 | | | |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 5A

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 5A 7-Apr-93 | TH 5A 4-Oct-93 | TH 5A 13-Jun-94 | TH 5A 19-Jun-95 | TH 5A 30-Oct-95 | TH5A 15-Nov-96 | TH5A 19-Dec-97 | TH5A 18-Dec-98 | TH5A 18-Oct-01 007 | TH5A 22-Oct-02 DRY | TH5A 11-Oct-03 DRY | TH5A 29-Sep-04 | TH5A 21-Sep-05 DRY | TH5A 25-Sep-06 013 | TH5A 9-Oct-07 DRY | TH5A 15-Apr-08 DRY | TH5A 17-Sep-08 DRY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 254 | 241 | 248 | 239 | | 263 | 259 | 181 | 154 | | | 300 | | 230 | | | |
| Ammonia(as N) | | 0.194 | 0.66 | 0.266 | 0.81 | | 3.52 | 0.03 | 1.83 | 0.65 | | | 19.7 | | 0.82 | | | |
| Calcium | | 51.8 | 43.3 | 41.8 | 51.0 | 40.3 | 32.9 | 36.7 | 32.3 | 26.2 | | | 35.8 | | 44 | | | |
| Chloride | 250 [AO] | 2.5 | 3.6 | 4.4 | 4.6 | 9.4 | 2.77 | 2.88 | 9 | 9.1 | | | 6.8 | | 9.6 | | | |
| Conductivity @25øC (µmho/cm) | | 513 | 445 | 509 | 509 | 424 | 477 | 479 | 385 | 316 | | | 533 | | 466 | | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 7.1 | 6.7 | 7.8 | 10.6 | 4.5 | 3 | 2.2 | 18.6 | | | | 14.7 | | 3.1 | | | |
| Hardness(as CaCO3) | 80-100 [OG] | 257 | 223 | 215 | 254 | 194 | 196 | 208 | 170 | 139 | | | 195 | | 192 | | | |
| Iron | 0.3 [AO] | 0.06 | 0.12 | <0.01 | 0.07 | 0.31 | 0.97 | 1.41 | 0.13 | 0.02 | | | 0.046 | | 0.016 | | | |
| Magnesium | | 31 | 27.8 | 26.8 | 30.8 | 22.6 | 27 | 28.2 | 21.7 | 18 | | | 25.6 | | 20 | | | |
| Manganese | 0.05 [AO] | | | 0.064 | 0.059 | 0.067 | 0.118 | 0.131 | 0.12 | | | | 0.113 | | 0.064 | | | |
| Nitrate(as N) | 10 d | 0.2 | 0.2 | 4.1 | 6.5 | | 0.3 | | 0.41 | 0.6 | | | 0.3 | | 5.8 | | | |
| Nitrite(as N) | 1 d | <0.01 | 0.12 | 0.26 | 0.33 | | 0.12 | 0.03 | 0.04 | <0.1 | | | 0.1 | | 0.2 | | | |
| Orthophosphate(as P) | | | | | | | <0.05 | | nd | | | | 0.24 | | <0.01 | | | |
| pH | 6.5-8.5 [OG] | 8.18 | 8.11 | 8.13 | 8.1 | 8.36 | 7.59 | 7.65 | 7.95 | 7.95 | | | 7.38 | | 7.6 | | | |
| Phenols | | 0.001 | 0.0045 | 0.0078 | 0.0015 | 0.0015 | 0.018 | | 0.002 | | | | 0.008 | | <0.001 | | | |
| Phosphorus, Total (as P) | | 0.006 | 0.01 | 0.42 | 0.02 | | 0.22 | 2.3 | 0.02 | | | | 1.97 | | 5.31 | | | |
| Potassium | | | | 1.2 | 2.19 | 2.49 | 2 | | 3.8 | | | | 7 | | 2.3 | | | |
| Sodium | 200 [AO] | | | 11.4 | 8.9 | 13.1 | 31.1 | 23.5 | 11.7 | 10.9 | | | 10.2 | | 32.9 | | | |
| Sulphate | 500 [AO] | | | 14.5 | 12.1 | | 4.24 | 4.53 | 5.6 | <1.0 | | | 2 | | 4 | | | |
| Total Kjeldahl Nitrogen(as N) | | 0.66 | 1.35 | 0.97 | 1.89 | | | 0.3 | 3.28 | 0.71 | | | 25.8 | | 15.1 | | | |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 5A

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH5A 30-Apr-09 DRY | TH5A 1-Oct-09 | TH5A (11) 12-May-10 | TH5A 9-Nov-10 DRY | TH5A 2-May-11 | TH5A 21-Sep-11 DRY | TH5A 12-Apr-12 | TH5A 23-Nov-12 | TH5A 7-May-13 DRY | TH5A 26-Nov-13 DRY | TH5A 1-May-14 | TH5A 4-Nov-14 DRY | TH5A 20-Apr-15 | TH5A 3-Nov-15 | TH5A 20-Apr-16 | TH5A 26-Oct-16 | TH5A 16-May-17 | TH5A 7-Dec-17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | | 256 | 181 | | 221 | | 223 | 242 | | | 240 | | 200 | 200 | 210 | 180 | 210 | 270 |
| Ammonia(as N) | | | 1.14 | 0.05 | | 0.07 | | 0.05 | 0.06 | | | 1.5 | | 0.084 | 0.3 | 0.071 | 1.4 | 0.11 | 0.079 |
| Calcium | | | 56.7 | 39.4 | | 42.4 | | 57.1 | 68.3 | | | 69 | | 62 | 52 | 59 | 47 | 53 | 87 |
| Chloride | 250 [AO] | | 5.2 | 7.8 | | 7.1 | | 7.3 | 5.6 | | | 4 | | 5 | 6.5 | 6.4 | 7.1 | 7 | 9.8 |
| Conductivity @25øC (µmho/cm) | | | 518 | 374 | | 494 | | 486 | 508 | | | 490 | | 430 | 410 | 400 | 350 | 420 | 650 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | 2.3 | 1.1 | | 1.2 | | 1.6 | 2.5 | | | 1.6 | | 1.4 | 1 | 0.83 | 1.5 | 0.94 | 1.3 |
| Hardness(as CaCO3) | 80-100 [OG] | | 234 | 182 | | 200 | | 231 | 256 | | | 260 | | 240 | 200 | 220 | 180 | 210 | 350 |
| Iron | 0.3 [AO] | | 0.259 | 0.069 | | 0.054 | | 0.036 | 0.112 | | | ND | | <0.1 | <0.1 | <0.001 | <0.001 | <0.10 | <0.10 |
| Magnesium | | | 22.4 | 20.3 | | 22.9 | | 21.4 | 20.7 | | | 21 | | 20 | 18 | 19 | 14 | 19 | 23 |
| Manganese | 0.05 [AO] | | 0.125 | 0.058 | | 0.031 | | 0.104 | 0.097 | | | 0.28 | | 0.058 | 0.13 | <2.0 | 0.34 | 0.042 | 0.15 |
| Nitrate(as N) | 10 d | | 5.3 | 1.7 | | 5.0 | | 4.8 | 6.3 | | | 3.95 | | 2.98 | 2.43 | 1.69 | 0.99 | 1.09 | 2.64 |
| Nitrite(as N) | 1 d | | | | | <0.1 | | <0.1 | 0.1 | | | 0.057 | | 0.028 | 0.031 | <0.010 | 0.226 | 0.027 | <0.010 |
| Orthophosphate(as P) | | | <0.01 | <0.01 | | <0.01 | | <0.01 | 0.02 | | | ND | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | | 7.65 | 8.12 | | 7.96 | | 8.05 | 7.94 | | | 8.06 | | 7.93 | 8.01 | 8.12 | 8.19 | 8.01 | 7.84 |
| Phenols | | | 0.005 | <0.001 | | <0.001 | | <0.001 | <0.001 | | | ND | | <0.0010 | <0.001 | <0.0010 | 0.0041 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | | 1.54 | 0.51 | | 3.12 | | 0.42 | 2.21 | | | 7 | | 0.27 | 0.9 | 0.42 | <0.001 | 2.8 | <0.1 |
| Potassium | | | 0.7 | 0.7 | | 1.1 | | 0.7 | 0.8 | | | 0.74 | | 0.77 | 0.66 | 0.68 | 0.83 | 0.68 | 0.7 |
| Sodium | 200 [AO] | | 2.2 | 5.4 | | 4.6 | | 2.9 | 3.2 | | | 0.84 | | 2.3 | 2.2 | 2.4 | 2.5 | 2.5 | 1.9 |
| Sulphate | 500 [AO] | | 9 | 4 | | 7 | | 7 | 9 | | | 9 | | 5 | 3.7 | 4 | 2.1 | 3.2 | 6.7 |
| Total Kjeldahl Nitrogen(as N) | | | 4.33 | 1.65 | | 5.13 | | 0.29 | 3.07 | | | 15 | | 0.66 | 0.71 | 0.22 | 1.9 | 0.63 | 0.31 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 5A

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH5A 10-Apr-18 | TH5A 15-Nov-18 | TH5A 24-Apr-19 | TH5A 20-Nov-19 | TH5A 13-May-20 | TH5A 12-Nov-20 | TH5A 8-Apr-21 | TH5A 7-Oct-21 | TH5A 3-May-22 Dry | TH5A 29-Sep-22 No Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 240 | 270 | 420 | 380 | 490 | 550 | 470 | 410 | | |
| Ammonia(as N) | | 0.15 | 0.21 | 0.062 | 0.34 | 0.42 | 2.9 | 2.8 | 3.0 | | |
| Calcium | | 58 | 66 | 120 | 93 | 120 | 120 | 99 | 88 | | |
| Chloride | 250 [AO] | 11 | 21 | 92 | 110 | 130 | 110 | 100 | 88 | | |
| Conductivity @25øC (µmho/cm) | | 460 | 560 | 1100 | 1100 | 1200 | 1300 | 1200 | 960 | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.1 | 4.7 | 7.9 | 36 | 12 | 8.5 | 7.2 | 5.2 | | |
| Hardness(as CaCO3) | 80-100 [OG] | 240 | 280 | 520 | 420 | 540 | 520 | 460 | 430 | | |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | |
| Magnesium | | 24 | 27 | 50 | 46 | 60 | 52 | 52 | 51 | | |
| Manganese | 0.05 [AO] | 0.016 | 0.33 | 0.45 | 0.11 | 0.086 | 0.0021 | 0.044 | 0.016 | | |
| Nitrate(as N) | 10 d | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.12 | | |
| Nitrite(as N) | 1 d | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.034 | | |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | 0.23 | <0.010 | <0.010 | <0.010 | | |
| pH | 6.5-8.5 [OG] | 8.09 | 7.67 | 7.8 | 7.79 | 7.95 | 7.73 | 7.93 | 7.93 | | |
| Phenols | | <0.0010 | <0.0010 | 0.0058 | 0.018 | 0.0078 | 0.0063 | 0.0017 | 0.0010 | | |
| Phosphorus, Total (as P) | | 0.28 | 0.15 | 0.16 | 5.5 | 0.23 | 2.8 | 0.29 | NV | | |
| Potassium | | 0.64 | 0.63 | 0.9 | 2.1 | 3.2 | 3.6 | 3.2 | 3.9 | | |
| Sodium | 200 [AO] | 2.6 | 7.5 | 52 | 61 | 73 | 66 | 63 | 53 | | |
| Sulphate | 500 [AO] | 1.4 | <1.0 | <1.0 | 6.3 | <1.0 | <1.0 | <1.0 | <1.0 | | |
| Total Kjeldahl Nitrogen(as N) | | 0.2 | 0.27 | 0.51 | 1.8 | 0.88 | 3.4 | 3.5 | 3.7 | | |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 5B

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 5B 27-Apr-93 | TH 5B 4-Oct-93 | TH 5B 13-Jun-94 | TH 5B 19-Jun-95 | TH 5B 30-Oct-95 | TH5B 15-Nov-96 | TH5B 18-Dec-98 | TH5B 21-Dec-00 | TH5B 18-Oct-01 | TH5B 22-Oct-02 DRY | TH5B 1-Oct-03 DRY | TH5B 29-Sep-04 | TH5B 21-Sep-05 DRY | TH5B 25-Sep-06 DRY | TH5B 9-Oct-07 DRY | TH5B 15-Apr-08 DRY | TH5B 17-Sep-08 DRY | TH5B 30-Apr-09 | TH5B 1-Oct-09 DRY | TH5B [(11)] 12-May-10 | TH5B [(11)] 9-Nov-10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 205 | 206 | 206 | 198 | 239 | 215 | 269 | 243 | 207 | | | 240 | | | | | | | | 231 | 233 |
| Ammonia(as N) | | 0.454 | 0.404 | 0.403 | 0.61 | 7.99 | 4 | 8.6 | 3.1 | 1.45 | | | 5.55 | | | | | | 0.05 | | 1.34 | 2.74 |
| Calcium | | 32.8 | 33.5 | 28.6 | 33.6 | 34 | 42 | 36.4 | 34.6 | 29.6 | | | 35.1 | | | | | | 42.8 | | 39.8 | 39.2 |
| Chloride | 250 [AO] | 2.1 | 2.2 | 2.4 | 1.9 | 2.6 | 6.91 | 3.7 | 2.5 | 3.3 | | | 2.5 | | | | | | | | 1.5 | 1.7 |
| Conductivity @25øC (µmho/cm) | | 480 | 400 | 416 | 409 | 488 | 405 | 504 | 433 | 398 | | | 450 | | | | | | | | 440 | 442 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 2.1 | 1.9 | 8 | 2.6 | 43 | 2.7 | 11 | 3.1 | | | | 3.3 | | | | | | | | 1.4 | 2.6 |
| Hardness(as CaCO3) | 80-100 [OG] | 196 | 203 | 172 | 203 | 208 | 203 | 208 | 198 | 174 | | | 205 | | | | | | 229 | | 207 | 218 |
| Iron | 0.3 [AO] | 0.06 | 0.07 | 0.02 | 0.45 | 3.95 | 0.736 | 2.25 | 0.79 | 0.83 | | | 0.05 | | | | | | 0.008 | | 0.319 | 0.065 |
| Magnesium | | 27.7 | 28.9 | 24.5 | 29 | 29.9 | 23.6 | 28.3 | 27 | 24.3 | | | 28.5 | | | | | | 29.6 | | 26.1 | 29.1 |
| Manganese | 0.05 [AO] | | | 0.086 | 0.073 | 0.068 | 0.102 | 0.16 | 0.089 | | | | 0.066 | | | | | | 0.02 | | 0.121 | 0.084 |
| Nitrate(as N) | 10 d | 2.2 | <0.1 | 0.2 | <0.1 | <0.1 | 0.24 | nd | 1.5 | <0.1 | | | 0.1 | | | | | | | | <0.1 | <0.1 |
| Nitrite(as N) | 1 d | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | 0.22 | nd | nd | <0.1 | | | <0.1 | | | | | | | | | <0.1 |
| Orthophosphate(as P) | | | | | | | <0.05 | nd | nd | | | | 0.01 | | | | | | | | <0.01 | 0.02 |
| pH | 6.5-8.5 [OG] | 8.19 | 7.9 | 7.86 | 7.94 | 7.76 | 7.53 | 7.98 | 7.83 | 7.98 | | | 7.29 | | | | | | | | 7.99 | 7.45 |
| Phenols | | 0.003 | 0.0035 | 0.006 | 0.0069 | 0.269 | 0.077 | 0.021 | nd | | | | 0.194 | | | | | | <0.001 | | <0.001 | 0.031 |
| Phosphorus, Total (as P) | | 0.007 | 0.005 | 0.008 | 0.04 | 0.06 | 1.57 | 0.08 | | | | | 3.35 | | | | | | 0.25 | | 0.29 | 1.26 |
| Potassium | | | | 1.2 | 1.35 | 3.17 | 3.3 | 3.3 | 2 | | | | 1.8 | | | | | | 1.2 | | 1.5 | 1.2 |
| Sodium | 200 [AO] | | | 11.1 | 8.1 | 8.5 | 9.73 | 19.1 | 13.2 | 9.5 | | | 7.4 | | | | | | 7.8 | | 9.3 | 6.4 |
| Sulphate | 500 [AO] | | | 18.6 | 17.1 | 14.2 | 3.79 | 0.84 | 17.9 | 12.1 | | | 16 | | | | | | | | 17 | 8 |
| Total Kjeldahl Nitrogen(as N) | | 0.99 | 0.79 | 1.02 | 1.04 | 13.6 | 4.23 | 9.6 | 3.2 | 1.54 | | | 19.3 | | | | | | 0.69 | | 2.55 | 7.23 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 5B

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH5B 2-May-11 | TH5B 21-Sep-11 | TH5B 12-Apr-12 | TH5B 23-Nov-12 | TH5B 7-May-13 DRY | TH5B 26-Nov-13 DRY | TH5B 1-May-14 | TH5B 4-Nov-14 DRY | TH5B 20-Apr-15 | TH5B 3-Nov-15 | TH5B 20-Apr-16 | TH5B 26-Oct-16 | TH5B 16-May-17 | TH5B 7-Dec-17 | TH5B 10-Apr-18 | TH5B 15-Nov-18 | TH5B 24-Apr-19 | TH5B 20-Nov-19 | TH5B 13-May-20 | TH5B 12-Nov-20 | TH5B 8-Apr-21 | TH5B 7-Oct-21 | TH5B 3-May-22 No Sample | TH5B 29-Sep-22 No Sample |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 215 | 208 | 212 | 215 | | | 220 | | 200 | 200 | 210 | 200 | 200 | 210 | 210 | 210 | 200 | 210 | 220 | 210 | 230 | 220 | | |
| Ammonia(as N) | | 1.21 | 0.14 | 0.68 | 0.15 | | | 2.6 | | <0.050 | 0.15 | 0.1 | 0.05 | <0.050 | 0.3 | 0.2 | 0.081 | <0.050 | 0.05 | 0.07 | 0.051 | 0.12 | 0.17 | | |
| Calcium | | 38.8 | 37.9 | 38.3 | 38.7 | | | 43 | | 41 | 35 | 42 | 35 | 110 | 38 | 37 | 37 | 40 | 40 | 45 | 41 | 45 | 45 | | |
| Chloride | 250 [AO] | 1.2 | 1.4 | 1.4 | 1.3 | | | ND | | 2 | 1.8 | 1.4 | <1.0 | 1.5 | 1.2 | 1.4 | 1.7 | 1.5 | 1.6 | 1.1 | 1.4 | 1.6 | 1.8 | | |
| Conductivity @25øC (µmho/cm) | | 442 | 434 | 427 | 405 | | | 440 | | 430 | 410 | 430 | 410 | 410 | 420 | 420 | 430 | 420 | 420 | 440 | 440 | 460 | 430 | | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.1 | 1.2 | 0.9 | 2.9 | | | 1.8 | | 1.1 | 0.81 | 0.92 | 1.3 | 1.3 | 1.6 | 1.2 | 0.91 | 0.87 | 0.65 | 0.64 | 0.98 | 0.89 | 0.74 | | |
| Hardness(as CaCO3) | 80-100 [OG] | 211 | 211 | 215 | 218 | | | 220 | | 220 | 200 | 230 | 200 | 210 | 210 | 210 | 200 | 220 | 220 | 240 | 210 | 230 | 230 | | |
| Iron | 0.3 [AO] | 0.084 | 0.006 | 0.009 | 0.632 | | | ND | | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | |
| Magnesium | | 27.7 | 28.3 | 29.1 | 29.5 | | | 21 | | 29 | 27 | 29 | 28 | 29 | 29 | 28 | 27 | 29 | 28 | 30 | 27 | 27 | 29 | | |
| Manganese | 0.05 [AO] | 0.074 | 0.051 | 0.027 | 0.052 | | | 0.1 | | 0.012 | 0.047 | 0.081 | <2.0 | 0.019 | 0.063 | 0.047 | 0.014 | 0.0039 | 0.09 | 0.13 | 0.2 | 0.12 | 0.12 | | |
| Nitrate(as N) | 10 d | <0.1 | <0.1 | 0.1 | 0.2 | | | ND | | 0.25 | <0.10 | <0.1 | <0.1 | 0.12 | 0.16 | 0.14 | 0.25 | 0.33 | 0.29 | 0.023 | <0.10 | <0.10 | <0.10 | | |
| Nitrite(as N) | 1 d | <0.1 | <0.1 | <0.1 | <0.1 | | | 0.02 | | 0.012 | 0.01 | <0.01 | <0.01 | <0.0.010 | 0.025 | <0.010 | <0.010 | <0.010 | <0.010 | <0.10 | <0.010 | <0.010 | <0.010 | | |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | 0.02 | | | ND | | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | | |
| pH | 6.5-8.5 [OG] | 7.84 | 7.91 | 8.05 | 7.98 | | | 8.07 | | 7.99 | 8.03 | 8.09 | 8.25 | 8.15 | 8.15 | 8.1 | 7.99 | 8.16 | 8.03 | 8.07 | 8.02 | 7.98 | 7.99 | | |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | | | ND | | <0.001 | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 0.001 | <0.0010 | <0.0010 | 0.0012 | | |
| Phosphorus, Total (as P) | | 0.53 | 0.25 | 0.12 | 4.35 | | | 4.6 | | 0.15 | 0.35 | 2.8 | <0.1 | 0.055 | <0.1 | 0.22 | 0.024 | 0.057 | 0.043 | 0.82 | 0.07 | 0.33 | NV | | |
| Potassium | | 1.2 | 1.0 | 1 | 0.9 | | | 1.3 | | 1.5 | 0.94 | 1 | 1 | 1.1 | 1.2 | 1.1 | 1.1 | 1 | 0.99 | 1.1 | 1.1 | 0.95 | 1.1 | | |
| Sodium | 200 [AO] | 7.3 | 7.3 | 7.3 | 7.1 | | | 7.4 | | 7.8 | 7.1 | 7.7 | 7.1 | 7.6 | 7.6 | 7.4 | 7 | 7.5 | 7.6 | 7.8 | 7.1 | 7.4 | 7.6 | | |
| Sulphate | 500 [AO] | 18 | 21 | 23 | 21 | | | 22 | | 26 | 23 | 27 | 21 | 21 | 22 | 25 | 24 | 21 | 24 | 23 | 23 | 22 | 20 | | |
| Total Kjeldahl Nitrogen(as N) | | 1.91 | 0.77 | 0.33 | 3.32 | | | 12 | | 0.48 | <0.50 | 0.57 | 0.23 | 0.25 | 0.41 | 0.29 | 0.12 | 0.1 | 0.13 | 0.18 | 0.24 | 0.28 | 0.28 | | |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 6

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 6 27-Apr-93 | TH 6 4-Oct-93 | TH 6 13-Jun-94 | TH 6 7-Nov-94 | TH 6 19-Jun-95 | TH 6 30-Oct-95 | TH 6 27-May-96 | TH 6 27-May-96 Replicate | TH 6 15-Nov-96 | TH 6 9-May-97 | TH 6 19-Dec-97 | TH 6 13-May-98 | TH 6 18-Dec-98 | TH 6 11-Jul-00 | TH 6 21-Dec-00 | TH 6 11-Jul-01 001 | TH 6 18-Oct-01 001 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 590 | 375 | 639 | 418 | 637 | 693 | 796 | 779 | 820 | 811 | 948 | 951 | 837 | 699 | 694 | 708 | 691 |
| Ammonia(as N) | | 0.071 | 0.245 | 0.011 | 0.33 | 0.1 | 0.48 | <0.05 | | 0.17 | 0.16 | 0.05 | nd | nd | 0.09 | 0.06 | 0.03 | 0.02 |
| Calcium | | 229 | 220 | 258 | 266 | 254 | 264 | 239 | 237 | 232 | 154 | 155 | 126 | 101 | 119 | 137 | 140 | 175 |
| Chloride | 250 [AO] | 143 | 107 | 193 | 169 | 98.2 | 90 | 82.5 | 82.5 | 137 | 156 | 150 | 70.9 | 29.5 | 35.3 | 112 | 184 | 177 |
| Conductivity @25øC (µmho/cm) | | 2790 | 2660 | 3370 | 3010 | 2960 | 2810 | 2880 | 2880 | 3120 | 3490 | 3680 | 3020 | 1980 | 1320 | 1340 | 2400 | 2240 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 3.7 | 3.2 | 10.7 | 10.3 | 5.3 | 5.4 | 5.6 | | 6.3 | 7.3 | 7.6 | 5.5 | 5.1 | 4 | 2.5 | | |
| Hardness(as CaCO3) | 80-100 [OG] | 1664 | 1546 | 1778 | 1880 | 1801 | 1748 | 2080 | 2080 | 2110 | 2430 | 2380 | 1910 | 1280 | 840 | 781 | 1073 | 1120 |
| Iron | 0.3 [AO] | 0.07 | 0.09 | 0.01 | 0.04 | 0.03 | 0.05 | 0.021 | 0.021 | 0.037 | 0.034 | 0.05 | 0.067 | 0.03 | 0.11 | 0.09 | 0.02 | <0.01 |
| Magnesium | | 264 | 241 | 274 | 294 | 283 | 264 | 359 | | 369 | 480 | 483 | 386 | 249 | 132 | 107 | 176 | 166 |
| Manganese | 0.05 [AO] | | | 0.027 | 0.016 | 0.028 | 0.019 | 0.015 | 0.016 | 0.023 | 0.009 | 0.021 | 0.024 | 0.07 | 0.068 | 0.048 | | |
| Nitrate(as N) | 10 | 0.3 | 0.8 | 1.1 | 1.3 | 1.6 | 1.6 | 1.63 | 1.63 | 2.71 | 2.31 | 0.77 | 0.39 | 0.12 | nd | nd | 0.8 | 1 |
| Nitrite(as N) | 1 | <0.01 | 0.02 | 0.04 | 0.01 | 0.02 | 0.01 | <0.03 | <0.03 | <0.03 | | 0.3 | nd | nd | nd | nd | <0.1 | <0.1 |
| Orthophosphate(as P) | | | | | | | | <0.05 | | <0.05 | | 0.5 | nd | nd | nd | nd | | |
| pH | 6.5-8.5 [OG] | 7.34 | 7.37 | 7.08 | 7.07 | 7.21 | 7.24 | 7.24 | 7.25 | 6.97 | 7.3 | 7.15 | 7.13 | 7.89 | 7.2 | 7.46 | 7.06 | 7.13 |
| Phenols | | <0.001 | 0.003 | 0.002 | <0.001 | 0.0042 | 0.0042 | 0.001 | | <0.001 | | | 0.02 | 0.001 | 0.002 | nd | | |
| Phosphorus, Total (as P) | | 0.007 | 0.007 | 0.009 | 0.007 | 0.04 | 0.05 | 0.274 | | 0.33 | 56.8 | 61.2 | 0.02 | nd | nd | | | |
| Potassium | | | | 19.3 | 23 | 24.9 | 24.4 | 17.9 | | 27.6 | | | 59.1 | 46.7 | 21 | 21 | | |
| Sodium | 200 [AO] | | | 71.5 | 79 | 55 | 49.4 | 43.1 | | 70.9 | 77.6 | 92.3 | 56.5 | 21.1 | 21.1 | 23.1 | 129 | 130 |
| Sulphate | 500 [AO] | | | 1402 | 1083 | 1190 | 1085 | 1130 | | 1160 | 1570 | 1510 | 1100 | 493 | 150 | 138 | 321 | 314 |
| Total Kjeldahl Nitrogen(as N) | | 0.52 | 0.8 | 0.6 | 0.43 | 0.51 | 0.57 | 0.69 | | 0.74 | 1.58 | 0.61 | 0.45 | 0.47 | 0.65 | 0.2 | 0.31 | 0.27 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 6

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 6 (Dup) 18-Oct-01 002 | TH 6 18-Jun-02 005 | TH 6 (Dup) 18-Jun-02 006 | TH 6 22-Oct-02 004 | TH 6 (Dup) 22-Oct-02 005 | TH 6 20-May-03 007 | TH 6 1-Oct-03 002 | TH 6 5-May-04 005 | TH 6 29-Sep-04 013 | TH 6 (dup) 29-Sep-04 014 | TH 6 6-Apr-05 002 | TH 6 21-Sep-05 003 | TH 6 4-Apr-06 008 | TH 6 (dup) 4-Apr-06 009 | TH 6 25-Sep-06 012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 713 | 745 | 740 | 640 | 639 | 672 | 651 | 588 | 582 | 573 | 580 | 532 | 520 | 525 | 543 |
| Ammonia(as N) | | 0.02 | 0.1 | 0.11 | 0.09 | 0.08 | <0.01 | 0.02 | 0.04 | 0.05 | 0.05 | 0.02 | 0.02 | <0.01 | <0.01 | <0.01 |
| Calcium | | 140 | 97.9 | 122 | 172 | 170 | 181 | 210 | 194 | 216 | 216 | 314 | 250 | 327 | 329 | 292 |
| Chloride | 250 [AO] | 176 | 61 | 61.1 | 56.3 | 56.3 | 78.7 | 70.5 | 83 | 106 | 106 | 141 | 104 | 118 | 118 | 97.3 |
| Conductivity @25øC (µmho/cm) | | 2260 | 1847 | 1841 | 1660 | 1660 | 1730 | 1650 | 1380 | 1600 | 1590 | 2130 | 1870 | 2160 | 2130 | 1980 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | 2.2 | 2.1 | 2.2 | 2.5 | 2.0 | 4 | 1.6 | 1.7 | 1.7 | 2.2 | 12.6 | 6.3 | 9.2 | 7 |
| Hardness(as CaCO3) | 80-100 [OG] | 1069 | 869 | 1090 | 1129 | 1124 | 1011 | 973 | 925 | 930 | 929 | 1240 | 962 | 1300 | 1310 | 1190 |
| Iron | 0.3 [AO] | 0.02 | <0.01 | <0.01 | <0.02 | <0.02 | 0.68 | 0.007 | <0.005 | <0.005 | <0.005 | 0.014 | <0.005 | <0.005 | <0.005 | <0.005 |
| Magnesium | | 175 | 152 | 191 | 170 | 170 | 136 | 109 | 107 | 94.7 | 94.6 | 110 | 82 | 118 | 118 | 113 |
| Manganese | 0.05 [AO] | | 0.049 | 0.047 | 0.08 | 0.08 | 0.06 | 0.069 | 0.054 | 0.085 | 0.085 | 0.127 | 0.101 | 0.153 | 0.154 | 0.14 |
| Nitrate(as N) | 10 | 0.9 | 0.7 | 0.7 | 0.4 | 0.4 | 0.2 | 0.3 | 0.9 | 0.7 | 0.7 | 0.7 | 3.6 | 4.8 | 4.8 | 5.5 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.2 |
| Orthophosphate(as P) | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.02 | 7.06 | 7.11 | 8.09 | 8.08 | 7.46 | 8.04 | 7.5 | 7.11 | 7.1 | 7.08 | 7.15 | 7.64 | 7.57 | 6.88 |
| Phenols | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | | 0.13 | <0.1 | 0.51 | 0.51 | 1.09 | 0.21 | 0.49 | 0.33 | 0.28 | 0.06 | 1.89 | 0.06 | 0.08 | 0.32 |
| Potassium | | | 17.9 | 17.4 | 16.8 | 17.2 | 21.0 | 18.5 | 13.8 | 11.5 | 11.4 | 10.6 | 7.4 | 7.3 | 7.4 | 6.3 |
| Sodium | 200 [AO] | 120 | 47.6 | 49.1 | 27.1 | 27.6 | 42.9 | 37.3 | 29.1 | 30.4 | 30.4 | 53.5 | 42.2 | 48.7 | 48.7 | 42.5 |
| Sulphate | 500 [AO] | 318 | 301 | 302 | 280 | 279 | 364 | 362 | 280 | 320 | 330 | 590 | 390 | 690 | 680 | 620 |
| Total Kjeldahl Nitrogen(as N) | | 0.23 | 0.28 | 0.3 | 0.3 | 0.26 | <0.05 | 0.18 | 0.35 | 0.16 | 0.2 | 0.25 | 0.48 | 0.37 | 0.37 | 0.48 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 6

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 6 13-Apr-07 004 | TH 6 9-Oct-07 003 | TH 6 15-Apr-08 004 | TH 6 (dup) 15-Apr-08 005 | TH 6 17-Sep-08 004 | TH 6 30-Apr-09 | TH 6 (dup) 30-Apr-09 Duplicate #1 | TH 6 1-Oct-09 | TH 6 12-May-10 | TH 6 (dup) 12-May-10 Duplicate #2 | TH 6 9-Nov-10 | TH 6 2-May-11 | TH 6 (dup) 2-May-11 Duplicate #1 | TH 6 21-Sep-11 | TH 6 (dup) 21-Sep-11 Duplicate #1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 520 | 528 | 525 | 550 | 575 | 588 | 571 | 573 | 602 | 601 | 592 | 576 | 573 | 546 | 527 |
| Ammonia(as N) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | 0.02 | 0.01 | 0.21 | 0.28 | 0.27 | 0.29 | 0.27 |
| Calcium | | 321 | 248 | 275 | 280 | 224 | 289 | 289 | 180 | 166 | 189 | 148 | 147 | 147 | 140 | 137 |
| Chloride | 250 [AO] | 121 | 91.3 | 116 | 117 | 94.5 | 124 | 124 | 93.6 | 79.9 | 80.9 | 59.8 | 49.8 | 49.7 | 62.4 | 62.0 |
| Conductivity @25øC (µmho/cm) | | 2250 | 1660 | 2230 | 2240 | 1970 | 2210 | 2210 | 1910 | 1950 | 1890 | 1650 | 1600 | 1600 | 1560 | 1540 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 2.6 | 1.9 | 2 | 2 | 1.6 | 1.7 | 1.5 | 2.2 | 2.3 | 2.3 | 2.8 | 2.4 | 2.3 | 2.7 | 2.7 |
| Hardness(as CaCO3) | 80-100 [OG] | 1330 | 998 | 1180 | 1200 | 934 | 1240 | 1240 | 807 | 889 | 877 | 700 | 675 | 671 | 641 | 631 |
| Iron | 0.3 [AO] | <0.005 | 0.016 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| Magnesium | | 128 | 92 | 120 | 122 | 90.7 | 125 | 125 | 87.1 | 94.2 | 93.2 | 80.3 | 74.6 | 74.2 | 71.1 | 69.9 |
| Manganese | 0.05 [AO] | 0.167 | 0.159 | 0.204 | 0.207 | 0.181 | 0.173 | 0.172 | 0.156 | 0.141 | 0.139 | 0.143 | 0.138 | 0.137 | 0.146 | 0.143 |
| Nitrate(as N) | 10 | 5.4 | 2.9 | 3 | 3 | 2.8 | 1.4 | 1.4 | 0.8 | 0.5 | 0.5 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | | | | | | | | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.01 | 6.85 | 6.65 | 6.7 | 6.9 | 6.49 | 6.64 | 6.99 | 7.46 | 7.42 | 6.82 | 7.46 | 7.44 | 7.37 | 7.42 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.41 | 0.04 | 0.25 | 0.23 | 0.18 | 0.67 | 0.67 | 1.43 | 0.38 | 0.39 | 0.41 | 0.07 | 0.08 | 0.56 | 0.41 |
| Potassium | | 6.5 | 6.6 | 9.5 | 9.7 | 21.6 | 49.1 | 49 | 55.4 | 83.2 | 82.3 | 89.4 | 80.3 | 79.6 | 74.3 | 73.0 |
| Sodium | 200 [AO] | 47.3 | 38 | 49.3 | 49.1 | 38.8 | 53.9 | 54 | 35.2 | 43.2 | 42.7 | 48.2 | 45.7 | 45.4 | 49.0 | 48.1 |
| Sulphate | 500 [AO] | 720 | 540 | 690 | 680 | 490 | 610 | 600 | 430 | 440 | 440 | 303 | 228 | 225 | 190 | 192 |
| Total Kjeldahl Nitrogen(as N) | | 0.41 | 0.3 | 0.3 | 0.29 | 0.29 | 0.53 | 0.41 | 0.18 | 0.25 | 0.26 | 0.42 | 0.29 | 0.34 | 0.48 | 0.50 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 6

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 6 12-Apr-12 | TH 6 (dup) 12-Apr-12 Duplicate #1 | TH 6 22-Nov-12 | TH 6 7-May-13 | TH 6 26-Nov-13 | TH 6 1-May-14 | TH 6 4-Nov-14 | TH 6 20-Apr-15 | TH 6 3-Nov-15 | TH6 20-Apr-16 | TH 6 26-Oct-16 | TH6 16-May-17 | TH 6 7-Dec-17 | TH6 10-Apr-18 | TH 6 15-Nov-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 545 | 535 | 527 | 510 | 590 | 630 | 700 | **770** | 780 | **770** | 740 | 740 | 800 | 840 | 820 |
| Ammonia(as N) | | 0.20 | 0.20 | 0.11 | 0.5 | 0.53 | 1.6 | 3.1 | 2 | 2.1 | 2.9 | 4.3 | 4.7 | 9.1 | 8.6 | 12 |
| Calcium | | 133 | 136 | 114 | 110 | 100 | 110 | 130 | 120 | 110 | 120 | 100 | 110 | 120 | 140 | 130 |
| Chloride | 250 [AO] | 93.8 | 94.6 | 86.8 | 78 | 69 | 76 | 94 | 86 | 73 | 59 | 70 | 73 | 85 | 72 | 73 |
| Conductivity @25øC (µmho/cm) | | 1520 | 1520 | 1350 | 1300 | 1300 | 1400 | 1600 | 1700 | 1600 | 1600 | 1600 | 1700 | 1700 | 1800 | 1700 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 4.1 | 4.3 | 4.8 | 4.8 | 6 | 6.7 | 6.5 | 7.2 | 7.3 | 6.2 | 6 | 6.5 | 6.3 | 7.1 | 6.9 |
| Hardness(as CaCO3) | 80-100 [OG] | 608 | 616 | 523 | 490 | 470 | 540 | 720 | **730** | **670** | **710** | **670** | 700 | 740 | 790 | 760 |
| Iron | 0.3 [AO] | <0.005 | <0.005 | 0.009 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <100 | <0.1 | <0.10 | <0.10 | <0.1 | <0.1 |
| Magnesium | | 66.7 | 67.4 | 57.7 | 55 | 52 | 68 | 97 | 110 | 98 | 100 | 100 | 100 | 110 | 110 | 110 |
| Manganese | 0.05 [AO] | 0.151 | 0.151 | 0.311 | 0.16 | 0.41 | 0.23 | 0.34 | **0.32** | **0.34** | **0.46** | **0.48** | 0.57 | 1.1 | 1.1 | 0.91 |
| Nitrate(as N) | 10 | 0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | 0.19 | 1.25 | 2.43 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | <0.1 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.042 | <0.10 | 0.017 | <0.010 | 0.031 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | 0.027 | <0.010 | 0.013 |
| pH | 6.5-8.5 [OG] | 7.68 | 7.79 | 7.72 | 7.82 | 7.85 | 7.84 | 7.78 | 7.69 | 7.86 | 7.82 | 7.83 | 7.67 | 7.63 | 7.66 | 7.4 |
| Phenols | | <0.001 | <0.001 | <0.001 | 0.0011 | <0.001 | <0.001 | <0.001 | 0.0031 | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 0.31 | 0.32 | 0.79 | 0.027 | <0.02 | <0.02 | 0.062 | 0.029 | 0.044 | <0.02 | <0.1 | <0.020 | <0.1 | 0.091 | 0.033 |
| Potassium | | 75.6 | 76.2 | 74.3 | 64 | 58 | 58 | 69 | 61 | 52 | 66 | 57 | 57 | 57 | 62 | 59 |
| Sodium | 200 [AO] | 58.1 | 59.0 | 66.3 | 68 | 51 | 64 | 84 | 82 | 70 | 69 | 62 | 60 | 62 | 69 | 61 |
| Sulphate | 500 [AO] | 156 | 157 | 99 | 59 | 35 | 27 | 34 | 34 | 37 | 46 | 54 | 78 | 78 | 100 | 95 |
| Total Kjeldahl Nitrogen(as N) | | 0.51 | 0.51 | 0.79 | 0.98 | 1.1 | 2.1 | 3.5 | 2.5 | 2.9 | 3.5 | 5.3 | 7.1 | 10 | 9.3 | 12 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 6

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH6 24-Apr-19 | TH 6 20-Nov-19 | TH6 13-May-20 | TH 6 12-Nov-20 | TH6 8-Apr-21 | TH 6 7-Oct-21 | TH6 3-May-22 | TH 6 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 820 | 740 | 810 | 880 | 800 | 800 | 820 | 780 |
| Ammonia(as N) | | 17 | 12 | 17 | 35 | 17 | 17 | 17 | 19 |
| Calcium | | 140 | 120 | 140 | 130 | 140 | 160 | 150 | 160 |
| Chloride | 250 [AO] | 75 | 41 | 72 | 80 | 47 | 90 | 45 | 80 |
| Conductivity @25øC (µmho/cm) | | 2000 | 1600 | 1700 | 1900 | 1700 | 1800 | 1800 | 1800 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 7.9 | 5.8 | 6.4 | 9.2 | 7.9 | 8.0 | 8.4 | 8.4 |
| Hardness(as CaCO3) | 80-100 [OG] | 850 | 670 | 780 | 740 | 730 | 820 | 770 | 780 |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 120 | 94 | 100 | 98 | 94 | 100 | 94 | 95 |
| Manganese | 0.05 [AO] | 1.7 | 1.4 | 2.2 | 2.2 | 2.6 | 2.8 | 3.0 | 2.9 |
| Nitrate(as N) | 10 | <0.10 | 1.68 | 0.49 | 0.18 | <0.10 | 1.57 | 0.49 | 1.36 |
| Nitrite(as N) | 1 | <0.010 | 0.015 | <0.010 | 0.079 | 0.180 | 0.096 | 0.013 | 0.016 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | 1.2 | 0.022 | 0.018 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.66 | 7.45 | 7.83 | 7.65 | 8.08 | 7.68 | 7.53 | 7.56 |
| Phenols | | <0.0010 | <0.0010 | 0.0012 | 0.066 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 0.047 | 0.042 | 0.072 | 2.1 | 0.26 | NV | NV | 0.19 |
| Potassium | | 68 | 65 | 68 | 61 | 58 | 64 | 60 | 60 |
| Sodium | 200 [AO] | 68 | 49 | 56 | 58 | 57 | 62 | 53 | 51 |
| Sulphate | 500 [AO] | 130 | 100 | 98 | 82 | 100 | 100 | 130 | 110 |
| Total Kjeldahl Nitrogen(as N) | | 18 | 14 | 16 | 34 | 17 | 18 | NV | 18 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 7

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 7 27-Apr-93 | TH 7 4-Oct-93 | TH 7 13-Jun-94 | TH 7 7-Nov-94 | TH 7 19-Jun-95 | TH 7 30-Oct-95 | TH 7 27-May-96 | TH 7 15-Nov-96 | TH 7 15-Nov-96 Replicate | TH 7 9-May-97 | TH 7 19-Dec-97 | TH 7 13-May-98 | TH 7 18-Dec-98 | TH 7 11-Jul-00 | TH 7 21-Dec-00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 296 | 283 | 312 | 292 | 335 | 327 | 292 | 347 | | 308 | 501 | 535 | 563 | 732 | 722 |
| Ammonia(as N) | | 0.056 | 0.104 | 0.011 | 1.2 | 0.03 | 0.36 | <0.05 | 0.06 | | 0.16 | 0.04 | 0.41 | 2.21 | 12.6 | 11.8 |
| Calcium | | 74.7 | 78.4 | 66.6 | 93.3 | 72.9 | 85.9 | 79 | 92 | 91 | 69.7 | 79.8 | 90.8 | 107 | 121 | 139 |
| Chloride | 250 [AO] | 5.4 | 5.5 | 4.3 | 12.7 | 9.3 | 20.8 | 18.6 | 38.8 | | 25.5 | 37 | 30.6 | 53.7 | 34.5 | 24.9 |
| Conductivity @25øC (µmho/cm) | | 640 | 747 | 682 | 717 | 632 | 693 | 548 | 677 | | 583 | 937 | 960 | 1010 | 1260 | 1100 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 2.4 | 0.5 | 7.3 | 8.9 | 8.7 | 3.6 | 1.6 | 3.9 | | 2.8 | 5.2 | 3.7 | 5.3 | 8.1 | 4.4 |
| Hardness(as CaCO3) | 80-100 [OG] | 329 | 354 | 282 | 383 | 308 | 341 | 306 | 369 | | 297 | 498 | 491 | 534 | 643 | 601 |
| Iron | 0.3 [AO] | 0.05 | 0.07 | <0.01 | <0.01 | <0.01 | 0.08 | 0.069 | <0.005 | <0.005 | 0.016 | 0.056 | 0.064 | 0.07 | 0.05 | 0.01 |
| Magnesium | | 34.6 | 38.3 | 28.1 | 36.4 | 30.6 | 30.6 | 26.4 | 34.9 | 34.6 | 29.4 | 72.7 | 64.3 | 64.6 | 82.6 | 61.7 |
| Manganese | 0.05 [AO] | | | <0.003 | <0.003 | <0.003 | 0.042 | 0.017 | <0.005 | <0.005 | | | 0.856 | 0.9 | 1.47 | 1.06 |
| Nitrate(as N) | 10 | 2.1 | 1.2 | 0.5 | 0.3 | 0.4 | 0.2 | 0.27 | 0.07 | | 2.31 | 0.03 | nd | 0.2 | 0.4 | 0.5 |
| Nitrite(as N) | 1 | 0.07 | <0.01 | <0.01 | 0.02 | <0.01 | 0.02 | <0.03 | <0.03 | | | | nd | nd | nd | nd |
| Orthophosphate(as P) | | | | | | | | <0.05 | <0.05 | | | | nd | nd | nd | nd |
| pH | 6.5-8.5 [OG] | 7.66 | 7.55 | 7.45 | 7.4 | 7.7 | 7.71 | 7.56 | 7.41 | | 7.6 | 52.3 | 7.57 | 8 | 7.12 | 7.46 |
| Phenols | | <0.001 | - | 0.0114 | <0.001 | <0.001 | 0.0039 | <0.001 | <0.001 | | | | 0.02 | 0.001 | 0.001 | nd |
| Phosphorus, Total (as P) | | 0.005 | 0.005 | 0.006 | 0.002 | 0.03 | 0.03 | 0.29 | 1 | | | | 0.04 | 0.01 | nd | |
| Potassium | | | | 0.5 | 0.61 | 0.5 | 0.68 | <1 | <1 | <1 | | | 3.8 | 11.9 | 23 | 31 |
| Sodium | 200 [AO] | | | 2.3 | 8.7 | 7.3 | 11.5 | 9.45 | 21.5 | 21.2 | 19.2 | 31.1 | 18.5 | 36.9 | 38.4 | 21.9 |
| Sulphate | 500 [AO] | | | 18.4 | 5.4 | 5.8 | 3.3 | 3.33 | 0.91 | | 1.93 | 2.5 | 9 | 8.7 | 12.6 | 9.6 |
| Total Kjeldahl Nitrogen(as N) | | 0.34 | 0.33 | 0.21 | | 0.25 | 0.73 | 0.3 | 0.4 | | 0.85 | 0.45 | 0.88 | 2.8 | 14.2 | 17 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 7

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 7 11-Jul-01 | TH 7 18-Oct-01 | TH 7 18-Jun-02 | TH 7 22-Oct-02 | TH 7 20-May-03 | TH 7 20-May-03 | TH 7 1-Oct-03 | TH 7 5-May-04 | TH 7 (dup) 5-May-04 | TH 7 29-Sep-04 | TH 7 (dup) 29-Sep-04 | TH 7 6-Apr-05 | TH 7 (dup) 6-Apr-05 | TH 7 21-Sep-05 | TH 7 (dup) 21-Sep-05 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 652 | 662 | 555 | 615 | 555 | 543 | 462 | 504 | 504 | 540 | 619 | 444 | 442 | 619 | 615 |
| Ammonia(as N) | | 5.66 | 10.6 | 4.42 | 6.68 | 3.24 | 3.30 | 6.17 | 7.82 | 8.05 | 2.35 | 2.37 | 2.51 | 2.48 | 2.43 | 2.43 |
| Calcium | | 137 | | 119 | 172 | 124 | 125 | 91.6 | 115 | 116 | 133 | 132 | 120 | 120 | 192 | 195 |
| Chloride | 250 [AO] | 17.1 | 17.3 | 9.7 | 21.8 | 15.3 | 15.4 | 10.9 | 12.9 | 13.5 | 8.1 | 7.9 | 4.4 | 4.5 | 10.1 | 10.1 |
| Conductivity @25øC (µmho/cm) | | 1194 | 1244 | 1045 | 1160 | 1010 | 1020 | 918 | 770 | 775 | 907 | 905 | 880 | 882 | 1110 | 1110 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | | 2.1 | 3.6 | 2.0 | 2.0 | 5 | 2 | 2.2 | 1.7 | 1.8 | 1.3 | 1.3 | 18.4 | 19.7 |
| Hardness(as CaCO3) | 80-100 [OG] | 626 | | 496 | 637 | 507 | 510 | 421 | 494 | 497 | 505 | 499 | 464 | 467 | 672 | 684 |
| Iron | 0.3 [AO] | <0.01 | <0.01 | <0.01 | 0.1 | 0.28 | 0.28 | 0.005 | 0.01 | 0.005 | <0.005 | <0.005 | 0.008 | <0.005 | <0.005 | <0.005 |
| Magnesium | | 69.0 | | 48.3 | 50.3 | 48.0 | 48.1 | 46.8 | 50.2 | 50.4 | 41.8 | 41.3 | 40.2 | 40.4 | 46.9 | 47.7 |
| Manganese | 0.05 [AO] | | | 0.667 | 0.89 | 0.77 | 0.78 | 0.667 | 0.7 | 0.699 | 0.692 | 0.638 | 0.524 | 0.535 | 0.783 | 0.795 |
| Nitrate(as N) | 10 | 4.2 | | 2.8 | 0.6 | 12.1 | 12.1 | 3.5 | 12 | 12.4 | 3.1 | 3.2 | 10.6 | 10.6 | 1.3 | 1.3 |
| Nitrite(as N) | 1 | 0.1 | | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | <0.1 | 0.2 | <0.1 | <0.1 | 0.1 | 0.2 | <0.1 | <0.1 |
| Orthophosphate(as P) | | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.13 | 7.06 | 6.89 | 7.82 | 7.30 | 7.37 | 8.1 | 7.58 | 7.57 | 7.17 | 7.21 | 7.24 | 7.23 | 7.15 | 7.04 |
| Phenols | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | | 0.02 | 0.54 | 1.76 | 0.66 | 0.65 | 0.25 | 0.2 | 0.19 | 0.09 | 0.27 | 0.35 | 0.48 | 0.31 | 0.28 |
| Potassium | | | | 22.5 | 21.7 | 18.7 | 18.7 | 24.7 | 24.5 | 24.6 | 18.2 | 17.9 | 14.2 | 14.3 | 19.3 | 19.8 |
| Sodium | 200 [AO] | 20.7 | | 11.3 | 22 | 19.7 | 19.7 | 10.1 | 11.5 | 11.6 | 9.5 | 9.2 | 5.4 | 5.5 | 11.7 | 11.9 |
| Sulphate | 500 [AO] | 9.7 | | 9.4 | 5 | 7 | 7 | 8 | 9 | 9 | 5 | 5 | 7 | 7 | 4 | 4 |
| Total Kjeldahl Nitrogen(as N) | | 5.69 | | 5.2 | 7.47 | 4.22 | 3.97 | 7.58 | 7.93 | 8.1 | 2.89 | 2.95 | 2.59 | 2.56 | 3.28 | 3.33 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 7

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 7 4-Apr-06 | TH 7 25-Sep-06 | TH 7 (dup) 25-Sep-06 | TH 7 13-Apr-07 | TH 7 9-Oct-07 | TH 7 (dup) 9-Oct-07 | TH 7 15-Apr-08 | TH 7 17-Sep-08 | TH 7 (dup) 17-Sep-08 | TH 7 30-Apr-09 | TH 7 1-Oct-09 | TH 7 12-May-10 | TH 7 9-Nov-10 | TH 7 (dup) 9-Nov-10 Dup#2 | TH 7 2-May-11 | TH 7 21-Sep-11 | TH 7 (dup) 21-Sep-11 Duplicate #2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 605 | 681 | 672 | 468 | 660 | 700 | 490 | 448 | 450 | | 599 | 475 | 482 | 484 | 511 | 578 | 577 |
| Ammonia(as N) | | 5.63 | 0.49 | 0.48 | 2.24 | 3.1 | 3.08 | 2.79 | 0.87 | 0.86 | 1.13 | 1.38 | 1.73 | 0.16 | 0.16 | 1.89 | 0.27 | 0.26 |
| Calcium | | 160 | 175 | 170 | 127 | 155 | 155 | 131 | 116 | 115 | 145 | 143 | 134 | 137 | 139 | 149 | 162 | 163 |
| Chloride | 250 [AO] | 12.9 | 17.3 | 17.3 | 5.5 | 14 | 14 | 6.6 | 5.3 | 5 | | 9.6 | 5.6 | 4.3 | 4.3 | 4.8 | 6.8 | 6.8 |
| Conductivity @25øC (µmho/cm) | | 1050 | 1090 | 1090 | 920 | 1060 | 1060 | 967 | 794 | 806 | | 1060 | 918 | 875 | 869 | 1000 | 1110 | 1090 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 9.4 | 8.2 | 12.9 | 2 | 4.1 | 4.3 | 2.2 | 1.7 | 1.7 | 1.5 | 2.7 | 1.9 | 1.8 | 2.0 | 2.0 | 3.7 | 3.5 |
| Hardness(as CaCO3) | 80-100 [OG] | 610 | 627 | 611 | 477 | 558 | 557 | 489 | 423 | 419 | 526 | 505 | 470 | 487 | 492 | 515 | 569 | 570 |
| Iron | 0.3 [AO] | <0.005 | <0.005 | <0.005 | <0.005 | 0.01 | 0.008 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| Magnesium | | 51 | 46.1 | 45.3 | 38.7 | 41.4 | 41.2 | 39.2 | 32.4 | 32.3 | 39.8 | 36 | 32.6 | 35 | 35.3 | 34.8 | 40.0 | 39.5 |
| Manganese | 0.05 [AO] | 0.965 | 0.995 | 0.994 | 0.562 | 0.875 | 0.857 | 0.6 | 0.508 | 0.501 | 0.396 | 0.391 | 0.508 | 0.773 | 0.783 | 0.405 | 0.451 | 0.467 |
| Nitrate(as N) | 10 | 4 | 0.9 | 0.9 | 12.4 | 1 | 1 | 7 | 3 | 3 | | 1 | 6.8 | 2.0 | 2.0 | 5.2 | 0.6 | 0.6 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | | | | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.61 | 6.79 | 6.78 | 7.18 | 7.01 | 6.99 | 6.92 | 7 | 6.99 | | 6.94 | 7.49 | 6.76 | 6.75 | 7.41 | 7.20 | 7.20 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.27 | 0.24 | 0.21 | 0.36 | 0.08 | 0.08 | 0.18 | 0.2 | 0.22 | 0.27 | 0.15 | 0.05 | 0.13 | 0.11 | 0.10 | 0.34 | 0.35 |
| Potassium | | 27.1 | 13.5 | 13.4 | 22.2 | 21 | 20.9 | 21.3 | 13.2 | 13.1 | 13 | 14.4 | 9.5 | 10.5 | 10.6 | 15.7 | 11.1 | 10.9 |
| Sodium | 200 [AO] | 16.5 | 17.6 | 17.5 | 7 | 16.7 | 16.9 | 10.7 | 5.9 | 5.8 | 5.1 | 10 | 5.9 | 4.5 | 4.6 | 4.9 | 9.0 | 8.9 |
| Sulphate | 500 [AO] | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 7 | 7 | | 11 | 10 | 5 | 5 | 9 | 7 | 7 |
| Total Kjeldahl Nitrogen(as N) | | 6.37 | 0.96 | 0.91 | 2.7 | 3.83 | 3.72 | 3.49 | 1.27 | 1.27 | 1.43 | 1.87 | 2.1 | 0.29 | 0.36 | 2.29 | 0.63 | 0.62 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 7

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 7 12-Apr-12 | TH 7 22-Nov-12 | TH 7 22-Nov-12 Duplicate #1 | TH 7 7-May-13 | TH 7 26-Nov-13 | TH 7 1-May-14 | TH 7 4-Nov-14 | TH 7 20-Apr-15 | TH 7 3-Nov-15 | TH7 20-Apr-16 | TH 7 26-Oct-16 | TH7 16-May-17 | TH 7 7-Dec-17 | TH7 10-Apr-18 | TH 7 15-Nov-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 454 | 605 | 630 | 470 | 400 | 630 | 460 | **420** | **510** | **430** | **450** | 570 | 540 | 580 | 540 |
| Ammonia(as N) | | 0.41 | 7.16 | 6.51 | 1.6 | <0.05 | 1.6 | <0.05 | 0.069 | 2.2 | 0.52 | 0.61 | 3.8 | 0.066 | 0.32 | 1.9 |
| Calcium | | 130 | 166 | 165 | 140 | 120 | 120 | 140 | 150 | 150 | 130 | 130 | 150 | 150 | 170 | 150 |
| Chloride | 250 [AO] | 4.5 | 7.3 | 7.7 | 6 | 4 | 7.6 | 5 | 7 | 7.8 | 8.7 | 8.5 | 7.0 | 3.4 | 7.1 | 7.3 |
| Conductivity @25øC (µmho/cm) | | 873 | 1060 | 1070 | 940 | 800 | 1400 | 890 | 820 | 970 | 820 | 870 | 1100 | 960 | 1000 | 960 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.5 | 3.9 | 3.1 | 1.8 | 1.3 | 6.7 | 1.7 | 1.8 | 1.8 | 1.3 | 1.9 | 1.7 | 1.3 | 1.8 | 2.1 |
| Hardness(as CaCO3) | 80-100 [OG] | 479 | 571 | 569 | 480 | 420 | 540 | 470 | **520** | **510** | **460** | **450** | 550 | 550 | 580 | 510 |
| Iron | 0.3 [AO] | <0.005 | <0.005 | <0.005 | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 | <0.1 |
| Magnesium | | 37.6 | 37.9 | 37.9 | 34 | 30 | 29 | 34 | 36 | 34 | 31 | 32 | 40 | 40 | 39 | 34 |
| Manganese | 0.05 [AO] | 0.317 | 0.793 | 0.811 | 0.6 | 0.12 | 0.69 | 0.097 | 0.047 | 0.11 | 0.037 | 0.0059 | 0.14 | 0.15 | 0.1 | 0.19 |
| Nitrate(as N) | 10 | 5.8 | 1.5 | 1.5 | 5.9 | 6.7 | ND | 3.79 | 5.67 | 3.69 | 4.37 | 4.25 | 5.48 | 4.83 | 3.73 | 2.63 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | <0.1 | 0.016 | 0.041 | ND | <0.1 | <0.10 | 0.014 | <0.010 | 0.024 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | 0.012 | ND | <0.01 | <0.10 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.65 | 7.41 | 7.49 | 7.54 | 7.89 | 7.84 | 7.73 | 7.83 | 7.71 | 7.88 | 7.67 | 7.49 | 7.76 | 7.53 | 7.47 |
| Phenols | | <0.001 | <0.001 | <0.001 | 0.001 | <0.001 | ND | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 0.13 | 0.38 | 0.43 | <0.02 | <0.02 | ND | 0.029 | 0.045 | 0.072 | 0.023 | <0.1 | <0.020 | <0.1 | 0.053 | <0.020 |
| Potassium | | 9.6 | 17.1 | 17.0 | 15 | 6.2 | 7.9 | 6.1 | 5.8 | 9.2 | 11 | 7.8 | 18 | 5.1 | 9.6 | 9.2 |
| Sodium | 200 [AO] | 3.7 | 8.6 | 8.6 | 6.3 | 4.5 | 3.3 | 4.7 | 4.1 | 7.1 | 3.9 | 5 | 6.4 | 3.7 | 6.1 | 7.3 |
| Sulphate | 500 [AO] | 8 | 10 | 10 | 10 | 9 | 27 | 8 | 7 | 9.2 | 5.8 | 6.4 | 8.8 | 7.1 | 9 | 8.1 |
| Total Kjeldahl Nitrogen(as N) | | 0.53 | 7.29 | 7.76 | 2.3 | 0.22 | 2.1 | 0.19 | 0.23 | 2.6 | 0.79 | 0.9 | 5.4 | <0.20 | 1 | 1.7 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 7

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH7 24-Apr-19 | TH 7 20-Nov-19 | TH7 13-May-20 | TH 7 12-Nov-20 | TH7 8-Apr-21 | TH 7 7-Oct-21 | TH7 3-May-22 | TH 7 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 470 | 520 | 560 | 530 | 520 | 460 | 550 | 430 |
| Ammonia(as N) | | 3.2 | 1.6 | 2.1 | 0.31 | 0.069 | 0.075 | 2.3 | <0.050 |
| Calcium | | 180 | 150 | 180 | 150 | 180 | 140 | 160 | 130 |
| Chloride | 250 [AO] | 6.2 | 7 | 13.0 | 7.4 | 130.0 | 10 | 18 | 11 |
| Conductivity @25øC (µmho/cm) | | 1100 | 980 | 1000 | 980 | 1400 | 860 | 1100 | 870 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.6 | 1.6 | 2 | 1.7 | 1.9 | 1.4 | 1.8 | 1.8 |
| Hardness(as CaCO3) | 80-100 [OG] | 600 | 520 | 640 | 520 | 650 | 510 | 560 | 460 |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 39 | 36 | 44 | 36 | 47 | 36 | 36 | 36 |
| Manganese | 0.05 [AO] | 0.13 | 0.02 | 0.079 | 0.11 | 0.15 | 0.13 | 0.01 | 0.021 |
| Nitrate(as N) | 10 | 6.18 | 6.83 | 12.9 | 3.54 | 10.2 | 5.51 | 5.93 | 6.96 |
| Nitrite(as N) | 1 | <0.010 | 0.024 | 0.011 | <0.010 | 0.035 | 0.058 | 0.016 | <0.010 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.59 | 7.56 | 7.76 | 7.65 | 7.79 | 7.68 | 7.51 | 7.79 |
| Phenols | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | <0.020 | <0.020 | <0.020 | 0.033 | <0.020 | NV | NV | <0.020 |
| Potassium | | 12 | 9.1 | 9.6 | 5.2 | 5.6 | 5.4 | 8 | 3.1 |
| Sodium | 200 [AO] | 5.5 | 5.8 | 8 | 5.8 | 46 | 7.3 | 18 | 15 |
| Sulphate | 500 [AO] | 8.3 | 7.9 | 12 | 9.1 | 14 | 12 | 12 | 16 |
| Total Kjeldahl Nitrogen(as N) | | 2.9 | 2 | 2.1 | 0.39 | <0.50 | 0.27 | NV | 0.25 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH-8

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 8 27-Apr-93 | TH 8 4-Oct-93 | TH 8 13-Jun-94 | TH 8 7-Nov-94 | TH 8 19-Jun-95 | TH 8 30-Oct-95 | TH 8 27-May-96 | TH 8 15-Nov-96 | TH 8 9-May-97 | TH 8 19-Dec-97 | TH 8 13-May-98 | TH 8 18-Dec-98 | TH 8 11-Jul-00 | TH 8 21-Dec-00 | TH 8 11-Jul-01 | TH 8 (Dup 11-Jul-01 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 829 | 1387 | 913 | 812 | 788 | 810 | 759 | 741 | 703 | 723 | 736 | 757 | 774 | 795 | 757 | 769 |
| Ammonia(as N) | | 4.7 | 13.6 | 18.9 | 19.7 | 17.8 | 23.3 | 12.6 | 17.6 | | 13 | 14.1 | 18.2 | 6 | 11 | 12.6 | 10.1 |
| Calcium | | 88.5 | 55.4 | 78 | 95.6 | 96.4 | 92.5 | 121 | 128 | 139 | 138 | 147 | 135 | 194 | 190 | 203 | 205 |
| Chloride | 250 [AO] | 75.1 | 75.3 | 60.2 | 53.6 | 43.8 | 52.5 | 33.2 | 35.1 | 45.2 | 15.2 | 21.4 | 24.3 | 19.4 | 21 | 16.2 | 16.3 |
| Conductivity @25øC (µmho/cm) | | 1630 | 1700 | 1700 | 1710 | 1550 | 1550.0 | 1290 | 1220 | 1250 | 1160 | 1290 | 1250 | 1200 | 1160 | 1343 | 1347 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 24 | 22.5 | 32 | >20 | 16.3 | 20 | 10.3 | 10.3 | 9.6 | 7.2 | 8.5 | 15.9 | 18.6 | 10.6 | | |
| Hardness(as CaCO3) | 80-100 [OG] | 751 | 677 | 630 | 724 | 669 | 631 | 639 | 628 | 598 | 624 | 600 | 601 | 644 | 656 | 691 | 702 |
| Iron | 0.3 [AO] | 0.48 | 0.07 | 4.41 | 4.43 | 11 | 1.91 | 2.72 | 4.18 | 1.6 | 2.16 | 4.35 | 0.08 | 0.01 | 1.91 | 3.1 | 2.05 |
| Magnesium | | 128 | 130 | 105 | 117 | 104 | 97.0 | 81.8 | 75.9 | 62 | 67.7 | 56.4 | 64.3 | 38.9 | 44.2 | 44.6 | 46.2 |
| Manganese | 0.05 [AO] | | | 1.06 | 1.39 | 1.31 | 1.89 | 1.76 | 1.69 | 1.91 | 2.4 | 2.14 | 2.95 | 0.921 | 1.55 | | |
| Nitrate(as N) | 10 | 0.3 | 0.1 | 0.2 | <0.1 | 0.1 | 0.1 | 0.18 | 0.64 | | 0.61 | nd | nd | nd | nd | <0.1 | <0.1 |
| Nitrite(as N) | 1 | 0.02 | 0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.03 | <0.03 | | | nd | nd | nd | nd | <0.1 | <0.1 |
| Orthophosphate(as P) | | | | | | | | <0.05 | <0.05 | | | nd | nd | nd | nd | | |
| pH | 6.5-8.5 [OG] | 7.38 | 7.51 | 7.17 | 7.07 | 7.12 | 7.35 | 7.18 | 6.97 | 6.97 | 0.32 | 6.8 | 7.89 | 6.89 | 7.16 | 7.25 | 7.27 |
| Phenols | | 0.02 | 0.019 | | <0.001 | 0.012 | 0.0128 | 0.004 | <0.001 | 3 | 0.001 | 0.025 | 0.005 | 0.005 | 0.003 | | |
| Phosphorus, Total (as P) | | 0.019 | 0.017 | 0.017 | 0.206 | 0.03 | 0.04 | 0.386 | 0.73 | | 35.4 | 0.04 | 0.01 | nd | | | |
| Potassium | | | | 29.9 | 47.6 | 49.4 | 49.6 | 43.4 | 36.8 | | | 32.2 | 40.8 | 10 | 18 | | |
| Sodium | 200 [AO] | | | 48.6 | 49.3 | 38.1 | 39.7 | 30 | 30.9 | 29.2 | 19.4 | 19.1 | 19 | 21.7 | 14.7 | 19 | 19.6 |
| Sulphate | 500 [AO] | | | 5.0 | 0.9 | 2.3 | 1.7 | 3.72 | 1.61 | 1.95 | 1.88 | 1 | 1.2 | 2.7 | 6.7 | 4.1 | 4.1 |
| Total Kjeldahl Nitrogen(as N) | | 7.6 | 17.2 | 20.6 | 33.7 | 24.3 | 26.3 | 14 | 20.8 | 29.8 | 15.5 | 15 | 18.4 | 10.3 | 17 | 12.7 | 13.9 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH-8

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 8 18-Oct-01 | TH 8 18-Jun-02 | TH 8 22-Oct-02 | TH 8 20-May-03 | TH 8 1-Oct-03 | TH 8 5-May-04 | TH 8 29-Sep-04 | TH 8 6-Apr-05 | TH 8 21-Sep-05 | TH 8 4-Apr-06 | TH 8 25-Sep-06 | TH 8 13-Apr-07 | TH 8 9-Oct-07 DRY | TH 8 15-Apr-08 | TH 8 17-Sep-08 | TH 8 30-Apr-09 | TH 8 1-Oct-09 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 768 | 760 | 723 | 639 | 495 | 738 | 744 | 750 | 713 | 665 | 708 | 678 | | 639 | 655 | 705 | 698 |
| Ammonia(as N) | | 14.4 | 15.1 | 18.2 | 16.7 | 11 | 8.17 | 7.7 | 14 | 13.2 | 15.2 | 9.77 | 8.45 | | 10.3 | 8.6 | 7.01 | 6.38 |
| Calcium | | 166 | 160 | 197 | 139 | 128 | 214 | 213 | 203 | 226 | 175 | 191 | 187 | | 169 | 172 | 220 | 175 |
| Chloride | 250 [AO] | 15.5 | 14.7 | 10.9 | 8.5 | 4.3 | 10 | 9.8 | 9.8 | 9.1 | 7.4 | 5.4 | 6.8 | | 6.5 | 5.7 | 5.2 | 5.3 |
| Conductivity @25øC (µmho/cm) | | 1365 | 1315 | 1300 | 1100 | 904 | 1320 | 1190 | 1320 | 1290 | 1140 | 1150 | 1150 | | 1150 | 1090 | 1200 | 1230 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | 10.7 | 180 | 5.3 | 14 | 5.8 | 7.2 | 6.3 | 35.4 | 17.7 | 16 | 6.3 | | 7.5 | 7.7 | 6.7 | 7.3 |
| Hardness(as CaCO3) | 80-100 [OG] | 600 | 573 | 699 | 523 | 474 | 715 | 696 | 671 | 736 | 607 | 641 | 617 | | 563 | 565 | 719 | 584 |
| Iron | 0.3 [AO] | 2.09 | 3.31 | 1.37 | 1.74 | 0.017 | 2.02 | 1.98 | 0.901 | 0.67 | 1.16 | 0.251 | 0.133 | | 0.321 | 0.044 | 0.151 | 0.57 |
| Magnesium | | 44.9 | 42.1 | 50.3 | 42.6 | 37.5 | 43.9 | 39.9 | 39.7 | 41.3 | 41.1 | 39.7 | 36.5 | | 34.3 | 33 | 40.9 | 35.9 |
| Manganese | 0.05 [AO] | | 2.24 | 1.9 | 1.94 | 0.959 | 1.71 | 1.55 | 1.58 | 1.57 | 2.13 | 1.58 | 0.715 | | 1.52 | 1 | 0.832 | 1.09 |
| Nitrate(as N) | 10 | 1 | <0.1 | 0.2 | 0.1 | 1 | 0.7 | 0.4 | 0.3 | 0.3 | 0.4 | 1.6 | 1.7 | | 0.3 | 0.7 | 0.9 | 1 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | | |
| Orthophosphate(as P) | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.22 | 6.61 | 7.77 | 7.23 | 7.75 | 7.36 | 6.91 | 6.86 | 7.02 | 7.54 | 6.92 | 6.91 | | 6.62 | 6.8 | 6.42 | 6.73 |
| Phenols | | | 0.001 | 0.002 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | | 0.11 | 1.24 | 1.05 | 3.63 | 1.35 | 1.36 | 2.45 | 0.7 | 1.26 | 0.67 | 1.16 | | 1.11 | 0.68 | 0.61 | 1.62 |
| Potassium | | | 17.9 | 26.3 | 25.7 | 16.3 | 18.4 | 16.2 | 20.1 | 21.6 | 22.9 | 16.9 | 9.9 | | 16.7 | 11.2 | 8.5 | 10.6 |
| Sodium | 200 [AO] | 17.3 | 21.9 | 14 | 11.7 | 4.7 | 8.8 | 12.3 | 8.6 | 11.3 | 8.8 | 7.2 | 4.5 | | 6.1 | 4.8 | 3.4 | 5 |
| Sulphate | 500 [AO] | <1.0 | 4.8 | 1 | 2 | 8 | 5 | 4 | 12 | 13 | 11 | 9 | 4 | | 13 | 15 | 16 | 25 |
| Total Kjeldahl Nitrogen(as N) | | 14.9 | 17.9 | 20.8 | 18.7 | 15.3 | 10.5 | 9.75 | 10.1 | 14.8 | 15.6 | 11.4 | 9.37 | | 11.8 | 9.4 | 7.79 | 7.93 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH-8

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 8 12-May-10 | TH 8 9-Nov-10 | TH 8 2-May-11 | TH 8 21-Sep-11 | TH 8 12-Apr-12 | TH 8 22-Nov-12 | TH 8 7-May-13 | TH 8 26-Nov-13 | TH 8 1-May-14 | TH 8 4-Nov-14 | TH 8 20-Apr-15 | TH 8 3-Nov-15 | TH8 20-Apr-16 | TH 8 26-Oct-16 | TH8 16-May-17 | TH 8 7-Dec-17 | TH8 10-Apr-18 | TH 8 15-Nov-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 652 | 658 | 666 | 664 | 689 | 623 | 440 | 380 | 510 | 470 | **490** | **520** | 370 | **460** | **540** | **550** | **500** | **560** |
| Ammonia(as N) | | 6.46 | 9.56 | 11.0 | 13.4 | 13.9 | 10.0 | 6.2 | 2.8 | 0.72 | 1.1 | 0.64 | 0.8 | 0.055 | 0.93 | 1.1 | 0.5 | 0.32 | 0.2 |
| Calcium | | 178 | 183 | 200 | 198 | 205 | 175 | 140 | 120 | 160 | 160 | 160 | 160 | 130 | 140 | 160 | 160 | 150 | 170 |
| Chloride | 250 [AO] | 4.3 | 4.0 | 4.3 | 4.6 | 5.3 | 4.4 | 6 | 2 | 2 | 1 | 2 | 2.5 | 1.3 | 1.2 | 2.2 | 1.5 | 1.4 | 1.4 |
| Conductivity @25øC (µmho/cm) | | 1190 | 1180 | 1230 | 1290 | 1250 | 1100 | 840 | 710 | 920 | 870 | 900 | 950 | 630 | 820 | 980 | 940 | 860 | 950 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 6.4 | 8.4 | 7.8 | 7.5 | 7.2 | 10.6 | 2.9 | 1.8 | 1.8 | 2.2 | 2.4 | 1.8 | 0.73 | 3.2 | 2.5 | 1.9 | 1.6 | 2.4 |
| Hardness(as CaCO3) | 80-100 [OG] | 612 | 613 | 646 | 651 | 674 | 584 | 460 | 390 | 530 | 530 | **520** | **520** | **420** | **460** | **530** | **520** | **490** | **570** |
| Iron | 0.3 [AO] | 0.076 | 1.16 | 2.60 | 2.41 | 3.58 | 1.53 | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 | <0.1 |
| Magnesium | | 36.5 | 38.1 | 35.8 | 38.1 | 39.0 | 35.4 | 28.0 | 24 | 29.0 | 30 | 29.0 | 31 | 24 | 27 | 31.0 | 31 | 30.0 | 37 |
| Manganese | 0.05 [AO] | 0.779 | 1.42 | 1.17 | 1.11 | 1.02 | 0.816 | 0.56 | 0.19 | 0.51 | 0.72 | **0.82** | **0.87** | 0.029 | **0.6** | **0.66** | **0.56** | 0.25 | 0.11 |
| Nitrate(as N) | 10 | 1.5 | 0.5 | 0.2 | 0.5 | 0.2 | 0.9 | 0.91 | 1.3 | 0.58 | 0.57 | 0.22 | 0.59 | 0.38 | 0.81 | 0.26 | 0.37 | 0.4 | 0.86 |
| Nitrite(as N) | 1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.14 | 0.26 | <0.1 | 0.072 | 0.048 | 0.142 | 0.011 | 0.159 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.10 | <0.010 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.21 | 6.47 | 7.65 | 7.03 | 7.31 | 7.37 | 7.79 | 7.87 | 7.71 | 7.61 | 7.58 | 7.75 | 7.92 | 7.9 | 7.73 | 7.75 | 7.83 | 7.6 |
| Phenols | | <0.001 | <0.001 | <0.001 | 0.002 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0053 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 0.62 | 1.72 | 0.90 | 0.29 | 0.46 | 0.41 | 0.63 | 2.8 | 0.13 | 0.41 | 0.14 | 0.12 | 0.11 | <0.1 | 0.28 | <0.1 | 0.67 | 0.094 |
| Potassium | | 8.3 | 13.5 | 12.3 | 13.5 | 13.5 | 12.1 | 6.6 | 3.1 | 3.7 | 4 | 2.7 | 3.2 | 1.2 | 2.5 | 3.2 | 2.3 | 1.7 | 1.6 |
| Sodium | 200 [AO] | 2.7 | 4.5 | 4.8 | 6.2 | 6.0 | 4.4 | 2.2 | 1.2 | 1.5 | 1.3 | 1.2 | 1.3 | 0.74 | 1.4 | 1.3 | 1.5 | 1.0 | 1.2 |
| Sulphate | 500 [AO] | 20 | 23 | 12 | 12 | 12 | 8 | 6 | 3 | 10 | 8 | 11 | 14 | 2.8 | 9 | 10 | 7.5 | 5.8 | 8.5 |
| Total Kjeldahl Nitrogen(as N) | | 8.03 | 11.0 | 11.8 | 13.4 | 4.5 | 10.7 | 6.6 | 3.6 | 0.89 | 1.1 | 0.91 | 1.3 | 0.13 | 1.3 | 1.7 | 0.67 | 0.55 | 0.3 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH-8

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH8 24-Apr-19 | TH 8 20-Nov-19 | TH8 13-May-20 | TH 8 12-Nov-20 | TH8 8-Apr-21 | TH 8 7-Oct-21 | TH 8 3-May-22 | TH 8 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | **510** | **580** | **550** | **550** | **450** | **530** | **520** | **580** |
| Ammonia(as N) | | 0.056 | 0.2 | 0.6 | <0.050 | <0.050 | 0.11 | 0.06 | <0.050 |
| Calcium | | 170 | 170 | 180 | 160 | 140 | 170 | 160 | 210 |
| Chloride | 250 [AO] | 2.1 | 2.1 | 1.7 | 2.4 | 1.9 | 2.9 | 3.8 | 8.5 |
| Conductivity @25øC (µmho/cm) | | 960 | 1000 | 960 | 970 | 810 | 930 | 970 | 1100 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.9 | 2.2 | 2.5 | 2.2 | 0.94 | 1.7 | 2.4 | 4.1 |
| Hardness(as CaCO3) | 80-100 [OG] | **580** | **580** | **600** | **540** | **450** | **570** | **540** | **690** |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 35.0 | 37 | 35.0 | 36 | 27.0 | 34 | 34 | 43 |
| Manganese | 0.05 [AO] | 0.3 | **0.37** | **0.56** | **0.96** | 0.067 | 0.17 | 0.062 | 0.095 |
| Nitrate(as N) | 10 | 0.54 | 1.25 | 1.21 | 1.91 | 0.32 | 0.91 | 1.10 | 1.73 |
| Nitrite(as N) | 1 | 0.021 | 0.052 | 0.014 | <0.010 | 0.013 | 0.017 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.76 | 7.72 | 7.83 | 7.76 | 7.72 | 7.65 | 7.73 | 7.65 |
| Phenols | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 0.054 | 0.17 | 0.21 | 0.25 | 0.022 | NV | 0.060 | 0.15 |
| Potassium | | 1.7 | 2 | 2.2 | 1.9 | 1.5 | 2.0 | 1.9 | 2.4 |
| Sodium | 200 [AO] | 1.5 | 1.6 | 1.5 | 1.2 | 1.1 | 1.5 | 1.7 | 4.3 |
| Sulphate | 500 [AO] | 6.1 | 10 | 8.3 | 12 | 4.1 | 19 | 28 | 42 |
| Total Kjeldahl Nitrogen(as N) | | 0.22 | 0.36 | 0.73 | 0.11 | 0.18 | 0.29 | 0.21 | 0.25 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

**Historic Groundwater Quality for Test Well TH 9**

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 9 27-Apr-93 | TH 9 4-Oct-93 | TH 9 13-Jun-94 | TH 9 7-Nov-94 | TH 9 19-Jun-95 | TH 9 30-Oct-95 | TH 9 27-May-96 | TH 9 15-Nov-96 | TH 9 9-May-97 | TH 9 19-Dec-97 | TH 9 13-May-98 | TH 9 18-Dec-98 | TH 9 11-Jul-00 | TH 9 21-Dec-00 | TH 9 11-Jul-01 Not Found | TH 9 18-Jun-02 | TH 9 22-Oct-02 | TH 9 20-May-03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 275 | 291 | 322 | 329 | 295 | 299 | 296 | 287 | 270 | 329 | 308 | 292 | 289 | 279 | | 309 | 285 | 315 |
| Ammonia(as N) | | 0.136 | 0.14 | 0.144 | 0.15 | 0.28 | 1.18 | 0.62 | 1.59 | 10.4 | 1.22 | 0.44 | 1.28 | 0.49 | 0.9 | | 0.47 | 0.5 | 0.08 |
| Calcium | | 73.6 | 82 | 72.6 | 90.2 | 81.3 | 80.9 | 82.9 | 79.2 | 77.8 | 77.4 | 81.8 | 82.9 | 88.3 | 82 | | 78.6 | 86 | 83.0 |
| Chloride | 250 [AO] | 2.4 | 1.6 | 1.8 | 2.4 | 2.6 | 5.1 | 3.03 | 2.28 | 2.66 | 2.88 | 2.1 | 2.6 | 1.9 | 2 | | 2.7 | 1.9 | 2.1 |
| Conductivity @25øC (µmho/cm) | | 516 | 536 | 581 | 579 | 587 | 575 | 527 | 500 | 496 | 530 | 536 | 538 | 540 | 506 | | 565 | 546 | 537 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 15.8 | 13.8 | 23 | >20 | 15.5 | 14.3 | 20.6 | 22.5 | 20 | 20.1 | 22.9 | 15.7 | 23.9 | 23 | | 17.8 | 89 | 12.9 |
| Hardness(as CaCO3) | 80-100 [OG] | 296 | 320 | 288 | 356 | 324 | 318 | 328 | 309 | 295 | 305 | 314 | 325 | 342 | 318 | | 310 | 330 | 322 |
| Iron | 0.3 [AO] | 0.26 | 0.1 | 0.24 | 1.48 | 0.03 | 1.34 | 2.15 | 1.71 | 1.54 | 1.74 | 2.57 | 1.18 | 0.72 | 0.83 | | 1.96 | 2.32 | 0.81 |
| Magnesium | | 27.1 | 28 | 25.9 | 31.6 | 29.2 | 28.2 | 29.4 | 26.4 | 24.6 | 27.1 | 26.7 | 28.5 | 29.5 | 27.5 | | 27.5 | 28 | 27.9 |
| Manganese | 0.05 [AO] | | | 0.273 | 0.44 | 0.263 | 0.301 | 0.372 | 0.318 | 0.362 | 0.333 | 0.359 | 0.33 | 0.285 | 0.291 | | 0.322 | 0.3 | 0.22 |
| Nitrate(as N) | 10 | 0.3 | 0.3 | 0.2 | 0.1 | <0.1 | 0.1 | 0.1 | 0.17 | | 0.63 | 0.11 | 0.05 | nd | 0.4 | | < 0.1 | 0.1 | 0.2 |
| Nitrite(as N) | 1 | <0.01 | 0.01 | 0.01 | 0.01 | <0.01 | 0.01 | <0.03 | 0.1 | | 0.07 | nd | nd | nd | nd | | < 0.1 | < 0.1 | <0.1 |
| Orthophosphate(as P) | | | | | | | | <0.05 | <0.05 | | | nd | nd | nd | nd | | < 0.01 | 0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.8 | 7.74 | 7.54 | 7.44 | 7.64 | 7.67 | 7.33 | 7.41 | 6.97 | 7.41 | 7.36 | 7.83 | 7.38 | 7.67 | | 7.14 | 8.39 | 7.70 |
| Phenols | | 0.02 | 0.003 | 0.0046 | 0.005 | 0.0034 | 0.131 | <0.001 | 0.006 | 1 | | 0.019 | 0.001 | 0.004 | nd | | < 0.001 | < 0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.008 | 0.006 | 0.008 | 0.011 | <0.01 | 0.09 | 0.082 | 0.27 | | | 0.13 | 0.02 | nd | | | 1.05 | 0.99 | 2.55 |
| Potassium | | | | 0.4 | 0.64 | 0.53 | 1.01 | 1.5 | <1 | | | nd | 1.6 | nd | nd | | < 1.0 | < 1.0 | <0.4 |
| Sodium | 200 [AO] | | | 0.5 | 0.7 | 0.8 | 0.9 | 0.85 | 1.02 | 0.75 | 0.72 | 0.77 | 0.8 | 9 | 1.1 | | < 1.0 | < 1.0 | 1.0 |
| Sulphate | 500 [AO] | | | 22.0 | 26.3 | 49.8 | 33.4 | 14.1 | 8.76 | 14 | 9.8 | 6.6 | 14 | 27.8 | 22.8 | | 5.1 | 3 | 4 |
| Total Kjeldahl Nitrogen(as N) | | 0.83 | 0.81 | 0.82 | 1.03 | 0.77 | 2.41 | 0.96 | 1.97 | 14.3 | 1.86 | 1.4 | 1.77 | 3.3 | 2.4 | | 1.55 | 2.69 | 5.6 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

**Historic Groundwater Quality for Test Well TH 9**

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 9 1-Oct-03 | TH 9 5-May-04 | TH 9 29-Sep-04 | TH 9 6-Apr-05 | TH 9 21-Sep-05 | TH 9 4-Apr-06 | TH 9 25-Sep-06 | TH 9 13-Apr-07 | TH 9 (dup) 13-Apr-07 | TH 9 9-Oct-07 | TH 9 15-Apr-08 | TH 9 17-Sep-08 | TH 9 30-Apr-09 | TH 9 1-Oct-09 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 330 | 303 | 300 | 326 | 295 | 330 | 318 | 304 | 300 | 286 | 290 | 290 | 266 | 292 |
| Ammonia(as N) | | 0.34 | 0.26 | 0.34 | 0.19 | 0.3 | 0.19 | 0.23 | 0.15 | 0.15 | 0.16 | 0.19 | 0.27 | 0.15 | 0.23 |
| Calcium | | 83.2 | 90.1 | 81.2 | 87.3 | 83.5 | 90.6 | 87.2 | 85.8 | 85.8 | 78.4 | 85.1 | 80.4 | 90.2 | 72.1 |
| Chloride | 250 [AO] | 2.1 | 2.1 | 2.2 | 2.4 | 2.5 | 2.3 | 2.7 | 2.7 | 2.6 | 3.1 | 2.7 | 3 | 3 | 3.3 |
| Conductivity @25øC (µmho/cm) | | 613 | 654 | 498 | 579 | 563 | 579 | 544 | 531 | 542 | 526 | 563 | 540 | 540 | 572 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 28 | 16.3 | 15.2 | 19.6 | 20.5 | 22.1 | 23.8 | 19 | 19.1 | 20 | 20.8 | 19.9 | 18.3 | 15.1 |
| Hardness(as CaCO3) | 80-100 [OG] | 338 | 347 | 317 | 343 | 321 | 353 | 339 | 336 | 336 | 308 | 330 | 310 | 343 | 287 |
| Iron | 0.3 [AO] | 1.89 | 0.826 | 1.82 | 1.72 | 1.15 | 1.21 | 1.65 | 0.437 | 0.487 | 0.532 | 0.574 | 1.02 | 0.189 | 0.392 |
| Magnesium | | 31.7 | 29.7 | 27.8 | 30.3 | 27.3 | 30.7 | 29.5 | 29.6 | 29.5 | 27.1 | 28.5 | 26.5 | 28.7 | 26 |
| Manganese | 0.05 [AO] | 0.321 | 0.285 | 0.303 | 0.327 | 0.239 | 0.252 | 0.35 | 0.113 | 0.119 | 0.131 | 0.194 | 0.285 | 0.09 | 0.215 |
| Nitrate(as N) | 10 | 0.1 | <0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | <0.1 | <0.1 | 0.2 | <0.1 | <0.1 | 0.1 | 0.1 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | | | | |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 8.43 | 8.03 | 7.65 | 7.53 | 7.66 | 8.14 | 7.14 | 7.43 | 7.48 | 6.99 | 7.14 | 7.39 | 6.93 | 7.27 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.48 | 0.99 | 0.33 | 0.27 | 0.22 | 0.17 | 0.1 | 0.22 | 0.22 | 0.2 | 0.12 | 0.06 | 0.4 | 0.36 |
| Potassium | | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 |
| Sodium | 200 [AO] | 1 | 0.9 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 1.2 | 1 | 1.1 | 1.4 | 1 | 1 | 0.9 |
| Sulphate | 500 [AO] | 11 | 28 | 19 | 11 | 9 | 9 | 12 | 19 | 18 | 20 | 16 | 26 | 25 | 28 |
| Total Kjeldahl Nitrogen(as N) | | 1.69 | 2.42 | 1.16 | 1.34 | 0.9 | 1.01 | 1.06 | 1.08 | 1.12 | 1.06 | 0.41 | 0.91 | 1.08 | 1.08 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

**Historic Groundwater Quality for Test Well TH 9**

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 9 12-May-10 | TH 9 9-Nov-10 | TH 9 2-May-11 | TH 9 21-Sep-11 | TH 9 12-Apr-12 | TH 9 22-Nov-12 | TH 9 7-May-13 | TH 9 26-Nov-13 | TH 9 1-May-14 | TH 9 4-Nov-14 | TH 9 20-Apr-15 | TH 9 3-Nov-15 | TH9 20-Apr-16 | TH 9 26-Oct-16 | TH9 16-May-17 | TH 9 7-Dec-17 | TH9 10-Apr-18 | TH 9 15-Nov-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 341 | 317 | 333 | 272 | 292 | 287 | 320 | 280 | 270 | 270 | 270 | 290 | 310 | 400 | 270 | 290 | 270 | 280 |
| Ammonia(as N) | | 0.18 | 0.3 | 0.21 | 0.24 | 0.22 | 0.25 | 0.3 | 0.058 | 0.11 | 0.82 | 0.11 | 0.25 | 0.12 | 27 | 0.5 | 0.095 | 0.092 | 0.16 |
| Calcium | | 87.5 | 89 | 83.9 | 78.1 | 81.8 | 80.9 | 160 | 76 | 73 | 71 | 76 | 67 | 87 | 76 | 72 | 68 | 68 | 72 |
| Chloride | 250 [AO] | 2.3 | 2.5 | 2.0 | 3.2 | 2.7 | 3.2 | 3 | 3 | 2 | 3 | 2 | 3.6 | 2.7 | 4.9 | 3.0 | 2.6 | 2.9 | 3.8 |
| Conductivity @25øC (µmho/cm) | | 616 | 592 | 573 | 565 | 546 | 528 | 550 | 510 | 500 | 500 | 500 | 530 | 550 | 750 | 530 | 510 | 490 | 500 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 26.9 | 31.3 | 23.1 | 17.8 | 20.3 | 17.9 | 23 | 23 | 20 | 18 | **19** | **19** | **23** | **23** | 1.2 | **22** | **17** | 13 |
| Hardness(as CaCO3) | 80-100 [OG] | 340 | 351 | 329 | 307 | 323 | 319 | 320 | 300 | 290 | 280 | 300 | 260 | **340** | 300 | 290 | 270 | 270 | 280 |
| Iron | 0.3 [AO] | 0.68 | 2.73 | 1.06 | 2.25 | 2.13 | 2.83 | 0.42 | 0.71 | 0.16 | 0.63 | 0.15 | 0.41 | 0.21 | 0.46 | 0.014 | 0.69 | 0.21 | 0.65 |
| Magnesium | | 29.4 | 31.3 | 29.1 | 27.1 | 28.9 | 28.4 | 28 | 26 | 26 | 26 | 26 | 24 | 30 | 27 | 26 | 25 | 25 | 24 |
| Manganese | 0.05 [AO] | 0.202 | 0.372 | 0.303 | 0.299 | 0.312 | 0.149 | 0.26 | 0.92 | 0.098 | 0.26 | 0.051 | 0.23 | 0.0031 | **0.36** | 0.17 | 0.16 | 0.0039 | 0.15 |
| Nitrate(as N) | 10 | <0.1 | 0.1 | <0.1 | <0.1 | 0.1 | 0.1 | <0.1 | <0.1 | ND | <0.10 | <0.10 | <0.10 | 0.11 | <0.50 | 0.35 | 0.3 | <0.50 | 0.16 |
| Nitrite(as N) | 1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.01 | 0.024 | ND | <0.010 | <0.010 | 0.011 | <0.010 | 0.097 | 0.06 | 0.011 | <0.050 | 0.012 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND | <0.01 | <0.010 | 0.021 | <0.010 | 0.41 | 0.068 | 0.041 | 0.038 | 0.026 |
| pH | 6.5-8.5 [OG] | 7.68 | 7.02 | 7.69 | 7.64 | 7.83 | 7.86 | 8.1 | 8.06 | 8.01 | 7.99 | 7.96 | 7.96 | 8.17 | 8.01 | 7.9 | 7.92 | 8.00 | 7.93 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | ND | <0.001 | 0.001 | <0.001 | <0.0010 | 0.028 | <0.0010 | <0.0020 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 0.17 | 0.11 | 0.10 | 0.14 | 0.12 | 0.39 | 0.41 | 0.087 | 0.66 | 0.21 | 0.76 | 0.73 | 0.43 | 0.14 | 0.7 | 0.1 | 0.26 | 0.22 |
| Potassium | | 0.2 | 0.3 | 0.5 | 0.3 | 0.2 | 0.3 | 0.32 | 0.33 | 0.28 | 0.32 | 0.23 | 0.37 | 0.33 | 3.4 | 0.6 | 0.37 | 0.31 | 0.31 |
| Sodium | 200 [AO] | 1 | 0.8 | 0.9 | 1.4 | 0.9 | 1.2 | 0.95 | 0.92 | 0.87 | 1 | 0.98 | 1.1 | 1 | 2.4 | 0.97 | 0.9 | 0.83 | 1 |
| Sulphate | 500 [AO] | 5 | 7 | 8 | 21 | 7 | 10 | <1 | <1 | ND | <1 | <1 | 2.8 | <1 | <1 | <1.0 | <1.0 | <1.0 | 4.6 |
| Total Kjeldahl Nitrogen(as N) | | 1.12 | 1.22 | 1.08 | 0.86 | 0.77 | 1.39 | 1.8 | 2.4 | 2.4 | 0.8 | 1.2 | 1 | 0.57 | 27 | 1.2 | 0.59 | 0.45 | 0.39 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

**Historic Groundwater Quality for Test Well TH 9**

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH9 24-Apr-19 | TH 9 20-Nov-19 | TH9 13-May-20 | TH 9 12-Nov-20 | TH9 8-Apr-21 | TH 9 7-Oct-21 | TH9 3-May-22 | TH 9 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 300 | 290 | 310 | 300 | 310 | 300 | 300 | 290 |
| Ammonia(as N) | | 0.14 | 0.85 | 0.23 | 0.28 | 0.078 | 0.053 | <0.050 | <0.050 |
| Calcium | | 84 | 74 | 89 | 77 | 83 | 82 | 81 | 82 |
| Chloride | 250 [AO] | 3.4 | 4.2 | 2.9 | 3.6 | 3.7 | 4.0 | 6.7 | 6.4 |
| Conductivity @25øC (µmho/cm) | | 560 | 540 | 560 | 540 | 560 | 530 | 560 | 540 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | **16** | **17** | **18** | **21** | **19** | **19** | **19** | **16** |
| Hardness(as CaCO3) | 80-100 [OG] | 330 | 300 | 350 | 300 | 320 | 310 | 310 | 310 |
| Iron | 0.3 [AO] | 0.38 | 0.77 | 0.5 | 2.4 | 0.17 | 1.8 | 140 | 0.27 |
| Magnesium | | 29 | 27 | 31 | 26 | 27 | 26 | 27 | 27 |
| Manganese | 0.05 [AO] | 0.19 | 0.23 | 0.3 | 0.25 | 0.023 | 0.15 | 0.0035 | 0.025 |
| Nitrate(as N) | 10 | <0.10 | <0.10 | 0.14 | <0.10 | 0.16 | 0.17 | 0.15 | 0.24 |
| Nitrite(as N) | 1 | 0.024 | 0.052 | <0.010 | 0.015 | <0.010 | 0.029 | <0.010 | 0.011 |
| Orthophosphate(as P) | | <0.010 | 0.023 | 0.017 | 0.041 | <0.010 | 0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.99 | 7.92 | 8.02 | 7.91 | 8.05 | 7.90 | 8.04 | 8.09 |
| Phenols | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 0.24 | 0.37 | 0.091 | 0.16 | 0.3 | NV | NV | 0.098 |
| Potassium | | 0.3 | 0.5 | 0.42 | 0.31 | 0.25 | 0.37 | 0.25 | 0.30 |
| Sodium | 200 [AO] | 1.1 | 1.1 | 1.1 | 0.86 | 0.82 | 0.87 | 0.80 | 0.93 |
| Sulphate | 500 [AO] | <5.0 | 7 | <1.0 | <1.0 | <5.0 | <1.0 | <5.0 | <1.0 |
| Total Kjeldahl Nitrogen(as N) | | 0.5 | 1.5 | 0.56 | 0.7 | 0.51 | 0.57 | NV | 0.45 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 10

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 10 27-Apr-93 | TH 10 4-Oct-93 | TH 10 13-Jun-94 | TH 10 7-Nov-94 | TH 10 19-Jun-95 | TH 10 30-Oct-95 | TH 10 27-May-96 | TH 10 15-Nov-96 | TH 10 9-May-97 | TH 10 19-Dec-97 | TH 10 13-May-98 | TH 10 18-Dec-98 | TH 10 11-Jul-00 | TH 10 21-Dec-00 | TH 10 11-Jul-01 | TH 10 18-Oct-01 | TH 10 18-Jun-02 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 209 | 206 | 212 | 218 | 236 | 230 | 239 | 238 | 237 | 251 | 238 | 283 | 282 | 309 | 308 | 304 | 372 |
| Ammonia(as N) | | 0.083 | 0.084 | 0.019 | 0.21 | <0.05 | 0.38 | <0.05 | 0.07 | 0.08 | 0.04 | nd | 0.03 | 0.06 | 0.04 | 0.05 | 0.02 | <0.01 |
| Calcium | | 60.5 | 72.4 | 56.1 | 71.4 | 63.7 | 76.1 | 75.9 | 81.4 | 76.9 | 82.1 | 79.2 | 93.7 | 90.9 | 90.4 | 92.6 | 92.3 | 102 |
| Chloride | 250 [AO] | 50.3 | 58.3 | 35.6 | 56 | 19.9 | 65.9 | 85.6 | 4.58 | 73.1 | 66.5 | 46.6 | 90.7 | 59.1 | 57.8 | 50.3 | 81 | 79 |
| Conductivity @25øC (µmho/cm) | | 557 | 566 | 519 | 587 | 510 | 655 | 666 | 598 | 668 | 650 | 625 | 783 | 685 | 639 | 734 | 811 | 877 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.5 | 0.4 | 13.3 | 6.9 | 9.6 | 9.9 | 1.7 | 0.9 | 1.7 | 1 | 0.5 | 1.6 | 3 | 1.1 | | | <0.5 |
| Hardness(as CaCO3) | 80-100 [OG] | 225 | 265 | 208 | 256 | 236 | 270 | 272 | 288 | 276 | 299 | 284 | 337 | 333 | 326 | 343 | 334 | 409 |
| Iron | 0.3 [AO] | 0.05 | 0.07 | <0.01 | 0.02 | 0.02 | <0.01 | 0.087 | 0.022 | 0.006 | 0.02 | 0.006 | 0.04 | 0.06 | nd | 0.01 | 0.01 | <0.01 |
| Magnesium | | 18 | 20.3 | 16.5 | 18.8 | 18.6 | 19.4 | 20.2 | 20.4 | 20.2 | 22.9 | 21 | 25.1 | 25.7 | 24.3 | 27.2 | 25 | 37.5 |
| Manganese | 0.05 [AO] | | | <0.003 | 0.013 | <0.003 | 0.007 | 0.061 | 0.031 | 0.038 | | 0.014 | nd | 0.022 | nd | | | <0.005 |
| Nitrate(as N) | 10 d | 0.9 | 0.2 | 0.4 | 0.1 | 0.5 | 0.1 | 0.16 | 0.35 | | 0.49 | 0.31 | 0.58 | 1.9 | 1.2 | 1.4 | 1.2 | 2 |
| Nitrite(as N) | 1 d | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.03 | 0.2 | | | nd | nd | nd | nd | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | | | | | | | <0.05 | <0.05 | | | nd | nd | nd | nd | | | <0.01 |
| pH | 6.5-8.5 [OG] | 7.81 | 7.82 | 7.71 | 7.65 | 7.81 | 7.87 | 7.79 | 7.53 | 7.65 | 7.8 | 7.6 | 8.18 | 7.56 | 7.88 | 7.63 | 7.61 | 7.32 |
| Phenols | | 0.0015 | <0.001 | 0.0012 | 0.0134 | <0.001 | 0.0053 | <1 | <1 | | | 0.017 | 0.001 | 0.002 | nd | | | <0.001 |
| Phosphorus, Total (as P) | | 0.006 | 0.008 | 0.008 | 0.004 | <0.01 | 0.04 | 0.017 | <0.01 | | | 0.01 | nd | nd | | | | <0.1 |
| Potassium | | | | 0.6 | 0.71 | 0.49 | 0.68 | <1 | <1 | | | nd | 1.7 | nd | nd | | | 1.5 |
| Sodium | 200 [AO] | | | 10.6 | 29.0 | 11.5 | 29.9 | 43.4 | 22.8 | 45 | 20.2 | 21.7 | 37.4 | 31.8 | 24.2 | 26.6 | 29.3 | 28.3 |
| Sulphate | 500 [AO] | | | 12.6 | 9.9 | 11.5 | 16.5 | 15.3 | 17.5 | 52 | 17.3 | 32.3 | 15 | 15.8 | 8.8 | 12.9 | 10.6 | 13.1 |
| Total Kjeldahl Nitrogen(as N) | | 0.31 | 0.33 | 0.15 | 0.17 | 0.18 | 0.23 | 0.21 | 0.2 | 0.64 | | 0.11 | 0.25 | 0.74 | 0.43 | 0.37 | 0.53 | 0.13 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 10

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 10 22-Oct-02 | TH 10 20-May-03 | TH 10 1-Oct-03 | TH 10 5-May-04 | TH 10 29-Sep-04 | TH 10 27-Apr-05 | TH 10 21-Sep-05 | TH 10 4-Apr-06 | TH 10 25-Sep-06 | TH 10 13-Apr-07 | TH 10 9-Oct-07 | TH 10 15-Apr-08 | TH 10 17-Sep-08 | TH 10 30-Apr-09 | TH 10 1-Oct-09 | TH 10 12-May-10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 294 | 339 | 393 | 519 | 290 | 316 | 315 | 360 | 348 | 354 | 327 | 452 | 352 | 469 | 337 | 319 |
| Ammonia(as N) | | 0.02 | <0.01 | 0.01 | 0.08 | 0.07 | <0.01 | 0.04 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 |
| Calcium | | 103 | 97.7 | 115 | 140 | 93.4 | 100 | 99.2 | 114 | 105 | 112 | 105 | 123 | 101 | 117 | 82.4 | 81.1 |
| Chloride | 250 [AO] | 83.2 | 85.6 | 68.1 | 38.5 | 95.3 | 71.3 | 68.9 | 82.3 | 83 | 67.2 | 102 | 51.4 | 38.4 | 26.9 | 35.7 | 21.8 |
| Conductivity @25øC (µmho/cm) | | 827 | 802 | 868 | 731 | 744 | 790 | 784 | 879 | 806 | 793 | 854 | 947 | 729 | 931 | 725 | 661 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 59 | <0.5 | 4 | 2.1 | 0.5 | <0.5 | 5.6 | 3.9 | 2.6 | 1.2 | 3.4 | 1.1 | 0.9 | 1.5 | 0.9 | 0.9 |
| Hardness(as CaCO3) | 80-100 [OG] | 368 | 363 | 422 | 535 | 365 | 381 | 358 | 417 | 376 | 412 | 381 | 465 | 381 | 442 | 322 | 306 |
| Iron | 0.3 [AO] | 0.07 | 0.18 | 0.158 | 0.016 | 0.008 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | 0.01 | <0.005 | 0.028 | <0.005 | <0.005 | <0.005 |
| Magnesium | | 26.9 | 28.8 | 32.7 | 45.1 | 32 | 31.8 | 26.8 | 32.5 | 27.9 | 32.4 | 29.1 | 38.6 | 31.4 | 36.1 | 28.1 | 25 |
| Manganese | 0.05 [AO] | <0.01 | <0.01 | 0.015 | 0.004 | 0.006 | <0.001 | 0.002 | <0.001 | 0.003 | <0.001 | 0.002 | <0.001 | 0.009 | 0.003 | 0.003 | <0.001 |
| Nitrate(as N) | 10 d | 0.5 | 1.3 | 0.6 | 0.3 | 0.8 | 1.3 | 0.4 | 1.3 | 0.7 | 1.1 | 0.5 | 0.5 | 1.1 | 0.6 | 1.0 | 1.0 |
| Nitrite(as N) | 1 d | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | | |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 8.22 | 7.65 | 8.39 | 7.76 | 7.55 | 7.57 | 7.63 | 7.86 | 7.12 | 7.46 | 7.08 | 6.99 | 7.21 | 6.79 | 7.21 | 7.76 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.04 | 0.02 | <0.01 | 0.02 | 0.01 | <0.01 | 0.02 | 0.02 | <0.01 | 0.02 | <0.01 | 0.01 | 0.03 | 0.13 | 0.02 | 0.01 |
| Potassium | | <0.4 | 0.7 | 0.9 | 0.7 | 0.7 | 0.7 | 0.7 | 0.9 | 1 | 1 | 1.1 | 1 | 1.1 | 0.9 | 1.4 | 1.1 |
| Sodium | 200 [AO] | 41.8 | 36.8 | 32.3 | 27.1 | 25.7 | 31.8 | 31.6 | 42.9 | 35.3 | 32.9 | 43.2 | 35.5 | 23.7 | 17.2 | 18.6 | 14.8 |
| Sulphate | 500 [AO] | 7 | 9 | 9 | 12 | 9 | 10 | 8 | 11 | 10 | 11 | 10 | 15 | 11 | 17 | 8 | 8 |
| Total Kjeldahl Nitrogen(as N) | | 0.47 | 0.09 | <0.05 | 0.31 | 0.1 | <0.05 | 0.06 | 0.08 | 0.07 | 0.2 | <0.05 | 0.08 | 0.25 | 0.92 | 0.14 | <0.05 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 10

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 10 9-Nov-10 | TH 10 2-May-11 | TH 10 21-Sep-11 | TH 10 12-Apr-12 | TH 10 22-Nov-12 | TH 10 7-May-13 | TH 10 26-Nov-13 | TH 10 1-May-14 | TH 10 4-Nov-14 | TH 10 20-Apr-15 | TH 10 3-Nov-15 | TH 10 20-Apr-16 | TH 10 26-Oct-16 | TH 10 16-May-17 | TH 10 7-Dec-17 | TH 10 15-Nov-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 330 | 467 | 343 | 508 | 367 | 460 | 360 | 410 | 300 | 270 | 330 | 370 | 370 | **430** | 350 | 330 |
| Ammonia(as N) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.05 | <0.05 | 0.063 | 0.13 | <0.050 | <0.050 | <0.050 | 0.058 | 0.33 | 0.13 | 0.053 |
| Calcium | | 92.2 | 134 | 95.0 | 139 | 115 | 160 | 100 | 120 | 130 | 85 | 87 | 110 | 97 | 120 | 86 | 88 |
| Chloride | 250 [AO] | 16.3 | 19.6 | 14.7 | 20.4 | 25.6 | 24 | 24 | 24 | 18 | 21 | 21 | 19 | 20 | 25 | 16 | 20 |
| Conductivity @25øC (µmho/cm) | | 675 | 934 | 718 | 991 | 745 | 960 | 750 | 830 | 630 | 580 | 660 | 740 | 730 | 870 | 680 | 650 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.3 | 1.4 | 1.5 | 1.4 | 2.3 | 1.6 | 1.1 | 1.3 | 0.69 | 1.3 | 0.67 | 1.1 | 1.9 | 3.8 | 0.6 | 0.81 |
| Hardness(as CaCO3) | 80-100 [OG] | 345 | 496 | 357 | 529 | 427 | 590 | 370 | 430 | 340 | 310 | **330** | **390** | **370** | **430** | 320 | **330** |
| Iron | 0.3 [AO] | <0.005 | <0.005 | 0.008 | 0.007 | 0.008 | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 |
| Magnesium | | 27.9 | 39.2 | 29.1 | 44.0 | 33.8 | 49.0 | 29 | 34.0 | 33 | 25.0 | 27 | 31 | 31 | 34.0 | 26 | 26 |
| Manganese | 0.05 [AO] | <0.001 | 0.001 | 0.006 | 0.006 | 0.002 | 0.0065 | 0.0027 | 0.001 | 0.094 | <0.002 | 0.0036 | 0.026 | <0.002 | 0.1 | 0.19 | <0.002 |
| Nitrate(as N) | 10 d | 0.8 | 0.6 | 0.8 | 0.3 | 0.7 | <0.1 | 0.99 | 0.5 | 1.15 | 0.74 | 0.34 | 0.34 | 0.24 | 0.13 | 0.6 | 0.46 |
| Nitrite(as N) | 1 d | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.01 | <0.01 | ND | 0.023 | <0.01 | <0.01 | <0.01 | <0.01 | 0.015 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.012 | ND | 0.012 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | 0.022 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.23 | 7.84 | 7.69 | 7.88 | 7.72 | 7.87 | 8.06 | 7.88 | 8 | 7.75 | 7.9 | 8.03 | 8.11 | 7.93 | 7.9 | 7.96 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.01 | ND | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0026 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 0.02 | 0.01 | 0.04 | 0.06 | 0.02 | 0.046 | <0.02 | 0.084 | 0.025 | 0.056 | 0.021 | <0.02 | <0.1 | 0.04 | <0.1 | 0.074 |
| Potassium | | 0.9 | 1.1 | 1.1 | 1.4 | 1.4 | 1.9 | 1.7 | 2 | 5.9 | 1.4 | 1.3 | 1.9 | 2.1 | 3.6 | 2.1 | 2.3 |
| Sodium | 200 [AO] | 10.1 | 15.1 | 10.3 | 14.1 | 10.8 | 16 | 13 | 12 | 4.6 | 8.4 | 11 | 12 | 11 | 15 | 9.5 | 9.3 |
| Sulphate | 500 [AO] | 8 | 18 | 9 | 26 | 11 | 31 | 11 | 17 | 6 | 6 | 6.3 | 7.9 | 6.4 | 7.7 | 6 | 4.7 |
| Total Kjeldahl Nitrogen(as N) | | 0.11 | <0.05 | 0.18 | <0.05 | 0.11 | 0.61 | 0.11 | 0.67 | <0.10 | 0.13 | <0.50 | 0.14 | 0.27 | 1.4 | 0.13 | <0.10 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 10

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 10 24-Apr-19 | TH 10 20-Nov-19 | TH 10 13-May-20 | TH 10 12-Nov-20 | TH 10 8-Apr-21 | TH 10 7-Oct-21 | TH 10 3-May-22 | TH 10 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 340 | 400 | 340 | 430 | 440 | 390 | 360 | 130 |
| Ammonia(as N) | | 0.18 | 0.071 | 0.071 | 0.12 | 0.056 | <0.050 | 0.30 | 0.22 |
| Calcium | | 110 | 100 | 100 | 110 | 130 | 130 | 110 | 40 |
| Chloride | 250 [AO] | 24 | 26 | 23 | 30 | 36 | 38 | 33 | 13 |
| Conductivity @25øC (µmho/cm) | | 760 | 780 | 680 | 850 | 920 | 810 | 770 | 310 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.6 | 1.3 | 0.88 | 1.3 | 1.5 | 2.3 | 1.5 | 2.0 |
| Hardness(as CaCO3) | 80-100 [OG] | **390** | **390** | **360** | **410** | **470** | **440** | **410** | 140 |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 31 | 32 | 28 | 32 | 35 | 31 | 29 | 11 |
| Manganese | 0.05 [AO] | 0.072 | 0.035 | 0.046 | 0.053 | <0.002 | 0.015 | 0.17 | 0.026 |
| Nitrate(as N) | 10 d | 0.32 | 0.25 | 0.4 | 0.93 | 1.68 | 1.5 | 0.58 | 1.8 |
| Nitrite(as N) | 1 d | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.035 | 0.010 | 0.020 |
| Orthophosphate(as P) | | 0.02 | <0.010 | <0.010 | 0.025 | 0.019 | 0.029 | 0.011 | 0.13 |
| pH | 6.5-8.5 [OG] | 7.9 | 7.97 | 8.04 | 7.9 | 7.86 | 7.88 | 7.73 | 7.83 |
| Phenols | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 0.057 | 0.071 | <0.020 | 0.05 | 0.094 | NV | NV | 0.067 |
| Potassium | | 2.2 | 2.8 | 2.2 | 2.7 | 2.7 | 2.4 | 3.1 | 1.6 |
| Sodium | 200 [AO] | 17 | 16 | 12 | 20 | 20 | 18 | 23 | 7.2 |
| Sulphate | 500 [AO] | 4.8 | 6.1 | 5.5 | 7.4 | 7.9 | 6.5 | 11 | 2.3 |
| Total Kjeldahl Nitrogen(as N) | | 0.26 | 0.29 | 0.11 | 0.53 | 0.4 | 0.28 | NV | 0.49 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 11

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 11 27-Apr-93 | TH 11 4-Oct-93 | TH 11 13-Jun-94 | TH 11 7-Nov-94 | TH 11 19-Jun-95 | TH 11 30-Oct-95 | TH 11 15-Nov-96 | TH 11 19-Dec-97 | TH 11 18-Dec-98 | TH 11 21-Dec-00 | TH 11 18-Oct-01 | TH 11 22-Oct-02 | TH 11 1-Oct-03 | TH 11 29-Sep-04 | TH 11 21-Sep-05 | TH 11 (dup) 21-Sep-05 | TH 11 25-Sep-06 | TH 11 9-Oct-07 | TH 11 17-Sep-08 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 179 | 213 | 166 | 226 | 198 | 260 | 197 | 194 | 234 | 233 | 227 | 243 | 238 | 280 | 260 | 262 | 262 | 270 | 302 |
| Ammonia(as N) | | 0.078 | 0.06 | 0.021 | 0.09 | 0.18 | <0.05 | 0.05 | 0.04 | 0.05 | 0.11 | 0.02 | 0.02 | <0.01 | 0.04 | 0.04 | 0.04 | <0.01 | <0.01 | <0.01 |
| Calcium | | 46.4 | 64.4 | 46.1 | 67 | 56 | 77.5 | 60.5 | 53.2 | 74.8 | 62.4 | 61.6 | 83.8 | 74.4 | 73.2 | 80.6 | 78.6 | 82.4 | 80.8 | 76.9 |
| Chloride | 250 [AO] | 0.4 | 2.4 | 0.7 | 6.7 | 2 | 23.2 | 3.39 | 4.56 | 30.3 | 3.5 | 4.6 | 29.1 | 13.6 | 15 | 24.1 | 24.1 | 38.2 | 33.3 | 7.5 |
| Conductivity @25øC (µmho/cm) | | 340 | 407 | 324 | 444 | 390 | 554 | 370 | 370 | 515 | 346 | 426 | 564 | 489 | 493 | 567 | 566 | 572 | 574 | 526 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.2 | 1.4 | 5.9 | 6.1 | 5.1 | 2.4 | 1.5 | 1.5 | 3.1 | 3.7 | | 65 | 5 | 0.7 | 3.6 | 3.9 | 3.4 | 0.7 | 1.4 |
| Hardness(as CaCO3) | 80-100 [OG] | 176 | 234 | 175 | 248 | 210 | 287 | 213 | 204 | 275 | 241 | 237 | 303 | 271 | 290 | 300 | 293 | 316 | 305 | 302 |
| Iron | 0.3 [AO] | 0.06 | 0.01 | 0.02 | 0.04 | 0.02 | 0.03 | 0.048 | 0.009 | 0.23 | 0.01 | 0.02 | 0.03 | 0.006 | 0.014 | <0.005 | <0.005 | 0.007 | 0.018 | <0.005 |
| Magnesium | | 14.6 | 17.7 | 14.5 | 19.5 | 16.9 | 22.7 | 17 | 17.2 | 21.3 | 20.5 | 20.2 | 22.8 | 20.8 | 26 | 24 | 23.5 | 26.8 | 25 | 26.7 |
| Manganese | 0.05 [AO] | | | <0.003 | 0.014 | 0.003 | 0.008 | 0.007 | | nd | nd | | <0.01 | 0.007 | 0.004 | 0.004 | 0.004 | 0.005 | 0.001 | 0.003 |
| Nitrate(as N) | 10 | 0.9 | 0.3 | 0.8 | 0.2 | 0.2 | 0.4 | 0.46 | 0.49 | 0.25 | 0.2 | <0.1 | 0.5 | 0.3 | 0.3 | 0.5 | 0.6 | 0.5 | 0.6 | 0.1 |
| Nitrite(as N) | 1 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | 0.01 | <0.03 | | nd | nd | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | |
| Orthophosphate(as P) | | | | | | | | <0.05 | | nd | nd | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 8.07 | 7.89 | 7.78 | 7.56 | 7.88 | 7.8 | 7.83 | 8.13 | 8.21 | 7.96 | 7.68 | 8.23 | 8.47 | 7.48 | 7.71 | 7.69 | 7.24 | 7.03 | 7.36 |
| Phenols | | 0.003 | <0.001 | 0.0019 | 0.0014 | 0.001 | <0.001 | <0.001 | | 0.001 | nd | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.006 | 0.007 | 0.008 | 0.007 | 0.01 | 0.07 | 0.13 | | nd | | | 2.52 | 0.56 | 0.05 | 0.19 | 0.19 | 0.1 | 0.31 | 0.46 |
| Potassium | | | | 0.5 | 0.5 | 0.45 | 0.49 | <1 | | nd | nd | | <0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 |
| Sodium | 200 [AO] | | | 0.4 | 2.3 | 0.6 | 4.3 | 1.1 | 1.2 | 5.2 | 2.2 | 1.5 | 10.1 | 2 | 4.6 | 3.4 | 3.3 | 6.7 | 8.5 | 2.1 |
| Sulphate | 500 [AO] | | | 9.4 | 8.3 | 8 | 8 | 4.51 | 4.44 | 6 | 4.5 | 6.9 | 7 | 6 | 5 | 6 | 6 | 10 | 13 | 5 |
| Total Kjeldahl Nitrogen(as N) | | 0.4 | 0.31 | 0.25 | 0.23 | 0.35 | 0.34 | 0.29 | 0.11 | 0.22 | 0.21 | 0.18 | 2.43 | 0.5 | 0.31 | 0.7 | 0.75 | 0.39 | 0.84 | 1.03 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 11

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 11 1-Oct-09 | TH 11 9-Nov-10 | TH 11 21-Sep-11 | TH 11 22-Nov-12 | TH 11 26-Nov-13 | TH 11 1-May-14 | TH 11 4-Nov-14 | TH 11 20-Apr-15 | TH 11 3-Nov-15 | TH 11 26-Oct-16 | TH 11 16-May-17 | TH 11 7-Dec-17 | TH 11 10-Apr-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 272 | 318 | 272 | 263 | 230 | 190 | 280 | 230 | 280 | 260 | 180 | 300 | 200 |
| Ammonia(as N) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.05 | ND | 0.13 | <0.050 | <0.050 | <0.050 | 0.33 | <0.050 | 0.073 |
| Calcium | | 67.1 | 85.7 | 81.0 | 73.8 | 57 | 44 | 74 | 59 | 81 | 85 | 43 | 66 | 43 |
| Chloride | 250 [AO] | 19.4 | 12.1 | 50.5 | 12.8 | 2 | <1 | 9 | 5 | 16 | 68 | 2.0 | 4.4 | 1.2 |
| Conductivity @25øC (µmho/cm) | | 560 | 622 | 692 | 509 | 420 | 340 | 540 | 450 | 560 | 710 | 870 | 530 | 340 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1 | 1.8 | 1.9 | 1.6 | 1.4 | 1.3 | 1.7 | 1.1 | 1 | 1.1 | 3.8 | 0.94 | 1.1 |
| Hardness(as CaCO3) | 80-100 [OG] | 271 | 344 | 313 | 286 | 240 | 180 | 300 | 240 | 310 | **340** | 180 | 290 | 190 |
| Iron | 0.3 [AO] | <0.005 | <0.005 | <0.005 | <0.005 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 |
| Magnesium | | 25.2 | 31.7 | 27.0 | 24.7 | 23 | 18 | 29 | 24 | 25 | 30 | 187 | 30 | 19 |
| Manganese | 0.05 [AO] | 0.003 | <0.001 | <0.001 | <0.001 | <0.002 | ND | 0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrate(as N) | 10 | 0.2 | 0.1 | 0.4 | 0.2 | <0.1 | ND | <0.10 | <0.10 | 0.33 | 0.22 | 0.13 | <0.10 | <0.10 |
| Nitrite(as N) | 1 | | <0.1 | <0.1 | <0.1 | 0.011 | ND | <0.01 | <0.01 | <0.01 | <0.01 | 0.015 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND | <0.01 | 0.013 | 0.018 | <0.01 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.3 | 7.21 | 7.77 | 7.89 | 8.15 | 8.17 | 7.99 | 7.9 | 8.14 | 7.91 | 7.93 | 8.05 | 8.11 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | ND | 0.0012 | <0.001 | <0.001 | <0.001 | 0.0026 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 0.23 | 0.26 | 0.13 | 0.65 | 0.43 | 0.15 | 0.32 | 0.84 | 0.94 | <0.1 | 0.04 | <0.1 | 0.37 |
| Potassium | | 0.6 | 0.4 | 0.5 | 0.3 | 0.35 | 0.3 | 0.67 | 0.49 | 0.55 | 0.45 | 0.2 | 0.44 | 0.27 |
| Sodium | 200 [AO] | 4.5 | 2.4 | 9.7 | 4.2 | 1.2 | 0.44 | 1.6 | 1.1 | 4.8 | 8.8 | 0.54 | 2.1 | 0.38 |
| Sulphate | 500 [AO] | 4 | 3 | 6 | 4 | 2 | 4 | 4 | 3 | 3.7 | 7.6 | 7.7 | <1.0 | <1.0 |
| Total Kjeldahl Nitrogen(as N) | | 0.3 | 0.43 | 0.20 | 0.61 | 6.8 | 0.25 | 0.44 | 1 | <0.50 | 0.23 | 1.4 | <0.13 | <0.10 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 11

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH 11 15-Nov-18 | TH 11 24-Apr-19 | TH 11 20-Nov-19 | TH 11 13-May-20 | TH 11 12-Nov-20 | TH 11 8-Apr-21 | TH 11 7-Oct-21 | TH 11 3-May-22 | TH 11 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 270 | 190 | 270 | 200 | 290 | 220 | 240 | 210 | 230 |
| Ammonia(as N) | | <0.050 | <0.050 | 0.069 | 0.11 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calcium | | 77 | 47 | 87 | 51 | 81 | 56 | 66 | 46 | 62 |
| Chloride | 250 [AO] | 33 | 1.4 | 64 | 2.3 | 30 | 7.4 | 10 | 2.0 | 24 |
| Conductivity @25øC (µmho/cm) | | 590 | 350 | 700 | 370 | 610 | 430 | 460 | 400 | 500 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.94 | 1.1 | 0.77 | 1.1 | 0.87 | 1.2 | 1.1 | 1.1 | 1.5 |
| Hardness(as CaCO3) | 80-100 [OG] | 300 | 190 | **350** | 210 | 310 | 230 | 260 | 200 | 260 |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 27 | 18 | 31 | 20 | 26 | 21 | 24 | 21 | 27 |
| Manganese | 0.05 [AO] | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0026 | <0.002 | <0.002 |
| Nitrate(as N) | 10 | <0.10 | <0.10 | <0.10 | <0.10 | 0.27 | <0.10 | 0.72 | 0.13 | 0.59 |
| Nitrite(as N) | 1 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | 0.027 | <0.010 | 0.049 | <0.010 | 0.033 |
| pH | 6.5-8.5 [OG] | 8.02 | 8.15 | 8.06 | 8.18 | 8.07 | 8.07 | 8.06 | 8.07 | 8.13 |
| Phenols | | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 0.045 | 0.033 | 0.055 | 0.068 | 0.53 | 0.071 | NV | NV | 0.13 |
| Potassium | | 0.38 | 0.23 | 0.36 | 0.24 | 0.38 | 0.27 | 0.58 | 0.26 | 0.46 |
| Sodium | 200 [AO] | 3.1 | 0.55 | 7.8 | 0.98 | 2.9 | 2.8 | 2.3 | 0.68 | 4.2 |
| Sulphate | 500 [AO] | 3.3 | <1.0 | 4 | 1.6 | <1.0 | 2.5 | 3.4 | 2.0 | 2.1 |
| Total Kjeldahl Nitrogen(as N) | | <0.10 | 0.12 | 0.16 | 0.1 | 0.21 | 0.17 | 0.25 | NV | <0.1 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 12

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH12 25-Sep-06 | TH12 9-Oct-07 | TH12 17-Sep-08 | TH12 1-Oct-09 | TH12 1-Oct-09 Duplicate #1 | TH12 9-Nov-10 | TH12 9-Nov-10 Dup#3 | TH12 21-Sep-11 | TH12 23-Nov-12 | TH12 23-Nov-12 Duplicate #3 | TH12 26-Nov-13 | TH12 1-May-14 | TH12 4-Nov-14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 175 | 167 | 180 | 172 | 171 | 166 | 167 | 166 | 167 | 167 | 170 | 170 | 170 |
| Ammonia(as N) | | 0.17 | 0.12 | 0.21 | 0.19 | 0.17 | 0.2 | 0.23 | 0.19 | 0.16 | 0.17 | 0.24 | 0.26 | 0.33 |
| Calcium | | 45.1 | 42.2 | 43.7 | 39.3 | 39.4 | 44 | 44.3 | 42.3 | 44.2 | 44.5 | 45 | 43 | 47 |
| Chloride | 250 [AO] | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.2 | 0.9 | 0.9 | <1 | <1 | <1 |
| Conductivity @25øC (µmho/cm) | | 462 | 443 | 486 | 477 | 480 | 478 | 476 | 501 | 469 | 466 | 480 | 470 | 480 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.9 | 4 | 0.6 | 0.4 | 0.4 | 0.9 | 0.6 | 0.8 | 1.1 | 1.1 | 0.46 | 0.48 | 0.55 |
| Hardness(as CaCO3) | 80-100 [OG] | 233 | 217 | 219 | 206 | 207 | 229 | 230 | 219 | 229 | 231 | 230 | 220 | 240 |
| Iron | 0.3 [AO] | <0.005 | 0.008 | 0.062 | 0.042 | 0.042 | 0.064 | 0.066 | 0.108 | <0.005 | <0.005 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 29.2 | 27.1 | 26.7 | 26.2 | 26.3 | 28.9 | 29 | 27.5 | 28.7 | 29.0 | 28 | 26.0 | 31 |
| Manganese | 0.05 [AO] | 0.01 | 0.018 | 0.006 | 0.006 | 0.006 | 0.002 | 0.002 | 0.005 | 0.005 | 0.005 | 0.0081 | 0.0075 | 0.008 |
| Nitrate(as N) | 10 | <0.1 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.1 | 0.1 | <0.1 | <0.1 | <0.1 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | | | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.054 | 0.031 | 0.105 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.1 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.77 | 7.44 | 7.69 | 7.55 | 7.68 | 7.43 | 7.36 | 7.89 | 8.03 | 7.99 | 8.17 | 8.22 | 8.13 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 15.7 | 10.9 | 0.32 | 0.33 | 0.41 | 0.28 | 0.26 | 0.14 | 2.15 | 1.88 | 1.4 | 5.9 | 13 |
| Potassium | | 1.3 | 1.2 | 1.2 | 1.1 | 1.1 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 | 1.5 |
| Sodium | 200 [AO] | 14.4 | 13.4 | 14 | 11.8 | 11.9 | 11.9 | 12 | 13.3 | 13.6 | 13.7 | 14 | 14 | 15 |
| Sulphate | 500 [AO] | 90 | 86 | 89 | 87 | 87 | 92 | 92 | 89 | 89 | 89 | 74 | 75 | 78 |
| Total Kjeldahl Nitrogen(as N) | | 4.19 | 3.49 | 0.34 | 0.21 | 0.19 | 0.27 | 0.24 | 0.19 | 0.58 | 0.53 | 1.6 | ND | 5.1 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 12

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH12 20-Apr-15 | TH12 3-Nov-15 | TH12 26-Oct-16 | TH12 16-May-17 | TH12 7-Dec-17 | TH12 10-Apr-18 | TH12 15-Nov-18 | TH12 24-Apr-19 | TH12 20-Nov-19 | TH12 13-May-20 | TH12 12-Nov-20 | TH12 8-Apr-21 | TH12 7-Oct-21 | TH12 3-May-22 | TH12 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 170 | 170 | 170 | 180 | 180 | 170 | 170 | 160 | 170 | 170 | 170 | 170 | 160 | 170 | 170 |
| Ammonia(as N) | | 0.23 | 0.22 | 0.22 | 0.071 | 0.25 | 0.31 | 0.41 | 0.25 | 0.3 | 0.26 | 0.21 | <0.050 | 0.23 | 0.13 | 0.26 |
| Calcium | | 46 | 41 | 42 | 58 | 42 | 42 | 43 | 44 | 42 | 46 | 42 | 44 | 46 | 42 | 43 |
| Chloride | 250 [AO] | 1 | 1.7 | 1.1 | 1.5 | 1.0 | 1.1 | 1.2 | <1.0 | 1.3 | 1.1 | 1.6 | 1.0 | 1.5 | <1.0 | 1.4 |
| Conductivity @25øC (µmho/cm) | | 480 | 480 | 480 | 570 | 480 | 480 | 460 | 480 | 470 | 480 | 480 | 480 | 470 | 480 | 470 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.94 | 0.47 | 0.41 | 0.66 | 1.0 | <0.50 | <0.50 | <0.50 | <0.50 | 0.47 | 0.57 | 0.51 | <0.40 | <0.40 | 0.42 |
| Hardness(as CaCO3) | 80-100 [OG] | 230 | 210 | 220 | 260 | 220 | 220 | 230 | 230 | 220 | 240 | 210 | 220 | 230 | 210 | 220 |
| Iron | 0.3 [AO] | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 29.0 | 27 | 28 | 29 | 0.0066 | 27 | 29 | 29 | 27 | 30 | 26 | 28 | 28 | 26 | 27 |
| Manganese | 0.05 [AO] | 0.0082 | 0.0062 | 0.0074 | 0.019 | 6.6 | 0.008 | 0.007 | 0.0073 | 0.0066 | 0.0078 | 0.0076 | 0.0088 | 0.0081 | 0.0076 | 0.0084 |
| Nitrate(as N) | 10 | 0.13 | <0.10 | 0.13 | <0.10 | <0.10 | <0.10 | 0.13 | 0.12 | <0.10 | 0.18 | 0.33 | 0.22 | 0.19 | 0.24 | 0.22 |
| Nitrite(as N) | 1 | 0.037 | 0.039 | 0.105 | 0.093 | 0.019 | 0.014 | 0.022 | 0.043 | 0.068 | 0.021 | 0.022 | 0.031 | 0.043 | 0.023 | 0.018 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.99 | 8.12 | 8.08 | 8.04 | 8.07 | 8.11 | 7.99 | 8.2 | 8.12 | 8.14 | 8.12 | 8.11 | 8.19 | 8.09 | 8.21 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 9.1 | 3.9 | <0.1 | 17 | <0.1 | 2 | 14 | 2.7 | 7.7 | 5.7 | 8.4 | 9.4 | NV | NV | 0.04 |
| Potassium | | 1.4 | 1.1 | 1.5 | 1.4 | 1.3 | 1.3 | 1.4 | 1.3 | 1.2 | 1.3 | 1.3 | 1.4 | 1.3 | 1.2 | 1.2 |
| Sodium | 200 [AO] | 15 | 13 | 14 | 14 | 13 | 13 | 14 | 14 | 13 | 14 | 13 | 14 | 15 | 13 | 14 |
| Sulphate | 500 [AO] | 68 | 78 | 78 | 100 | 76 | 77 | 76 | 73 | 80 | 83 | 79 | 80 | 73 | 81 | 74 |
| Total Kjeldahl Nitrogen(as N) | | <2.0 | <0.50 | 0.78 | 0.69 | 0.75 | 0.4 | 0.4 | 0.34 | 0.51 | 0.47 | 0.25 | 0.48 | 0.78 | NV | 0.29 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TH 13

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH13 26-Nov-13 | TH13 1-May-14 | TH13 4-Nov-14 | TH13 20-Apr-15 | TH13 3-Nov-15 | TH13 20-Apr-16 | TH13 26-Oct-16 | TH13 16-May-17 | TH13 7-Dec-17 | TH13 10-Apr-18 | TH13 15-Nov-18 | TH13 24-Apr-19 | TH13 20-Nov-19 | TH13 13-May-20 | TH13 12-Nov-20 | TH13 8-Apr-21 | TH13 7-Oct-21 | TH13 3-May-22 | TH13 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 260 | 260 | 270 | 260 | 260 | 270 | 270 | 280 | 280 | 280 | 280 | 250 | 280 | 290 | 290 | 280 | 280 | 280 | 260 |
| Ammonia(as N) | | <0.05 | ND | 0.093 | 0.11 | <0.050 | <0.050 | 0.06 | <0.050 | 0.05 | 0.2 | 0.12 | 0.12 | 0.12 | 0.092 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calcium | | 65 | 67 | 77 | 68 | 65 | 67 | 66 | 69 | 64 | 65 | 67 | 71 | 69 | 75 | 69 | 69 | 73 | 70 | 71 |
| Chloride | 250 [AO] | 2 | 2 | 2 | 2 | 3.2 | 2.2 | 2.4 | 2.2 | 1.6 | 2.2 | 2.6 | 2.9 | 3.4 | 3 | 1.5 | 1.8 | 2.8 | 3.4 | 3.3 |
| Conductivity @25øC (µmho/cm) | | 520 | 510 | 520 | 490 | 510 | 510 | 520 | 540 | 510 | 510 | 510 | 520 | 540 | 540 | 540 | 520 | 510 | 540 | 480 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 1.3 | 1.6 | 1.4 | 2.5 | 1.4 | 2.6 | 1.6 | 1.8 | 2.4 | 2.3 | 1.5 | 1.3 | 1.1 | 1.3 | 1.6 | 1.4 | 1.4 | 1.2 | 1.4 |
| Hardness(as CaCO3) | 80-100 [OG] | 270 | 270 | 320 | 280 | 270 | 280 | 280 | 290 | 270 | 270 | 290 | 290 | 290 | 310 | 290 | 290 | 300 | 300 | 290 |
| Iron | 0.3 [AO] | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 25 | 25 | 31 | 27 | 26 | 27 | 28 | 29 | 26 | 27 | 29 | 29 | 29 | 31 | 28 | 28 | 28 | 30 | 29 |
| Manganese | 0.05 [AO] | <0.002 | ND | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.19 | <0.02 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrate(as N) | 10 | 2.5 | 1.73 | 1.13 | 0.76 | 1.4 | 0.24 | 2.22 | 0.23 | 0.63 | 0.34 | 1.85 | 1.37 | 2.03 | 1.85 | 1.22 | 0.68 | 0.59 | 1.19 | 0.72 |
| Nitrite(as N) | 1 | 0.011 | ND | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | ND | 0.011 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 8.08 | 8.04 | 7.99 | 8.09 | 7.93 | 8.1 | 8.17 | 7.96 | 7.96 | 8.07 | 7.83 | 8.09 | 7.98 | 7.89 | 7.95 | 7.99 | 7.86 | 7.95 | 8.29 |
| Phenols | | <0.01 | ND | <0.001 | <0.0010 | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 8.8 | 3.9 | 1.9 | 1.8 | 1.1 | 0.75 | <0.1 | 2.6 | <0.1 | 4.3 | 1.4 | 1.2 | 0.65 | 0.42 | 2.4 | 0.81 | NV | NV | 0.70 |
| Potassium | | 0.47 | 0.42 | 0.53 | 0.43 | 0.49 | 0.39 | 0.52 | 0.49 | 0.39 | 0.41 | 0.47 | 0.4 | 0.47 | 0.5 | 0.45 | 0.37 | 0.55 | 0.38 | 0.44 |
| Sodium | 200 [AO] | 1 | 1.3 | 1.1 | 1 | 1 | 1.2 | 1.2 | 1.4 | 0.95 | 0.92 | 1 | 1.1 | 0.92 | 1.3 | 0.9 | 0.7 | 0.91 | 1.1 | 0.96 |
| Sulphate | 500 [AO] | 6 | 10 | 7 | 8 | 9.4 | 9.3 | 7.2 | 4.9 | 4.2 | 5.4 | 5.1 | 5.7 | 9.1 | 9.1 | 4.8 | 2.6 | 4.4 | 5.2 | 5.4 |
| Total Kjeldahl Nitrogen(as N) | | 11 | 6.7 | <2.0 | 2.1 | <0.50 | 0.25 | 0.6 | 0.37 | 0.29 | 0.43 | 0.52 | 0.2 | 0.41 | 0.24 | 0.24 | 0.15 | 0.2 | NV | <0.10 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TH 14

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TH14 26-Nov-13 | TH14 1-May-14 | TH14 4-Nov-14 | TH14 20-Apr-15 | TH14 3-Nov-15 | TH14 20-Apr-16 | TH14 26-Oct-16 | TH14 16-May-17 | TH14 7-Dec-17 | TH14 10-Apr-18 | TH14 15-Nov-18 | TH14 24-Apr-19 | TH14 20-Nov-19 | TH14 13-May-20 | TH14 12-Nov-20 | TH14 8-Apr-21 | TH14 7-Oct-21 | TH14 3-May-22 | TH14 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 730 | 690 | 540 | **460** | **540** | **550** | **460** | **520** | **630** | **470** | **590** | **470** | **550** | **510** | **490** | **490** | **480** | **590** | **420** |
| Ammonia(as N) | | 23 | 22 | 21 | 15 | 8.3 | 6.2 | 12 | 14 | 22 | 8.6 | 15 | 8.3 | 13 | 9.3 | 16 | 7.7 | 16 | 16 | 1.3 |
| Calcium | | 200 | 190 | 140 | 130 | 150 | 160 | 120 | 130 | 150 | 130 | 150 | 130 | 140 | 140 | 130 | 140 | 140 | 160 | 120 |
| Chloride | 250 [AO] | 11 | 12 | 7 | 5 | 8 | 8.4 | 5.9 | 15 | 7 | 13 | 8.4 | 7.3 | 8.6 | 9 | 6.6 | 9.6 | 7.3 | 17 | 15 |
| Conductivity @25øC (µmho/cm) | | 1400 | 1300 | 1000 | 890 | 1000 | 1000 | 870 | 1000 | 1100 | 870 | 1000 | 970 | 1000 | 940 | 910 | 910 | 880 | 1100 | 810 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 7.7 | 6.5 | 5.1 | 4.5 | 3.8 | 3.9 | 3.3 | 5.3 | 5.6 | 3.9 | 4.7 | 3.1 | 3.6 | 4 | 3.7 | 3.3 | 3.6 | 6.6 | 2.7 |
| Hardness(as CaCO3) | 80-100 [OG] | 660 | 600 | 500 | **430** | **520** | **580** | **400** | **430** | **490** | **430** | **520** | **470** | **490** | **500** | **410** | **460** | **450** | **540** | **450** |
| Iron | 0.3 [AO] | <0.1 | ND | <0.1 | <0.1 | 3.2 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.27 | <0.1 | 1.4 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 40 | 34 | 30 | 28 | 38 | 43 | 25 | 26 | 28 | 27 | 32 | 33 | 31 | 36 | 23 | 29 | 25 | 30 | 36 |
| Manganese | 0.05 [AO] | 0.26 | 0.26 | 0.2 | 0.17 | 0.17 | 0.19 | 0.16 | **<0.002** | 0.2 | 0.16 | 0.3 | **0.31** | 0.27 | 0.24 | 0.25 | 0.25 | 0.24 | 0.26 | 0.19 |
| Nitrate(as N) | 10 | <0.1 | ND | <0.1 | <0.10 | <0.1 | <0.1 | <0.1 | <0.10 | <0.1 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |
| Nitrite(as N) | 1 | <0.01 | ND | 0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | ND | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.0010 | 0.011 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.41 | 7.49 | 7.43 | 7.53 | 7.49 | 7.79 | 7.75 | 7.5 | 7.34 | 7.55 | 7.19 | 7.64 | 7.39 | 7.73 | 7.54 | 7.76 | 7.56 | 7.38 | 7.82 |
| Phenols | | 0.0053 | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.001 | <0.0010 | <0.0010 | <0.0010 | 0.001 | 0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | NV | <0.0010 |
| Phosphorus, Total (as P) | | 3.4 | 2.9 | 2.1 | 1.4 | 0.71 | 0.58 | <0.1 | 0.45 | <0.1 | 0.75 | 7.5 | 0.14 | 0.33 | 0.31 | 0.18 | 0.096 | NV | NV | 0.054 |
| Potassium | | 18 | 17 | 14 | 12 | 8.8 | 7.2 | 12 | 12 | 180 | 7 | 15 | 10 | 8.1 | 7.5 | 9.5 | 6.6 | 12 | 15 | 1.9 |
| Sodium | 200 [AO] | 10 | 13 | 8 | 5.8 | 6.2 | 8.2 | 7.3 | 12 | 6.5 | 4.2 | 5.7 | 7 | 6.5 | 8.5 | 4.3 | 6.5 | 4.6 | 11 | 6.7 |
| Sulphate | 500 [AO] | 10 | 16 | 14 | 12 | 7.4 | 8.8 | 9.3 | 6.9 | 3.9 | 12 | 3.7 | 9.5 | 7.1 | 16 | 6.3 | 9.2 | 6.9 | 5.3 | 11 |
| Total Kjeldahl Nitrogen(as N) | | 31 | 6.5 | 5.1 | 14 | 8.7 | 6.6 | 13 | 17 | 23 | 9.1 | 14 | 8.2 | 14 | 8.2 | 15 | 7.1 | 17 | NV | 1.4 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TP 3

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TP 3 27-Apr-93 | TP 3 13-Jun-94 | TP 3 7-Nov-94 | TP 3 19-Jun-95 | TP 3 30-Oct-95 | TP3 15-Nov-96 | TP3 19-Dec-97 | TP3 18-Dec-98 | TP3 11-Jul-01 | TP3 18-Jun-02 | TP3 22-Oct-02 Dry | TP3 20-May-03 | TP3 1-Oct-03 Dry | TP3 5-May-04 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 171 | 102 | 105 | 105 | 170 | 240 | 255 | 227 | | 218 | | 183 | | 167 |
| Ammonia(as N) | | 0.142 | 0.46 | 0.223 | <0.05 | 0.05 | <0.05 | 0.03 | 0.16 | | <0.01 | | <0.01 | | 0.03 |
| Calcium | | 54.6 | 44.4 | 38.2 | 36.5 | 61.7 | 86.5 | 80.5 | 75.2 | | 65.9 | | 59.7 | | 56.1 |
| Chloride | 250 [AO] | 3.1 | 28 | 4.8 | 4.7 | 3.1 | 1.41 | 4.67 | 2.1 | | 3.7 | | 17.2 | | 4.9 |
| Conductivity @25øC (µmho/cm) | | 354 | 343 | 256 | 262 | 369 | 442 | 470 | 414 | | 410 | | 385 | | 342 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.9 | 15.9 | 15 | 4.5 | 2.5 | 1.2 | 0.9 | 2 | | <0.5 | | 0.5 | | <0.5 |
| Hardness(as CaCO3) | 80-100 [OG] | 175 | 138 | 117 | 113 | 191 | 245 | 257 | 245 | | 204 | | 185 | | 171 |
| Iron | 0.3 [AO] | <0.01 | 1.82 | 0.29 | 0.21 | 0.2 | 0.017 | 0.046 | 0.24 | | <0.01 | | 0.07 | | <0.005 |
| Magnesium | | 9.3 | 6.6 | 5.2 | 5.3 | 9 | 13 | 13.7 | 13.9 | | 9.5 | | 8.63 | | 7.41 |
| Manganese | 0.05 [AO] | | 0.499 | 0.149 | 0.016 | <0.003 | <0.005 | | nd | | <0.005 | | <0.01 | | <0.001 |
| Nitrate(as N) | 10 | 0.6 | 0.5 | 2.5 | 0.6 | 0.9 | 1.19 | 0.29 | 1.27 | | 0.6 | | 0.3 | | 0.3 |
| Nitrite(as N) | 1 | 0.02 | 0.01 | 0.01 | <0.01 | 0.01 | <0.03 | | nd | | <0.1 | | <0.1 | | <0.1 |
| Orthophosphate(as P) | | | | | | | <0.05 | | nd | | <0.01 | | <0.01 | | <0.01 |
| pH | 6.5-8.5 [OG] | 8.16 | 7.7 | 7.76 | 8.06 | 8.1 | 7.54 | 7.7 | 8.26 | | 7.44 | | 7.85 | | 8.06 |
| Phenols | | 0.0045 | 0.0033 | 0.0053 | <0.001 | 0.0017 | <0.001 | | nd | | <0.001 | | <0.001 | | <0.001 |
| Phosphorus, Total (as P) | | 0.02 | 0.137 | 0.094 | 0.01 | 0.03 | 0.3 | 1.6 | 0.01 | | 0.18 | | 0.06 | | 0.14 |
| Potassium | | | 2.4 | 2.79 | 2.25 | 2.03 | 1.9 | | 2 | | 1.3 | | 0.9 | | 1.1 |
| Sodium | 200 [AO] | | 14.3 | 4.7 | 7.3 | 1.4 | 1.08 | 4.54 | 1.1 | | 2.5 | | 14.7 | | 5.7 |
| Sulphate | 500 [AO] | | 24.0 | 14.0 | 16.7 | 16.4 | 4.65 | 3.78 | 5.2 | | 6.5 | | 4 | | 3 |
| Total Kjeldahl Nitrogen(as N) | | | | | | | 0.29 | | 0.37 | | 0.04 | | 0.17 | | 0.21 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TP 3

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TP3 29-Sep-04 | TP3 6-Apr-05 | TP3 21-Sep-05 Dry | TP3 4-Apr-06 | TP3 25-Sep-06 Dry | TP3 13-Apr-07 | TP3 9-Oct-07 Dry | TP3 15-Apr-08 | TP3 17-Sep-08 | TP3 30-Apr-09 | TP3 1-Oct-09 | TP3 12-May-10 | TP3 9-Nov-10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 230 | 180 | | 160 | | 166 | | 140 | 180 | 140 | 145 | 229 | 249 |
| Ammonia(as N) | | 0.05 | 0.02 | | <0.01 | | 0.04 | | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 |
| Calcium | | 73.4 | 60.2 | | 61.8 | | 55.6 | | 49 | 58.2 | 53.8 | 45.1 | 73.1 | 87.6 |
| Chloride | 250 [AO] | 11.4 | 2.2 | | 1.5 | | 1.2 | | 1.1 | 5.8 | 3.5 | 10.6 | 4.1 | 22.2 |
| Conductivity @25øC (µmho/cm) | | 409 | 345 | | 375 | | 305 | | 316 | 360 | 278 | 310 | 438 | 545 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.6 | 0.9 | | 1.2 | | 1.4 | | 0.9 | 1.4 | 0.6 | 1 | 0.8 | 0.9 |
| Hardness(as CaCO3) | 80-100 [OG] | 235 | 185 | | 195 | | 175 | | 151 | 177 | 158 | 137 | 223 | 267 |
| Iron | 0.3 [AO] | 0.005 | <0.005 | | <0.005 | | <0.005 | | 0.007 | <0.005 | <0.005 | <0.005 | <0.005 | 0.005 |
| Magnesium | | 12.6 | 8.47 | | 9.78 | | 8.67 | | 7.03 | 7.73 | 5.81 | 5.91 | 9.77 | 11.7 |
| Manganese | 0.05 [AO] | <0.001 | <0.001 | | <0.001 | | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Nitrate(as N) | 10 | 0.4 | 0.4 | | 6.1 | | 1 | | 1.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.2 |
| Nitrite(as N) | 1 | <0.1 | <0.1 | | <0.1 | | <0.1 | | | | | | | <0.1 |
| Orthophosphate(as P) | | <0.01 | <0.01 | | <0.01 | | <0.01 | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 7.55 | 7.7 | | 8.11 | | 7.66 | | 7.3 | 7.53 | 7.13 | 7.59 | 7.9 | 7.12 |
| Phenols | | <0.001 | <0.001 | | <0.001 | | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.25 | 0.01 | | 0.02 | | <0.01 | | 0.02 | 0.03 | <0.01 | 1.07 | 0.55 | 1.74 |
| Potassium | | 1 | 0.5 | | 0.6 | | 0.8 | | 1.2 | 1.3 | 1.6 | 1.6 | 1.3 | 1.6 |
| Sodium | 200 [AO] | 2.6 | 0.7 | | 0.7 | | 1.8 | | 3.3 | 3.8 | 1.7 | 2.8 | 2.9 | 8.4 |
| Sulphate | 500 [AO] | 2 | 3 | | 4 | | 3 | | 3 | 2 | 2 | 1 | 2 | 2 |
| Total Kjeldahl Nitrogen(as N) | | 0.16 | 0.07 | | 0.16 | | 0.09 | | 0.08 | 0.09 | <0.05 | 1.15 | 0.05 | 0.59 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality at Test Well TP 3

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TP3 2-May-11 | TP3 21-Sep-11 | TP3 12-Apr-12 | TP3 23-Nov-12 | TP3 7-May-13 | TP3 26-Nov-13 | TP3 1-May-14 | TP3 4-Nov-14 | TP3 20-Apr-15 | TP3 3-Nov-15 | TP3 20-Apr-16 | TP3 16-May-17 | TP3 7-Dec-17 | TP3 10-Apr-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 149 | 240 | 170 | 268 | 180 | 170 | 180 | 230 | 240 | 280 | 120 | 220 | 270 | 170 |
| Ammonia(as N) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.05 | <0.05 | ND | 0.084 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.1 |
| Calcium | | 56.5 | 115 | 58.2 | 91.5 | 57 | 59 | 61 | 84 | 91 | 89 | 45 | 70 | 84 | 54 |
| Chloride | 250 [AO] | 2.0 | 151* | 4.7 | 5.3 | 2 | 5 | 2 | 16 | 4 | 4.7 | <1.0 | 1.4 | 6.4 | 2.7 |
| Conductivity @25øC (µmho/cm) | | 336 | 957 | 334 | 503 | 340 | 340 | 340 | 480 | 470 | 530 | 240 | 400 | 510 | 320 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.9 | 0.9 | 0.7 | 1.5 | 0.94 | 0.65 | 0.77 | 0.81 | 1.1 | 1 | 0.9 | 0.8 | 0.75 | 1 |
| Hardness(as CaCO3) | 80-100 [OG] | 168 | 351 | 175 | 281 | 170 | 180 | 180 | 260 | 280 | 270 | 130 | 210 | 250 | 160 |
| Iron | 0.3 [AO] | <0.005 | <0.005 | <0.005 | <0.005 | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 |
| Magnesium | | 6.46 | 15.5 | 7.18 | 12.8 | 7.8 | 7.4 | 7.7 | 11 | 12 | 12 | 5.2 | 9.7 | 11 | 6.7 |
| Manganese | 0.05 [AO] | <0.001 | <0.001 | <0.001 | 0.001 | <0.002 | <0.002 | ND | ,0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Nitrate(as N) | 10 | 0.4 | 0.3 | 0.3 | 0.6 | <0.1 | <0.1 | 0.11 | <0.10 | 0.2 | 0.25 | 0.58 | 0.17 | <0.10 | 0.21 |
| Nitrite(as N) | 1 | <0.1 | 0.1 | <0.1 | <0.1 | <0.01 | 0.011 | ND | <0.01 | <0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND | <0.001 | <0.01 | <0.001 | 0.016 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | 7.87 | 7.86 | 8.06 | 8.00 | 8.11 | 8.18 | 8.15 | 7.99 | 8.13 | 8.01 | 8.07 | 8.03 | 7.91 | 8.13 |
| Phenols | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | ND | <0.001 | <0.001 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | 0.03 | 0.51 | 0.09 | 1.62 | 0.14 | 0.072 | 0.12 | 0.1 | 0.037 | 0.11 | 0.025 | 0.1 | <0.1 | 0.14 |
| Potassium | | 1.2 | 2.3 | 1.1 | 2.1 | 1.6 | 1.3 | 1.3 | 1.6 | 1.7 | 1.5 | 0.98 | 0.73 | 1.4 | 3.4 |
| Sodium | 200 [AO] | 1.8 | 39.9 | 3.1 | 5.1 | 3.7 | 1.1 | 0.96 | 7.9 | 4.5 | 2.1 | 0.73 | 1.2 | 2.4 | 1.6 |
| Sulphate | 500 [AO] | 2 | 2 | 3 | 2 | 2 | <1 | 2 | <1 | <1 | <1 | 2.1 | <1.0 | <1.0 | 3.6 |
| Total Kjeldahl Nitrogen(as N) | | <0.05 | 0.44 | <0.05 | 1.29 | 0.56 | 0.27 | 0.38 | <0.1 | 0.22 | <0.50 | <0.1 | 0.3 | <0.10 | 0.29 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TP 5

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TP 5 27-Apr-93 | TP 5 13-Jun-94 | TP 5 7-Nov-94 | TP 5 19-Jun-95 | TP 5 27-May-96 | TP 5 15-Nov-96 | TP 5 9-May-97 | TP 5 19-Dec-97 | TP 5 13-May-98 | TP 5 11-Jun-99 | TP 5 11-Jul-01 DRY | TP 5 18-Oct-01 DRY | TP 5 18-Jun-02 | TP 5 22-Oct-02 DRY | TP 5 20-May-03 | TP 5 1-Oct-03 DRY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 175 | 181 | 192 | 210 | 179 | 181 | 137 | 208 | 213 | 229.73 | | | 204 | | 158 | |
| Ammonia(as N) | | 0.101 | 0.014 | 0.167 | 0.16 | <0.05 | <0.05 | 0.16 | 0.12 | 0.03 | 0.12 | | | 0.03 | | <0.01 | |
| Calcium | | 43.4 | 49.6 | 49.2 | 55.8 | 51.1 | 51.8 | 38.4 | 53.5 | 57.9 | | | | 58 | | 42.3 | |
| Chloride | 250 [AO] | 1.4 | 0.6 | 1.2 | 0.8 | 0.76 | 0.72 | 0.63 | 0.79 | 0.41 | 1.24 | | | 1.9 | | 1.2 | |
| Conductivity @25øC (µmho/cm) | | 354 | 350 | 344 | 403 | 326 | 334 | 256 | 381 | 386 | 344 | | | 384 | | 275 | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.5 | 4.3 | 11 | 2.5 | 0.8 | 0.9 | 0.6 | 1.2 | 0.3 | | | | <0.5 | | <0.5 | |
| Hardness(as CaCO3) | 80-100 [OG] | 171 | 191 | 193 | 217 | 189 | 194 | 139 | 213 | 216 | 241.07 | | | 216 | | 159 | |
| Iron | 0.3 [AO] | 0.02 | 0.03 | 0.05 | 0.03 | 0.037 | 0.01 | 0.009 | 0.007 | nd | 2.29 | | | <0.01 | | 0.08 | |
| Magnesium | | 15.2 | 16.3 | 16.9 | 18.9 | 15 | 16.6 | 10.6 | 19.2 | 17.4 | | | | 17.3 | | 12.9 | |
| Manganese | 0.05 [AO] | | <0.003 | 0.009 | 0.004 | 0.007 | 0.005 | | | 0.015 | | | | <0.005 | | <0.01 | |
| Nitrate(as N) | 10 | 1.3 | 0.2 | 0.2 | 0.2 | 0.07 | 0.17 | 0.32 | 0.27 | nd | <0.05 | | | <0.1 | | 0.4 | |
| Nitrite(as N) | 1 | <0.01 | <0.01 | <0.01 | <0.01 | <0.03 | <0.03 | | 0.09 | nd | <0.05 | | | <0.1 | | <0.1 | |
| Orthophosphate(as P) | | | | | | <0.05 | <0.05 | | 0.05 | nd | | | | <0.01 | | <0.01 | |
| pH | 6.5-8.5 [OG] | 8.12 | 7.82 | 7.75 | 7.83 | 7.69 | 7.61 | 7.83 | 7.59 | 7.65 | 7.32 | | | 7.46 | | 7.94 | |
| Phenols | | <0.001 | 0.0028 | 0.0024 | <0.001 | <0.001 | <0.001 | | | 0.018 | | | | <0.001 | | <0.001 | |
| Phosphorus, Total (as P) | | 0.007 | 0.01 | 0.022 | <0.01 | 0.057 | <0.01 | | | 0.02 | | | | 0.13 | | 0.45 | |
| Potassium | | | 0.3 | 0.22 | <0.15 | <1 | <1 | | | nd | | | | <1.0 | | <0.4 | |
| Sodium | 200 [AO] | | 0.6 | 0.4 | 0.5 | 0.47 | 0.67 | 0.39 | 0.39 | 0.35 | 0.62 | | | <1.0 | | 0.3 | |
| Sulphate | 500 [AO] | | 5.3 | 4.8 | 6 | 4.08 | 3.96 | 3.65 | 3.7 | 4.5 | 5.63 | | | 6.5 | | 3 | |
| Total Kjeldahl Nitrogen(as N) | | | | | | 0.29 | 0.19 | 0.84 | 0.4 | 0.17 | 4.4 | | | 0.17 | | 0.90 | |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TP 5

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TP 5 5-May-04 | TP 5 29-Sep-04 DRY | TP 5 6-Apr-05 | TP 5 21-Sep-05 DRY | TP 5 4-Apr-06 | TP 5 25-Sep-06 DRY | TP 5 13-Apr-07 | TP 5 9-Oct-07 DRY | TP 5 15-Apr-08 | TP 5 17-Sep-08 | TP 5 30-Apr-09 | TP 5 1-Oct-09 | TP 5 12-May-10 | TP 5 9-Nov-10 | TP 5 2-May-11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 151 | | 150 | | 121 | | 138 | | 100 | 244 | 130 | 217 | 221 | 274 | 149 |
| Ammonia(as N) | | 0.05 | | 0.02 | | 0.06 | | <0.01 | | <0.01 | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 | <0.01 |
| Calcium | | 44.5 | | 40.7 | | 34.5 | | 39.3 | | 30.9 | 62.6 | 43.9 | 51.7 | 56.3 | 73.3 | 40.3 |
| Chloride | 250 [AO] | 0.5 | | 1.1 | | 1.1 | | 0.5 | | 0.5 | 0.5 | 0.5 | 0.5 | 1 | 0.5 | 0.6 |
| Conductivity @25øC (µmho/cm) | | 316 | | 285 | | 247 | | 272 | | 220 | 426 | 257 | 388 | 402 | 493 | 290 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.5 | | 0.8 | | 1.2 | | 1.3 | | 0.5 | 1.3 | 0.4 | 0.7 | 0.8 | 0.9 | 0.7 |
| Hardness(as CaCO3) | 80-100 [OG] | 161 | | 155 | | 129 | | 145 | | 113 | 231 | 156 | 135 | 213 | 284 | 150 |
| Iron | 0.3 [AO] | <0.005 | | <0.005 | | 0.007 | | <0.005 | | <0.005 | <0.005 | <0.005 | <0.005 | 0.012 | 0.006 | <0.005 |
| Magnesium | | 12.1 | | 12.9 | | 10.4 | | 11.4 | | 8.7 | 18.1 | 11.3 | 15.3 | 17.5 | 24.5 | 12.0 |
| Manganese | 0.05 [AO] | <0.001 | | <0.001 | | <0.001 | | <0.001 | | <0.001 | 0.002 | <0.001 | <0.001 | 0.003 | 0.002 | <0.001 |
| Nitrate(as N) | 10 | 0.2 | | 0.3 | | 0.3 | | 0.3 | | 0.4 | 0.1 | 0.2 | 0.1 | <0.1 | 0.1 | 0.1 |
| Nitrite(as N) | 1 | <0.1 | | <0.1 | | <0.1 | | <0.1 | | | | | | | <0.1 | <0.1 |
| Orthophosphate(as P) | | <0.01 | | <0.01 | | <0.01 | | <0.01 | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 [OG] | 8.04 | | 7.67 | | 8.13 | | 7.77 | | 7.22 | 7.5 | 7.28 | 7.67 | 7.89 | 7.21 | 7.82 |
| Phenols | | <0.001 | | <0.001 | | <0.001 | | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | | 0.18 | | 0.35 | | 0.28 | | 0.25 | | 0.73 | 0.1 | 0.17 | 1.1 | 0.2 | 0.09 | 0.78 |
| Potassium | | <0.1 | | <0.1 | | 0.1 | | 0.2 | | 0.3 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.5 |
| Sodium | 200 [AO] | 0.3 | | 0.3 | | 0.3 | | 1.1 | | 0.9 | 0.4 | 0.3 | 3.6 | 0.4 | 0.4 | <0.2 |
| Sulphate | 500 [AO] | 3 | | 3 | | 3 | | 2 | | 2 | 3 | 2 | 2 | 2 | 2 | 2 |
| Total Kjeldahl Nitrogen(as N) | | 0.52 | | 0.47 | | 0.47 | | 0.38 | | 0.99 | 0.27 | 0.24 | 1.52 | 0.28 | 0.18 | 1.06 |

NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

# Historic Groundwater Quality for Test Well TP 5

**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

| Chemical Parameter | ODWS | TP 5 21-Sep-11 DRY | TP 5 12-Apr-12 | TP 5 23-Nov-12 DRY | TP 5 7-May-13 | TP 5 26-Nov-13 | TP 5 1-May-14 | TP 5 4-Nov-14 | TP 5 20-Apr-15 | TP 5 20-Apr-16 | TP 5 16-May-17 | TP 5 7-Dec-17 | TP 5 15-Nov-18 | TP 5 24-Apr-19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | | 203 | | 160 | 210 | 160 | 260 | 210 | 170 | 170 | 270 | 220 | 180 |
| Ammonia(as N) | | | 0.03 | | <0.05 | <0.05 | ND | 0.06 | <0.050 | <0.050 | <0.050 | 0.066 | 0.096 | <0.050 |
| Calcium | | | 52.8 | | 49 | 54 | 39 | 70 | 56 | 46 | 44 | 66 | 54 | 48 |
| Chloride | 250 [AO] | | 0.6 | | <1 | <1 | ND | <1 | <1 | <1.0 | 1.1 | <1.0 | <1.0 | <1.0 |
| Conductivity @25øC (µmho/cm) | | | 369 | | 310 | 380 | 290 | 470 | 390 | 300 | 310 | 480 | 400 | 330 |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | | 0.9 | | 0.64 | 0.85 | 0.49 | <0.001 | 0.96 | 0.67 | 0.94 | 0.73 | 0.69 | 0.6 |
| Hardness(as CaCO3) | 80-100 [OG] | | 205 | | 180 | 200 | 150 | 270 | 220 | 170 | 170 | 260 | 210 | 180 |
| Iron | 0.3 [AO] | | <0.005 | | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.1 | <0.1 |
| Magnesium | | | 17.9 | | 14 | 17 | 13 | 23 | 20 | 15 | 14 | 23 | 18 | 16 |
| Manganese | 0.05 [AO] | | 0.003 | | <0.002 | <0.002 | ND | <0.002 | <0.002 | <0.002 | <0.002 | 0.0078 | <0.002 | <0.002 |
| Nitrate(as N) | 10 | | 0.1 | | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.10 | <0.10 | <0.10 | <0.10 |
| Nitrite(as N) | 1 | | <0.1 | | <0.001 | <0.01 | ND | <0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | | <0.01 | | <0.01 | <0.01 | ND | <0.01 | <0.01 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 [OG] | | 7.99 | | 7.79 | 8.11 | 8.16 | 7.96 | 7.95 | 8.18 | 8.1 | 7.9 | 7.96 | 8.13 |
| Phenols | | | <0.001 | | <0.001 | <0.001 | ND | <0.01 | <0.001 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | | | 0.19 | | 0.58 | 1.3 | 0.27 | 0.31 | 0.12 | 0.23 | 0.67 | <0.1 | 1.5 | 0.06 |
| Potassium | | | 0.2 | | 0.24 | 0.24 | 0.21 | 0.4 | 0.025 | 0.6 | <0.2 | 0.31 | <0.2 | <0.2 |
| Sodium | 200 [AO] | | 0.3 | | 0.26 | 0.37 | 0.27 | 0.39 | 0.33 | 1.5 | 0.27 | 0.44 | 0.32 | 0.28 |
| Sulphate | 500 [AO] | | 2 | | 2 | 2 | 1 | 2 | 2 | <1 | 1.7 | <1.0 | <1.0 | <1.0 |
| Total Kjeldahl Nitrogen(as N) | | | 0.07 | | 1.4 | 2.9 | 9.9 | 0.36 | 0.49 | 0.1 | 0.19 | 0.11 | 0.15 | <0.10 |

NOTES:

1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

shading indicates exceedence of ODWQS

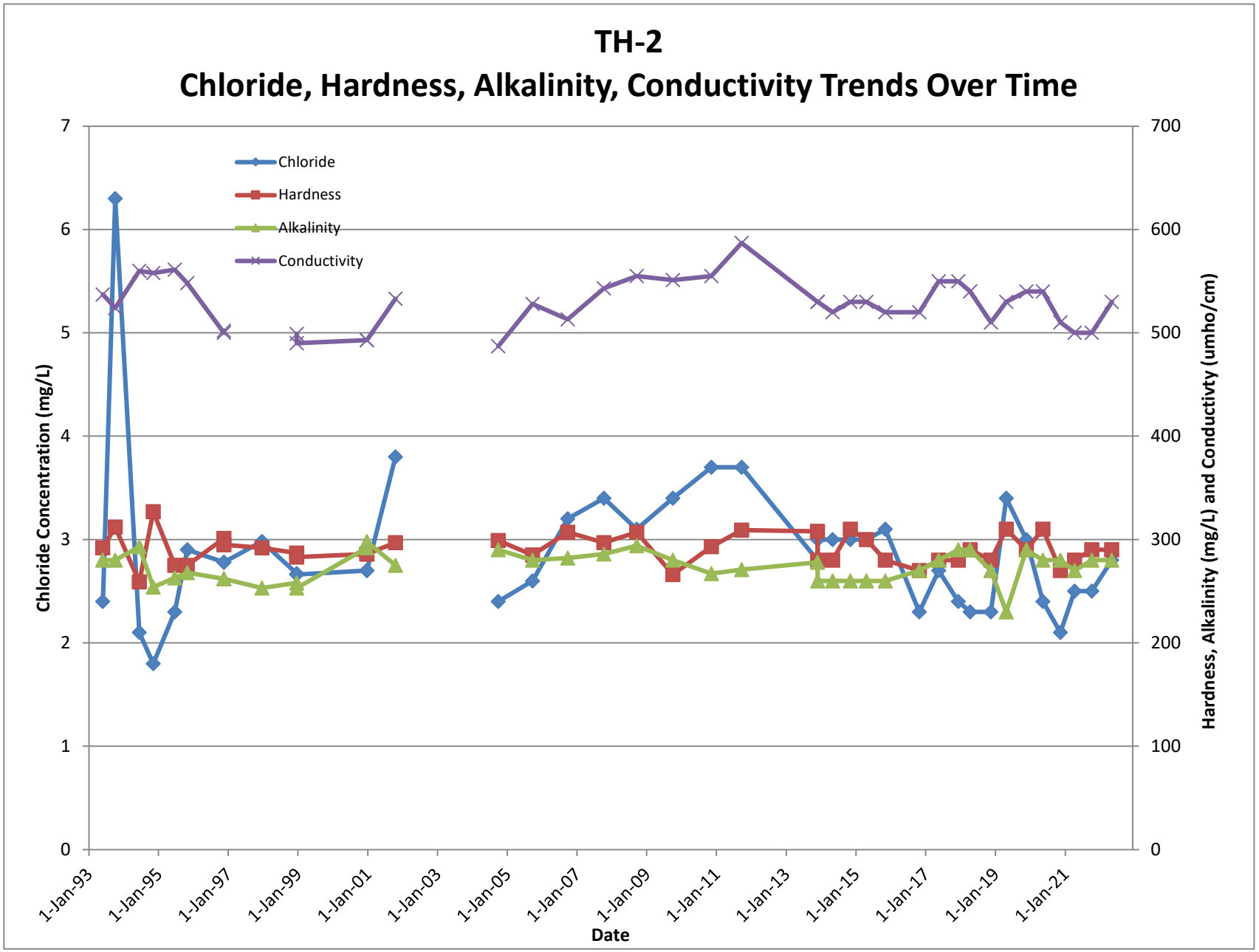
# Historic Groundwater Quality for Test Well TP 5

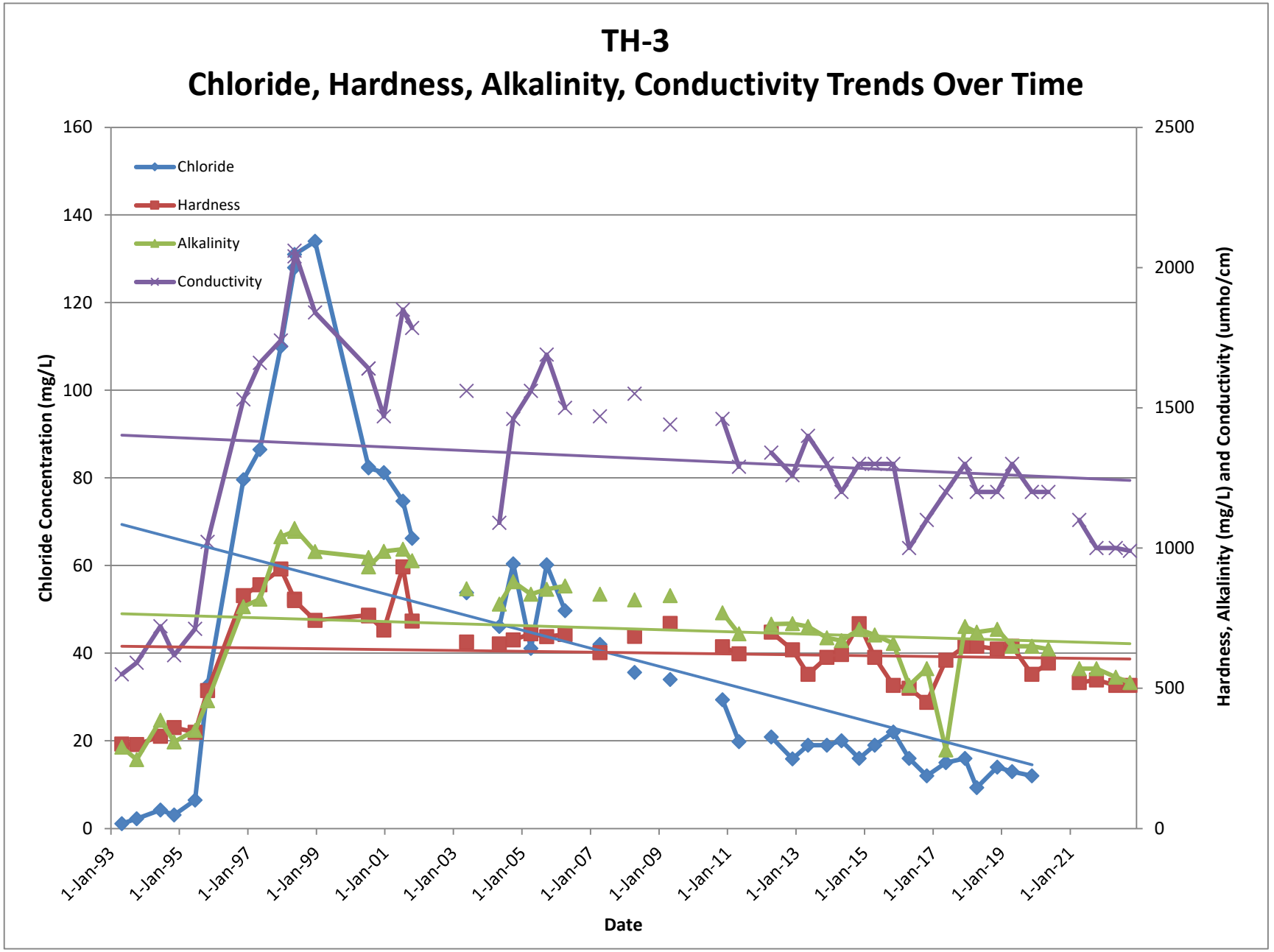
**Municipality of West Grey**
**Groundwater Quality - Bentinck Landfill**

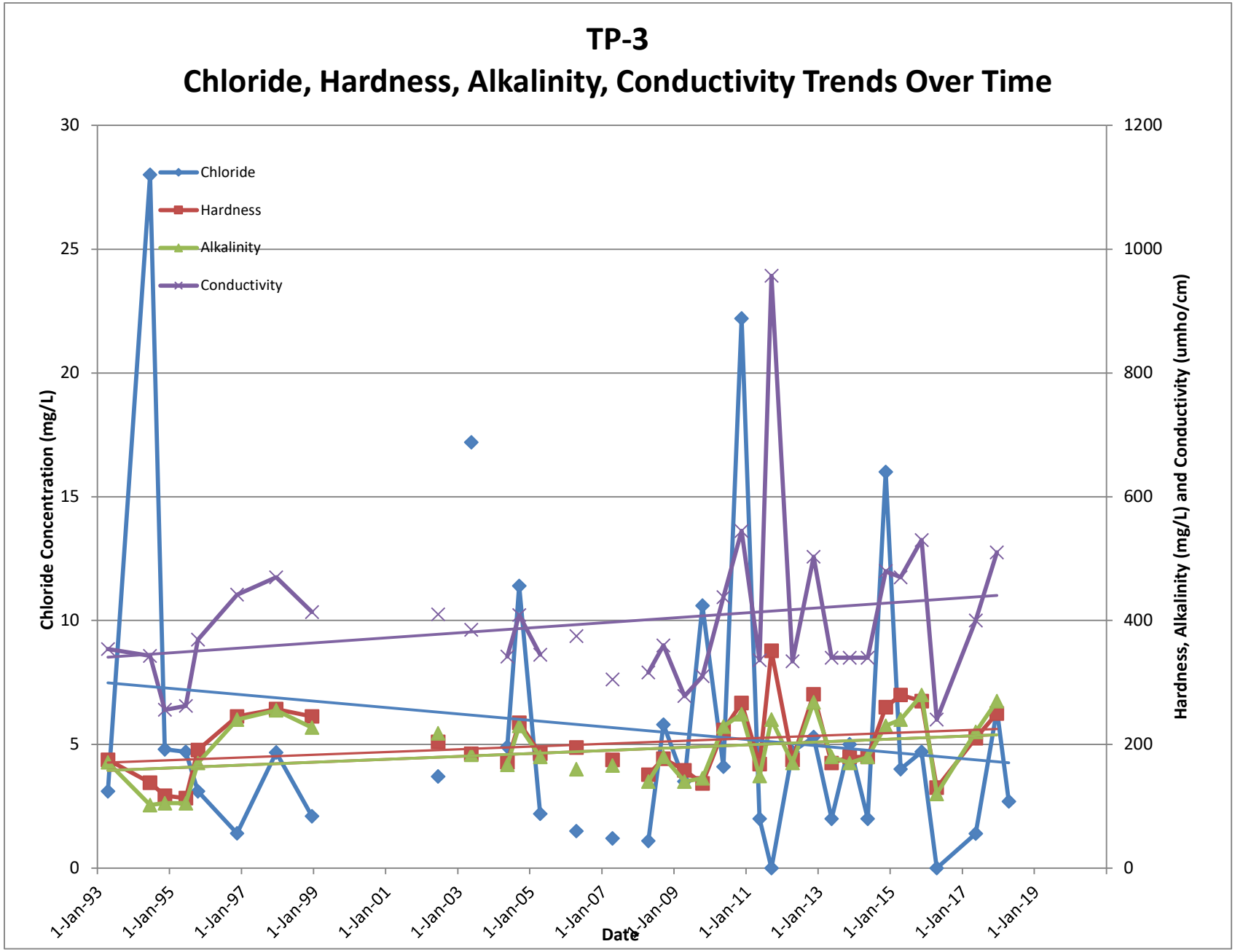
| Chemical Parameter | ODWS | TP 5 20-Nov-19 | TP 5 13-May-20 | TP 5 12-Nov-20 Dry | TP 5 8-Apr-21 | TP 5 7-Oct-21 Dry | TP 5 3-May-22 | TP 5 29-Sep-22 Dry |
|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | 30 - 500 [OG] | 220 | 180 | | 180 | | 230 | |
| Ammonia(as N) | | 0.075 | <0.050 | | <0.050 | | 0.12 | |
| Calcium | | 54 | 49 | | 46 | | 58 | |
| Chloride | 250 [AO] | <1.0 | <1.0 | | 1.4 | | <1.0 | |
| Conductivity @25øC (µmho/cm) | | 390 | 340 | | 340 | | 430 | |
| Dissolved Organic Carbon(DOC) | 5.0 [AO] | 0.51 | 0.8 | | 0.98 | | 0.67 | |
| Hardness(as CaCO3) | 80-100 [OG] | 210 | 190 | | 180 | | 230 | |
| Iron | 0.3 [AO] | <0.1 | <0.1 | | <0.1 | | <0.1 | |
| Magnesium | | 19 | 17 | | 16 | | 21 | |
| Manganese | 0.05 [AO] | <0.002 | <0.002 | | <0.002 | | <0.002 | |
| Nitrate(as N) | 10 | <0.10 | <0.10 | | <0.10 | | <0.10 | |
| Nitrite(as N) | 1 | <0.010 | <0.010 | | <0.010 | | <0.010 | |
| Orthophosphate(as P) | | <0.010 | <0.010 | | <0.010 | | 0.036 | |
| pH | 6.5-8.5 [OG] | 8.16 | 8.13 | | 8.01 | | 8.06 | |
| Phenols | | <0.0010 | <0.0010 | | <0.010 | | NV | |
| Phosphorus, Total (as P) | | 0.26 | 0.57 | | 0.72 | | NV | |
| Potassium | | <0.2 | 0.23 | | <0.2 | | <0.2 | |
| Sodium | 200 [AO] | 0.33 | 0.29 | | 0.33 | | 0.36 | |
| Sulphate | 500 [AO] | <1.0 | 1.4 | | <1.0 | | <1.0 | |
| Total Kjeldahl Nitrogen(as N) | | 0.17 | 0.14 | | 0.11 | | NV | |

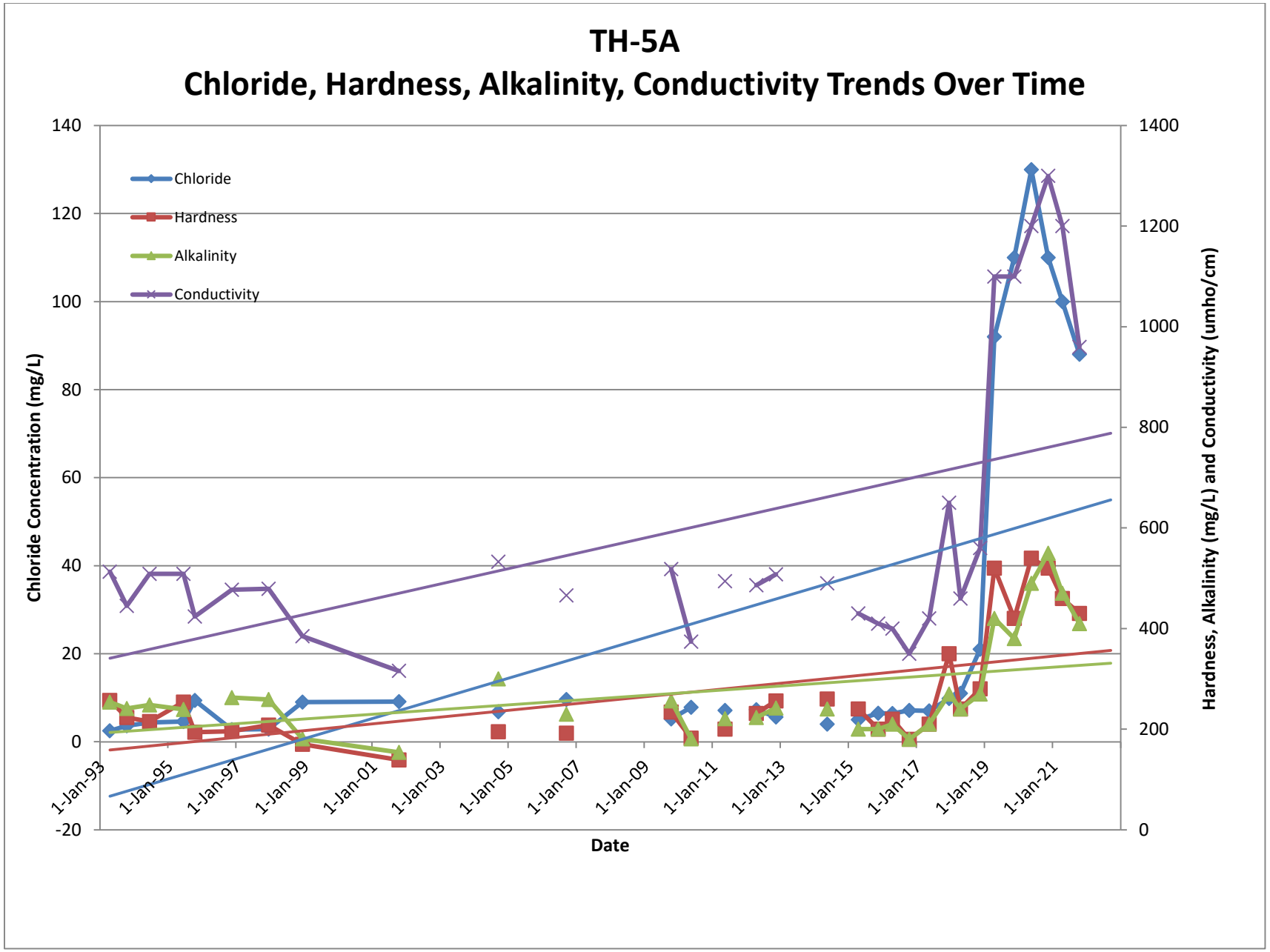
NOTES:
1. All results expressed in mg/L unless otherwise noted.
2. ODWS - Ontario Drinking Water Standards
3. IMAC indicates an interim maximum acceptable concentration.
4. AO indicates an aesthetic objective, not health related.
5. OG indicates an operational guideline, not health related.
6. Concentrations reported up to 2012 are from the 2012 Annual Monitoring Report prepared by Genivar Inc.

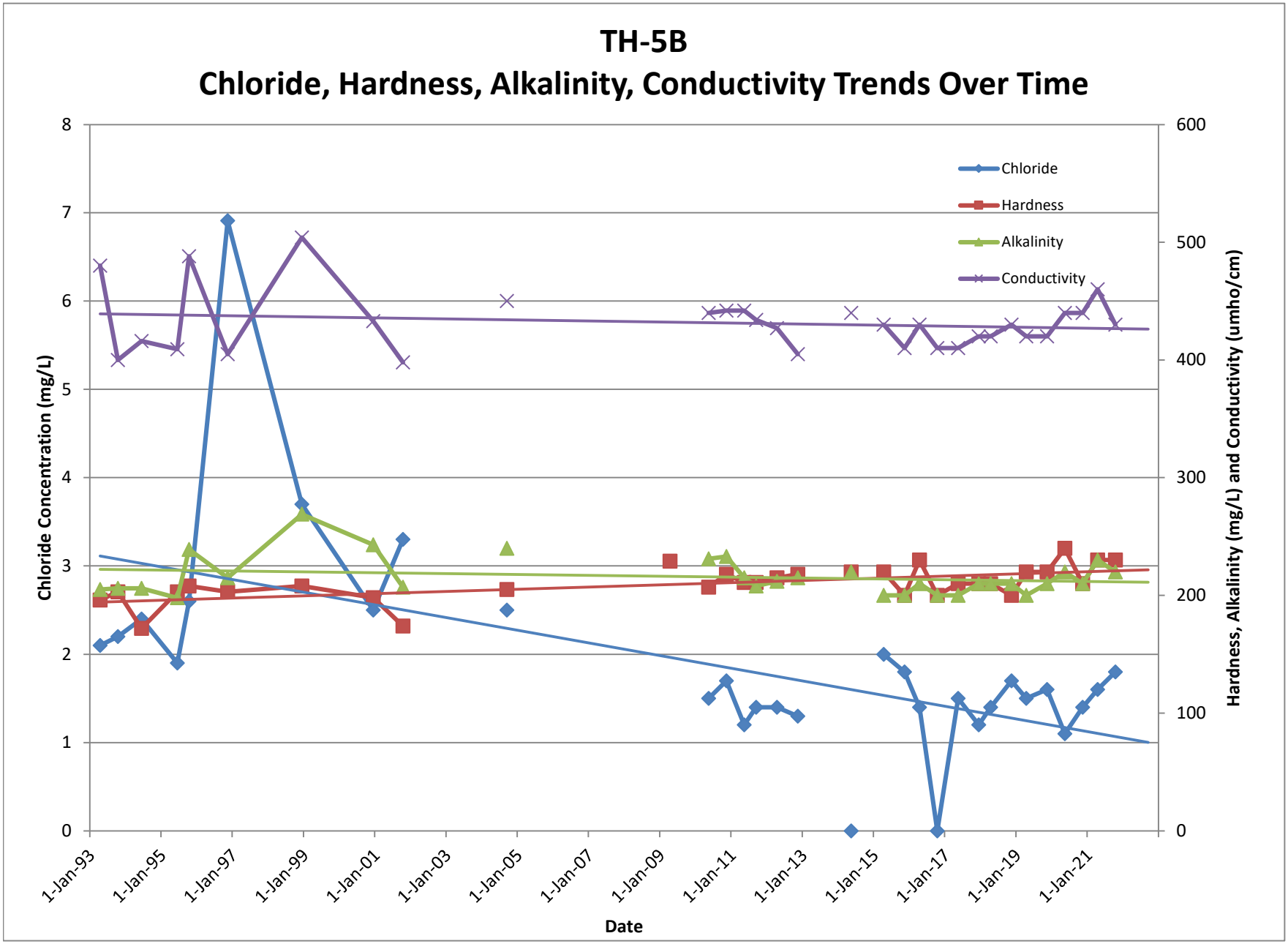
shading indicates exceedence of ODWQS

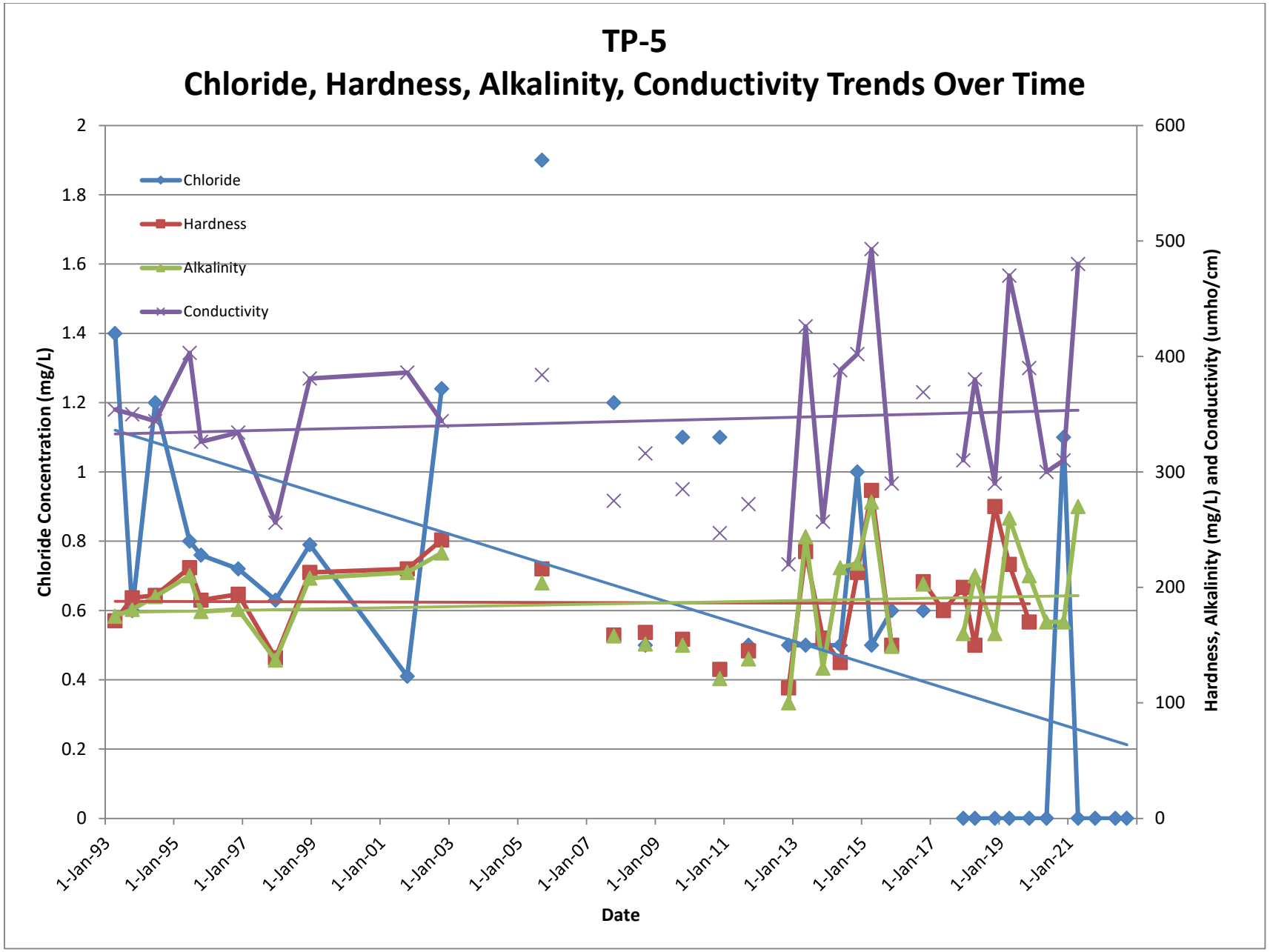

TH-2
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivty (umho/cm)
Date
0
1
2
3
4
5
6
7
100
200
300
400
500
600
700
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

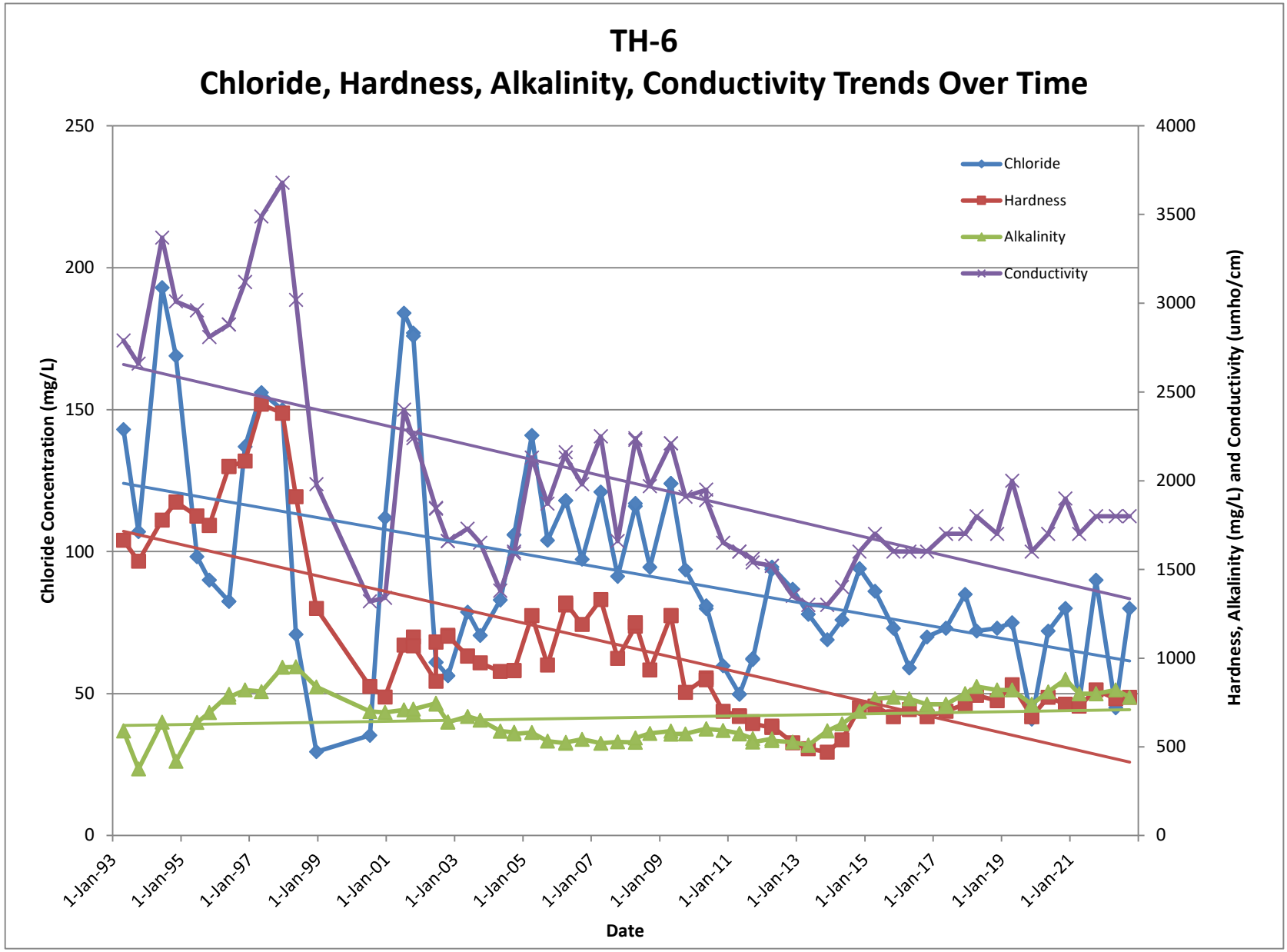

TH-3
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
20
40
60
80
100
120
140
160
0
500
1000
1500
2000
2500
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

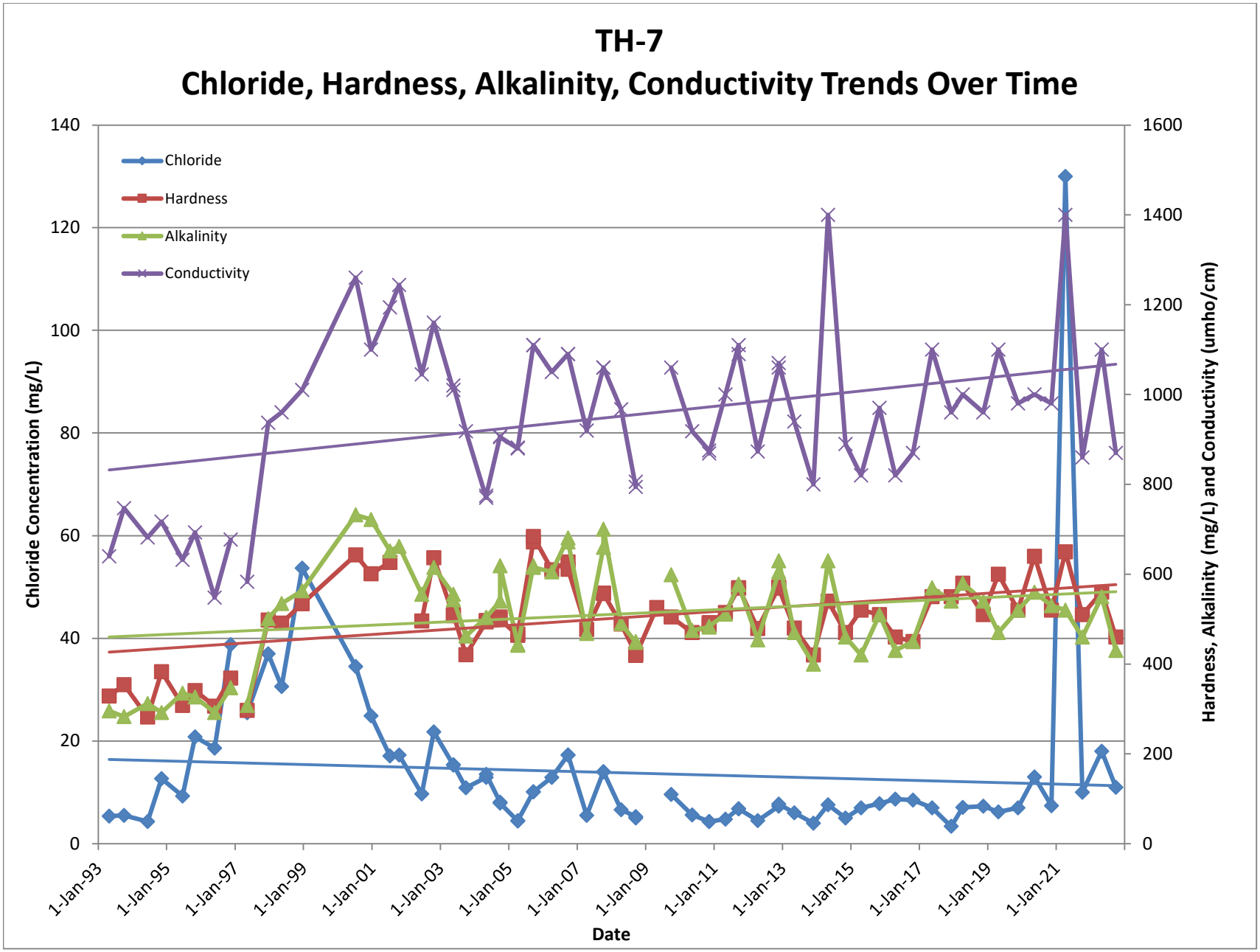

TP-3
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
5
10
15
20
25
30
0
200
400
600
800
1000
1200
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19

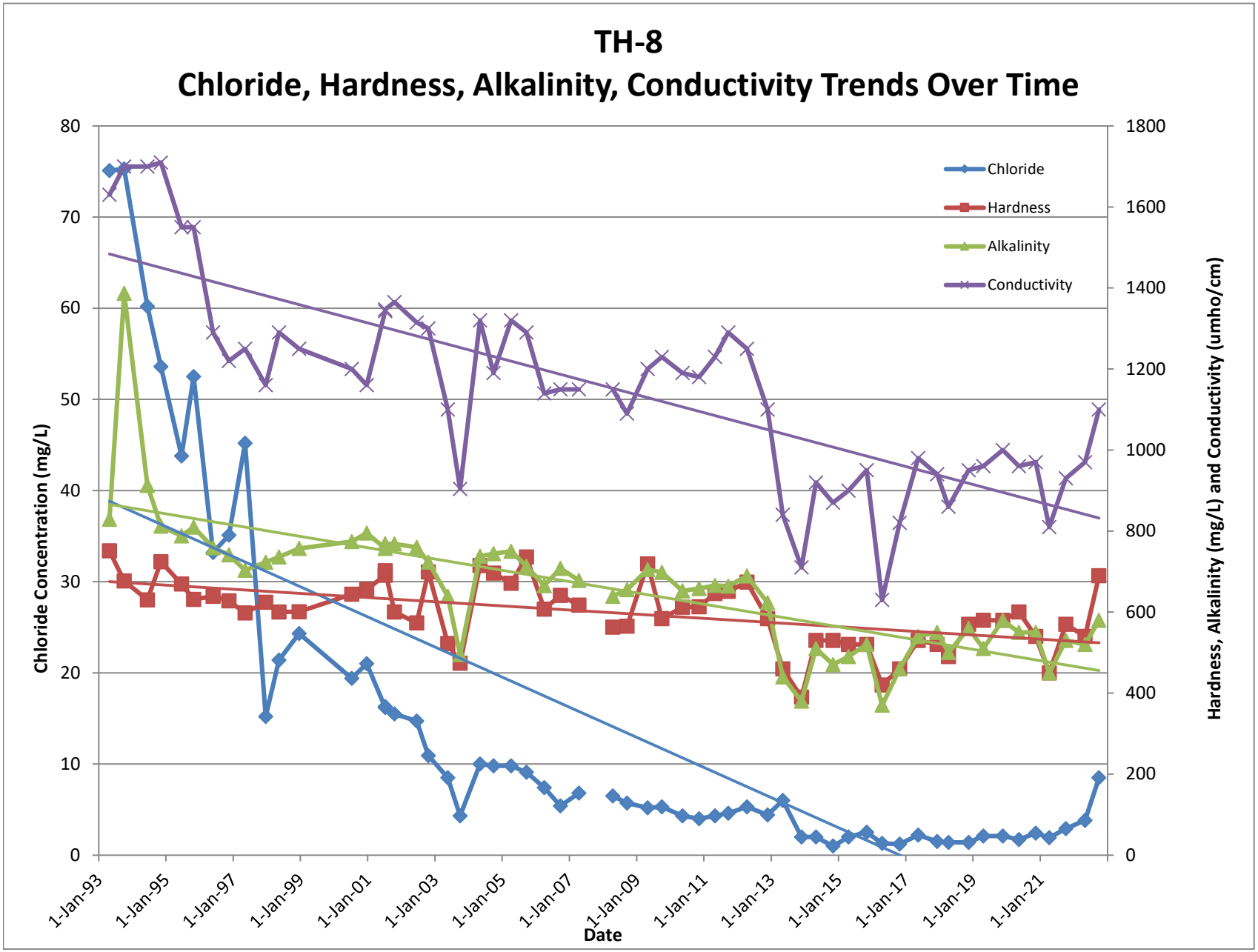

TH-5A
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
140
120
100
80
60
40
20
0
-20
1400
1200
1000
800
600
400
200
0
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

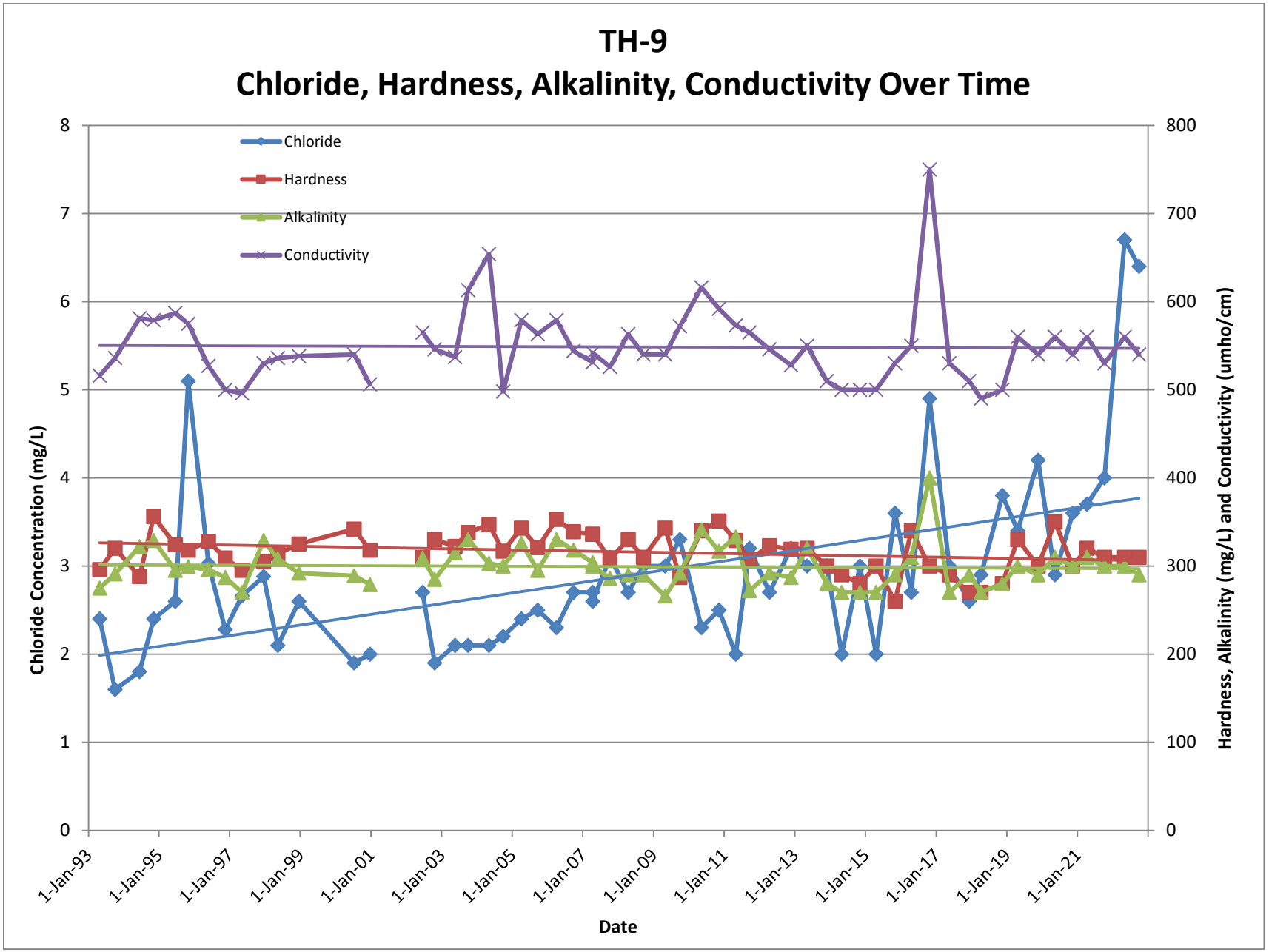

TH-5B
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
1
2
3
4
5
6
7
8
0
100
200
300
400
500
600
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

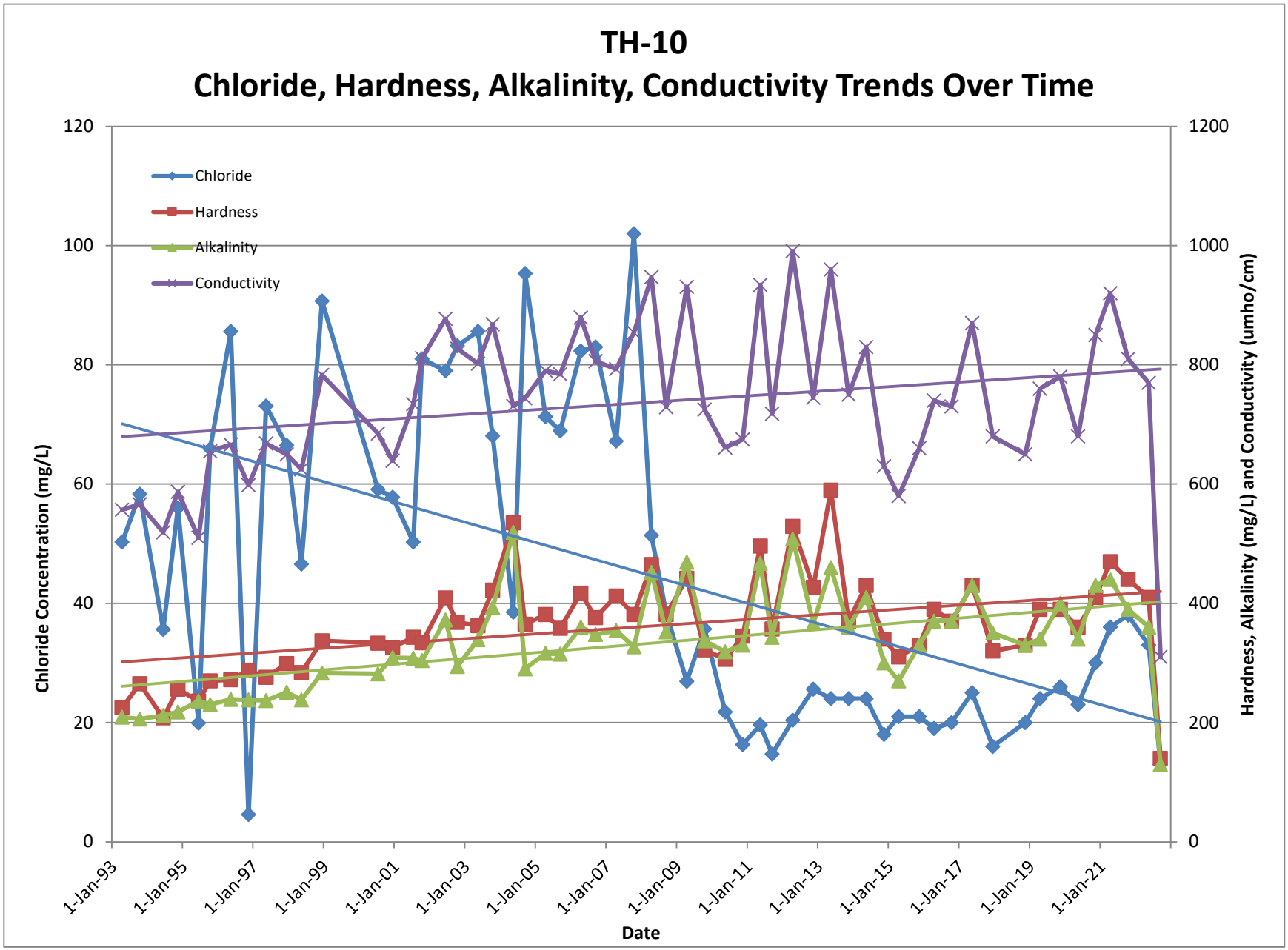

TP-5
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
0
100
200
300
400
500
600
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

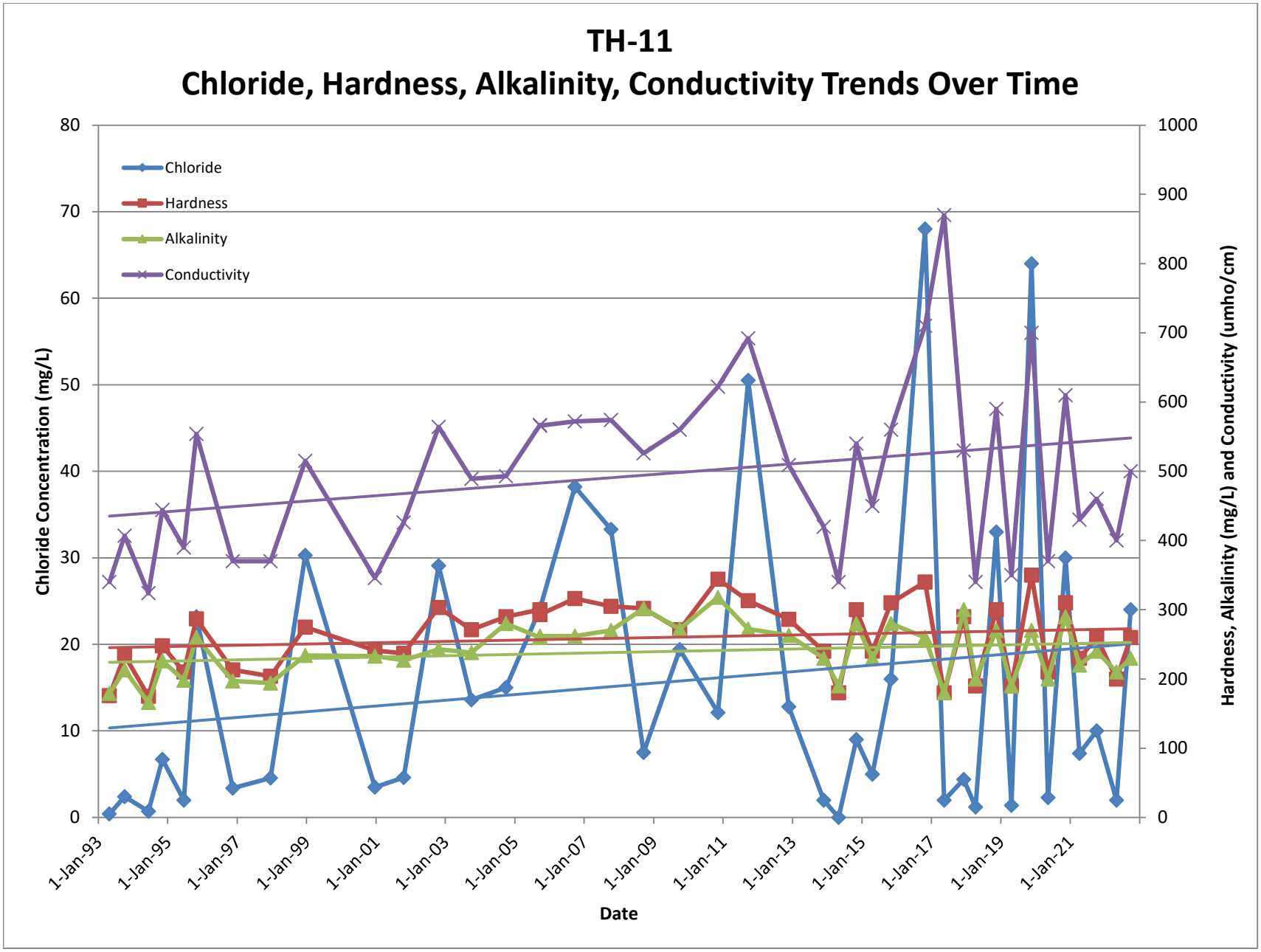

TH-6
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
Chloride
Hardness
Alkalinity
Conductivity
250
200
150
100
50
0
4000
3500
3000
2500
2000
1500
1000
500
0
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

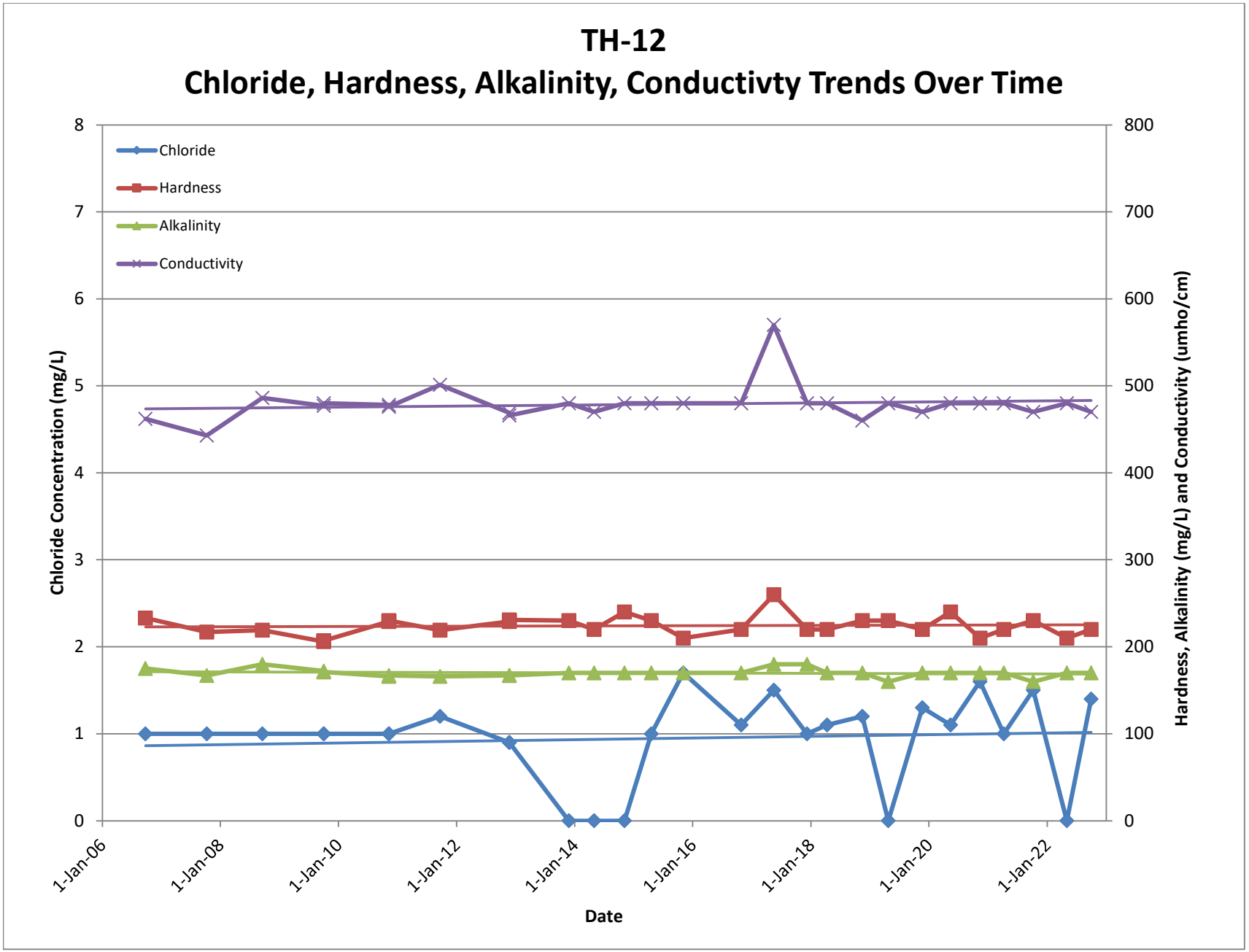

TH-7
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
20
40
60
80
100
120
140
0
200
400
600
800
1000
1200
1400
1600
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

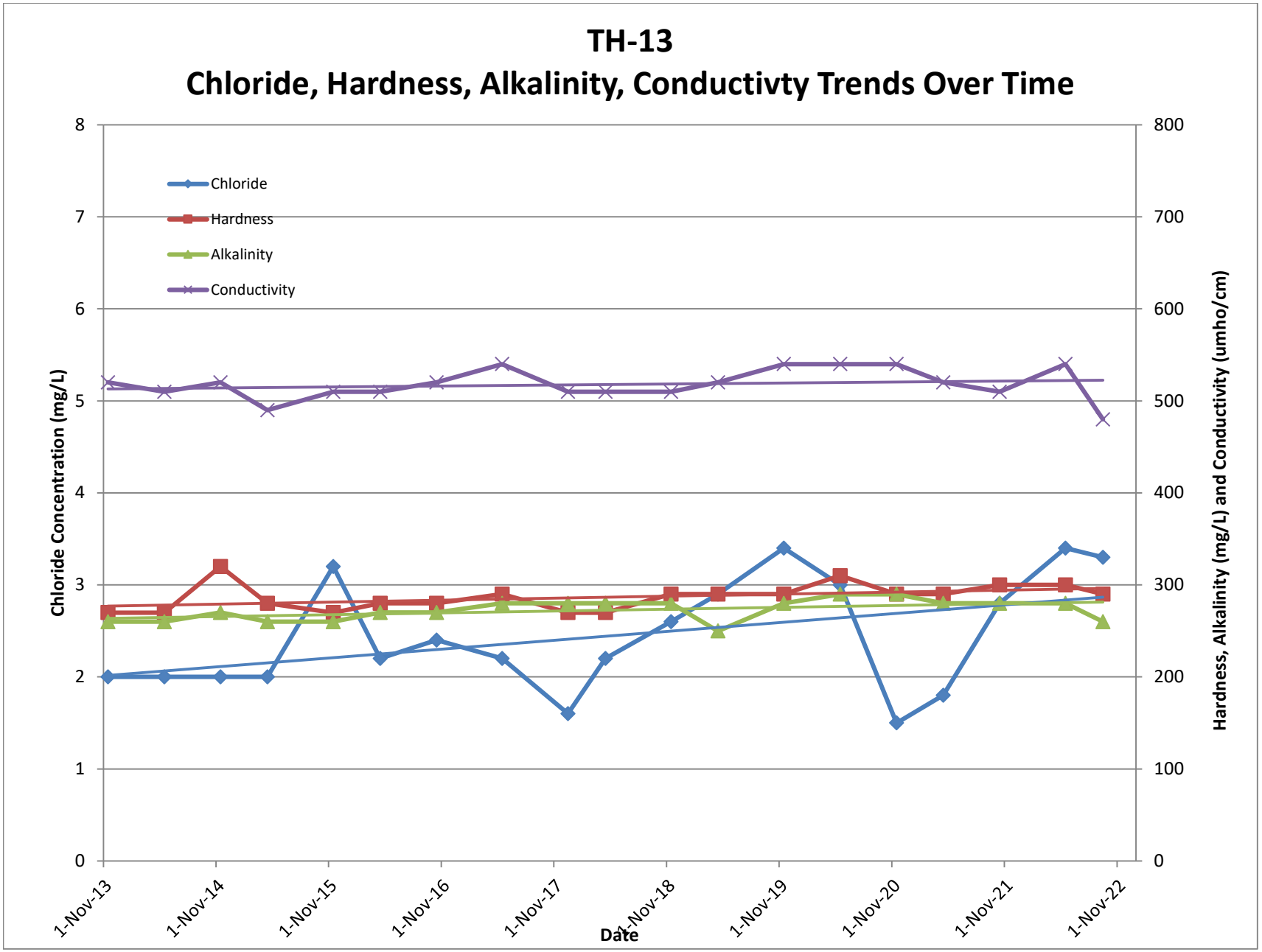

TH-8
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
Chloride
Hardness
Alkalinity
Conductivity
0
10
20
30
40
50
60
70
80
0
200
400
600
800
1000
1200
1400
1600
1800
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21

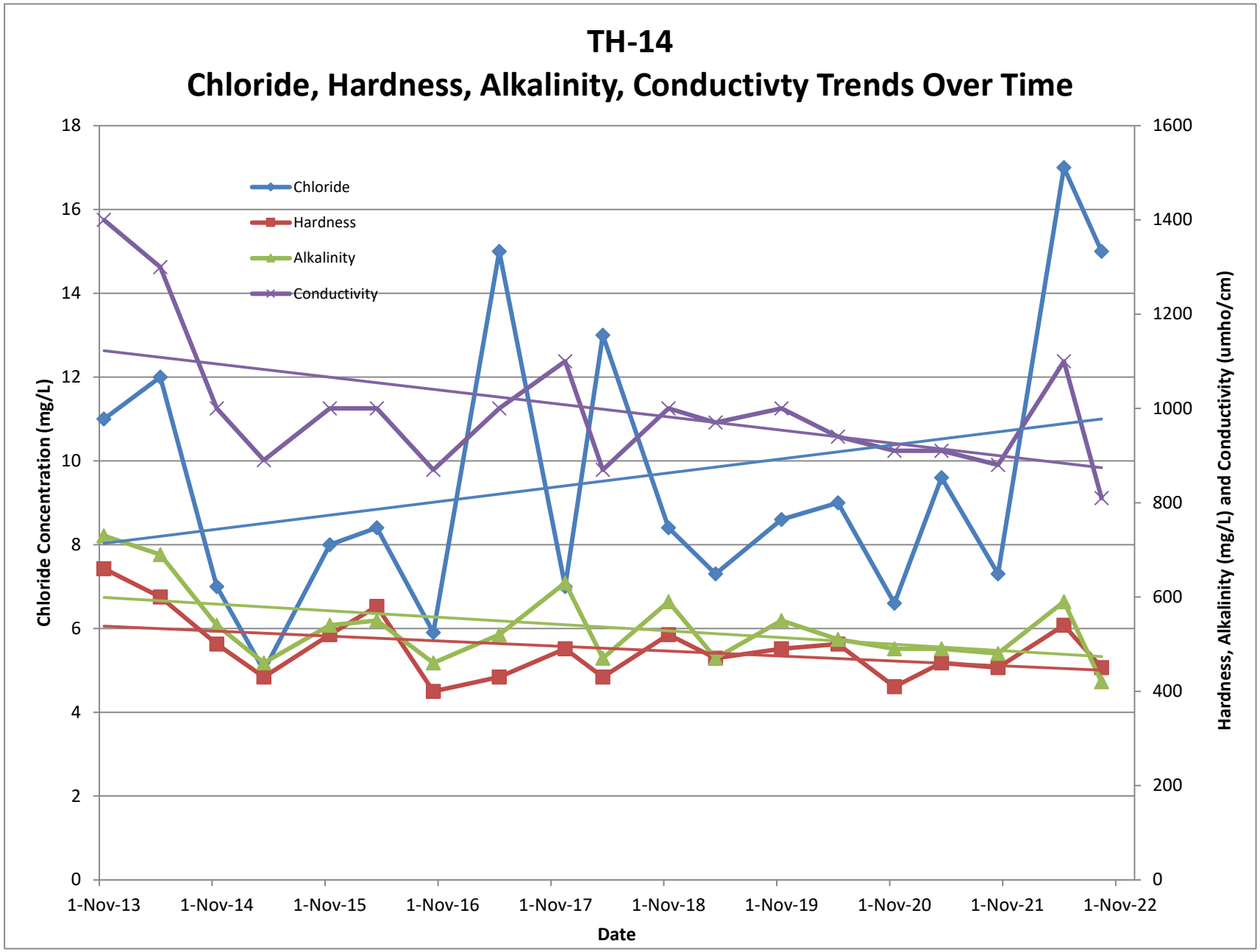

TH-9
Chloride, Hardness, Alkalinity, Conductivity Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
1
2
3
4
5
6
7
8
100
200
300
400
500
600
700
800
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21


TH-10
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
20
40
60
80
100
120
0
200
400
600
800
1000
1200
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21


TH-11
Chloride, Hardness, Alkalinity, Conductivity Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
10
20
30
40
50
60
70
80
0
100
200
300
400
500
600
700
800
900
1000
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
1-Jan-13
1-Jan-15
1-Jan-17
1-Jan-19
1-Jan-21


TH-12
Chloride, Hardness, Alkalinity, Conductivty Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
1
2
3
4
5
6
7
8
0
100
200
300
400
500
600
700
800
1-Jan-06
1-Jan-08
1-Jan-10
1-Jan-12
1-Jan-14
1-Jan-16
1-Jan-18
1-Jan-20
1-Jan-22


TH-13
Chloride, Hardness, Alkalinity, Conductivty Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
1
2
3
4
5
6
7
8
100
200
300
400
500
600
700
800
1-Nov-13
1-Nov-14
1-Nov-15
1-Nov-16
1-Nov-17
1-Nov-18
1-Nov-19
1-Nov-20
1-Nov-21
1-Nov-22


TH-14
Chloride, Hardness, Alkalinity, Conductivty Trends Over Time
Chloride
Hardness
Alkalinity
Conductivity
Chloride Concentration (mg/L)
Hardness, Alkalinity (mg/L) and Conductivity (umho/cm)
Date
0
2
4
6
8
10
12
14
16
18
0
200
400
600
800
1000
1200
1400
1600
1-Nov-13
1-Nov-14
1-Nov-15
1-Nov-16
1-Nov-17
1-Nov-18
1-Nov-19
1-Nov-20
1-Nov-21
1-Nov-22

# APPENDIX E:
# HISTORICAL SURFACE WATER QUALITY

# Historic Surface Water Quality at Sampling Point SW 1

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 1 27-Apr-93 | SW 1 4-Oct-93 | SW 1 13-Jun-94 | SW 1 7-Nov-94 | SW 1 19-Jun-95 | SW 1 11-Jul-01 | SW 1 22-Oct-02 | SW 1 20-May-03 002 | SW 1 1-Oct-03 | SW 1 5-May-04 | SW 1 29-Sep-04 | SW 1 6-Apr-05 007 | SW 1 21-Sep-05 | SW 1 4-Apr-06 | SW 1 25-Sep-06 | SW 1 13-Apr-07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | | | 159 | 104 | 129 | DRY | DRY | 73 | DRY | DRY | DRY | 46 | DRY | No Flow | DRY | Discontinued |
| Ammonia(as N) | | 0.059 | 0.083 | 0.021 | 0.11 | 0.18 | | | 0.15 | | | | 0.09 | | | | |
| Calcium | | 24.4 | 43.4 | 41.8 | 29.8 | 36.3 | | | 17.0 | | | | 7.47 | | | | |
| Chloride | | 0.8 | 2.7 | 1.8 | 3.7 | 2 | | | 2.7 | | | | 1.2 | | | | |
| Conductivity @25øC (µmho/cm) | | 181 | 279 | 303 | 219 | 254 | | | 151 | | | | 89 | | | | |
| Dissolved Organic Carbon(DOC) | | 14.8 | 36.5 | 36.5 | >20 | 47 | | | 28.8 | | | | 3.3 | | | | |
| Hardness(as CaCO3) | | 99 | 167 | 168 | 122 | 141 | | | 82 | | | | 31 | | | | |
| Iron | 0.300 | 0.01 | 1.01 | 0.58 | 0.71 | 3.81 | | | 0.42 | | | | 0.238 | | | | |
| Magnesium | | 9.2 | 14.2 | 15.5 | 11.5 | 12.3 | | | 9.60 | | | | 2.94 | | | | |
| Manganese | | | | 0.154 | 0.296 | 0.356 | | | 0.21 | | | | 0.1 | | | | |
| Nitrate(as N) | | 0.3 | <0.1 | 0.4 | 0.1 | <0.1 | | | 0.1 | | | | <0.1 | | | | |
| Nitrite(as N) | | 0.01 | 0.01 | <0.01 | 0.01 | 0.02 | | | <0.1 | | | | <0.1 | | | | |
| Orthophosphate(as P) | | | | | | | | | <0.01 | | | | <0.01 | | | | |
| pH | 6.5-8.5 | 7.53 | 7.24 | 7.30 | 7.17 | 7.24 | | | 7.15 | | | | 6.8 | | | | |
| Phenols | 0.001 | 0.011 | 0.0275 | 0.0161 | 0.045 | 0.0076 | | | <0.001 | | | | <0.001 | | | | |
| Phosphorus, Total (as P) | (15) | | | 0.052 | 0.037 | 0.89 | | | 0.06 | | | | 0.09 | | | | |
| Potassium | | | | 2.60 | 4.7 | 2.26 | | | 2.6 | | | | 2.8 | | | | |
| Sodium | | | | 0.4 | 0.2 | 0.6 | | | 1.9 | | | | 8.4 | | | | |
| Sulphate | | | | 0.8 | 20.1 | 8.5 | | | 2 | | | | 2 | | | | |
| TDS (ion sum calc.) | | | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen(as N) | | 0.8 | 1.91 | 1.74 | 1.69 | 7.27 | | | 0.99 | | | | 0.75 | | | | |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 2

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 2 27-Apr-93 | SW 2 4-Oct-93 | SW 2 30-Oct-95 | SW 2 9-May-97 | SW 2 11-Jul-01 003 | SW 2 (Dup) 11-Jul-01 004 | SW 2 18-Oct-01 011 | SW 2 18-Jun-02 001 | SW 2 22-Oct-02 006 | SW 2 20-May-03 008 | SW 2 1-Oct-03 001 | SW 2 5-May-04 012 | SW2 (Dup) 5-May-04 013 | SW 2 29-Sep-04 011 | SW 2 6-Apr-05 010 | SW 2 (Dup) 6-Apr-05 009 | SW 2 21-Sep-05 014 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity (as CaCO3) | | | | 210 | 182 | 308 | 302 | 204 | 235 | 282 | 220 | 270 | 225 | 216 | 321 | 180 | 180 | 325 |
| Ammonia (as N) | | 0.079 | 0.053 | <0.05 | 0.09 | 0.07 | 0.06 | 0.02 | <0.01 | 0.06 | 0.02 | 0.01 | 0.07 | 0.06 | 0.05 | 0.02 | 0.02 | 0.05 |
| Calcium | | 54.7 | 76.9 | 65.4 | 60.8 | | | | 54.9 | 87.5 | 64.3 | 62.6 | 60 | 61 | 73.4 | 47.9 | 47.5 | 81.9 |
| Chloride | | 24.4 | 43.4 | 34.8 | 12.1 | 11.6 | 11.7 | 19.0 | 12.6 | 12.5 | 19.3 | 27.1 | 18.9 | 18.7 | 10.1 | 14.7 | 14.7 | 6.5 |
| Conductivity @25øC (µmho/cm) | | 438 | 572 | 523 | 418 | 599 | 598 | 445 | 473 | 592 | 482 | 532 | 536 | 520 | 562 | 397 | 398 | 614 |
| Dissolved Organic Carbon(DOC) | | 4 | 4.5 | 6.8 | 4.6 | | | | 7.8 | 5.7 | 7.1 | 8.0 | 6.6 | 6.6 | 4.4 | 4.5 | 4.1 | 8.8 |
| Hardness(as CaCO3) | | 210 | 291 | 255 | 197 | | | | 220 | 350 | 253 | 247 | 239 | 243 | 297 | 195 | 194 | 330 |
| Iron | 0.300 | 0.07 | 0.07 | 0.33 | 6.76 | 0.04 | 0.04 | 0.05 | 0.04 | 0.08 | 0.21 | 0.101 | 0.04 | 0.038 | 0.119 | 0.039 | 0.047 | 0.021 |
| Magnesium | | 17.8 | 24 | 22.3 | 15.7 | | | | 20.1 | 32 | 22.5 | 22.0 | 21.7 | 22.1 | 27.6 | 18.4 | 18.3 | 30.6 |
| Manganese | | | | 0.112 | 2.8 | | | | 0.006 | 0.03 | 0.02 | 0.02 | 0.012 | 0.013 | 0.018 | 0.011 | 0.012 | 0.017 |
| Nitrate(as N) | | 0.3 | <0.1 | <0.1 | | | | | 0.6 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.5 | 0.5 | 0.3 |
| Nitrite(as N) | | <0.01 | <0.01 | 0.01 | | | | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | | | | | | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 | 7.81 | 7.86 | 7.71 | 7.46 | 7.90 | 7.92 | 7.59 | 7.56 | 8.51 | 7.93 | 7.87 | 8.06 | 8.06 | 7.97 | 7.71 | 7.69 | 7.97 |
| Phenols | 0.001 | 0.011 | 0.002 | 0.0035 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | (15) | | | 0.11 | 2.2 | 0.01 | 0.01 | <0.01 | 0.2 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 |
| Potassium | | | | 0.3 | | | | | 1.7 | <0.4 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.3 | 1.3 | 2.2 |
| Sodium | | | | 10.2 | 4.93 | | | | 7.5 | 6.1 | 10.6 | 10.4 | 10.1 | 10.3 | 5.3 | 8.5 | 8.5 | 3.9 |
| Sulphate | | | | 14.6 | 5.57 | | | | 8.1 | 17 | 15 | 9 | 8 | 7 | 8 | 6 | 6 | 11 |
| TDS (ion sum calc.) | | | | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen(as N) | | 0.5 | 0.39 | 1.26 | 1.55 | | | | 0.4 | 0.31 | 0.47 | 0.3 | 0.34 | 0.42 | 0.27 | 0.3 | 0.27 | 0.18 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 2

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 2 4-Apr-06 010 | SW 2 25-Sep-06 005 | SW 2 13-Apr-07 009 | SW 2 9-Oct-07 004 | SW 2 15-Apr-08 006 | SW 2 17-Sep-08 008 | SW 2 30-Apr-09 | SW 2 1-Oct-09 | SW 2 1-Oct-09 Duplicate 2 | SW 2 12-May-10 | SW 2 12-May-10 Duplicate #1 | SW 2 9-Nov-10 | SW 2 2-May-11 | SW 2 2-May-11 Duplicate #2 | SW 2 21-Sep-11 | SW 2 12-Apr-12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity (as CaCO3) | | 169 | 300 | 208 | 321 | 180 | 244 | 240 | 241 | 242 | 256 | 256 | 267 | 230 | 230 | 298 | 236 |
| Ammonia (as N) | | < 0.01 | < 0.01 | < 0.01 | 0.03 | < 0.01 | 0.02 | 0.03 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.06 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Calcium | | 42.2 | 75.1 | 54.9 | 83.7 | 49.2 | 61.2 | 67.1 | 59.4 | 59.3 | 64.8 | 62.5 | 73.7 | 58.0 | 60.4 | 84.2 | 62.9 |
| Chloride | | 15.1 | 27.4 | 19.5 | 8.7 | 16.7 | 16.6 | 14.8 | 18.6 | 18.9 | 14.7 | 14.8 | 15.2 | 16.7 | 16.7 | 17.3 | 14.9 |
| Conductivity @25øC (µmho/cm) | | 385 | 581 | 431 | 552 | 450 | 469 | 469 | 503 | 502 | 465 | 521 | 552 | 502 | 504 | 630 | 496 |
| Dissolved Organic Carbon(DOC) | | 9.4 | 9.4 | 4.9 | 4.6 | 7.1 | 14.4 | 8.1 | 11.3 | 11.1 | 6.7 | 6.6 | 5.6 | 6.6 | 6.7 | 7.5 | 5.0 |
| Hardness(as CaCO3) | | 173 | 296 | 224 | 329 | 199 | 243 | 259 | 240 | 240 | 259 | 252 | 294 | 232 | 242 | 334 | 254 |
| Iron | 0.300 | 0.024 | 0.384 | 0.05 | 0.124 | 0.038 | 0.082 | 0.039 | 0.096 | 0.048 | 0.123 | 0.056 | 0.101 | 0.321 | 0.064 | 0.093 | 0.094 |
| Magnesium | | 16.5 | 26.4 | 21 | 29.1 | 18.4 | 22 | 22.3 | 22.2 | 22.4 | 23.6 | 23.2 | 26.7 | 21.2 | 22.1 | 30.1 | 23.6 |
| Manganese | | 0.003 | 0.151 | 0.005 | 0.027 | 0.003 | 0.019 | 0.028 | 0.014 | 0.013 | 0.023 | 0.019 | 0.018 | 0.021 | 0.018 | 0.021 | 0.010 |
| Nitrate(as N) | | 0.7 | 0.2 | 0.7 | 0.2 | 0.7 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.3 |
| Nitrite(as N) | | <0.1 | <0.1 | <0.1 | <0.1 | | | | | | | | <0.1 | <0.1 | <0.1 | 0.2 | <0.1 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 | 8.09 | 7.69 | 7.69 | 7.38 | 7.28 | 7.16 | 7.28 | 7.62 | 7.79 | 8 | 8.01 | 7.11 | 7.88 | 7.94 | 7.92 | 8.15 |
| Phenols | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | (15) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.03 | 0.05 |
| Potassium | | 1.2 | 1.7 | 1.3 | 2.2 | 1.4 | 1.9 | 1.7 | 1.8 | 1.8 | 1.3 | 1.4 | 1.8 | 1.2 | 1.3 | 1.8 | 1.5 |
| Sodium | | 8 | 13.3 | 10.3 | 5.1 | 9.5 | 10 | 8.1 | 9.5 | 9.6 | 8.6 | 8.5 | 8.9 | 9.3 | 9.6 | 10.6 | 8.6 |
| Sulphate | | 9 | 7 | 7 | 10 | 8 | 4 | 5 | 6 | 6 | 9 | 9 | 9 | 5 | 5 | 9 | 8 |
| TDS (ion sum calc.) | | 195 | 332 | 243 | 333 | 215 | 263 | 264 | 263 | 264 | 278 | 275 | 298 | 251 | 254 | 333 | 263 |
| Total Kjeldahl Nitrogen(as N) | | 0.33 | 0.49 | 0.34 | 0.21 | 0.32 | 0.46 | 0.29 | 0.19 | 0.34 | 0.30 | 0.24 | 0.23 | 0.16 | 0.16 | 0.30 | 0.19 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 2

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 2 22-Nov-12 | SW 2 7-May-13 | SW 2 26-Nov-13 | SW 2 1-May-14 | SW 2 4-Nov-14 | SW 2 20-Apr-15 | SW 2 3-Nov-15 | SW 2 20-Apr-16 | SW 2 26-Oct-16 | SW 2 16-May-17 | SW 2 7-Dec-17 | SW 2 10-Apr-18 | SW 2 15-Nov-18 | SW 2 24-Apr-19 | SW 2 20-Nov-19 | SW 2 13-May-20 | SW 2 12-Nov-20 | SW 2 8-Apr-21 | SW 2 7-Oct-21 | SW 2 3-May-22 | SW 2 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity (as CaCO3) | | 277 | 250 | 230 | 210 | 260 | 190 | 250 | 240 | 300 | 260 | 230 | 250 | 250 | 190 | 260 | 240 | 290 | 220 | 260 | 240 | 250 |
| Ammonia (as N) | | 0.01 | 0.08 | <0.05 | ND | 0.067 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | 0.055 | <0.050 | 0.075 | 0.077 | 0.07 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calcium | | 75.4 | 74 | 61 | 61 | 71 | 54 | 67 | 63 | 77 | 63 | 59 | 66 | 61 | 55 | 76 | 62 | 77 | 61 | 74 | 56 | 76 |
| Chloride | | 16.7 | 18 | 17 | 18 | 20 | 18 | 24 | 15 | 18 | 17 | 14 | 13 | 19 | 15 | 24 | 17 | 23 | 21 | 21 | 20 | 29 |
| Conductivity @25øC (µmho/cm) | | 578 | 530 | 490 | 450 | 560 | 430 | 550 | 490 | 610 | 530 | 460 | 490 | 510 | 400 | 560 | 490 | 600 | 470 | 510 | 500 | 550 |
| Dissolved Organic Carbon(DOC) | | 6.4 | 7.3 | 6.7 | 6.4 | 6.2 | 6.3 | 8 | 5.5 | 5.8 | 7 | 6.2 | 3.8 | 6.4 | 6.2 | 5.9 | 5.1 | 5.8 | 7.4 | 9.5 | 6.2 | 10 |
| Hardness(as CaCO3) | | 306 | 270 | 260 | 230 | 280 | 220 | 290 | 250 | 330 | 270 | 240 | 250 | 270 | 210 | 290 | 230 | 320 | 230 | 260 | 230 | 290 |
| Iron | 0.300 | 0.176 | <0.1 | <0.1 | ND | <0.1 | 0.11 | <0.1 | <0.100 | 0.19 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.67 | <0.1 | <0.1 | <0.1 | 0.12 | <0.1 | <0.1 |
| Magnesium | | 28.6 | 24 | 25 | 23 | 26 | 18 | 24 | 23 | 28 | 23 | 22 | 26 | 24 | 20 | 27 | 22 | 26 | 21 | 25 | 22 | 26 |
| Manganese | | 0.029 | 0.021 | 0.008 | 0.006. | 0.002 | 0.027 | 0.014 | 0.008 | 0.044 | 0.02 | 0.015 | 0.02 | 0.02 | 0.004 | 0.13 | 0.021 | 0.03 | 0.0094 | 0.022 | 0.017 | 0.024 |
| Nitrate(as N) | | 0.3 | <0.1 | 0.36 | 0.25 | 0.36 | 0.34 | 0.1 | 0.1 | <0.10 | 0.1 | 0.33 | 0.56 | 0.28 | 0.11 | 0.26 | 0.21 | 0.12 | 0.12 | 0.11 | 0.13 | <0.10 |
| Nitrite(as N) | | <0.1 | <0.01 | <0.01 | ND | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.1 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | ND | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 0.026 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 8.02 | 8.09 | 8.11 | 8.11 | 8.2 | 8.02 | 8.06 | 8.18 | 8.19 | 8.18 | 8.1 | 8.18 | 8.11 | 8.2 | 8.07 | 8.07 | 8.09 | 8.3 | 8.01 | 8.19 | 8.21 |
| Phenols | 0.001 | <0.001 | <0.001 | <0.001 | ND | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | (15) | <0.01 | 0.009 | <0.002 | ND | 0.006 | 0.015 | <0.004 | 0.004 | <0.1 | 0.004 | <0.10 | <0.004 | <0.004 | <0.004 | 0.079 | <0.004 | 0.004 | 0.006 | 0.005 | 0.005 | 0.007 |
| Potassium | | 1.5 | 1.3 | 1.3 | 1.6 | 1.6 | 1.4 | 1.8 | 1.5 | 1.3 | 1.1 | 1.3 | 1.4 | 1.1 | 1.3 | 1.3 | 1.1 | 1.3 | 1.5 | 1.8 | 1.4 | 1.8 |
| Sodium | | 9.3 | 11 | 11 | 10 | 11 | 10 | 13 | 8.3 | 8.9 | 9.3 | 8.3 | 7.9 | 9.2 | 8.6 | 13 | 8.5 | 11 | 11 | 12 | 9.5 | 16 |
| Sulphate | | 18 | <1 | <1 | ND | 1 | <1 | <1.0 | <1.0 | 11 | <5.0 | <1.0 | 1.4 | <1.0 | <1.0 | 5.1 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 | <1.0 |
| TDS (ion sum calc.) | | 317 | 292 | 270 | 246 | 310 | 212 | 302 | 254 | 330 | 269.4 | 242.6 | 230 | 230 | 160 | 340 | 315 | 335 | 245 | 320 | 185 | 300 |
| Total Kjeldahl Nitrogen(as N) | | 0.24 | 0.72 | 0.44 | 0.33 | 0.33 | 0.35 | 0.36 | 0.23 | 0.34 | 0.37 | 0.18 | 0.17 | 0.12 | 0.21 | 0.28 | 0.22 | 0.27 | 0.25 | 0.33 | 0.26 | 0.3 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 2A

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW2A 4-Apr-06 | SW2A (dup) 4-Apr-06 | SW2A 25-Sep-06 | SW2A (dup) 25-Sep-06 | SW2A 13-Apr-07 | SW2A (dup) 13-Apr-07 | SW2A 9-Oct-07 | SW2A (dup) 9-Oct-07 | SW2A 15-Apr-08 | SW2A (dup) 15-Apr-08 | SW2A 17-Sep-08 | SW2A 30-Apr-09 | SW2A (dup) 30-Apr-09 Duplicate #2 | SW2A 1-Oct-09 | SW2A 12-May-10 | SW2A 9-Nov-10 | SW2A (dup) 9-Nov-10 Duplicate #1 | SW2A 2-May-11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 148 | 148 | 292 | 290 | 200 | 190 | 314 | 312 | 170 | 170 | 216 | 227 | 220 | 222 | 226 | 231 | 232 | 220 |
| Ammonia(as N) | | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | 0.01 |
| Calcium | | 35.8 | 36.0 | 71.8 | 68.1 | 51.3 | 50 | 76.5 | 77.6 | 44.4 | 44.5 | 55.4 | 62.2 | 62.5 | 53.8 | 56.9 | 62.2 | 61.6 | 55.3 |
| Chloride | | 8.4 | 8 | 24.1 | 24 | 15.4 | 15.3 | 8 | 8 | 12 | 11.7 | 13 | 14.3 | 14.2 | 15.3 | 14.9 | 16.4 | 15.7 | 16.8 |
| Conductivity @25øC (µmho/cm) | | 328 | 331 | 543 | 540 | 405 | 400 | 544 | 529 | 417 | 400 | 416 | 442 | 445 | 450 | 464 | 491 | 504 | 482 |
| Dissolved Organic Carbon(DOC) | | 8.6 | 11.2 | 13.7 | 12.9 | 5.4 | 5.1 | 11.6 | 6.9 | 8.3 | 8.4 | 16.8 | 8.2 | 7.7 | 12.5 | 8.5 | 7.1 | 6.9 | 7.1 |
| Hardness(as CaCO3) | | 151 | 151 | 288 | 273 | 213 | 208 | 306 | 310 | 181 | 182 | 222 | 242 | 243 | 220 | 230 | 254 | 251 | 223 |
| Iron | 0.300 | 0.03 | 0.022 | 0.081 | 0.068 | 0.02 | 0.016 | 0.165 | 0.179 | <0.005 | <0.005 | 0.032 | <0.005 | <0.005 | 0.031 | 0.025 | 0.015 | 0.013 | 0.034 |
| Magnesium | | 14.9 | 14.9 | 26.4 | 25 | 20.7 | 20.3 | 28 | 28.3 | 17 | 17.1 | 20.4 | 21.1 | 21.1 | 20.8 | 21.4 | 23.9 | 23.7 | 20.7 |
| Manganese | | 0.003 | 0.004 | 0.075 | 0.06 | 0.004 | 0.004 | 0.173 | 0.188 | 0.003 | 0.003 | 0.021 | 0.035 | 0.035 | 0.019 | 0.048 | 0.011 | 0.01 | 0.014 |
| Nitrate(as N) | | 0.7 | 0.7 | 0.1 | 0.1 | 0.8 | 0.8 | <0.1 | <0.1 | 0.7 | 0.7 | <0.1 | 0.2 | 0.2 | 0.1 | 0.3 | 0.3 | 0.3 | 0.2 |
| Nitrite(as N) | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | | | | | | | | | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 | 8.08 | 8.05 | 7.46 | 7.42 | 7.98 | 7.9 | 7.58 | 7.54 | 7.63 | 7.6 | 7.33 | 7.29 | 7.54 | 7.64 | 7.96 | 7.04 | 7.27 | 7.91 |
| Phenols | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | (15) | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Potassium | | 1.3 | 1.2 | 1.8 | 1.8 | 1.3 | 1.3 | 1.2 | 1.2 | 1.4 | 1.4 | 1.9 | 1.7 | 1.7 | 1.8 | 1.2 | 1.8 | 1.8 | 1.2 |
| Sodium | | 4.1 | 3.9 | 13.3 | 12.7 | 7.9 | 7.6 | 5 | 5.1 | 6.8 | 6.6 | 8.8 | 7.8 | 7.7 | 8.1 | 9.1 | 9.7 | 9.6 | 9.2 |
| Sulphate | | 7 | 7 | 3 | 3 | 6 | 6 | 2 | 2 | 7 | 7 | 2 | 3 | 3 | 3 | 4 | 5 | 5 | 3 |
| TDS (ion sum calc.) | | 162 | 162 | 316 | 309 | 224 | 220 | 310 | 310 | 190 | 192 | 231 | 247 | 243 | 237 | 245 | 259 | 258 | 268 |
| Total Kjeldahl Nitrogen(as N) | | 0.36 | 0.39 | 0.45 | 0.48 | 0.32 | 0.24 | 0.25 | 0.24 | 0.3 | 0.33 | 0.46 | 0.29 | 0.3 | 0.32 | 0.33 | 0.18 | 0.22 | 0.18 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 2A

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW2A 21-Sep-11 | SW2A 12-Apr-12 | SW2A 22-Nov-12 | SW2A 7-May-13 | SW2A 26-Nov-13 | SW2A 1-May-14 | SW2A 4-Nov-14 | SW2A 20-Apr-15 | SW2A 3-Nov-15 | SW2A 20-Apr-16 | SW2A 26-Oct-16 | SW2A 16-May-17 | SW2A 7-Dec-17 | SW2A 10-Apr-18 | SW2A 15-Nov-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 282 | 218 | 251 | 240 | 220 | 200 | 230 | 180 | 240 | 240 | 290 | 240 | 220 | 230 | 230 |
| Ammonia(as N) | | 0.01 | 0.01 | 0.01 | 0.11 | <0.05 | ND | 0.062 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calcium | | 70.4 | 54.4 | 60.1 | 66 | 58 | 56 | 59 | 48 | 60 | 61 | 70 | 57 | 54 | 58 | 55 |
| Chloride | | 20.1 | 13.6 | 16.4 | 20 | 18 | 16 | 20 | 18 | 23 | 15 | 17 | 18 | 13 | 13 | 16 |
| Conductivity @25øC (µmho/cm) | | 598 | 454 | 517 | 510 | 480 | 430 | 500 | 390 | 510 | 480 | 570 | 500 | 430 | 460 | 460 |
| Dissolved Organic Carbon(DOC) | | 10.1 | 5.9 | 7.7 | 8.4 | 7.5 | 6.8 | 7.1 | 6.6 | 8.3 | 5.9 | 6.9 | 7.7 | 6.4 | 3.9 | 6.9 |
| Hardness(as CaCO3) | | 285 | 224 | 251 | 260 | 250 | 220 | 250 | 200 | 270 | 240 | 300 | 260 | 220 | 240 | 260 |
| Iron | 0.300 | 0.045 | 0.042 | 1.39 | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.100 | <0.100 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 26.6 | 21.5 | 24.5 | 24 | 24 | 22 | 23 | 18 | 23 | 22 | 27 | 22 | 21 | 24 | 22 |
| Manganese | | 0.055 | 0.021 | 0.161 | 0.021 | 0.044 | 0.049 | 0.013 | 0.011 | 0.024 | 0.0061 | 72 | 0.018 | 0.0063 | 0.011 | 0.014 |
| Nitrate(as N) | | <0.1 | 0.4 | 0.3 | <0.1 | 0.42 | 0.18 | 0.47 | 0.43 | 0.13 | 0.14 | <0.10 | <0.10 | 0.35 | 0.68 | 0.44 |
| Nitrite(as N) | | <0.1 | <0.1 | <0.1 | <0.01 | <0.01 | ND | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 7.83 | 8.12 | 7.93 | 8.06 | 8.11 | 8.1 | 8.14 | 8.09 | 8.08 | 8.15 | 8.2 | 8.13 | 8.12 | 8.17 | 8.03 |
| Phenols | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | ND | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | (15) | 0.03 | 0.05 | <0.01 | 0.009 | <0.002 | 0.003 | 0.005 | 0.007 | 0.005 | <0.004 | <0.100 | <0.004 | <0.10 | <0.004 | 0.004 |
| Potassium | | 1.4 | 1.5 | 1.1 | 1.3 | 1.3 | 1.4 | 1.5 | 1.5 | 2.2 | 1.5 | 1.4 | 0.93 | 1.3 | 1.4 | 1.3 |
| Sodium | | 11.7 | 8.4 | 9.4 | 12 | 11 | 8 | 11 | 10 | 13 | 8.5 | 9 | 9.4 | 8.3 | 7.3 | 7.8 |
| Sulphate | | 3 | 5 | 9 | <1 | <1 | ND | <1 | <1 | <1.0 | <1.0 | <1.0 | <1.0 | <5.0 | <1.0 | <1.0 |
| TDS (ion sum calc.) | | 302 | 237 | 274 | 284 | 254 | 246 | 296 | 194 | 262 | 248 | 300 | 251.33 | 229.6 | 235 | 205 |
| Total Kjeldahl Nitrogen(as N) | | 0.34 | 0.22 | 0.21 | 0.91 | 0.48 | 0.36 | 0.21 | 0.34 | 0.35 | 0.24 | 0.35 | 0.3 | 0.18 | 0.17 | <0.10 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 2A

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW2A 24-Apr-19 | SW2A 20-Nov-19 | SW2A 13-May-20 | SW2A 12-Nov-20 | SW2A 8-Apr-21 Dry | SW2A 7-Oct-21 | SW2A 3-May-22 | SW2A 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 180 | 230 | 220 | 270 | | 240 | 230 | 240 |
| Ammonia(as N) | | 0.097 | 0.08 | 0.19 | 0.22 | | 0.051 | <0.050 | <0.050 |
| Calcium | | 51 | 65 | 55 | 65 | | 65 | 53 | 64 |
| Chloride | | 13 | 19 | 15 | 18 | | 18 | 18 | 23 |
| Conductivity @25øC (µmho/cm) | | 380 | 490 | 450 | 540 | | 470 | 470 | 510 |
| Dissolved Organic Carbon(DOC) | | 6.2 | 6.1 | 5.7 | 6.2 | | 11 | 6.8 | 10 |
| Hardness(as CaCO3) | | 210 | 260 | 210 | 280 | | 240 | 220 | 270 |
| Iron | 0.300 | <0.1 | <0.1 | <0.1 | <0.1 | | <0.1 | <0.1 | <0.1 |
| Magnesium | | 19 | 25 | 20 | 25 | | 23 | 21 | 24 |
| Manganese | | 0.0028 | 0.027 | 0.021 | 0.058 | | 0.025 | 0.017 | 0.017 |
| Nitrate(as N) | | 0.14 | 0.41 | 0.27 | 0.12 | | 0.11 | 0.15 | <0.10 |
| Nitrite(as N) | | <0.010 | 0.017 | <0.010 | <0.010 | | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 8.16 | 8.12 | 8.21 | 8.09 | | 7.98 | 8.13 | 8.22 |
| Phenols | 0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | (15) | <0.004 | <0.004 | <0.004 | <0.004 | | 0.005 | <0.004 | 0.006 |
| Potassium | | 1.3 | 1.3 | 1.0 | 1.4 | | 2.0 | 1.4 | 2.0 |
| Sodium | | 6.8 | 10 | 7.7 | 9.8 | | 11 | 8.9 | 11 |
| Sulphate | | <1.0 | <1.0 | <1.0 | <1.0 | | <1.0 | <1.0 | <1.0 |
| TDS (ion sum calc.) | | 160 | 305 | 290 | 300 | | 275 | 195 | 275 |
| Total Kjeldahl Nitrogen(as N) | | 0.23 | 0.29 | 0.25 | 0.24 | | 0.29 | 0.27 | 0.34 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

**Historic Surface Water Quality at Sampling Point SW 3**

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 3 27-Apr-93 | SW 3 4-Oct-93 | SW 3 7-Nov-94 | SW 3 19-Oct-95 | SW 3 30-Oct-95 | SW 3 9-May-97 | SW 3 11-Jul-01 | SW 3 18-Oct-01 | SW 3 18-Jun-02 | SW 3 22-Oct-02 007 | SW 3 20-May-03 009 | SW 3 1-Oct-03 013 | SW 3 5-May-04 011 | SW 3 29-Sep-04 012 | SW 3 6-Apr-05 008 | SW 3 21-Sep-05 002 | SW 3 4-Apr-06 011 | SW 3 25-Sep-06 | SW 3 13-Apr-07 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | | | 272 | 237 | 233 | 172 | DRY | DRY | NO | 264 | 227 | 235 | 216 | 312 | 180 | 333 | 167 | DRY | Discontinued |
| Ammonia(as N) | | 0.476 | 0.067 | 0.07 | 0.05 | 0.05 | 0.16 | | | | 0.02 | < 0.01 | < 0.01 | 0.04 | 0.07 | 0.03 | 0.21 | 0.01 | | |
| Calcium | | 50.9 | 92.8 | 74.4 | 53.7 | 67.3 | 74 | | | | 103 | 66.3 | 58.2 | 60 | 82.4 | 49.2 | 82.6 | 42.7 | | |
| Chloride | | 2.9 | 4.7 | 7.5 | 5.9 | 7.6 | 12.3 | | | | 14.4 | 18.8 | 22 | 18.8 | 10.8 | 14.7 | 7.5 | 15 | | |
| Conductivity @25øC (µmho/cm) | | 366 | 604 | 511 | 468 | 483 | 503 | | | | 594 | 484 | 491 | 484 | 556 | 401 | 621 | 384 | | |
| Dissolved Organic Carbon(DOC) | | 4.5 | 8.6 | 6 | 4 | 6.8 | 5.1 | | | | 70 | 6.9 | 4.9 | 6.6 | 4.3 | 3.8 | 7.1 | 7.9 | | |
| Hardness(as CaCO3) | | 199 | 356 | 290 | 254 | 262 | 291 | | | | 396 | 260 | 231 | 239 | 334 | 201 | 332 | 174 | | |
| Iron | 0.300 | 0.02 | 0.03 | 2.42 | 0.07 | 0.3 | 2.98 | | | | 5.29 | 0.50 | 0.072 | 0.029 | 0.072 | 0.064 | 0.061 | 0.029 | | |
| Magnesium | | 17.5 | 30.1 | 25.3 | 29 | 22.8 | 22.9 | | | | 33.6 | 23.0 | 20.8 | 21.7 | 31.1 | 18.9 | 30.6 | 16.5 | | |
| Manganese | | | | 0.222 | 0.015 | 0.046 | 1.19 | | | | 0.39 | 0.14 | 0.017 | 0.023 | 0.036 | 0.015 | 0.031 | 0.005 | | |
| Nitrate(as N) | | 0.3 | <0.1 | <0.1 | 0.3 | <0.1 | | | | | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 | 0.5 | 0.3 | 0.7 | | |
| Nitrite(as N) | | <0.01 | <0.01 | 0.01 | <0.01 | 0.01 | | | | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | | |
| Orthophosphate(as P) | | | | | | | | | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | | |
| pH | 6.5-8.5 | 7.68 | 7.41 | 7.36 | 8.38 | 7.63 | 7.69 | | | | 8.09 | 7.96 | 7.91 | 8.16 | 7.96 | 7.71 | 8.1 | 8.12 | | |
| Phenols | 0.001 | 0.006 | 0.0135 | 0.0086 | 0.001 | 0.0014 | | | | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | | |
| Phosphorus, Total (as P) | (15) | | | 0.126 | 0.01 | 0.04 | | | | | 0.65 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | | |
| Potassium | | | | 0.31 | 0.76 | 0.37 | | | | | 0.4 | 1.6 | 1.9 | 1.5 | 2.1 | 1.4 | 2.5 | 1.2 | | |
| Sodium | | | | 2.0 | 3.7 | 1.9 | 3.34 | | | | 7.7 | 10.8 | 10 | 10.1 | 6.1 | 8.7 | 4.5 | 7.9 | | |
| Sulphate | | | | 10.3 | 15.5 | 17.3 | 2.74 | | | | 23 | 14 | 10 | 7 | 8 | 6 | 11 | 9 | | |
| TDS (ion sum calc.) | | | | | | | | | | | | | | | | | | 194 | | |
| Total Kjeldahl Nitrogen(as N) | | 1.17 | 0.6 | 1.62 | 0.49 | 0.53 | 0.65 | | | | 9.27 | 0.57 | 0.3 | 0.35 | 0.33 | 0.29 | 0.22 | 0.39 | | |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 4

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 4 27-Apr-93 | SW 4 4-Oct-93 | SW 4 13-Jun-94 | SW 4 7-Nov-94 | SW 4 30-Oct-95 | SW4 27-May-96 | SW4 15-Nov-96 | SW4 9-May-97 | SW4 19-Dec-97 | SW 4 13-May-98 | SW 4 18-Dec-98 | SW 4 18-Dec-98 Replicate | SW 4 11-Jul-00 | SW 4 11-Jul-00 Replicate | SW 4 21-Dec-00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | | | 237 | 208 | 217 | 225 | 226 | 205 | 246 | 233 | 239 | 234 | 245 | 242 | 234 |
| Ammonia(as N) | | 0.079 | 0.266 | 0.007 | 0.071 | 0.07 | <0.05 | <0.05 | 0.09 | 0.05 | 0.02 | 0.03 | 0.03 | 0.13 | 0.15 | 0.06 |
| Calcium | | 53.6 | 61.5 | 57.7 | 54.6 | 58.4 | 57.8 | 58.8 | 49.2 | 66.1 | 57.3 | 64.9 | 63.8 | 58 | 59.9 | 58.5 |
| Chloride | | 5.5 | 6.9 | 6 | 6.1 | 7.4 | 6.5 | 6.16 | 6.62 | 7.73 | 6.5 | 9.7 | 9.6 | 7.9 | | 6.4 |
| Conductivity @25øC (µmho/cm) | | 419 | 469 | 463 | 410 | 460 | 430 | 419 | 395 | 480 | 447 | 501 | 502 | 471 | 456 | 383 |
| Dissolved Organic Carbon(DOC) | | 2.2 | 6.1 | 15.2 | 15.6 | 6.1 | 4.7 | 4.4 | 3.4 | 2.7 | 3.4 | 2.7 | 2.9 | 7.5 | 7.3 | 5 |
| Hardness(as CaCO3) | | 230 | 265 | 257 | 234 | 251 | 252 | 170 | 219 | 279 | 246 | 291 | | 264 | 264 | 257 |
| Iron | 0.300 | 0.02 | 0.68 | 0.01 | 0.06 | 0.08 | 0.147 | 0.026 | 0.074 | 0.048 | 0.04 | 0.07 | 0.27 | 0.24 | 0.25 | 0.11 |
| Magnesium | | 23.2 | 26.9 | 27.3 | 23.7 | 25.5 | 26.1 | 25.2 | 19.5 | 27.6 | 25 | 27.7 | 27.6 | 28.6 | 29.5 | 26.3 |
| Manganese | | | | 0.007 | 0.004 | 0.004 | 0.011 | 0.005 | | 0.01 | 0.01 | nd | nd | 0.037 | 0.038 | 0.15 |
| Nitrate(as N) | | 0.9 | 0.2 | 0.3 | 0.1 | 0.3 | 0.18 | 0.34 | 0.27 | 0.57 | 0.3 | 0.59 | 0.6 | 0.3 | na | 0.5 |
| Nitrite(as N) | | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.03 | <0.03 | | | nd | nd | nd | nd | na | nd |
| Orthophosphate(as P) | | | | | | | <0.05 | <0.05 | | | nd | nd | nd | nd | na | nd |
| pH | 6.5-8.5 | 8.27 | 8.19 | 8.35 | 8.14 | 8.31 | 8.13 | 8.04 | 8.16 | 8.25 | 8.26 | 8.47 | 8.48 | 8.25 | 8.25 | 8.07 |
| Phenols | 0.001 | 0.002 | 0.0025 | 0.0055 | 0.0074 | 0.0018 | <0.001 | <0.001 | | | 0.025 | | | nd | nd | nd |
| Phosphorus, Total (as P) | (15) | | | 0.013 | 0.005 | 0.03 | 0.008 | 0.29 | 1.7 | | 0.02 | 0.1 | nd | nd | nd | 0.003 |
| Potassium | | | | 0.9 | 1.05 | 0.97 | <1 | <1 | | | 1.2 | nd | nd | nd | nd | nd |
| Sodium | | | | 3.2 | 3.0 | 3.7 | 3.16 | 3.28 | 2.53 | 4.11 | 3.43 | 4.2 | 4.2 | 4.3 | 4.4 | 3.8 |
| Sulphate | | | | 9.4 | 19.2 | 25 | 10.2 | 10.9 | 9.93 | 17.2 | 11.2 | 30.9 | 31 | 14 | na | 11.7 |
| TDS (ion sum calc.) | | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen(as N) | | 0.43 | 0.76 | 0.38 | 0.47 | 0.41 | | 0.28 | 0.65 | 0.12 | 0.3 | | | 0.84 | 0.76 | 0.37 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 4

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 4 21-Dec-00 Replicate | SW 4 11-Jul-01 009 | SW 4 18-Oct-01 015 | SW 4 18-Jun-02 | SW 4 22-Oct-02 | SW 4 20-May-03 | SW 4 (dup) 20-May-03 | SW 4 1-Oct-03 | SW 4 5-May-04 | SW 4 29-Sep-04 | SW 4 6-Apr-05 | SW 4 21-Sep-05 | SW 4 4-Apr-06 | SW 4 25-Sep-06 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 234 | 234 | 205 | 236 | 231 | 206 | 209 | 222 | 198 | 250 | 190 | 238 | 170 | 240 |
| Ammonia(as N) | | 0.06 | 0.06 | 0.08 | 0.03 | 0.12 | < 0.01 | < 0.01 | 0.02 | 0.06 | 0.05 | 0.02 | 0.04 | < 0.01 | < 0.01 |
| Calcium | | 59 | | | 52.4 | 67.7 | 55.9 | 55.7 | 57.1 | 52.1 | 53 | 47.5 | 54.8 | 38.6 | 57.4 |
| Chloride | | 6.3 | 6.3 | 7.4 | 6.1 | 6.7 | 6.9 | 6.7 | 8.5 | 7.1 | 7.3 | 6.4 | 7.3 | 5.7 | 7.5 |
| Conductivity @25øC (µmho/cm) | | 388 | 463 | 410 | 446 | 496 | 428 | 426 | 444 | 433 | 459 | 381 | 477 | 351 | 449 |
| Dissolved Organic Carbon(DOC) | | 4.9 | | | 3.7 | 2.8 | 3.7 | 3.8 | 3.3 | 3.8 | 2 | 2.6 | 7.7 | 5.1 | 4.3 |
| Hardness(as CaCO3) | | 258 | | | 238.271 | 291 | 237 | 236 | 241 | 221 | 247 | 203 | 256 | 165 | 256 |
| Iron | 0.300 | 0.11 | 0.05 | 0.09 | 0.02 | 0.02 | 0.19 | 0.18 | 0.043 | 0.032 | 0.021 | 0.038 | 0.027 | 0.026 | 0.026 |
| Magnesium | | 26.4 | | | 26.1 | 29.6 | 23.7 | 23.6 | 23.8 | 22.1 | 27.9 | 20.4 | 29 | 16.7 | 27.5 |
| Manganese | | 0.15 | | | <0.005 | <0.01 | 0.01 | 0.01 | 0.004 | 0.004 | 0.005 | 0.006 | 0.007 | 0.002 | 0.005 |
| Nitrate(as N) | | 0.5 | | | 0.6 | 0.6 | 0.3 | 0.3 | 0.5 | 0.4 | 0.7 | 0.4 | 0.6 | 0.4 | 0.4 |
| Nitrite(as N) | | nd | | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | nd | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 | 8.06 | 8.21 | 7.97 | 8.15 | 8.64 | 8.17 | 8.14 | 8.14 | 8.3 | 8.24 | 7.89 | 8.21 | 8.15 | 7.99 |
| Phenols | 0.001 | nd | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | (15) | 0.003 | 0.26 | 0.02 | 0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.02 | <0.01 | <0.01 |
| Potassium | | nd | | | <1.0 | <0.4 | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 | 0.6 | 1 | 0.6 | 0.9 |
| Sodium | | 3.9 | | | 2.8 | 3.6 | 4.2 | 4.2 | 4.6 | 3.6 | 3.7 | 3.7 | 3.9 | 3 | 4.5 |
| Sulphate | | 11.6 | | | 12.7 | 23 | 18 | 18 | 22 | 11 | 16 | 10 | 15 | 10 | 17 |
| TDS (ion sum calc.) | | | | | | | | | | | | | | 178 | 261 |
| Total Kjeldahl Nitrogen(as N) | | 0.36 | | | 0.48 | 0.34 | 0.32 | 0.31 | 0.32 | 0.33 | 0.24 | 0.2 | 0.27 | 0.24 | 0.32 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 4

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 4 13-Apr-07 | SW 4 9-Oct-07 | SW 4 15-Apr-08 | SW 4 17-Sep-08 | SW 4 30-Apr-09 | SW 4 1-Oct-09 | SW 4 12-May-10 | SW 4 9-Nov-10 | SW 4 2-May-11 | SW 4 21-Sep-11 | SW 4 12-Apr-12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 204 | 240 | 160 | 208 | 265 | 211 | 238 | 255 | 224 | 238 | 243 |
| Ammonia(as N) | | < 0.01 | < 0.01 | < 0.01 | 0.02 | 0.02 | < 0.01 | < 0.01 | 0.04 | < 0.01 | < 0.01 | < 0.01 |
| Calcium | | 51.7 | 54.6 | 41.9 | 52 | 61 | 49.6 | 56.9 | 65.8 | 53.0 | 54.1 | 64.9 |
| Chloride | | 6.2 | 7.1 | 5.8 | 6.3 | 5.6 | 6.8 | 6.5 | 6.7 | 5.4 | 6.1 | 5.8 |
| Conductivity @25øC (µmho/cm) | | 380 | 452 | 387 | 398 | 410 | 421 | 462 | 509 | 451 | 496 | 470 |
| Dissolved Organic Carbon(DOC) | | 3.2 | 8.5 | 4.6 | 12 | 4.7 | 8.2 | 4.3 | 4 | 4.3 | 3.1 | 2.8 |
| Hardness(as CaCO3) | | 222 | 249 | 177 | 223 | 251 | 216 | 247 | 282 | 225 | 251 | 282 |
| Iron | 0.300 | 0.029 | 0.058 | 0.008 | 0.043 | <0.005 | 0.029 | 0.015 | 0.017 | 0.509 | 0.037 | 0.019 |
| Magnesium | | 22.5 | 27.4 | 17.7 | 22.6 | 23.9 | 22.3 | 25.6 | 28.6 | 22.6 | 28.1 | 29.0 |
| Manganese | | 0.002 | 0.006 | 0.001 | 0.007 | 0.009 | 0.006 | 0.004 | 0.003 | 0.011 | <0.001 | 0.002 |
| Nitrate(as N) | | 0.5 | 0.5 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 |
| Nitrite(as N) | | <0.1 | <0.1 | | | | | | <0.1 | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 | 8.06 | 7.63 | 7.66 | 7.53 | 7.59 | 7.86 | 8.32 | 7.44 | 8.12 | 8.15 | 8.36 |
| Phenols | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | (15) | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.03 | 0.05 |
| Potassium | | 0.6 | 1 | 0.6 | 0.8 | 0.8 | 0.8 | 0.6 | 0.9 | 0.5 | 0.8 | 0.8 |
| Sodium | | 3.5 | 4.2 | 3.2 | 3.7 | 3.3 | 3.5 | 4 | 4.1 | 3.3 | 3.9 | 3.8 |
| Sulphate | | 9 | 15 | 9 | 12 | 7 | 14 | 12 | 12 | 7 | 15 | 11 |
| TDS (ion sum calc.) | | 218 | 256 | 177 | 223 | 261 | 224 | 250 | 273 | 228 | 252 | 264 |
| Total Kjeldahl Nitrogen(as N) | | 0.21 | 0.28 | 0.16 | 0.41 | 0.22 | 0.31 | 0.17 | 0.16 | 0.08 | 0.19 | 0.11 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 4

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 4 22-Nov-12 | SW 4 22-Nov-12 Duplicate #2 | SW 4 7-May-13 | SW 4 ####### | SW 4 1-May-14 | SW 4 4-Nov-14 | SW 4 20-Apr-15 | SW 4 3-Nov-15 | SW 4 20-Apr-16 | SW 4 26-Oct-16 | SW 4 16-May-17 | SW 4 7-Dec-17 | SW 4 10-Apr-18 | SW 4 15-Nov-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 242 | 244 | 230 | 230 | 200 | 250 | 220 | 220 | 230 | 250 | 240 | 240 | 260 | 270 |
| Ammonia(as N) | | < 0.01 | < 0.01 | 0.051 | <0.05 | ND | 0.092 | <0.050 | <0.050 | 0.09 | 0.099 | <0.050 | <0.050 | 0.095 | 0.19 |
| Calcium | | 64.8 | 63.0 | 64 | 59 | 56 | 62 | 57 | 59 | 57 | 61 | 53 | 61 | 64 | 64 |
| Chloride | | 7.5 | 7.6 | 7 | 6 | 7 | 9 | 7 | 9.4 | 6.1 | 8.9 | 7 | 14 | 14 | 20 |
| Conductivity @25øC (µmho/cm) | | 503 | 507 | 470 | 450 | 400 | 500 | 440 | 470 | 450 | 520 | 470 | 470 | 510 | 540 |
| Dissolved Organic Carbon(DOC) | | 5.1 | 4.7 | 4.3 | 3.8 | 4.1 | 4.7 | 3.7 | 6.9 | 3.2 | 3.5 | 3.9 | 6.1 | 3.7 | 6.1 |
| Hardness(as CaCO3) | | 282 | 274 | 260 | 260 | 220 | 280 | 250 | 270 | 250 | 300 | 240 | 250 | 270 | 290 |
| Iron | 0.300 | 0.425 | 0.053 | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.100 | 0.11 | <0.1 | <0.1 | <0.1 | 0.11 |
| Magnesium | | 29.2 | 28.3 | 28 | 27 | 22 | 27 | 24 | 26 | 25 | 29 | 24 | 23 | 26 | 25 |
| Manganese | | 0.025 | 0.003 | 0.001 | 0.0029 | 0.0049 | 0.0089 | 0.013 | 0.005 | 0.0049 | 9.3 | 0.015 | 0.023 | 0.021 | 0.028 |
| Nitrate(as N) | | 0.5 | 0.6 | 0.27 | 0.57 | 0.33 | 0.43 | 0.32 | 0.3 | 0.39 | 0.51 | 0.35 | 0.29 | 0.55 | 0.28 |
| Nitrite(as N) | | <0.1 | <0.1 | <0.01 | <0.01 | ND | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | 7 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | ND | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 8.25 | 8.23 | 8.28 | 8.23 | 8.28 | 8.34 | 8.32 | 8.2 | 8.4 | 8.36 | 8.32 | 8.12 | 8.2 | 8.13 |
| Phenols | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | ND | <0.0010 | <0.0010 | <0.0010 | <0.0010 | 0.0017 | <0.0010 | <0.004 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | (15) | <0.01 | <0.01 | 0.018 | 0.002 | 0.005 | 0.004 | 0.009 | 0.007 | 0.004 | <0.100 | 0.007 | <0.10 | 0.006 | 0.005 |
| Potassium | | 0.8 | 0.8 | 0.83 | 0.81 | 0.84 | 0.89 | 0.86 | 1 | 0.81 | 1 | 0.68 | 1.4 | 1.5 | 1.4 |
| Sodium | | 4.3 | 4.2 | 4 | 3.9 | 3.8 | 0.41 | 3.6 | 4.6 | 3.2 | 4.6 | 3.3 | 8.9 | 8.6 | 11 |
| Sulphate | | 30 | 30 | 10 | 10 | 7 | 10 | 11 | 18 | 7.7 | 25 | 8.3 | <1.0 | 5.3 | <1.0 |
| TDS (ion sum calc.) | | 284 | 282 | 256 | 244 | 210 | 274 | 240 | 284 | 234 | 300 | 231.98 | 252.3 | 245 | 250 |
| Total Kjeldahl Nitrogen(as N) | | 0.24 | 0.22 | 0.51 | 0.38 | 0.35 | <0.10 | 0.29 | 0.36 | 0.16 | 0.32 | 0.23 | 0.21 | 0.33 | 0.35 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 4

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 4 24-Apr-19 | SW 4 20-Nov-19 | SW 4 13-May-20 | SW 4 12-Nov-20 | SW 4 8-Apr-21 | SW 4 7-Oct-21 | SW 4 3-May-22 | SW 4 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 200 | 240 | 250 | 310 | 230 | 250 | 250 | 230 |
| Ammonia(as N) | | <0.050 | 0.15 | 0.29 | 0.49 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calcium | | 48 | 67 | 64 | 78 | 61 | 62 | 59 | 59 |
| Chloride | | 6.4 | 8.1 | 18 | 25 | 6.9 | 7.4 | 7 | 8.5 |
| Conductivity @25øC (µmho/cm) | | 380 | 500 | 500 | 640 | 460 | 440 | 490 | 470 |
| Dissolved Organic Carbon(DOC) | | 4.4 | 3.4 | 5.0 | 5.4 | 3.8 | 6.2 | 3.1 | 5 |
| Hardness(as CaCO3) | | 220 | 280 | 240 | 320 | 250 | 250 | 250 | 260 |
| Iron | 0.300 | <0.1 | <0.1 | <0.1 | 0.11 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 20 | 29 | 23 | 28 | 25 | 26 | 26 | 27 |
| Manganese | | 0.0024 | 0.011 | 0.019 | 0.025 | 0.006 | 0.0047 | 0.012 | 0.0082 |
| Nitrate(as N) | | 0.28 | 0.61 | 0.30 | 0.21 | 0.44 | 0.28 | 0.59 | 0.35 |
| Nitrite(as N) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 8.31 | 8.25 | 8.26 | 8.14 | 8.47 | 8.22 | 8.31 | 8.32 |
| Phenols | 0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | (15) | 0.007 | 0.004 | <0.004 | 0.007 | 0.007 | 0.005 | 0.004 | <0.004 |
| Potassium | | 0.72 | 1 | 1.4 | 2.1 | 0.76 | 0.87 | 0.79 | 0.89 |
| Sodium | | 3.4 | 4.4 | 9.2 | 13 | 3.6 | 3.5 | 3.3 | 4.1 |
| Sulphate | | <1.0 | 21 | <1.0 | <1.0 | 13 | 1.7 | 9.9 | 17 |
| TDS (ion sum calc.) | | 165 | 285 | 280 | 365 | 240 | 270 | 190 | 215 |
| Total Kjeldahl Nitrogen(as N) | | 0.2 | 0.29 | 0.40 | 0.79 | 0.21 | 0.36 | 0.15 | 0.2 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 5

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW 5 7-Nov-94 | SW 5 19-Jun-95 | SW 5 30-Oct-95 | SW5 15-Nov-96 | SW5 19-Dec-97 | SW5 18-Dec-98 | SW5 18-Oct-01 | SW5 (Dup) 18-Oct-01 | SW5 18-Jun-02 | SW5 22-Oct-02 | SW5 20-May-03 | SW5 1-Oct-03 | SW5 (Dup) 1-Oct-03 | SW5 29-Sep-04 | SW5 (dup) 29-Sep-04 | SW5 21-Sep-05 | SW5 (dup) 21-Sep-05 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 205 | 260 | 217 | 221 | 241 | 242 | 204 | 203 | NO | 210 | NO | 220 | 221 | 250 | 250 | 236 | 236 |
| Ammonia(as N) | | 0.041 | <0.05 | 0.04 | 0.16 | 0.04 | 0.06 | 0.07 | 0.04 | | 0.11 | | 0.01 | 0.01 | 0.06 | 0.07 | 0.04 | 0.04 |
| Calcium | | 54.6 | 51.9 | 58.4 | 57.9 | 60.8 | 67.7 | | | | 68.9 | | 58 | 58.2 | 52.1 | 53.1 | 52 | 52.6 |
| Chloride | | 6.1 | 5.8 | 7.7 | 6.48 | 7.71 | 8.7 | 7.3 | 7.3 | | 6.7 | | 8.5 | 8.4 | 7.3 | 7.4 | 7.4 | 7.3 |
| Conductivity @25øC (µmho/cm) | | 406 | 458 | 460 | 410 | 486 | 494 | 415 | 411 | | 494 | | 441 | 440 | 448 | 450 | 465 | 465 |
| Dissolved Organic Carbon(DOC) | | 16.7 | 4.2 | 6.4 | 4.4 | 2.9 | 2.3 | | | | 65 | | 3.3 | 3.3 | 1.9 | 2.2 | 8.5 | 7.8 |
| Hardness(as CaCO3) | | 229 | 248 | 250 | 240 | 269 | 283 | | | | 297 | | 244 | 245 | 243 | 247 | 247 | 249 |
| Iron | 0.300 | 0.05 | 0.09 | 0.01 | 0.047 | 0.016 | 0.05 | 0.05 | 0.03 | | 0.03 | | 0.036 | 0.035 | 0.02 | 0.019 | 0.02 | 0.019 |
| Magnesium | | 22.4 | 28.6 | 25.2 | 24.9 | 27.3 | 27.4 | | | | 30.4 | | 24.1 | 24.2 | 27.4 | 27.9 | 28.4 | 28.5 |
| Manganese | | <0.003 | 0.015 | 0.004 | 0.007 | | nd | | | | 0.02 | | 0.004 | 0.004 | 0.004 | 0.005 | 0.005 | 0.005 |
| Nitrate(as N) | | 0.1 | 0.2 | 0.2 | 0.23 | 0.47 | 0.54 | | | | 0.6 | | 0.5 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 |
| Nitrite(as N) | | 0.01 | <0.01 | 0.01 | <0.03 | | nd | | | | <0.1 | | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Orthophosphate(as P) | | | | | <0.05 | | nd | | | | <0.01 | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 | 8.18 | 8.4 | 8.37 | 8.09 | 8.24 | 8.44 | 7.97 | 7.94 | | 8.51 | | 8.14 | 8.15 | 8.14 | 8.2 | 8.27 | 8.34 |
| Phenols | 0.001 | 0.007 | 0.001 | 0.001 | <0.001 | | | <0.001 | <0.001 | | <0.001 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | (15) | 0.005 | 0.01 | 0.03 | <0.01 | | nd | <0.01 | <0.01 | | 0.01 | | <0.01 | <0.01 | <0.01 | <0.01 | 0.02 | 0.01 |
| Potassium | | 1.19 | 0.8 | 0.93 | <1 | | nd | | | | <0.4 | | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 |
| Sodium | | 3.3 | 3.7 | 3.9 | 3.46 | 3.74 | 3.8 | | | | 3.4 | | 4.6 | 4.6 | 3.7 | 3.8 | 3.8 | 3.8 |
| Sulphate | | 21.8 | 15.9 | 26.0 | 11 | 17.9 | 28.8 | | | | 24 | | 22 | 22 | 16 | 16 | 15 | 15 |
| TDS (ion sum calc.) | | | | | | | | | | | | | | | | | | |
| Total Kjeldahl Nitrogen(as N) | | 0.46 | 0.47 | 0.43 | 0.28 | 0.11 | | | | | 0.43 | | 0.38 | 0.34 | 0.24 | 0.24 | 0.34 | 0.3 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 5

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW5 4-Apr-06 | SW5 25-Sep-06 | SW5 13-Apr-07 | SW5 9-Oct-07 | SW5 15-Apr-08 | SW5 17-Sep-08 | SW5 (dup) 17-Sep-08 | SW5 30-Apr-09 | SW5 1-Oct-09 | SW5 12-May-10 | SW5 9-Nov-10 | SW5 2-May-11 | SW5 21-Sep-11 | SW5 (dup) 21-Sep-11 Duplicate #3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | No Sample | 242 | 204 | 236 | 170 | 210 | 202 | 219 | 210 | 238 | 254 | 224 | 240 | 242 |
| Ammonia(as N) | | | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.02 | 0.02 | < 0.01 | < 0.01 | < 0.01 | 0.04 | < 0.01 | < 0.01 | < 0.01 |
| Calcium | | | 57.2 | 51.3 | 54.5 | 42.8 | 51.8 | 51.8 | 60.2 | 49.4 | 56.2 | 65.1 | 55.6 | 60.4 | 61 |
| Chloride | | | 7.6 | 6.4 | 7 | 5.8 | 6.2 | 6.3 | 5.7 | 6.9 | 6.6 | 6.8 | 5.4 | 6.0 | 7.4 |
| Conductivity @25øC (µmho/cm) | | | 450 | 393 | 468 | 381 | 396 | 405 | 418 | 422 | 464 | 518 | 451 | 497 | 497 |
| Dissolved Organic Carbon(DOC) | | | 5.3 | 2.8 | 25.2 | 4.6 | 11.8 | 11.8 | 4.2 | 8.1 | 4.3 | 3.9 | 4.2 | 3.0 | 2.9 |
| Hardness(as CaCO3) | | | 256 | 221 | 249 | 181 | 222 | 222 | 247 | 216 | 245 | 279 | 237 | 279 | 282 |
| Iron | 0.300 | | 0.021 | 0.022 | 0.05 | 0.01 | 0.039 | 0.04 | <0.005 | 0.043 | 0.011 | 0.016 | 0.086 | 0.141 | 0.273 |
| Magnesium | | | 27.5 | 22.4 | 27.4 | 17.9 | 22.5 | 22.5 | 23.6 | 22.5 | 25.4 | 28.2 | 23.9 | 31.2 | 31.5 |
| Manganese | | | 0.005 | 0.002 | 0.005 | <0.001 | 0.008 | 0.008 | 0.009 | 0.006 | 0.005 | 0.003 | 0.011 | 0.003 | 0.005 |
| Nitrate(as N) | | | 0.4 | 0.5 | 0.5 | 0.4 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 |
| Nitrite(as N) | | | <0.1 | <0.1 | <0.1 | | | | | | | <0.1 | <0.1 | 0.1 | 0.1 |
| Orthophosphate(as P) | | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| pH | 6.5-8.5 | | 8.02 | 8.11 | 7.72 | 7.63 | 7.65 | 7.72 | 7.67 | 7.9 | 8.35 | 7.52 | 8.11 | 8.11 | 8.11 |
| Phenols | 0.001 | | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Phosphorus, Total (as P) | (15) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.03 | 0.03 |
| Potassium | | | 0.9 | 0.7 | 1 | 0.6 | 0.8 | 0.8 | 0.8 | 0.8 | 0.6 | 0.8 | 0.6 | 0.9 | 0.9 |
| Sodium | | | 4.5 | 3.5 | 4.2 | 3.2 | 3.7 | 3.7 | 3.2 | 3.5 | 4 | 4 | 3.5 | 4.3 | 4.4 |
| Sulphate | | | 17 | 9 | 15 | 9 | 12 | 12 | 7 | 14 | 12 | 12 | 7 | 14 | 14 |
| TDS (ion sum calc.) | | | 262 | 218 | 253 | 180 | 224 | 219 | 233 | 224 | 249 | 271 | 232 | 263 | 267 |
| Total Kjeldahl Nitrogen(as N) | | | 0.26 | 0.15 | 0.23 | 0.21 | 0.46 | 0.45 | 0.2 | 0.34 | 0.21 | 0.19 | 0.12 | 0.26 | 0.25 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

# Historic Surface Water Quality at Sampling Point SW 5

**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

| Chemical Parameter | PWQO | SW5 12-Apr-12 | SW5 (dup) 12-Apr-12 Duplicate #2 | SW5 22-Nov-12 | SW5 7-May-13 | SW5 26-Nov-13 | SW5 1-May-14 | SW5 4-Nov-14 | SW5 20-Apr-15 | SW5 3-Nov-15 | SW5 20-Apr-16 | SW5 26-Oct-16 | SW5 16-May-17 | SW5 7-Dec-17 | SW5 10-Apr-18 | SW5 ######## |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 243 | 240 | 240 | 240 | 220 | 200 | 250 | 220 | 230 | 230 | 250 | 240 | 250 | 250 | 230 |
| Ammonia(as N) | | < 0.01 | < 0.01 | < 0.01 | 0.089 | <0.05 | ND | 0.063 | <0.050 | <0.050 | <0.050 | 0.061 | <0.050 | <0.050 | <0.050 | 0.051 |
| Calcium | | 61.2 | 59.2 | 65.7 | 65 | 59 | 61 | 63 | 57 | 57 | 60 | 60 | 54 | 64 | 49 | 57 |
| Chloride | | 5.9 | 5.9 | 7.5 | 7 | 7 | 6 | 8 | 7 | 9.6 | 6.4 | 9.1 | 7.0 | 6.9 | 6.0 | 8.4 |
| Conductivity @25øC (µmho/cm) | | 470 | 470 | 508 | 470 | 450 | 390 | 500 | 390 | 470 | 450 | 510 | 470 | 480 | 480 | 460 |
| Dissolved Organic Carbon(DOC) | | 2.8 | 2.8 | 4.7 | 4.2 | 3.9 | 3.8 | 4.8 | 3.7 | 6.8 | 3.1 | 3.8 | 3.9 | 3.8 | 2.4 | 5 |
| Hardness(as CaCO3) | | 266 | 258 | 285 | 260 | 260 | 210 | 270 | 270 | 270 | 250 | 310 | 260 | 270 | 260 | 260 |
| Iron | 0.300 | 0.031 | 0.032 | 0.017 | <0.1 | <0.1 | ND | <0.1 | <0.1 | <0.1 | <0.100 | <0.100 | <0.1 | <0.1 | <0.1 | 0.18 |
| Magnesium | | 27.4 | 26.7 | 29.5 | 28 | 27 | 26 | 28 | 24 | 24 | 25 | 28 | 24 | 28 | 25 | 25 |
| Manganese | | 0.001 | 0.002 | 0.003 | 0.012 | 0.0027 | 0.0038 | 0.0051 | 0.0091 | 0.004 | 0.0086 | 2.7 | 0.077 | 0.0051 | 0.0048 | 0.031 |
| Nitrate(as N) | | 0.4 | 0.4 | 0.5 | 0.27 | 0.56 | 0.32 | 0.41 | 0.31 | 0.3 | 0.38 | 0.53 | 0.36 | 0.54 | 0.64 | 0.55 |
| Nitrite(as N) | | <0.1 | <0.1 | <0.1 | <0.01 | <0.01 | ND | <0.01 | <0.010 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | ND | <0.01 | <0.010 | <0.01 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 8.37 | 8.36 | 8.24 | 8.24 | 8.24 | 8.28 | 8.34 | 8.14 | 8.29 | 8.33 | 8.35 | 8.33 | 8.28 | 8.35 | 8.25 |
| Phenols | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | ND | <0.001 | <0.0010 | <0.001 | <0.0010 | <0.0010 | <0.0010 | <0.004 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | (15) | 0.05 | 0.05 | <0.01 | 0.013 | <0.002 | 0.002 | 0.008 | 0.008 | 0.004 | 0.009 | <0.100 | 0.005 | <0.10 | 0.004 | 0.014 |
| Potassium | | 0.7 | 0.7 | 0.8 | 0.83 | 0.8 | 0.38 | <0.01 | 0.77 | 0.93 | 0.83 | 0.85 | 0.64 | 0.79 | 0.7 | 0.75 |
| Sodium | | 3.5 | 3.5 | 4.3 | 3.9 | 3.9 | 4.2 | 4.2 | 3.6 | 4.4 | 3.2 | 4.5 | 3.3 | 3.9 | 3.1 | 3.5 |
| Sulphate | | 11 | 11 | 30 | 10 | 11 | 7 | 11 | 11 | 18 | 7.7 | 25 | 8.4 | 8.4 | 8.6 | 24 |
| TDS (ion sum calc.) | | 258 | 253 | 284 | 252 | 240 | 216 | 260 | 222 | 216 | 232 | 310 | 233 | 254 | 205 | 195 |
| Total Kjeldahl Nitrogen(as N) | | 0.14 | 0.12 | 0.40 | 0.43 | 0.37 | 0.31 | <0.10 | 0.28 | 0.34 | 0.16 | 0.24 | 0.23 | 0.12 | 0.12 | 0.20 |

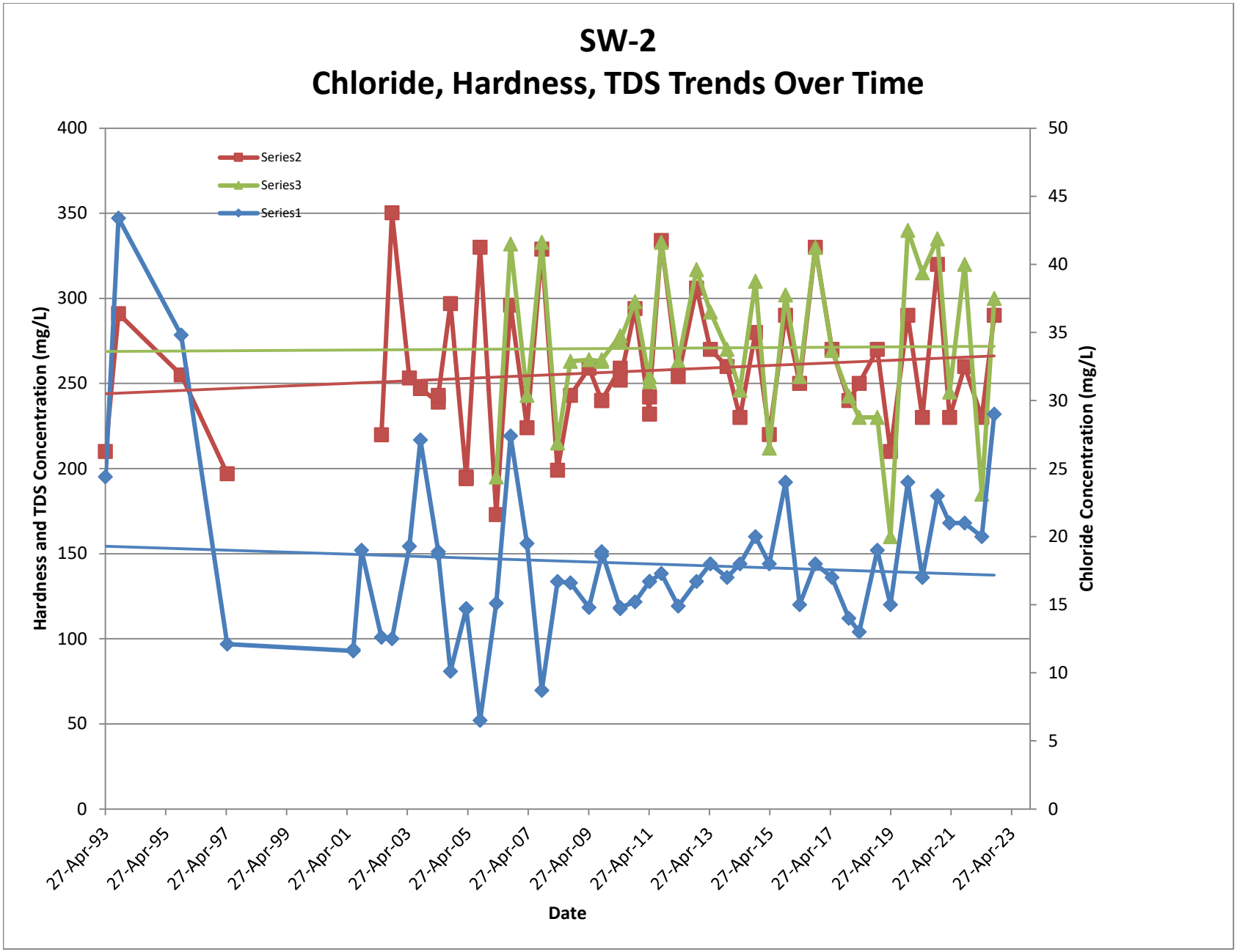
NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO

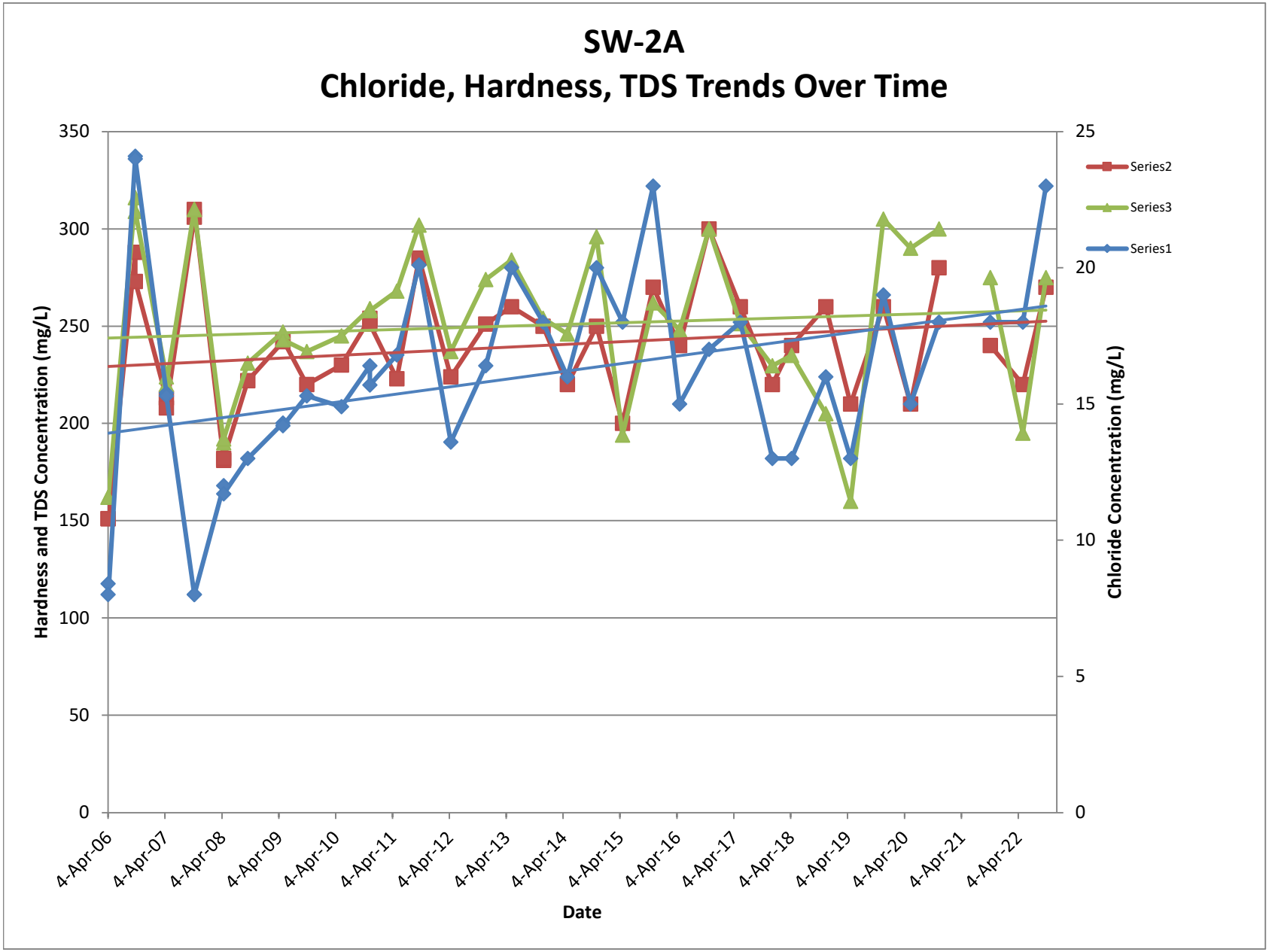
# Historic Surface Water Quality at Sampling Point SW 5

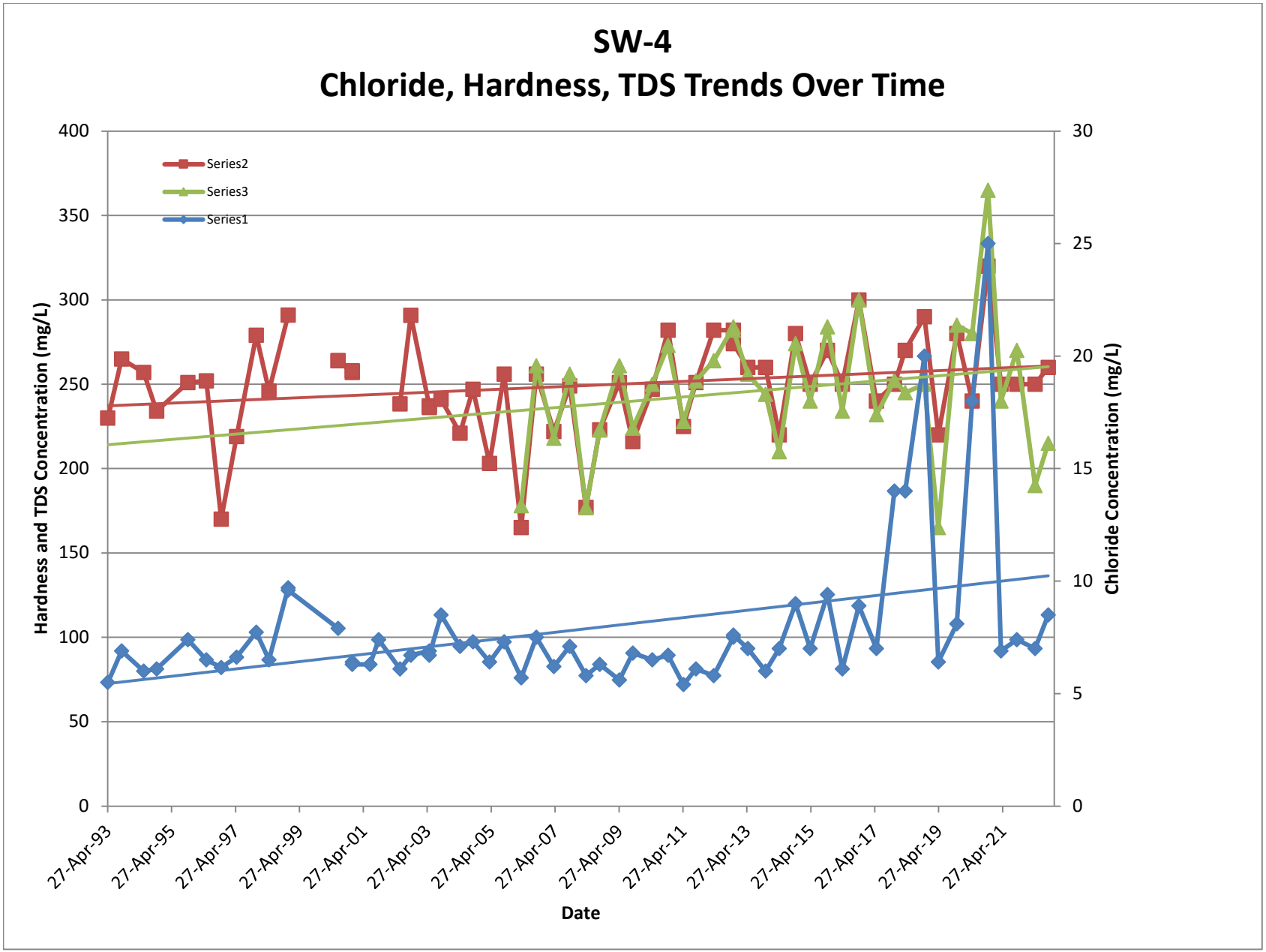
**Municipality of West Grey**
**Surface Water Quality - Bentinck Landfill**

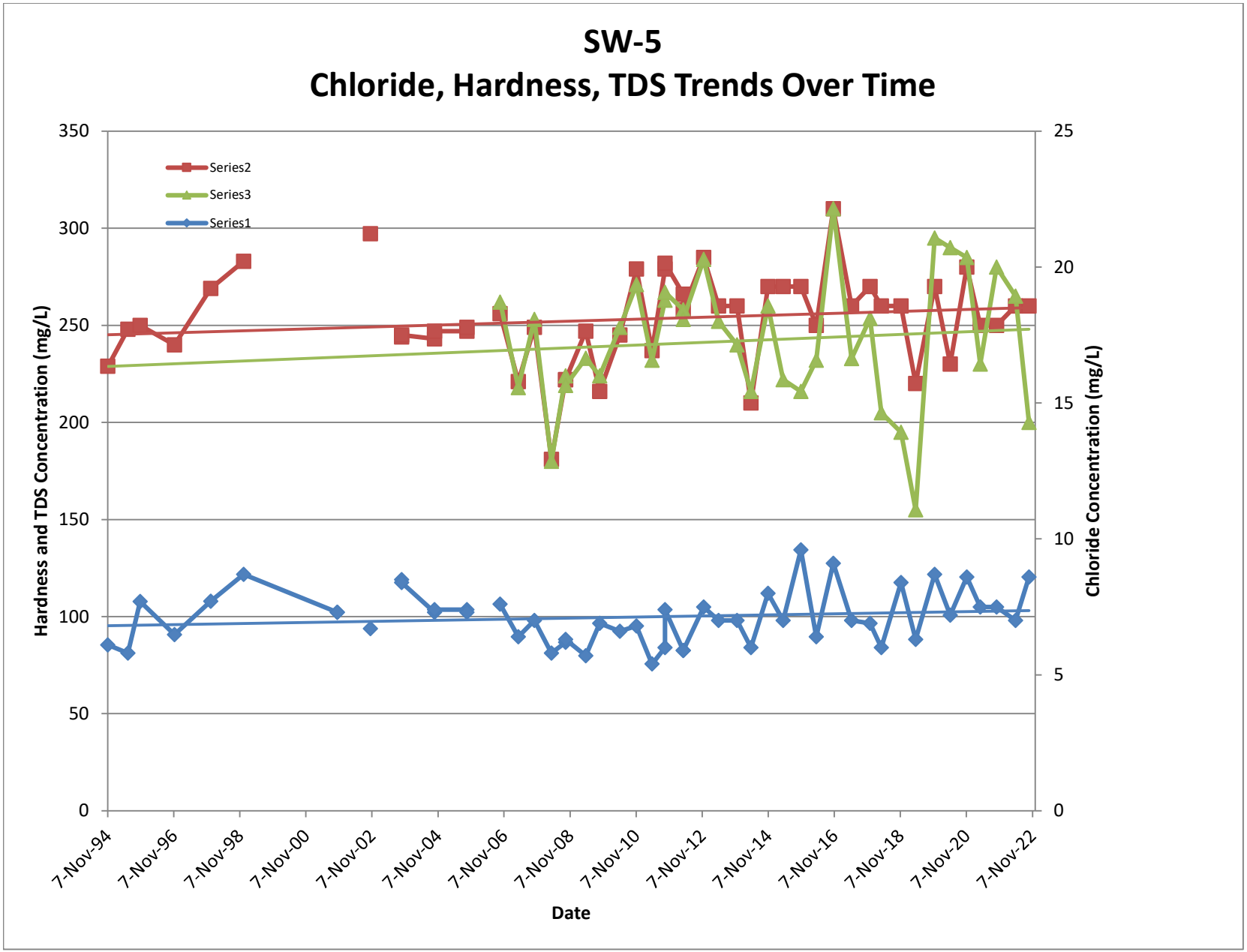
| Chemical Parameter | PWQO | SW5 24-Apr-19 | SW5 ######## | SW5 13-May-20 | SW5 12-Nov-20 | SW5 8-Apr-21 | SW5 7-Oct-21 | SW5 3-May-22 | SW5 29-Sep-22 |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity(as CaCO3) | | 190 | 240 | 240 | 240 | 230 | 240 | 250 | 230 |
| Ammonia(as N) | | 0.11 | 0.071 | <0.050 | 0.085 | <0.050 | <0.050 | <0.050 | <0.050 |
| Calcium | | 51 | 64 | 57 | 59 | 58 | 63 | 64 | 57 |
| Chloride | | 6.3 | 8.7 | 7.2 | 8.6 | 7.5 | 7.5 | 7 | 8.6 |
| Conductivity @25øC (µmho/cm) | | 390 | 490 | 460 | 500 | 460 | 470 | 490 | 470 |
| Dissolved Organic Carbon(DOC) | | 4.4 | 3.5 | 2.9 | 4 | 3.7 | 6 | 3.1 | 4.9 |
| Hardness(as CaCO3) | | 220 | 270 | 230 | 280 | 250 | 250 | 260 | 260 |
| Iron | 0.300 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Magnesium | | 20 | 27 | 25 | 27 | 25 | 27 | 27 | 27 |
| Manganese | | 0.0022 | 0.0031 | 0.0044 | 0.0037 | 0.0045 | 0.0043 | 0.010 | 0.0068 |
| Nitrate(as N) | | 0.28 | 0.63 | 0.44 | 0.5 | 0.44 | 0.28 | 0.6 | 0.35 |
| Nitrite(as N) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Orthophosphate(as P) | | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| pH | 6.5-8.5 | 8.29 | 8.29 | 8.38 | 8.37 | 8.45 | 8.25 | 8.4 | 8.36 |
| Phenols | 0.001 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 | <0.0010 |
| Phosphorus, Total (as P) | (15) | <0.004 | 0.008 | <0.004 | <0.004 | 0.005 | 0.005 | 0.004 | 0.005 |
| Potassium | | 0.69 | 0.72 | 0.65 | 0.81 | 0.73 | 0.87 | 0.78 | 0.83 |
| Sodium | | 3.4 | 4.1 | 3.3 | 4.2 | 3.6 | 3.5 | 3.3 | 4.0 |
| Sulphate | | <1.0 | 21 | 12 | 25 | 13 | 2.5 | 9.7 | 19 |
| TDS (ion sum calc.) | | 155 | 295 | 290 | 285 | 230 | 280 | 265 | 200 |
| Total Kjeldahl Nitrogen(as N) | | 0.26 | 0.21 | 0.26 | 0.38 | 0.27 | 0.24 | 0.24 | 0.23 |

NOTES:
1. All results in mg/L unless otherwise noted.
2. PWQO indicates Provincial Water Quality Objectives, MOE, July 1994.
3. Alkalinity should not be decreased by more than 25 % of the natural concentration.
4. Shading indicates exceedance of PWQO


SW-2
Chloride, Hardness, TDS Trends Over Time
Series2
Series3
Series1
Hardness and TDS Concentration (mg/L)
Chloride Concentration (mg/L)
Date
400
350
300
250
200
150
100
50
0
50
45
40
35
30
25
20
15
10
5
0
27-Apr-93
27-Apr-95
27-Apr-97
27-Apr-99
27-Apr-01
27-Apr-03
27-Apr-05
27-Apr-07
27-Apr-09
27-Apr-11
27-Apr-13
27-Apr-15
27-Apr-17
27-Apr-19
27-Apr-21
27-Apr-23


SW-2A
Chloride, Hardness, TDS Trends Over Time
Hardness and TDS Concentration (mg/L)
Chloride Concentration (mg/L)
Date
Series2
Series3
Series1
350
300
250
200
150
100
50
0
25
20
15
10
5
0
4-Apr-06
4-Apr-07
4-Apr-08
4-Apr-09
4-Apr-10
4-Apr-11
4-Apr-12
4-Apr-13
4-Apr-14
4-Apr-15
4-Apr-16
4-Apr-17
4-Apr-18
4-Apr-19
4-Apr-20
4-Apr-21
4-Apr-22


SW-4
Chloride, Hardness, TDS Trends Over Time
Series2
Series3
Series1
Hardness and TDS Concentration (mg/L)
Chloride Concentration (mg/L)
Date
400
350
300
250
200
150
100
50
0
30
25
20
15
10
5
0
27-Apr-93
27-Apr-95
27-Apr-97
27-Apr-99
27-Apr-01
27-Apr-03
27-Apr-05
27-Apr-07
27-Apr-09
27-Apr-11
27-Apr-13
27-Apr-15
27-Apr-17
27-Apr-19
27-Apr-21


SW-5
Chloride, Hardness, TDS Trends Over Time
Series2
Series3
Series1
Hardness and TDS Concentration (mg/L)
Chloride Concentration (mg/L)
350
300
250
200
150
100
50
0
25
20
15
10
5
0
7-Nov-94
7-Nov-96
7-Nov-98
7-Nov-00
7-Nov-02
7-Nov-04
7-Nov-06
7-Nov-08
7-Nov-10
7-Nov-12
7-Nov-14
7-Nov-16
7-Nov-18
7-Nov-20
7-Nov-22
Date

# APPENDIX F:
# LABORATORY CERTIFICATES OF ANALYSIS

Your Project #: Bentinck Groundwater (213085)
Your C.O.C. #: 872956-01-01, 872956-02-01

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/05/13**
Report #: R7123692
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2C2441**
**Received: 2022/05/04, 11:53**

Sample Matrix: Water
# Samples Received: 12

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Alkalinity | 8 | N/A | 2022/05/10 | CAM SOP-00448 | SM 23 2320 B m |
| Alkalinity | 4 | N/A | 2022/05/12 | CAM SOP-00448 | SM 23 2320 B m |
| Chloride by Automated Colourimetry | 4 | N/A | 2022/05/12 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Chloride by Automated Colourimetry | 8 | N/A | 2022/05/09 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Conductivity | 8 | N/A | 2022/05/10 | CAM SOP-00414 | SM 23 2510 m |
| Conductivity | 4 | N/A | 2022/05/12 | CAM SOP-00414 | SM 23 2510 m |
| Dissolved Organic Carbon (DOC) (1) | 4 | N/A | 2022/05/11 | CAM SOP-00446 | SM 23 5310 B m |
| Dissolved Organic Carbon (DOC) (1) | 8 | N/A | 2022/05/09 | CAM SOP-00446 | SM 23 5310 B m |
| Hardness (calculated as CaCO3) | 8 | N/A | 2022/05/10 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Hardness (calculated as CaCO3) | 4 | N/A | 2022/05/12 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Lab Filtered Metals by ICPMS | 4 | 2022/05/11 | 2022/05/12 | CAM SOP-00447 | EPA 6020B m |
| Lab Filtered Metals by ICPMS | 8 | 2022/05/09 | 2022/05/10 | CAM SOP-00447 | EPA 6020B m |
| Total Ammonia-N | 4 | N/A | 2022/05/11 | CAM SOP-00441 | USGS I-2522-90 m |
| Total Ammonia-N | 8 | N/A | 2022/05/09 | CAM SOP-00441 | USGS I-2522-90 m |
| Nitrate & Nitrite as Nitrogen in Water (2) | 4 | N/A | 2022/05/12 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| Nitrate & Nitrite as Nitrogen in Water (2) | 8 | N/A | 2022/05/09 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| pH | 4 | 2022/05/11 | 2022/05/12 | CAM SOP-00413 | SM 4500H+ B m |
| pH | 8 | 2022/05/07 | 2022/05/10 | CAM SOP-00413 | SM 4500H+ B m |
| Orthophosphate | 8 | N/A | 2022/05/10 | CAM SOP-00461 | EPA 365.1 m |
| Orthophosphate | 4 | N/A | 2022/05/12 | CAM SOP-00461 | EPA 365.1 m |
| Sulphate by Automated Colourimetry | 8 | N/A | 2022/05/10 | CAM SOP-00464 | EPA 375.4 m |
| Sulphate by Automated Colourimetry | 4 | N/A | 2022/05/12 | CAM SOP-00464 | EPA 375.4 m |
| Total Kjeldahl Nitrogen in Water | 1 | 2022/05/11 | 2022/05/11 | CAM SOP-00938 | OMOE E3516 m |
| Total Kjeldahl Nitrogen in Water | 2 | 2022/05/09 | 2022/05/10 | CAM SOP-00938 | OMOE E3516 m |
| Total Phosphorus (Colourimetric) | 1 | 2022/05/11 | 2022/05/11 | CAM SOP-00407 | SM 23 4500 P B H m |
| Total Phosphorus (Colourimetric) | 2 | 2022/05/09 | 2022/05/09 | CAM SOP-00407 | SM 23 4500 P B H m |

**Remarks:**

Your Project #: Bentinck Groundwater (213085)
Your C.O.C. #: 872956-01-01, 872956-02-01

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/05/13**
Report #: R7123692
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2C2441**

**Received: 2022/05/04, 11:53**

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

## RESULTS OF ANALYSES OF WATER

| Bureau Veritas ID | | SOB459 | | SOB460 | | | SOB461 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | 2022/05/03 | | | 2022/05/03 | | |
| COC Number | | 872956-01-01 | | 872956-01-01 | | | 872956-01-01 | | |
| | UNITS | TH-3 | RDL | TH-8 | RDL | QC Batch | TH-9 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 510 | 1.0 | 540 | 1.0 | 7981189 | 310 | 1.0 | 7981189 |
| **Inorganics** | | | | | | | | | |
| Total Ammonia-N | mg/L | 8.8 | 0.050 | 0.060 | 0.050 | 7983548 | <0.050 | 0.050 | 7983548 |
| Conductivity | umho/cm | 1000 | 1.0 | 970 | 1.0 | 7982593 | 560 | 1.0 | 7982640 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | 9.4 | 0.50 | 0.21 | 0.10 | 7983552 | | | |
| Dissolved Organic Carbon | mg/L | 3.9 | 0.40 | 2.4 | 0.40 | 7982609 | 19 | 0.40 | 7982609 |
| Orthophosphate (P) | mg/L | <0.010 | 0.010 | <0.010 | 0.010 | 7982693 | <0.010 | 0.010 | 7982693 |
| pH | pH | 7.65 | | 7.73 | | 7982590 | 8.04 | | 7982610 |
| Total Phosphorus | mg/L | 0.37 | 0.040 | 0.060 | 0.020 | 7983453 | | | |
| Dissolved Sulphate (SO4) | mg/L | 6.4 | 1.0 | 28 | 1.0 | 7982694 | <5.0 (1) | 5.0 | 7982694 |
| Alkalinity (Total as CaCO3) | mg/L | 540 | 1.0 | 520 | 1.0 | 7982591 | 300 | 1.0 | 7982639 |
| Dissolved Chloride (Cl-) | mg/L | 15 | 1.0 | 3.8 | 1.0 | 7982691 | 6.7 | 1.0 | 7982691 |
| Nitrite (N) | mg/L | <0.010 | 0.010 | <0.010 | 0.010 | 7982674 | <0.010 | 0.010 | 7982674 |
| Nitrate (N) | mg/L | <0.10 | 0.10 | 1.10 | 0.10 | 7982674 | 0.15 | 0.10 | 7982674 |
| Nitrate + Nitrite (N) | mg/L | <0.10 | 0.10 | 1.10 | 0.10 | 7982674 | 0.15 | 0.10 | 7982674 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2C2441
Report Date: 2022/05/13

GM BluePlan Engineering Limited
Client Project #: Bentinck Groundwater (213085)
Sampler Initials: JW

## RESULTS OF ANALYSES OF WATER

| Bureau Veritas ID | | SOB461 | | | SOB462 | SOB463 | SOB464 | SOB465 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | | 2022/05/03 | 2022/05/03 | 2022/05/03 | 2022/05/03 | | |
| COC Number | | 872956-01-01 | | | 872956-01-01 | 872956-01-01 | 872956-02-01 | 872956-02-01 | | |
| | UNITS | TH-9 Lab-Dup | RDL | QC Batch | TH-10 | TH-11 | TH-12 | TH-14 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | | | | 410 | 200 | 210 | 540 | 1.0 | 7981189 |
| **Inorganics** | | | | | | | | | | |
| Total Ammonia-N | mg/L | | | | 0.30 | <0.050 | 0.13 | 16 | 0.050 | 7983548 |
| Conductivity | umho/cm | 560 | 1.0 | 7982640 | 770 | 400 | 480 | 1100 | 1.0 | 7982593 |
| Dissolved Organic Carbon | mg/L | | | | 1.5 | 1.1 | <0.40 | 6.6 | 0.40 | 7982609 |
| Orthophosphate (P) | mg/L | | | | 0.011 | <0.010 | <0.010 | <0.010 | 0.010 | 7982693 |
| pH | pH | 8.10 | | 7982610 | 7.73 | 8.07 | 8.09 | 7.38 | | 7982590 |
| Dissolved Sulphate (SO4) | mg/L | | | | 11 | 2.0 | 81 | 5.3 | 1.0 | 7982694 |
| Alkalinity (Total as CaCO3) | mg/L | 300 | 1.0 | 7982639 | 360 | 210 | 170 | 590 | 1.0 | 7982591 |
| Dissolved Chloride (Cl-) | mg/L | | | | 33 | 2.0 | <1.0 | 17 | 1.0 | 7982691 |
| Nitrite (N) | mg/L | | | | 0.010 | <0.010 | 0.023 | <0.010 | 0.010 | 7982674 |
| Nitrate (N) | mg/L | | | | 0.58 | 0.13 | 0.24 | <0.10 | 0.10 | 7982674 |
| Nitrate + Nitrite (N) | mg/L | | | | 0.59 | 0.13 | 0.26 | <0.10 | 0.10 | 7982674 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2C2441
Report Date: 2022/05/13

GM BluePlan Engineering Limited
Client Project #: Bentinck Groundwater (213085)
Sampler Initials: JW

## RESULTS OF ANALYSES OF WATER

| Bureau Veritas ID | | SOB466 | | | SOS285 | | | SOS286 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | | 2022/05/03 | | | 2022/05/03 | | |
| COC Number | | 872956-02-01 | | | 872956-01-01 | | | 872956-02-01 | | |
| | UNITS | TP-5 | RDL | QC Batch | TH-2 | RDL | QC Batch | TH-6 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 230 | 1.0 | 7981189 | 290 | 1.0 | 7986011 | 770 | 1.0 | 7986011 |
| **Inorganics** | | | | | | | | | | |
| Total Ammonia-N | mg/L | 0.12 | 0.050 | 7983548 | <0.050 | 0.050 | 7988388 | 17 | 0.050 | 7988388 |
| Conductivity | umho/cm | 430 | 1.0 | 7982593 | 530 | 1.0 | 7990255 | 1800 | 1.0 | 7990255 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | | | | <0.10 | 0.10 | 7988376 | | | |
| Dissolved Organic Carbon | mg/L | 0.67 | 0.40 | 7982609 | 0.64 | 0.40 | 7988507 | 8.4 | 0.40 | 7988507 |
| Orthophosphate (P) | mg/L | 0.036 | 0.010 | 7982693 | <0.010 | 0.010 | 7990263 | <0.010 | 0.010 | 7990263 |
| pH | pH | 8.06 | | 7982590 | 8.14 | | 7990247 | 7.53 | | 7990247 |
| Total Phosphorus | mg/L | | | | <0.10 (1) | 0.10 | 7988291 | | | |
| Dissolved Sulphate (SO4) | mg/L | <1.0 | 1.0 | 7982694 | 5.1 | 1.0 | 7990261 | 130 | 1.0 | 7990261 |
| Alkalinity (Total as CaCO3) | mg/L | 230 | 1.0 | 7982591 | 280 | 1.0 | 7990234 | 820 | 1.0 | 7990234 |
| Dissolved Chloride (Cl-) | mg/L | <1.0 | 1.0 | 7982691 | 2.8 | 1.0 | 7990256 | 45 | 1.0 | 7990256 |
| Nitrite (N) | mg/L | <0.010 | 0.010 | 7982674 | <0.010 | 0.010 | 7990199 | 0.013 | 0.010 | 7990199 |
| Nitrate (N) | mg/L | <0.10 | 0.10 | 7982674 | 1.44 | 0.10 | 7990199 | 0.49 | 0.10 | 7990199 |
| Nitrate + Nitrite (N) | mg/L | <0.10 | 0.10 | 7982674 | 1.44 | 0.10 | 7990199 | 0.50 | 0.10 | 7990199 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2C2441
Report Date: 2022/05/13

GM BluePlan Engineering Limited
Client Project #: Bentinck Groundwater (213085)
Sampler Initials: JW

## RESULTS OF ANALYSES OF WATER

| Bureau Veritas ID | | SOS287 | | | SOS287 | | | SOS288 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | | 2022/05/03 | | | 2022/05/03 | | |
| COC Number | | 872956-02-01 | | | 872956-02-01 | | | 872956-02-01 | | |
| | UNITS | TH-7 | RDL | QC Batch | TH-7 Lab-Dup | RDL | QC Batch | TH-13 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 560 | 1.0 | 7986011 | | | | 300 | 1.0 | 7986011 |
| **Inorganics** | | | | | | | | | | |
| Total Ammonia-N | mg/L | 2.3 | 0.050 | 7988388 | | | | <0.050 | 0.050 | 7988388 |
| Conductivity | umho/cm | 1100 | 1.0 | 7990255 | | | | 540 | 1.0 | 7990255 |
| Dissolved Organic Carbon | mg/L | 1.8 | 0.40 | 7988507 | 1.8 | 0.40 | 7988507 | 1.2 | 0.40 | 7988507 |
| Orthophosphate (P) | mg/L | <0.010 | 0.010 | 7990263 | | | | <0.010 | 0.010 | 7990263 |
| pH | pH | 7.51 | | 7990247 | | | | 7.95 | | 7990247 |
| Dissolved Sulphate (SO4) | mg/L | 12 | 1.0 | 7990261 | | | | 5.2 | 1.0 | 7990261 |
| Alkalinity (Total as CaCO3) | mg/L | 550 | 1.0 | 7990234 | | | | 280 | 1.0 | 7990234 |
| Dissolved Chloride (Cl-) | mg/L | 18 | 1.0 | 7990256 | | | | 3.4 | 1.0 | 7990256 |
| Nitrite (N) | mg/L | 0.016 | 0.010 | 7990199 | | | | <0.010 | 0.010 | 7990199 |
| Nitrate (N) | mg/L | 5.93 | 0.10 | 7990199 | | | | 1.19 | 0.10 | 7990199 |
| Nitrate + Nitrite (N) | mg/L | 5.95 | 0.10 | 7990199 | | | | 1.19 | 0.10 | 7990199 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| Bureau Veritas ID | | SOB459 | SOB460 | SOB461 | SOB462 | SOB463 | SOB463 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | 2022/05/03 | 2022/05/03 | 2022/05/03 | 2022/05/03 | 2022/05/03 | | |
| COC Number | | 872956-01-01 | 872956-01-01 | 872956-01-01 | 872956-01-01 | 872956-01-01 | 872956-01-01 | | |
| | UNITS | TH-3 | TH-8 | TH-9 | TH-10 | TH-11 | TH-11 Lab-Dup | RDL | QC Batch |
| **Metals** | | | | | | | | | |
| Dissolved Calcium (Ca) | ug/L | 140000 | 160000 | 81000 | 110000 | 46000 | 46000 | 200 | 7984673 |
| Dissolved Iron (Fe) | ug/L | <100 | <100 | 140 | <100 | <100 | <100 | 100 | 7984673 |
| Dissolved Magnesium (Mg) | ug/L | 38000 | 34000 | 27000 | 29000 | 21000 | 21000 | 50 | 7984673 |
| Dissolved Manganese (Mn) | ug/L | 110 | 62 | 3.5 | 170 | <2.0 | <2.0 | 2.0 | 7984673 |
| Dissolved Phosphorus (P) | ug/L | <100 | <100 | <100 | <100 | <100 | <100 | 100 | 7984673 |
| Dissolved Potassium (K) | ug/L | 12000 | 1900 | 250 | 3100 | 260 | 250 | 200 | 7984673 |
| Dissolved Sodium (Na) | ug/L | 9100 | 1700 | 800 | 23000 | 680 | 710 | 100 | 7984673 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

| Bureau Veritas ID | | SOB464 | SOB465 | SOB466 | | SOS285 | SOS286 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | 2022/05/03 | 2022/05/03 | | 2022/05/03 | 2022/05/03 | | |
| COC Number | | 872956-02-01 | 872956-02-01 | 872956-02-01 | | 872956-01-01 | 872956-02-01 | | |
| | UNITS | TH-12 | TH-14 | TP-5 | QC Batch | TH-2 | TH-6 | RDL | QC Batch |
| **Metals** | | | | | | | | | |
| Dissolved Calcium (Ca) | ug/L | 42000 | 160000 | 58000 | 7984673 | 66000 | 150000 | 200 | 7988875 |
| Dissolved Iron (Fe) | ug/L | <100 | <100 | <100 | 7984673 | <100 | <100 | 100 | 7988875 |
| Dissolved Magnesium (Mg) | ug/L | 26000 | 30000 | 21000 | 7984673 | 30000 | 94000 | 50 | 7988875 |
| Dissolved Manganese (Mn) | ug/L | 7.6 | 260 | <2.0 | 7984673 | <2.0 | 3000 | 2.0 | 7988875 |
| Dissolved Phosphorus (P) | ug/L | <100 | <100 | <100 | 7984673 | <100 | <100 | 100 | 7988875 |
| Dissolved Potassium (K) | ug/L | 1200 | 15000 | <200 | 7984673 | 560 | 60000 | 200 | 7988875 |
| Dissolved Sodium (Na) | ug/L | 13000 | 11000 | 360 | 7984673 | 1300 | 53000 | 100 | 7988875 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| Bureau Veritas ID | | SOS286 | SOS287 | SOS288 | | |
|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | 2022/05/03 | 2022/05/03 | | |
| COC Number | | 872956-02-01 | 872956-02-01 | 872956-02-01 | | |
| | UNITS | TH-6 Lab-Dup | TH-7 | TH-13 | RDL | QC Batch |
| **Metals** | | | | | | |
| Dissolved Calcium (Ca) | ug/L | 150000 | 160000 | 70000 | 200 | 7988875 |
| Dissolved Iron (Fe) | ug/L | <100 | <100 | <100 | 100 | 7988875 |
| Dissolved Magnesium (Mg) | ug/L | 96000 | 36000 | 30000 | 50 | 7988875 |
| Dissolved Manganese (Mn) | ug/L | 2900 | 10 | <2.0 | 2.0 | 7988875 |
| Dissolved Phosphorus (P) | ug/L | <100 | <100 | <100 | 100 | 7988875 |
| Dissolved Potassium (K) | ug/L | 60000 | 8000 | 380 | 200 | 7988875 |
| Dissolved Sodium (Na) | ug/L | 53000 | 18000 | 1100 | 100 | 7988875 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## TEST SUMMARY

**Bureau Veritas ID:** SOB459
**Sample ID:** TH-3
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982591 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982593 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982590 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |
| Total Kjeldahl Nitrogen in Water | SKAL | 7983552 | 2022/05/09 | 2022/05/10 | Massarat Jan |
| Total Phosphorus (Colourimetric) | LACH/P | 7983453 | 2022/05/09 | 2022/05/09 | Shivani Shivani |

**Bureau Veritas ID:** SOB460
**Sample ID:** TH-8
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982591 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982593 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982590 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |
| Total Kjeldahl Nitrogen in Water | SKAL | 7983552 | 2022/05/09 | 2022/05/10 | Massarat Jan |
| Total Phosphorus (Colourimetric) | LACH/P | 7983453 | 2022/05/09 | 2022/05/09 | Shivani Shivani |

**Bureau Veritas ID:** SOB461
**Sample ID:** TH-9
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982639 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982640 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## TEST SUMMARY

**Bureau Veritas ID:** SOB461 **Collected:** 2022/05/03
**Sample ID:** TH-9 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982610 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |

**Bureau Veritas ID:** SOB461 Dup **Collected:** 2022/05/03
**Sample ID:** TH-9 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982639 | N/A | 2022/05/10 | Yogesh Patel |
| Conductivity | AT | 7982640 | N/A | 2022/05/10 | Yogesh Patel |
| pH | AT | 7982610 | 2022/05/07 | 2022/05/10 | Yogesh Patel |

**Bureau Veritas ID:** SOB462 **Collected:** 2022/05/03
**Sample ID:** TH-10 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982591 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982593 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982590 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |

**Bureau Veritas ID:** SOB463 **Collected:** 2022/05/03
**Sample ID:** TH-11 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982591 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982593 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982590 | 2022/05/07 | 2022/05/10 | Yogesh Patel |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## TEST SUMMARY

**Bureau Veritas ID:** SOB463 **Collected:** 2022/05/03
**Sample ID:** TH-11 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |

**Bureau Veritas ID:** SOB463 Dup **Collected:** 2022/05/03
**Sample ID:** TH-11 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |

**Bureau Veritas ID:** SOB464 **Collected:** 2022/05/03
**Sample ID:** TH-12 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982591 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982593 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982590 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |

**Bureau Veritas ID:** SOB465 **Collected:** 2022/05/03
**Sample ID:** TH-14 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982591 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982593 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982590 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

# TEST SUMMARY

**Bureau Veritas ID:** SOB466
**Sample ID:** TP-5
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982591 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982593 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/10 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7984673 | 2022/05/09 | 2022/05/10 | Prempal Bhatti |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982590 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |

**Bureau Veritas ID:** SOS285
**Sample ID:** TH-2
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7986011 | N/A | 2022/05/12 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7988875 | 2022/05/11 | 2022/05/12 | Arefa Dabhad |
| Total Ammonia-N | LACH/NH4 | 7988388 | N/A | 2022/05/11 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7990199 | N/A | 2022/05/12 | Samuel Law |
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |
| Total Kjeldahl Nitrogen in Water | SKAL | 7988376 | 2022/05/11 | 2022/05/11 | Massarat Jan |
| Total Phosphorus (Colourimetric) | LACH/P | 7988291 | 2022/05/11 | 2022/05/11 | Shivani Shivani |

**Bureau Veritas ID:** SOS286
**Sample ID:** TH-6
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7986011 | N/A | 2022/05/12 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7988875 | 2022/05/11 | 2022/05/12 | Arefa Dabhad |
| Total Ammonia-N | LACH/NH4 | 7988388 | N/A | 2022/05/11 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7990199 | N/A | 2022/05/12 | Samuel Law |
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## TEST SUMMARY

**Bureau Veritas ID:** SOS286 **Collected:** 2022/05/03
**Sample ID:** TH-6 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |

**Bureau Veritas ID:** SOS286 Dup **Collected:** 2022/05/03
**Sample ID:** TH-6 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Lab Filtered Metals by ICPMS | ICP/MS | 7988875 | 2022/05/11 | 2022/05/12 | Arefa Dabhad |

**Bureau Veritas ID:** SOS287 **Collected:** 2022/05/03
**Sample ID:** TH-7 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7986011 | N/A | 2022/05/12 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7988875 | 2022/05/11 | 2022/05/12 | Arefa Dabhad |
| Total Ammonia-N | LACH/NH4 | 7988388 | N/A | 2022/05/11 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7990199 | N/A | 2022/05/12 | Samuel Law |
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |

**Bureau Veritas ID:** SOS287 Dup **Collected:** 2022/05/03
**Sample ID:** TH-7 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |

**Bureau Veritas ID:** SOS288 **Collected:** 2022/05/03
**Sample ID:** TH-13 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7986011 | N/A | 2022/05/12 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 7988875 | 2022/05/11 | 2022/05/12 | Arefa Dabhad |
| Total Ammonia-N | LACH/NH4 | 7988388 | N/A | 2022/05/11 | Raiq Kashif |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2C2441
Report Date: 2022/05/13

GM BluePlan Engineering Limited
Client Project #: Bentinck Groundwater (213085)
Sampler Initials: JW

## TEST SUMMARY

**Bureau Veritas ID:** SOS288
**Sample ID:** TH-13
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7990199 | N/A | 2022/05/12 | Samuel Law |
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## GENERAL COMMENTS

**Results relate only to the items tested.**



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

# QUALITY ASSURANCE REPORT



| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 7982590 | pH | 2022/05/10 | | | 102 | 98 - 103 | | | 0.81 | N/A | | |
| 7982591 | Alkalinity (Total as CaCO3) | 2022/05/10 | | | 94 | 85 - 115 | <1.0 | mg/L | 1.4 | 20 | | |
| 7982593 | Conductivity | 2022/05/10 | | | 99 | 85 - 115 | <1.0 | umho/cm | 0.28 | 25 | | |
| 7982609 | Dissolved Organic Carbon | 2022/05/09 | 100 | 80 - 120 | 102 | 80 - 120 | <0.40 | mg/L | 0.94 | 20 | | |
| 7982610 | pH | 2022/05/10 | | | 102 | 98 - 103 | | | 0.67 | N/A | | |
| 7982639 | Alkalinity (Total as CaCO3) | 2022/05/10 | | | 96 | 85 - 115 | <1.0 | mg/L | 0.97 | 20 | | |
| 7982640 | Conductivity | 2022/05/10 | | | 98 | 85 - 115 | <1.0 | umho/cm | 0.90 | 25 | | |
| 7982674 | Nitrate (N) | 2022/05/09 | 105 | 80 - 120 | 105 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 7982674 | Nitrite (N) | 2022/05/09 | 101 | 80 - 120 | 107 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 7982691 | Dissolved Chloride (Cl-) | 2022/05/09 | NC | 80 - 120 | 106 | 80 - 120 | <1.0 | mg/L | 0.50 | 20 | | |
| 7982693 | Orthophosphate (P) | 2022/05/10 | 104 | 75 - 125 | 98 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |
| 7982694 | Dissolved Sulphate (SO4) | 2022/05/10 | 130 (1) | 75 - 125 | 106 | 80 - 120 | <1.0 | mg/L | NC | 20 | | |
| 7983453 | Total Phosphorus | 2022/05/09 | 96 | 80 - 120 | 95 | 80 - 120 | <0.020 | mg/L | 0.22 | 20 | 95 | 80 - 120 |
| 7983548 | Total Ammonia-N | 2022/05/09 | 84 | 75 - 125 | 99 | 80 - 120 | <0.050 | mg/L | 2.5 | 20 | | |
| 7983552 | Total Kjeldahl Nitrogen (TKN) | 2022/05/09 | NC | 80 - 120 | 99 | 80 - 120 | <0.10 | mg/L | 5.6 | 20 | 96 | 80 - 120 |
| 7984673 | Dissolved Calcium (Ca) | 2022/05/10 | NC | 80 - 120 | 98 | 80 - 120 | <200 | ug/L | 1.2 | 20 | | |
| 7984673 | Dissolved Iron (Fe) | 2022/05/10 | 94 | 80 - 120 | 99 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 7984673 | Dissolved Magnesium (Mg) | 2022/05/10 | 91 | 80 - 120 | 100 | 80 - 120 | <50 | ug/L | 2.8 | 20 | | |
| 7984673 | Dissolved Manganese (Mn) | 2022/05/10 | 94 | 80 - 120 | 99 | 80 - 120 | <2.0 | ug/L | NC | 20 | | |
| 7984673 | Dissolved Phosphorus (P) | 2022/05/10 | 100 | 80 - 120 | 109 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 7984673 | Dissolved Potassium (K) | 2022/05/10 | 94 | 80 - 120 | 98 | 80 - 120 | <200 | ug/L | 3.8 | 20 | | |
| 7984673 | Dissolved Sodium (Na) | 2022/05/10 | 91 | 80 - 120 | 97 | 80 - 120 | <100 | ug/L | 4.2 | 20 | | |
| 7988291 | Total Phosphorus | 2022/05/11 | 99 | 80 - 120 | 104 | 80 - 120 | <0.020 | mg/L | 0.051 | 20 | 96 | 80 - 120 |
| 7988376 | Total Kjeldahl Nitrogen (TKN) | 2022/05/11 | 97 | 80 - 120 | 104 | 80 - 120 | <0.10 | mg/L | NC | 20 | 100 | 80 - 120 |
| 7988388 | Total Ammonia-N | 2022/05/11 | 97 | 75 - 125 | 103 | 80 - 120 | <0.050 | mg/L | NC | 20 | | |
| 7988507 | Dissolved Organic Carbon | 2022/05/11 | 98 | 80 - 120 | 98 | 80 - 120 | <0.40 | mg/L | 0.71 | 20 | | |
| 7988875 | Dissolved Calcium (Ca) | 2022/05/12 | NC | 80 - 120 | 101 | 80 - 120 | <200 | ug/L | 0.52 | 20 | | |
| 7988875 | Dissolved Iron (Fe) | 2022/05/12 | 100 | 80 - 120 | 101 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 7988875 | Dissolved Magnesium (Mg) | 2022/05/12 | NC | 80 - 120 | 103 | 80 - 120 | <50 | ug/L | 1.6 | 20 | | |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## QUALITY ASSURANCE REPORT(CONT'D)



| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 7988875 | Dissolved Manganese (Mn) | 2022/05/12 | NC | 80 - 120 | 96 | 80 - 120 | <2.0 | ug/L | 0.68 | 20 | | |
| 7988875 | Dissolved Phosphorus (P) | 2022/05/12 | 103 | 80 - 120 | 111 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 7988875 | Dissolved Potassium (K) | 2022/05/12 | NC | 80 - 120 | 101 | 80 - 120 | <200 | ug/L | 0.38 | 20 | | |
| 7988875 | Dissolved Sodium (Na) | 2022/05/12 | NC | 80 - 120 | 100 | 80 - 120 | <100 | ug/L | 0.017 | 20 | | |
| 7990199 | Nitrate (N) | 2022/05/12 | 105 | 80 - 120 | 110 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 7990199 | Nitrite (N) | 2022/05/12 | 109 | 80 - 120 | 110 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 7990234 | Alkalinity (Total as CaCO3) | 2022/05/12 | | | 96 | 85 - 115 | <1.0 | mg/L | 0.42 | 20 | | |
| 7990247 | pH | 2022/05/12 | | | 102 | 98 - 103 | | | 0.14 | N/A | | |
| 7990255 | Conductivity | 2022/05/12 | | | 100 | 85 - 115 | <1.0 | umho/cm | 0 | 25 | | |
| 7990256 | Dissolved Chloride (Cl-) | 2022/05/12 | 115 | 80 - 120 | 104 | 80 - 120 | <1.0 | mg/L | 0.17 | 20 | | |
| 7990261 | Dissolved Sulphate (SO4) | 2022/05/12 | NC | 75 - 125 | 101 | 80 - 120 | <1.0 | mg/L | 1.1 | 20 | | |
| 7990263 | Orthophosphate (P) | 2022/05/12 | 106 | 75 - 125 | 100 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

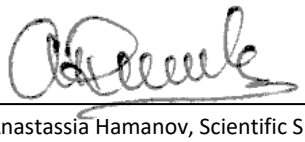
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your Project #: Bentinck Surfacewater (213085)
Your C.O.C. #: 872957-01-01

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/05/13**
Report #: R7123669
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2C2457**
**Received: 2022/05/04, 11:53**

Sample Matrix: Water
# Samples Received: 4

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Alkalinity | 1 | N/A | 2022/05/10 | CAM SOP-00448 | SM 23 2320 B m |
| Alkalinity | 3 | N/A | 2022/05/12 | CAM SOP-00448 | SM 23 2320 B m |
| Chloride by Automated Colourimetry | 3 | N/A | 2022/05/12 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Chloride by Automated Colourimetry | 1 | N/A | 2022/05/09 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Conductivity | 1 | N/A | 2022/05/10 | CAM SOP-00414 | SM 23 2510 m |
| Conductivity | 3 | N/A | 2022/05/12 | CAM SOP-00414 | SM 23 2510 m |
| Dissolved Organic Carbon (DOC) (1) | 3 | N/A | 2022/05/11 | CAM SOP-00446 | SM 23 5310 B m |
| Dissolved Organic Carbon (DOC) (1) | 1 | N/A | 2022/05/09 | CAM SOP-00446 | SM 23 5310 B m |
| Hardness (calculated as CaCO3) | 1 | N/A | 2022/05/11 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Hardness (calculated as CaCO3) | 3 | N/A | 2022/05/12 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Total Metals Analysis by ICPMS | 3 | N/A | 2022/05/11 | CAM SOP-00447 | EPA 6020B m |
| Total Metals Analysis by ICPMS | 1 | N/A | 2022/05/09 | CAM SOP-00447 | EPA 6020B m |
| Total Ammonia-N | 3 | N/A | 2022/05/11 | CAM SOP-00441 | USGS I-2522-90 m |
| Total Ammonia-N | 1 | N/A | 2022/05/09 | CAM SOP-00441 | USGS I-2522-90 m |
| Nitrate & Nitrite as Nitrogen in Water (2) | 3 | N/A | 2022/05/12 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| Nitrate & Nitrite as Nitrogen in Water (2) | 1 | N/A | 2022/05/09 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| pH | 3 | 2022/05/11 | 2022/05/12 | CAM SOP-00413 | SM 4500H+ B m |
| pH | 1 | 2022/05/07 | 2022/05/10 | CAM SOP-00413 | SM 4500H+ B m |
| Phenols (4AAP) | 1 | N/A | 2022/05/10 | CAM SOP-00444 | OMOE E3179 m |
| Phenols (4AAP) | 3 | N/A | 2022/05/11 | CAM SOP-00444 | OMOE E3179 m |
| Orthophosphate | 1 | N/A | 2022/05/10 | CAM SOP-00461 | EPA 365.1 m |
| Orthophosphate | 3 | N/A | 2022/05/12 | CAM SOP-00461 | EPA 365.1 m |
| Sulphate by Automated Colourimetry | 1 | N/A | 2022/05/10 | CAM SOP-00464 | EPA 375.4 m |
| Sulphate by Automated Colourimetry | 3 | N/A | 2022/05/12 | CAM SOP-00464 | EPA 375.4 m |
| Total Dissolved Solids | 3 | 2022/05/11 | 2022/05/12 | CAM SOP-00428 | SM 23 2540C m |
| Total Dissolved Solids | 1 | 2022/05/09 | 2022/05/10 | CAM SOP-00428 | SM 23 2540C m |
| Total Kjeldahl Nitrogen in Water | 3 | 2022/05/11 | 2022/05/11 | CAM SOP-00938 | OMOE E3516 m |
| Total Kjeldahl Nitrogen in Water | 1 | 2022/05/09 | 2022/05/09 | CAM SOP-00938 | OMOE E3516 m |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your Project #: Bentinck Surfacewater (213085)
Your C.O.C. #: 872957-01-01

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/05/13**
Report #: R7123669
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2C2457**
**Received: 2022/05/04, 11:53**

Sample Matrix: Water
# Samples Received: 4

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Total Phosphorus (Colourimetric) | 3 | 2022/05/11 | 2022/05/11 | CAM SOP-00407 | SM 23 4500 P B H m |
| Total Phosphorus (Colourimetric) | 1 | 2022/05/09 | 2022/05/09 | CAM SOP-00407 | SM 23 4500 P B H m |

**Remarks:**

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your Project #: Bentinck Surfacewater (213085)
Your C.O.C. #: 872957-01-01

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/05/13**
Report #: R7123669
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2C2457**
**Received: 2022/05/04, 11:53**

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C2C2457
Report Date: 2022/05/13

GM BluePlan Engineering Limited
Client Project #: Bentinck Surfacewater (213085)
Sampler Initials: JW

## RESULTS OF ANALYSES OF WATER

| Bureau Veritas ID | | SOB536 | | | SOB536 | | | SOS226 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | | 2022/05/03 | | | 2022/05/03 | | |
| COC Number | | 872957-01-01 | | | 872957-01-01 | | | 872957-01-01 | | |
| | UNITS | SW-5 | RDL | QC Batch | SW-5 Lab-Dup | RDL | QC Batch | SW-2 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 260 | 1.0 | 7981189 | | | | 230 | 1.0 | 7986011 |
| **Inorganics** | | | | | | | | | | |
| Total Ammonia-N | mg/L | <0.050 | 0.050 | 7983548 | | | | <0.050 | 0.050 | 7988388 |
| Conductivity | umho/cm | 490 | 1.0 | 7982589 | | | | 500 | 1.0 | 7990255 |
| Total Dissolved Solids | mg/L | 265 | 10 | 7984684 | | | | 185 | 10 | 7989391 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | 0.24 | 0.10 | 7983552 | | | | 0.26 | 0.10 | 7988376 |
| Dissolved Organic Carbon | mg/L | 3.1 | 0.40 | 7982609 | | | | 6.2 | 0.40 | 7988507 |
| Orthophosphate (P) | mg/L | <0.010 | 0.010 | 7982693 | | | | <0.010 | 0.010 | 7990263 |
| pH | pH | 8.40 | | 7982587 | | | | 8.19 | | 7990247 |
| Phenols-4AAP | mg/L | <0.0010 | 0.0010 | 7986086 | <0.0010 | 0.0010 | 7986086 | <0.0010 | 0.0010 | 7989465 |
| Total Phosphorus | mg/L | 0.004 | 0.004 | 7983501 | 0.004 | 0.004 | 7983501 | 0.005 | 0.004 | 7988343 |
| Dissolved Sulphate (SO4) | mg/L | 9.7 | 1.0 | 7982694 | | | | <1.0 | 1.0 | 7990261 |
| Alkalinity (Total as CaCO3) | mg/L | 250 | 1.0 | 7982588 | | | | 240 | 1.0 | 7990234 |
| Dissolved Chloride (Cl-) | mg/L | 7.0 | 1.0 | 7982691 | | | | 20 | 1.0 | 7990256 |
| Nitrite (N) | mg/L | <0.010 | 0.010 | 7982674 | | | | <0.010 | 0.010 | 7990199 |
| Nitrate (N) | mg/L | 0.60 | 0.10 | 7982674 | | | | 0.13 | 0.10 | 7990199 |
| Nitrate + Nitrite (N) | mg/L | 0.60 | 0.10 | 7982674 | | | | 0.13 | 0.10 | 7990199 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## RESULTS OF ANALYSES OF WATER

| Bureau Veritas ID | | SOS226 | | | SOS227 | SOS228 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | | 2022/05/03 | 2022/05/03 | | |
| COC Number | | 872957-01-01 | | | 872957-01-01 | 872957-01-01 | | |
| | UNITS | SW-2 Lab-Dup | RDL | QC Batch | SW-2A | SW-4 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | |
| Hardness (CaCO3) | mg/L | | | | 220 | 250 | 1.0 | 7986011 |
| **Inorganics** | | | | | | | | |
| Total Ammonia-N | mg/L | | | | <0.050 | <0.050 | 0.050 | 7988388 |
| Conductivity | umho/cm | 500 | 1.0 | 7990255 | 470 | 490 | 1.0 | 7990255 |
| Total Dissolved Solids | mg/L | | | | 195 | 190 | 10 | 7989391 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | | | | 0.27 | 0.15 | 0.10 | 7988376 |
| Dissolved Organic Carbon | mg/L | | | | 6.8 | 3.1 | 0.40 | 7988507 |
| Orthophosphate (P) | mg/L | | | | <0.010 | <0.010 | 0.010 | 7990263 |
| pH | pH | 8.18 | | 7990247 | 8.13 | 8.31 | | 7990247 |
| Phenols-4AAP | mg/L | | | | <0.0010 | <0.0010 | 0.0010 | 7989465 |
| Total Phosphorus | mg/L | | | | <0.004 | 0.004 | 0.004 | 7988343 |
| Dissolved Sulphate (SO4) | mg/L | | | | <1.0 | 9.9 | 1.0 | 7990261 |
| Alkalinity (Total as CaCO3) | mg/L | 240 | 1.0 | 7990234 | 230 | 250 | 1.0 | 7990234 |
| Dissolved Chloride (Cl-) | mg/L | | | | 18 | 7.0 | 1.0 | 7990256 |
| Nitrite (N) | mg/L | | | | <0.010 | <0.010 | 0.010 | 7990199 |
| Nitrate (N) | mg/L | | | | 0.15 | 0.59 | 0.10 | 7990199 |
| Nitrate + Nitrite (N) | mg/L | | | | 0.15 | 0.59 | 0.10 | 7990199 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

| Bureau Veritas ID | | SOS228 | | |
|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | |
| COC Number | | 872957-01-01 | | |
| | UNITS | SW-4 Lab-Dup | RDL | QC Batch |
| **Inorganics** | | | | |
| Orthophosphate (P) | mg/L | <0.010 | 0.010 | 7990263 |
| Total Phosphorus | mg/L | 0.004 | 0.004 | 7988343 |
| Dissolved Sulphate (SO4) | mg/L | 9.8 | 1.0 | 7990261 |
| Dissolved Chloride (Cl-) | mg/L | 7.0 | 1.0 | 7990256 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

| Bureau Veritas ID | | SOB536 | | SOS226 | SOS227 | SOS227 | SOS228 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/05/03 | | 2022/05/03 | 2022/05/03 | 2022/05/03 | 2022/05/03 | | |
| COC Number | | 872957-01-01 | | 872957-01-01 | 872957-01-01 | 872957-01-01 | 872957-01-01 | | |
| | UNITS | SW-5 | QC Batch | SW-2 | SW-2A | SW-2A Lab-Dup | SW-4 | RDL | QC Batch |
| **Metals** | | | | | | | | | |
| Total Calcium (Ca) | ug/L | 64000 | 7983460 | 56000 | 53000 | 54000 | 59000 | 200 | 7988707 |
| Total Iron (Fe) | ug/L | <100 | 7983460 | <100 | <100 | <100 | <100 | 100 | 7988707 |
| Total Magnesium (Mg) | ug/L | 27000 | 7983460 | 22000 | 21000 | 21000 | 26000 | 50 | 7988707 |
| Total Manganese (Mn) | ug/L | 10 | 7983460 | 17 | 17 | 17 | 12 | 2.0 | 7988707 |
| Total Potassium (K) | ug/L | 780 | 7983460 | 1400 | 1400 | 1400 | 790 | 200 | 7988707 |
| Total Sodium (Na) | ug/L | 3300 | 7983460 | 9500 | 8900 | 8700 | 3300 | 100 | 7988707 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## TEST SUMMARY

**Bureau Veritas ID:** SOB536 **Collected:** 2022/05/03
**Sample ID:** SW-5 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7982588 | N/A | 2022/05/10 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7982691 | N/A | 2022/05/09 | Raiq Kashif |
| Conductivity | AT | 7982589 | N/A | 2022/05/10 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7982609 | N/A | 2022/05/09 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7981189 | N/A | 2022/05/11 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 7983460 | N/A | 2022/05/09 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 7983548 | N/A | 2022/05/09 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7982674 | N/A | 2022/05/09 | Samuel Law |
| pH | AT | 7982587 | 2022/05/07 | 2022/05/10 | Yogesh Patel |
| Phenols (4AAP) | TECH/PHEN | 7986086 | N/A | 2022/05/10 | Louise Harding |
| Orthophosphate | KONE | 7982693 | N/A | 2022/05/10 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7982694 | N/A | 2022/05/10 | Chandra Nandlal |
| Total Dissolved Solids | BAL | 7984684 | 2022/05/09 | 2022/05/10 | Kristen Chan |
| Total Kjeldahl Nitrogen in Water | SKAL | 7983552 | 2022/05/09 | 2022/05/09 | Massarat Jan |
| Total Phosphorus (Colourimetric) | LACH/P | 7983501 | 2022/05/09 | 2022/05/09 | Shivani Shivani |

**Bureau Veritas ID:** SOB536 Dup **Collected:** 2022/05/03
**Sample ID:** SW-5 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Phenols (4AAP) | TECH/PHEN | 7986086 | N/A | 2022/05/10 | Louise Harding |
| Total Phosphorus (Colourimetric) | LACH/P | 7983501 | 2022/05/09 | 2022/05/09 | Shivani Shivani |

**Bureau Veritas ID:** SOS226 **Collected:** 2022/05/03
**Sample ID:** SW-2 **Shipped:**
**Matrix:** Water **Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7986011 | N/A | 2022/05/12 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 7988707 | N/A | 2022/05/11 | Nan Raykha |
| Total Ammonia-N | LACH/NH4 | 7988388 | N/A | 2022/05/11 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7990199 | N/A | 2022/05/12 | Samuel Law |
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |
| Phenols (4AAP) | TECH/PHEN | 7989465 | N/A | 2022/05/11 | Louise Harding |
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |
| Total Dissolved Solids | BAL | 7989391 | 2022/05/11 | 2022/05/12 | Kristen Chan |
| Total Kjeldahl Nitrogen in Water | SKAL | 7988376 | 2022/05/11 | 2022/05/11 | Massarat Jan |
| Total Phosphorus (Colourimetric) | LACH/P | 7988343 | 2022/05/11 | 2022/05/11 | Shivani Shivani |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## TEST SUMMARY

**Bureau Veritas ID:** SOS226 Dup
**Sample ID:** SW-2
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |

**Bureau Veritas ID:** SOS227
**Sample ID:** SW-2A
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7986011 | N/A | 2022/05/12 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 7988707 | N/A | 2022/05/11 | Nan Raykha |
| Total Ammonia-N | LACH/NH4 | 7988388 | N/A | 2022/05/11 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7990199 | N/A | 2022/05/12 | Samuel Law |
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |
| Phenols (4AAP) | TECH/PHEN | 7989465 | N/A | 2022/05/11 | Louise Harding |
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |
| Total Dissolved Solids | BAL | 7989391 | 2022/05/11 | 2022/05/12 | Kristen Chan |
| Total Kjeldahl Nitrogen in Water | SKAL | 7988376 | 2022/05/11 | 2022/05/11 | Massarat Jan |
| Total Phosphorus (Colourimetric) | LACH/P | 7988343 | 2022/05/11 | 2022/05/11 | Shivani Shivani |

**Bureau Veritas ID:** SOS227 Dup
**Sample ID:** SW-2A
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Total Metals Analysis by ICPMS | ICP/MS | 7988707 | N/A | 2022/05/11 | Nan Raykha |

**Bureau Veritas ID:** SOS228
**Sample ID:** SW-4
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 7990234 | N/A | 2022/05/12 | Yogesh Patel |
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Conductivity | AT | 7990255 | N/A | 2022/05/12 | Yogesh Patel |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 7988507 | N/A | 2022/05/11 | Anna-Kay Gooden |
| Hardness (calculated as CaCO3) | | 7986011 | N/A | 2022/05/12 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 7988707 | N/A | 2022/05/11 | Nan Raykha |
| Total Ammonia-N | LACH/NH4 | 7988388 | N/A | 2022/05/11 | Raiq Kashif |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 7990199 | N/A | 2022/05/12 | Samuel Law |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## TEST SUMMARY

**Bureau Veritas ID:** SOS228
**Sample ID:** SW-4
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| pH | AT | 7990247 | 2022/05/11 | 2022/05/12 | Yogesh Patel |
| Phenols (4AAP) | TECH/PHEN | 7989465 | N/A | 2022/05/11 | Louise Harding |
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |
| Total Dissolved Solids | BAL | 7989391 | 2022/05/11 | 2022/05/12 | Kristen Chan |
| Total Kjeldahl Nitrogen in Water | SKAL | 7988376 | 2022/05/11 | 2022/05/11 | Massarat Jan |
| Total Phosphorus (Colourimetric) | LACH/P | 7988343 | 2022/05/11 | 2022/05/11 | Shivani Shivani |

**Bureau Veritas ID:** SOS228 Dup
**Sample ID:** SW-4
**Matrix:** Water

**Collected:** 2022/05/03
**Shipped:**
**Received:** 2022/05/04

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Chloride by Automated Colourimetry | KONE | 7990256 | N/A | 2022/05/12 | Alina Dobreanu |
| Orthophosphate | KONE | 7990263 | N/A | 2022/05/12 | Chandra Nandlal |
| Sulphate by Automated Colourimetry | KONE | 7990261 | N/A | 2022/05/12 | Alina Dobreanu |
| Total Phosphorus (Colourimetric) | LACH/P | 7988343 | 2022/05/11 | 2022/05/11 | Shivani Shivani |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## GENERAL COMMENTS

**Results relate only to the items tested.**



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

# QUALITY ASSURANCE REPORT



| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 7982587 | pH | 2022/05/10 | | | 102 | 98 - 103 | | | 1.1 | N/A | | |
| 7982588 | Alkalinity (Total as CaCO3) | 2022/05/10 | | | 94 | 85 - 115 | <1.0 | mg/L | 1.6 | 20 | | |
| 7982589 | Conductivity | 2022/05/10 | | | 99 | 85 - 115 | <1.0 | umho/cm | 0.28 | 25 | | |
| 7982609 | Dissolved Organic Carbon | 2022/05/09 | 100 | 80 - 120 | 102 | 80 - 120 | <0.40 | mg/L | 0.94 | 20 | | |
| 7982674 | Nitrate (N) | 2022/05/09 | 105 | 80 - 120 | 105 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 7982674 | Nitrite (N) | 2022/05/09 | 101 | 80 - 120 | 107 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 7982691 | Dissolved Chloride (Cl-) | 2022/05/09 | NC | 80 - 120 | 106 | 80 - 120 | <1.0 | mg/L | 0.50 | 20 | | |
| 7982693 | Orthophosphate (P) | 2022/05/10 | 104 | 75 - 125 | 98 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |
| 7982694 | Dissolved Sulphate (SO4) | 2022/05/10 | 130 (1) | 75 - 125 | 106 | 80 - 120 | <1.0 | mg/L | NC | 20 | | |
| 7983460 | Total Calcium (Ca) | 2022/05/09 | NC | 80 - 120 | 104 | 80 - 120 | <200 | ug/L | | | | |
| 7983460 | Total Iron (Fe) | 2022/05/09 | 102 | 80 - 120 | 101 | 80 - 120 | <100 | ug/L | | | | |
| 7983460 | Total Magnesium (Mg) | 2022/05/09 | NC | 80 - 120 | 100 | 80 - 120 | <50 | ug/L | | | | |
| 7983460 | Total Manganese (Mn) | 2022/05/09 | 103 | 80 - 120 | 102 | 80 - 120 | <2.0 | ug/L | 6.7 | 20 | | |
| 7983460 | Total Potassium (K) | 2022/05/09 | NC | 80 - 120 | 102 | 80 - 120 | <200 | ug/L | | | | |
| 7983460 | Total Sodium (Na) | 2022/05/09 | NC | 80 - 120 | 100 | 80 - 120 | <100 | ug/L | | | | |
| 7983501 | Total Phosphorus | 2022/05/09 | 98 | 80 - 120 | 93 | 80 - 120 | <0.004 | mg/L | 2.4 | 20 | 92 | 80 - 120 |
| 7983548 | Total Ammonia-N | 2022/05/09 | 84 | 75 - 125 | 99 | 80 - 120 | <0.050 | mg/L | 2.5 | 20 | | |
| 7983552 | Total Kjeldahl Nitrogen (TKN) | 2022/05/09 | NC | 80 - 120 | 99 | 80 - 120 | <0.10 | mg/L | 5.6 | 20 | 96 | 80 - 120 |
| 7984684 | Total Dissolved Solids | 2022/05/10 | | | | | <10 | mg/L | 0.55 | 25 | 98 | 90 - 110 |
| 7986086 | Phenols-4AAP | 2022/05/10 | 106 | 80 - 120 | 101 | 80 - 120 | <0.0010 | mg/L | NC | 20 | | |
| 7988343 | Total Phosphorus | 2022/05/11 | 106 | 80 - 120 | 102 | 80 - 120 | <0.004 | mg/L | 4.8 | 20 | 103 | 80 - 120 |
| 7988376 | Total Kjeldahl Nitrogen (TKN) | 2022/05/11 | 97 | 80 - 120 | 104 | 80 - 120 | <0.10 | mg/L | NC | 20 | 100 | 80 - 120 |
| 7988388 | Total Ammonia-N | 2022/05/11 | 97 | 75 - 125 | 103 | 80 - 120 | <0.050 | mg/L | NC | 20 | | |
| 7988507 | Dissolved Organic Carbon | 2022/05/11 | 98 | 80 - 120 | 98 | 80 - 120 | <0.40 | mg/L | 0.71 | 20 | | |
| 7988707 | Total Calcium (Ca) | 2022/05/11 | NC | 80 - 120 | 95 | 80 - 120 | <200 | ug/L | 2.2 | 20 | | |
| 7988707 | Total Iron (Fe) | 2022/05/11 | 99 | 80 - 120 | 99 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 7988707 | Total Magnesium (Mg) | 2022/05/11 | 95 | 80 - 120 | 98 | 80 - 120 | <50 | ug/L | 0.55 | 20 | | |
| 7988707 | Total Manganese (Mn) | 2022/05/11 | 100 | 80 - 120 | 99 | 80 - 120 | <2.0 | ug/L | 1.3 | 20 | | |
| 7988707 | Total Potassium (K) | 2022/05/11 | 103 | 80 - 120 | 99 | 80 - 120 | <200 | ug/L | 0.60 | 20 | | |
| 7988707 | Total Sodium (Na) | 2022/05/11 | 96 | 80 - 120 | 96 | 80 - 120 | <100 | ug/L | 2.8 | 20 | | |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## QUALITY ASSURANCE REPORT(CONT'D)



| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 7989391 | Total Dissolved Solids | 2022/05/12 | | | | | <10 | mg/L | 13 | 25 | 97 | 90 - 110 |
| 7989465 | Phenols-4AAP | 2022/05/11 | 105 | 80 - 120 | 104 | 80 - 120 | <0.0010 | mg/L | 2.8 | 20 | | |
| 7990199 | Nitrate (N) | 2022/05/12 | 105 | 80 - 120 | 110 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 7990199 | Nitrite (N) | 2022/05/12 | 109 | 80 - 120 | 110 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 7990234 | Alkalinity (Total as CaCO3) | 2022/05/12 | | | 96 | 85 - 115 | <1.0 | mg/L | 0.42 | 20 | | |
| 7990247 | pH | 2022/05/12 | | | 102 | 98 - 103 | | | 0.14 | N/A | | |
| 7990255 | Conductivity | 2022/05/12 | | | 100 | 85 - 115 | <1.0 | umho/cm | 0 | 25 | | |
| 7990256 | Dissolved Chloride (Cl-) | 2022/05/12 | 115 | 80 - 120 | 104 | 80 - 120 | <1.0 | mg/L | 0.17 | 20 | | |
| 7990261 | Dissolved Sulphate (SO4) | 2022/05/12 | NC | 75 - 125 | 101 | 80 - 120 | <1.0 | mg/L | 1.1 | 20 | | |
| 7990263 | Orthophosphate (P) | 2022/05/12 | 106 | 75 - 125 | 100 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

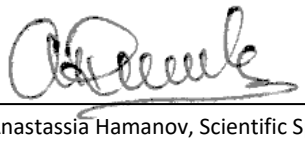
(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your Project #: 213085
Your C.O.C. #: NA, n/a

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/10/21**
Report #: R7352432
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2S5383**
**Received: 2022/10/03, 08:56**

Sample Matrix: Ground Water
# Samples Received: 10

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Alkalinity | 4 | N/A | 2022/10/06 | CAM SOP-00448 | SM 23 2320 B m |
| Alkalinity | 6 | N/A | 2022/10/08 | CAM SOP-00448 | SM 23 2320 B m |
| Chloride by Automated Colourimetry | 10 | N/A | 2022/10/06 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Conductivity | 4 | N/A | 2022/10/06 | CAM SOP-00414 | SM 23 2510 m |
| Conductivity | 6 | N/A | 2022/10/08 | CAM SOP-00414 | SM 23 2510 m |
| Dissolved Organic Carbon (DOC) (1) | 9 | N/A | 2022/10/06 | CAM SOP-00446 | SM 23 5310 B m |
| Dissolved Organic Carbon (DOC) (1) | 1 | N/A | 2022/10/08 | CAM SOP-00446 | SM 23 5310 B m |
| Hardness (calculated as CaCO3) | 6 | N/A | 2022/10/06 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Hardness (calculated as CaCO3) | 4 | N/A | 2022/10/07 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Lab Filtered Metals by ICPMS | 6 | 2022/10/04 | 2022/10/05 | CAM SOP-00447 | EPA 6020B m |
| Lab Filtered Metals by ICPMS | 4 | 2022/10/06 | 2022/10/07 | CAM SOP-00447 | EPA 6020B m |
| Total Ammonia-N | 4 | N/A | 2022/10/12 | CAM SOP-00441 | USGS I-2522-90 m |
| Total Ammonia-N | 1 | N/A | 2022/10/13 | CAM SOP-00441 | USGS I-2522-90 m |
| Total Ammonia-N | 5 | N/A | 2022/10/09 | CAM SOP-00441 | USGS I-2522-90 m |
| Nitrate & Nitrite as Nitrogen in Water (2) | 5 | N/A | 2022/10/06 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| Nitrate & Nitrite as Nitrogen in Water (2) | 5 | N/A | 2022/10/07 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| pH | 6 | 2022/10/04 | 2022/10/08 | CAM SOP-00413 | SM 4500H+ B m |
| pH | 4 | 2022/10/05 | 2022/10/06 | CAM SOP-00413 | SM 4500H+ B m |
| Phenols (4AAP) | 6 | N/A | 2022/10/12 | CAM SOP-00444 | OMOE E3179 m |
| Phenols (4AAP) | 4 | N/A | 2022/10/13 | CAM SOP-00444 | OMOE E3179 m |
| Orthophosphate | 1 | N/A | 2022/10/18 | CAM SOP-00461 | EPA 365.1 m |
| Orthophosphate | 9 | N/A | 2022/10/07 | CAM SOP-00461 | EPA 365.1 m |
| Sulphate by Automated Colourimetry | 6 | N/A | 2022/10/05 | CAM SOP-00464 | EPA 375.4 m |
| Sulphate by Automated Colourimetry | 4 | N/A | 2022/10/06 | CAM SOP-00464 | EPA 375.4 m |
| Total Kjeldahl Nitrogen in Water | 6 | 2022/10/05 | 2022/10/07 | CAM SOP-00938 | OMOE E3516 m |
| Total Kjeldahl Nitrogen in Water | 2 | 2022/10/06 | 2022/10/06 | CAM SOP-00938 | OMOE E3516 m |
| Total Kjeldahl Nitrogen in Water | 2 | 2022/10/06 | 2022/10/07 | CAM SOP-00938 | OMOE E3516 m |
| Total Phosphorus (Colourimetric) | 1 | 2022/10/14 | 2022/10/17 | CAM SOP-00407 | SM 23 4500-P I |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: 213085
Your C.O.C. #: NA, n/a

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/10/21**
Report #: R7352432
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2S5383**
**Received: 2022/10/03, 08:56**

Sample Matrix: Ground Water
# Samples Received: 10

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Total Phosphorus (Colourimetric) | 6 | 2022/10/06 | 2022/10/11 | CAM SOP-00407 | SM 23 4500-P I |
| Total Phosphorus (Colourimetric) | 3 | 2022/10/06 | 2022/10/06 | CAM SOP-00407 | SM 23 4500-P I |

**Remarks:**

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.


Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: 213085
Your C.O.C. #: NA, n/a

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/10/21**
Report #: R7352432
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2S5383**
**Received: 2022/10/03, 08:56**

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

## RESULTS OF ANALYSES OF GROUND WATER

| Bureau Veritas ID | | TXA677 | | | TXA677 | | | TXA680 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | | | 2022/09/29 | | | 2022/09/29 | | |
| COC Number | | NA | | | NA | | | NA | | |
| | UNITS | TH-6 | RDL | QC Batch | TH-6 Lab-Dup | RDL | QC Batch | TH-12 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 780 | 1.0 | 8266488 | | | | 220 | 1.0 | 8266488 |
| **Inorganics** | | | | | | | | | | |
| Total Ammonia-N | mg/L | 19 | 0.050 | 8269423 | 19 | 0.050 | 8269423 | 0.26 | 0.050 | 8269423 |
| Conductivity | umho/cm | 1800 | 1.0 | 8267473 | | | | 470 | 1.0 | 8267473 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | 18 | 1.0 | 8269445 | | | | 0.29 | 0.10 | 8269445 |
| Dissolved Organic Carbon | mg/L | 8.4 | 0.40 | 8267652 | | | | 0.42 | 0.40 | 8267652 |
| Orthophosphate (P) | mg/L | <0.010 | 0.010 | 8267272 | | | | <0.010 | 0.010 | 8267272 |
| pH | pH | 7.56 | | 8267474 | | | | 8.21 | | 8267474 |
| Phenols-4AAP | mg/L | <0.0010 | 0.0010 | 8279815 | | | | <0.0010 | 0.0010 | 8279815 |
| Total Phosphorus | mg/L | 0.19 | 0.020 | 8268837 | | | | 0.040 | 0.020 | 8268837 |
| Dissolved Sulphate (SO4) | mg/L | 110 | 1.0 | 8267271 | | | | 74 | 1.0 | 8267271 |
| Alkalinity (Total as CaCO3) | mg/L | 780 | 1.0 | 8267466 | | | | 170 | 1.0 | 8267466 |
| Dissolved Chloride (Cl-) | mg/L | 80 | 1.0 | 8267263 | | | | 1.4 | 1.0 | 8267263 |
| Nitrite (N) | mg/L | 0.016 | 0.010 | 8267229 | | | | 0.018 | 0.010 | 8267229 |
| Nitrate (N) | mg/L | 1.36 | 0.10 | 8267229 | | | | 0.22 | 0.10 | 8267229 |
| Nitrate + Nitrite (N) | mg/L | 1.38 | 0.10 | 8267229 | | | | 0.23 | 0.10 | 8267229 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

## RESULTS OF ANALYSES OF GROUND WATER

| Bureau Veritas ID | | TXA681 | | | TXA682 | | | TXA682 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | | | 2022/09/29 | | | 2022/09/29 | | |
| COC Number | | NA | | | NA | | | NA | | |
| | UNITS | TH-10 | RDL | QC Batch | TH-7 | RDL | QC Batch | TH-7 Lab-Dup | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 140 | 1.0 | 8266488 | 460 | 1.0 | 8266488 | | | |
| **Inorganics** | | | | | | | | | | |
| Total Ammonia-N | mg/L | 0.22 | 0.050 | 8269423 | <0.050 | 0.050 | 8269423 | | | |
| Conductivity | umho/cm | 310 | 1.0 | 8267473 | 870 | 1.0 | 8267473 | | | |
| Total Kjeldahl Nitrogen (TKN) | mg/L | 0.49 | 0.10 | 8269445 | 0.25 | 0.20 | 8269445 | | | |
| Dissolved Organic Carbon | mg/L | 2.0 | 0.40 | 8267657 | 1.8 | 0.40 | 8267657 | | | |
| Orthophosphate (P) | mg/L | 0.13 | 0.010 | 8288609 | <0.010 | 0.010 | 8267272 | | | |
| pH | pH | 7.83 | | 8267474 | 7.79 | | 8267474 | | | |
| Phenols-4AAP | mg/L | <0.0010 | 0.0010 | 8279815 | <0.0010 | 0.0010 | 8281958 | <0.0010 | 0.0010 | 8281958 |
| Total Phosphorus | mg/L | 0.067 | 0.020 | 8284752 | <0.020 | 0.020 | 8268837 | | | |
| Dissolved Sulphate (SO4) | mg/L | 2.3 | 1.0 | 8267271 | 16 | 1.0 | 8267271 | | | |
| Alkalinity (Total as CaCO3) | mg/L | 130 | 1.0 | 8267466 | 430 | 1.0 | 8267466 | | | |
| Dissolved Chloride (Cl-) | mg/L | 13 | 1.0 | 8267263 | 11 | 1.0 | 8267263 | | | |
| Nitrite (N) | mg/L | 0.020 | 0.010 | 8267229 | <0.010 | 0.010 | 8267229 | | | |
| Nitrate (N) | mg/L | 1.80 | 0.10 | 8267229 | 6.96 | 0.10 | 8267229 | | | |
| Nitrate + Nitrite (N) | mg/L | 1.82 | 0.10 | 8267229 | 6.96 | 0.10 | 8267229 | | | |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

## RESULTS OF ANALYSES OF GROUND WATER

| Bureau Veritas ID | | TXC712 | | | TXC713 | TXC714 | | TXC715 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | | | 2022/09/29 | 2022/09/29 | | 2022/09/29 | | |
| COC Number | | n/a | | | n/a | n/a | | n/a | | |
| | UNITS | TH-3 | RDL | QC Batch | TH-8 | TH-9 | QC Batch | TH-11 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | | |
| Hardness (CaCO3) | mg/L | 510 | 1.0 | 8262635 | 690 | 310 | 8262635 | 260 | 1.0 | 8262635 |
| **Inorganics** | | | | | | | | | | |
| Total Ammonia-N | mg/L | 9.7 | 0.050 | 8269764 | <0.050 | <0.050 | 8269747 | <0.050 | 0.050 | 8269747 |
| Conductivity | umho/cm | 990 | 1.0 | 8264573 | 1100 | 540 | 8264573 | 500 | 1.0 | 8264573 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | 10 | 0.50 | 8267568 | 0.25 | 0.45 | 8267568 | <0.10 | 0.10 | 8267568 |
| Dissolved Organic Carbon | mg/L | 3.0 | 0.40 | 8264812 | 4.1 | 16 | 8264812 | 1.5 | 0.40 | 8264812 |
| Orthophosphate (P) | mg/L | <0.010 | 0.010 | 8264278 | <0.010 | <0.010 | 8264278 | 0.033 | 0.010 | 8264278 |
| pH | pH | 7.77 | | 8264574 | 7.65 | 8.09 | 8264574 | 8.13 | | 8264574 |
| Phenols-4AAP | mg/L | <0.0010 | 0.0010 | 8276949 | <0.0010 | <0.0010 | 8276949 | <0.0010 | 0.0010 | 8276949 |
| Total Phosphorus | mg/L | 0.50 | 0.020 | 8268591 | 0.15 | 0.098 | 8268591 | 0.13 | 0.020 | 8268591 |
| Dissolved Sulphate (SO4) | mg/L | 7.2 | 1.0 | 8264282 | 42 | <1.0 | 8264282 | 2.1 | 1.0 | 8264282 |
| Alkalinity (Total as CaCO3) | mg/L | 520 | 1.0 | 8264568 | 580 | 290 | 8264568 | 230 | 1.0 | 8264568 |
| Dissolved Chloride (Cl-) | mg/L | 16 | 1.0 | 8264279 | 8.5 | 6.4 | 8264279 | 24 | 1.0 | 8264279 |
| Nitrite (N) | mg/L | <0.010 | 0.010 | 8264755 | <0.010 | 0.011 | 8264755 | <0.010 | 0.010 | 8264754 |
| Nitrate (N) | mg/L | <0.10 | 0.10 | 8264755 | 1.73 | 0.24 | 8264755 | 0.59 | 0.10 | 8264754 |
| Nitrate + Nitrite (N) | mg/L | <0.10 | 0.10 | 8264755 | 1.73 | 0.25 | 8264755 | 0.59 | 0.10 | 8264754 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

## RESULTS OF ANALYSES OF GROUND WATER

| Bureau Veritas ID | | TXC715 | | | TXC716 | | TXC717 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | | | 2022/09/29 | | 2022/09/29 | | |
| COC Number | | n/a | | | n/a | | n/a | | |
| | UNITS | TH-11 Lab-Dup | RDL | QC Batch | TH-13 | QC Batch | TH-14 | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | | |
| Hardness (CaCO3) | mg/L | | | | 290 | 8262635 | 450 | 1.0 | 8262635 |
| **Inorganics** | | | | | | | | | |
| Total Ammonia-N | mg/L | | | | <0.050 | 8269747 | 1.3 | 0.050 | 8269747 |
| Conductivity | umho/cm | | | | 480 | 8264573 | 810 | 1.0 | 8264573 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | | | | <0.10 | 8267568 | 1.4 | 0.10 | 8267568 |
| Dissolved Organic Carbon | mg/L | | | | 1.4 | 8269301 | 2.7 | 0.40 | 8264812 |
| Orthophosphate (P) | mg/L | 0.020 | 0.010 | 8264278 | <0.010 | 8264278 | <0.010 | 0.010 | 8264278 |
| pH | pH | | | | 8.29 | 8264574 | 7.82 | | 8264574 |
| Phenols-4AAP | mg/L | | | | <0.0010 | 8276949 | <0.0010 | 0.0010 | 8276949 |
| Total Phosphorus | mg/L | | | | 0.70 | 8268591 | 0.054 | 0.020 | 8268591 |
| Dissolved Sulphate (SO4) | mg/L | 2.2 | 1.0 | 8264282 | 5.4 | 8264282 | 11 | 1.0 | 8264282 |
| Alkalinity (Total as CaCO3) | mg/L | | | | 260 | 8264568 | 420 | 1.0 | 8264568 |
| Dissolved Chloride (Cl-) | mg/L | 24 | 1.0 | 8264279 | 3.3 | 8264279 | 15 | 1.0 | 8264279 |
| Nitrite (N) | mg/L | | | | <0.010 | 8264755 | <0.010 | 0.010 | 8264755 |
| Nitrate (N) | mg/L | | | | 0.72 | 8264755 | <0.10 | 0.10 | 8264755 |
| Nitrate + Nitrite (N) | mg/L | | | | 0.72 | 8264755 | <0.10 | 0.10 | 8264755 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

| Bureau Veritas ID | | TXC717 | | |
|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | | |
| COC Number | | n/a | | |
| | UNITS | TH-14 Lab-Dup | RDL | QC Batch |
| **Inorganics** | | | | |
| Total Phosphorus | mg/L | 0.049 | 0.020 | 8268591 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

## ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

| Bureau Veritas ID | | TXA677 | TXA680 | TXA681 | TXA682 | | TXC712 | TXC713 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | 2022/09/29 | 2022/09/29 | 2022/09/29 | | 2022/09/29 | 2022/09/29 | | |
| COC Number | | NA | NA | NA | NA | | n/a | n/a | | |
| | UNITS | TH-6 | TH-12 | TH-10 | TH-7 | QC Batch | TH-3 | TH-8 | RDL | QC Batch |
| **Metals** | | | | | | | | | | |
| Dissolved Calcium (Ca) | ug/L | 160000 | 43000 | 40000 | 130000 | 8269014 | 140000 | 210000 | 200 | 8264137 |
| Dissolved Iron (Fe) | ug/L | <100 | <100 | <100 | <100 | 8269014 | <100 | <100 | 100 | 8264137 |
| Dissolved Magnesium (Mg) | ug/L | 95000 | 27000 | 11000 | 36000 | 8269014 | 36000 | 43000 | 50 | 8264137 |
| Dissolved Manganese (Mn) | ug/L | 2900 | 8.4 | 26 | 21 | 8269014 | 110 | 95 | 2.0 | 8264137 |
| Dissolved Potassium (K) | ug/L | 60000 | 1200 | 1600 | 3100 | 8269014 | 10000 | 2400 | 200 | 8264137 |
| Dissolved Sodium (Na) | ug/L | 51000 | 14000 | 7200 | 15000 | 8269014 | 7500 | 4300 | 100 | 8264137 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

| Bureau Veritas ID | | TXC714 | TXC715 | TXC716 | TXC717 | | |
|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | 2022/09/29 | 2022/09/29 | 2022/09/29 | | |
| COC Number | | n/a | n/a | n/a | n/a | | |
| | UNITS | TH-9 | TH-11 | TH-13 | TH-14 | RDL | QC Batch |
| **Metals** | | | | | | | |
| Dissolved Calcium (Ca) | ug/L | 82000 | 62000 | 71000 | 120000 | 200 | 8264137 |
| Dissolved Iron (Fe) | ug/L | 270 | <100 | <100 | <100 | 100 | 8264137 |
| Dissolved Magnesium (Mg) | ug/L | 27000 | 27000 | 29000 | 36000 | 50 | 8264137 |
| Dissolved Manganese (Mn) | ug/L | 25 | <2.0 | <2.0 | 190 | 2.0 | 8264137 |
| Dissolved Potassium (K) | ug/L | 300 | 460 | 440 | 1900 | 200 | 8264137 |
| Dissolved Sodium (Na) | ug/L | 930 | 4200 | 960 | 6700 | 100 | 8264137 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

# TEST SUMMARY

**Bureau Veritas ID:** TXA677
**Sample ID:** TH-6
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8267466 | N/A | 2022/10/06 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8267263 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8267473 | N/A | 2022/10/06 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8267652 | N/A | 2022/10/06 | Nimarta Singh |
| Hardness (calculated as CaCO3) | | 8266488 | N/A | 2022/10/07 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8269014 | 2022/10/06 | 2022/10/07 | Nan Raykha |
| Total Ammonia-N | LACH/NH4 | 8269423 | N/A | 2022/10/12 | Chandra Nandlal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8267229 | N/A | 2022/10/06 | Chandra Nandlal |
| pH | AT | 8267474 | 2022/10/05 | 2022/10/06 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8279815 | N/A | 2022/10/13 | Mandeep Kaur |
| Orthophosphate | KONE | 8267272 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8267271 | N/A | 2022/10/06 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8269445 | 2022/10/06 | 2022/10/07 | Massarat Jan |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268837 | 2022/10/06 | 2022/10/06 | Shivani Shivani |

**Bureau Veritas ID:** TXA677 Dup
**Sample ID:** TH-6
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Total Ammonia-N | LACH/NH4 | 8269423 | N/A | 2022/10/12 | Chandra Nandlal |

**Bureau Veritas ID:** TXA680
**Sample ID:** TH-12
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8267466 | N/A | 2022/10/06 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8267263 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8267473 | N/A | 2022/10/06 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8267652 | N/A | 2022/10/06 | Nimarta Singh |
| Hardness (calculated as CaCO3) | | 8266488 | N/A | 2022/10/07 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8269014 | 2022/10/06 | 2022/10/07 | Nan Raykha |
| Total Ammonia-N | LACH/NH4 | 8269423 | N/A | 2022/10/12 | Chandra Nandlal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8267229 | N/A | 2022/10/06 | Chandra Nandlal |
| pH | AT | 8267474 | 2022/10/05 | 2022/10/06 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8279815 | N/A | 2022/10/13 | Mandeep Kaur |
| Orthophosphate | KONE | 8267272 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8267271 | N/A | 2022/10/06 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8269445 | 2022/10/06 | 2022/10/06 | Massarat Jan |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268837 | 2022/10/06 | 2022/10/06 | Shivani Shivani |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

## TEST SUMMARY

**Bureau Veritas ID:** TXA681
**Sample ID:** TH-10
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8267466 | N/A | 2022/10/06 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8267263 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8267473 | N/A | 2022/10/06 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8267657 | N/A | 2022/10/06 | Nimarta Singh |
| Hardness (calculated as CaCO3) | | 8266488 | N/A | 2022/10/07 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8269014 | 2022/10/06 | 2022/10/07 | Nan Raykha |
| Total Ammonia-N | LACH/NH4 | 8269423 | N/A | 2022/10/12 | Chandra Nandlal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8267229 | N/A | 2022/10/06 | Chandra Nandlal |
| pH | AT | 8267474 | 2022/10/05 | 2022/10/06 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8279815 | N/A | 2022/10/13 | Mandeep Kaur |
| Orthophosphate | KONE | 8288609 | N/A | 2022/10/18 | Alina Dobreanu |
| Sulphate by Automated Colourimetry | KONE | 8267271 | N/A | 2022/10/06 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8269445 | 2022/10/06 | 2022/10/06 | Massarat Jan |
| Total Phosphorus (Colourimetric) | SKAL/P | 8284752 | 2022/10/14 | 2022/10/17 | Sachi Patel |

**Bureau Veritas ID:** TXA682
**Sample ID:** TH-7
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8267466 | N/A | 2022/10/06 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8267263 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8267473 | N/A | 2022/10/06 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8267657 | N/A | 2022/10/06 | Nimarta Singh |
| Hardness (calculated as CaCO3) | | 8266488 | N/A | 2022/10/07 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8269014 | 2022/10/06 | 2022/10/07 | Nan Raykha |
| Total Ammonia-N | LACH/NH4 | 8269423 | N/A | 2022/10/12 | Chandra Nandlal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8267229 | N/A | 2022/10/06 | Chandra Nandlal |
| pH | AT | 8267474 | 2022/10/05 | 2022/10/06 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8281958 | N/A | 2022/10/13 | Mandeep Kaur |
| Orthophosphate | KONE | 8267272 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8267271 | N/A | 2022/10/06 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8269445 | 2022/10/06 | 2022/10/07 | Massarat Jan |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268837 | 2022/10/06 | 2022/10/06 | Shivani Shivani |

**Bureau Veritas ID:** TXA682 Dup
**Sample ID:** TH-7
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Phenols (4AAP) | TECH/PHEN | 8281958 | N/A | 2022/10/13 | Mandeep Kaur |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

## TEST SUMMARY

**Bureau Veritas ID:** TXC712
**Sample ID:** TH-3
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8264812 | N/A | 2022/10/06 | Chandra Nandlal |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8264137 | 2022/10/04 | 2022/10/05 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269764 | N/A | 2022/10/13 | Anna-Kay Gooden |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264755 | N/A | 2022/10/07 | Chandra Nandlal |
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268591 | 2022/10/06 | 2022/10/11 | Shivani Shivani |

**Bureau Veritas ID:** TXC713
**Sample ID:** TH-8
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8264812 | N/A | 2022/10/06 | Chandra Nandlal |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8264137 | 2022/10/04 | 2022/10/05 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269747 | N/A | 2022/10/09 | Amanpreet Sappal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264755 | N/A | 2022/10/07 | Chandra Nandlal |
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268591 | 2022/10/06 | 2022/10/11 | Shivani Shivani |

**Bureau Veritas ID:** TXC714
**Sample ID:** TH-9
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8264812 | N/A | 2022/10/06 | Chandra Nandlal |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

## TEST SUMMARY

**Bureau Veritas ID:** TXC714 **Collected:** 2022/09/29
**Sample ID:** TH-9 **Shipped:**
**Matrix:** Ground Water **Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Lab Filtered Metals by ICPMS | ICP/MS | 8264137 | 2022/10/04 | 2022/10/05 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269747 | N/A | 2022/10/09 | Amanpreet Sappal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264755 | N/A | 2022/10/07 | Chandra Nandlal |
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268591 | 2022/10/06 | 2022/10/11 | Shivani Shivani |

**Bureau Veritas ID:** TXC715 **Collected:** 2022/09/29
**Sample ID:** TH-11 **Shipped:**
**Matrix:** Ground Water **Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8264812 | N/A | 2022/10/06 | Chandra Nandlal |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8264137 | 2022/10/04 | 2022/10/05 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269747 | N/A | 2022/10/09 | Amanpreet Sappal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264754 | N/A | 2022/10/06 | Chandra Nandlal |
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268591 | 2022/10/06 | 2022/10/11 | Shivani Shivani |

**Bureau Veritas ID:** TXC715 Dup **Collected:** 2022/09/29
**Sample ID:** TH-11 **Shipped:**
**Matrix:** Ground Water **Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |

**Bureau Veritas ID:** TXC716 **Collected:** 2022/09/29
**Sample ID:** TH-13 **Shipped:**
**Matrix:** Ground Water **Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

## TEST SUMMARY

**Bureau Veritas ID:** TXC716
**Sample ID:** TH-13
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8269301 | N/A | 2022/10/08 | Nimarta Singh |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8264137 | 2022/10/04 | 2022/10/05 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269747 | N/A | 2022/10/09 | Amanpreet Sappal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264755 | N/A | 2022/10/07 | Chandra Nandlal |
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268591 | 2022/10/06 | 2022/10/11 | Shivani Shivani |

**Bureau Veritas ID:** TXC717
**Sample ID:** TH-14
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8264812 | N/A | 2022/10/06 | Chandra Nandlal |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |
| Lab Filtered Metals by ICPMS | ICP/MS | 8264137 | 2022/10/04 | 2022/10/05 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269747 | N/A | 2022/10/09 | Amanpreet Sappal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264755 | N/A | 2022/10/07 | Chandra Nandlal |
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268591 | 2022/10/06 | 2022/10/11 | Shivani Shivani |

**Bureau Veritas ID:** TXC717 Dup
**Sample ID:** TH-14
**Matrix:** Ground Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Total Phosphorus (Colourimetric) | SKAL/P | 8268591 | 2022/10/06 | 2022/10/11 | Shivani Shivani |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

## GENERAL COMMENTS

Sample TXA677 [TH-6] : TKN < Ammonia: Both values fall within the method uncertainty for duplicates and are likely equivalent.

Sample TXA681 [TH-10] : ortho-Phosphate > Total Phosphorus: Both values have been confirmed by reanalysis.

**Results relate only to the items tested.**



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Bureau Veritas Job #: C2S5383
Report Date: 2022/10/21

## QUALITY ASSURANCE REPORT

GM BluePlan Engineering Limited
Client Project #: 213085
Sampler Initials: JW

| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 8264137 | Dissolved Calcium (Ca) | 2022/10/05 | NC | 80 - 120 | 97 | 80 - 120 | <200 | ug/L | 0.53 | 20 | | |
| 8264137 | Dissolved Iron (Fe) | 2022/10/05 | 100 | 80 - 120 | 98 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 8264137 | Dissolved Magnesium (Mg) | 2022/10/05 | 100 | 80 - 120 | 99 | 80 - 120 | <50 | ug/L | 0.93 | 20 | | |
| 8264137 | Dissolved Manganese (Mn) | 2022/10/05 | 100 | 80 - 120 | 97 | 80 - 120 | <2.0 | ug/L | 6.6 | 20 | | |
| 8264137 | Dissolved Potassium (K) | 2022/10/05 | 100 | 80 - 120 | 99 | 80 - 120 | <200 | ug/L | 1.3 | 20 | | |
| 8264137 | Dissolved Sodium (Na) | 2022/10/05 | 100 | 80 - 120 | 98 | 80 - 120 | <100 | ug/L | 0.48 | 20 | | |
| 8264278 | Orthophosphate (P) | 2022/10/07 | 103 | 75 - 125 | 98 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |
| 8264279 | Dissolved Chloride (Cl-) | 2022/10/06 | NC | 80 - 120 | 103 | 80 - 120 | <1.0 | mg/L | 0.53 | 20 | | |
| 8264282 | Dissolved Sulphate (SO4) | 2022/10/05 | 117 | 75 - 125 | 102 | 80 - 120 | <1.0 | mg/L | 2.9 | 20 | | |
| 8264568 | Alkalinity (Total as CaCO3) | 2022/10/08 | | | 92 | 85 - 115 | <1.0 | mg/L | 0.34 | 20 | | |
| 8264573 | Conductivity | 2022/10/08 | | | 102 | 85 - 115 | <1.0 | umho/cm | 1.2 | 25 | | |
| 8264574 | pH | 2022/10/08 | | | 101 | 98 - 103 | | | 0.13 | N/A | | |
| 8264754 | Nitrate (N) | 2022/10/06 | 102 | 80 - 120 | 102 | 80 - 120 | <0.10 | mg/L | 0.43 | 20 | | |
| 8264754 | Nitrite (N) | 2022/10/06 | 104 | 80 - 120 | 106 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 8264755 | Nitrate (N) | 2022/10/07 | 95 | 80 - 120 | 99 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 8264755 | Nitrite (N) | 2022/10/07 | 107 | 80 - 120 | 109 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 8264812 | Dissolved Organic Carbon | 2022/10/06 | NC | 80 - 120 | 96 | 80 - 120 | <0.40 | mg/L | 0.60 | 20 | | |
| 8267229 | Nitrate (N) | 2022/10/06 | 98 | 80 - 120 | 100 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 8267229 | Nitrite (N) | 2022/10/06 | 103 | 80 - 120 | 106 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 8267263 | Dissolved Chloride (Cl-) | 2022/10/06 | 120 | 80 - 120 | 103 | 80 - 120 | <1.0 | mg/L | 1.8 | 20 | | |
| 8267271 | Dissolved Sulphate (SO4) | 2022/10/06 | 90 | 75 - 125 | 105 | 80 - 120 | <1.0 | mg/L | 4.2 | 20 | | |
| 8267272 | Orthophosphate (P) | 2022/10/07 | 102 | 75 - 125 | 100 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |
| 8267466 | Alkalinity (Total as CaCO3) | 2022/10/06 | | | 94 | 85 - 115 | <1.0 | mg/L | 0.050 | 20 | | |
| 8267473 | Conductivity | 2022/10/06 | | | 101 | 85 - 115 | <1.0 | umho/cm | 0 | 25 | | |
| 8267474 | pH | 2022/10/06 | | | 102 | 98 - 103 | | | 0.60 | N/A | | |
| 8267568 | Total Kjeldahl Nitrogen (TKN) | 2022/10/07 | 97 | 80 - 120 | 97 | 80 - 120 | <0.10 | mg/L | 18 | 20 | 92 | 80 - 120 |
| 8267652 | Dissolved Organic Carbon | 2022/10/06 | 92 | 80 - 120 | 93 | 80 - 120 | <0.40 | mg/L | 2.3 | 20 | | |
| 8267657 | Dissolved Organic Carbon | 2022/10/06 | 96 | 80 - 120 | 98 | 80 - 120 | <0.40 | mg/L | 2.5 | 20 | | |
| 8268591 | Total Phosphorus | 2022/10/11 | 98 | 80 - 120 | 106 | 80 - 120 | <0.020 | mg/L | 9.9 | 20 | 107 | 80 - 120 |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

## QUALITY ASSURANCE REPORT(CONT'D)



| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 8268837 | Total Phosphorus | 2022/10/06 | 99 | 80 - 120 | 97 | 80 - 120 | <0.020 | mg/L | 0.92 | 20 | 96 | 80 - 120 |
| 8269014 | Dissolved Calcium (Ca) | 2022/10/07 | NC | 80 - 120 | 96 | 80 - 120 | <200 | ug/L | | | | |
| 8269014 | Dissolved Iron (Fe) | 2022/10/07 | 103 | 80 - 120 | 101 | 80 - 120 | <100 | ug/L | | | | |
| 8269014 | Dissolved Magnesium (Mg) | 2022/10/07 | 103 | 80 - 120 | 101 | 80 - 120 | <50 | ug/L | | | | |
| 8269014 | Dissolved Manganese (Mn) | 2022/10/07 | 103 | 80 - 120 | 98 | 80 - 120 | <2.0 | ug/L | | | | |
| 8269014 | Dissolved Potassium (K) | 2022/10/07 | 108 | 80 - 120 | 101 | 80 - 120 | <200 | ug/L | | | | |
| 8269014 | Dissolved Sodium (Na) | 2022/10/07 | NC | 80 - 120 | 99 | 80 - 120 | <100 | ug/L | | | | |
| 8269301 | Dissolved Organic Carbon | 2022/10/08 | 91 | 80 - 120 | 94 | 80 - 120 | <0.40 | mg/L | 0.059 | 20 | | |
| 8269423 | Total Ammonia-N | 2022/10/12 | NC | 75 - 125 | 98 | 80 - 120 | <0.050 | mg/L | 0.49 | 20 | | |
| 8269445 | Total Kjeldahl Nitrogen (TKN) | 2022/10/06 | NC | 80 - 120 | 100 | 80 - 120 | <0.10 | mg/L | 2.1 | 20 | 91 | 80 - 120 |
| 8269747 | Total Ammonia-N | 2022/10/09 | NC | 75 - 125 | 98 | 80 - 120 | <0.050 | mg/L | 2.9 | 20 | | |
| 8269764 | Total Ammonia-N | 2022/10/13 | NC | 75 - 125 | 99 | 80 - 120 | <0.050 | mg/L | 3.7 | 20 | | |
| 8276949 | Phenols-4AAP | 2022/10/12 | 97 | 80 - 120 | 96 | 80 - 120 | <0.0010 | mg/L | NC | 20 | | |
| 8279815 | Phenols-4AAP | 2022/10/13 | 101 | 80 - 120 | 100 | 80 - 120 | <0.0010 | mg/L | NC | 20 | | |
| 8281958 | Phenols-4AAP | 2022/10/13 | 100 | 80 - 120 | 99 | 80 - 120 | <0.0010 | mg/L | NC | 20 | | |
| 8284752 | Total Phosphorus | 2022/10/17 | 113 | 80 - 120 | 98 | 80 - 120 | <0.020 | mg/L | 4.9 | 20 | 109 | 80 - 120 |
| 8288609 | Orthophosphate (P) | 2022/10/18 | 95 | 75 - 125 | 101 | 80 - 120 | <0.010 | mg/L | 19 | 25 | | |

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

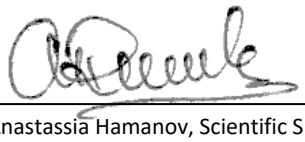
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

## VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvna.com

Your Project #: 213085
Site Location: BENTINCK LANDFILL
Your C.O.C. #: n/a, NA

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/10/14**
Report #: R7341286
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2S5745**
**Received: 2022/10/03, 09:03**

Sample Matrix: Surface Water
# Samples Received: 4

| Analyses | Quantity | Date Extracted | Date Analyzed | Laboratory Method | Analytical Method |
|---|---|---|---|---|---|
| Alkalinity | 2 | N/A | 2022/10/06 | CAM SOP-00448 | SM 23 2320 B m |
| Alkalinity | 2 | N/A | 2022/10/08 | CAM SOP-00448 | SM 23 2320 B m |
| Chloride by Automated Colourimetry | 4 | N/A | 2022/10/06 | CAM SOP-00463 | SM 23 4500-Cl E m |
| Conductivity | 2 | N/A | 2022/10/06 | CAM SOP-00414 | SM 23 2510 m |
| Conductivity | 2 | N/A | 2022/10/08 | CAM SOP-00414 | SM 23 2510 m |
| Dissolved Organic Carbon (DOC) (1) | 4 | N/A | 2022/10/06 | CAM SOP-00446 | SM 23 5310 B m |
| Hardness (calculated as CaCO3) | 2 | N/A | 2022/10/06 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Hardness (calculated as CaCO3) | 2 | N/A | 2022/10/07 | CAM SOP 00102/00408/00447 | SM 2340 B |
| Total Metals Analysis by ICPMS | 1 | N/A | 2022/10/06 | CAM SOP-00447 | EPA 6020B m |
| Total Metals Analysis by ICPMS | 3 | N/A | 2022/10/07 | CAM SOP-00447 | EPA 6020B m |
| Total Ammonia-N | 2 | N/A | 2022/10/12 | CAM SOP-00441 | USGS I-2522-90 m |
| Total Ammonia-N | 2 | N/A | 2022/10/09 | CAM SOP-00441 | USGS I-2522-90 m |
| Nitrate & Nitrite as Nitrogen in Water (2) | 2 | N/A | 2022/10/06 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| Nitrate & Nitrite as Nitrogen in Water (2) | 2 | N/A | 2022/10/07 | CAM SOP-00440 | SM 23 4500-NO3I/NO2B |
| pH | 2 | 2022/10/04 | 2022/10/08 | CAM SOP-00413 | SM 4500H+ B m |
| pH | 2 | 2022/10/05 | 2022/10/06 | CAM SOP-00413 | SM 4500H+ B m |
| Phenols (4AAP) | 2 | N/A | 2022/10/12 | CAM SOP-00444 | OMOE E3179 m |
| Phenols (4AAP) | 2 | N/A | 2022/10/13 | CAM SOP-00444 | OMOE E3179 m |
| Orthophosphate | 4 | N/A | 2022/10/07 | CAM SOP-00461 | EPA 365.1 m |
| Sulphate by Automated Colourimetry | 2 | N/A | 2022/10/05 | CAM SOP-00464 | EPA 375.4 m |
| Sulphate by Automated Colourimetry | 2 | N/A | 2022/10/06 | CAM SOP-00464 | EPA 375.4 m |
| Total Dissolved Solids | 4 | 2022/10/06 | 2022/10/07 | CAM SOP-00428 | SM 23 2540C m |
| Total Kjeldahl Nitrogen in Water | 2 | 2022/10/05 | 2022/10/07 | CAM SOP-00938 | OMOE E3516 m |
| Total Kjeldahl Nitrogen in Water | 1 | 2022/10/06 | 2022/10/06 | CAM SOP-00938 | OMOE E3516 m |
| Total Kjeldahl Nitrogen in Water | 1 | 2022/10/06 | 2022/10/07 | CAM SOP-00938 | OMOE E3516 m |
| Total Phosphorus (Colourimetric) | 2 | 2022/10/06 | 2022/10/06 | CAM SOP-00407 | SM 23 4500-P I |
| Total Phosphorus (Colourimetric) | 2 | 2022/10/06 | 2022/10/07 | CAM SOP-00407 | SM 23 4500-P I |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Your Project #: 213085
Site Location: BENTINCK LANDFILL
Your C.O.C. #: n/a, NA

**Attention: Reporting Contacts**

GM BluePlan Engineering Limited
1260 - 2nd Ave E
Unit 1
Owen Sound, ON
CANADA N4K 2J3

**Report Date: 2022/10/14**
Report #: R7341286
Version: 1 - Final

# CERTIFICATE OF ANALYSIS

**BUREAU VERITAS JOB #: C2S5745**
**Received: 2022/10/03, 09:03**
**Remarks:**

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ashton Gibson, Project Manager
Email: Ashton.Gibson@bureauveritas.com
Phone# (905)817-5765

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C2S5745
Report Date: 2022/10/14

GM BluePlan Engineering Limited
Client Project #: 213085
Site Location: BENTINCK LANDFILL
Sampler Initials: JW

## RESULTS OF ANALYSES OF SURFACE WATER

| Bureau Veritas ID | | TXA678 | TXA679 | | | TXA679 | | |
|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | 2022/09/29 | | | 2022/09/29 | | |
| COC Number | | NA | NA | | | NA | | |
| | UNITS | SW-4 | SW-5 | RDL | QC Batch | SW-5 Lab-Dup | RDL | QC Batch |
| **Calculated Parameters** | | | | | | | | |
| Hardness (CaCO3) | mg/L | 260 | 260 | 1.0 | 8266488 | | | |
| **Inorganics** | | | | | | | | |
| Total Ammonia-N | mg/L | <0.050 | <0.050 | 0.050 | 8269423 | | | |
| Conductivity | umho/cm | 470 | 470 | 1.0 | 8267473 | | | |
| Total Dissolved Solids | mg/L | 215 | 200 | 10 | 8267161 | | | |
| Total Kjeldahl Nitrogen (TKN) | mg/L | 0.20 | 0.23 | 0.10 | 8269445 | | | |
| Dissolved Organic Carbon | mg/L | 5.0 | 4.9 | 0.40 | 8267652 | 4.8 | 0.40 | 8267652 |
| Orthophosphate (P) | mg/L | <0.010 | <0.010 | 0.010 | 8267272 | <0.010 | 0.010 | 8267272 |
| pH | pH | 8.32 | 8.36 | | 8267474 | | | |
| Phenols-4AAP | mg/L | <0.0010 | <0.0010 | 0.0010 | 8279815 | | | |
| Total Phosphorus | mg/L | <0.004 | 0.005 | 0.004 | 8268534 | | | |
| Dissolved Sulphate (SO4) | mg/L | 17 | 19 | 1.0 | 8267271 | 18 | 1.0 | 8267271 |
| Alkalinity (Total as CaCO3) | mg/L | 230 | 230 | 1.0 | 8267466 | | | |
| Dissolved Chloride (Cl-) | mg/L | 8.5 | 8.6 | 1.0 | 8267263 | 8.8 | 1.0 | 8267263 |
| Nitrite (N) | mg/L | <0.010 | <0.010 | 0.010 | 8267229 | | | |
| Nitrate (N) | mg/L | 0.35 | 0.35 | 0.10 | 8267229 | | | |
| Nitrate + Nitrite (N) | mg/L | 0.35 | 0.35 | 0.10 | 8267229 | | | |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2S5745
Report Date: 2022/10/14

GM BluePlan Engineering Limited
Client Project #: 213085
Site Location: BENTINCK LANDFILL
Sampler Initials: JW

## RESULTS OF ANALYSES OF SURFACE WATER

| Bureau Veritas ID | | TXC718 | TXC719 | | |
|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | 2022/09/29 | | |
| COC Number | | n/a | n/a | | |
| | UNITS | SW-2 | SW-2A | RDL | QC Batch |
| **Calculated Parameters** | | | | | |
| Hardness (CaCO3) | mg/L | 290 | 270 | 1.0 | 8262635 |
| **Inorganics** | | | | | |
| Total Ammonia-N | mg/L | <0.050 | <0.050 | 0.050 | 8269747 |
| Conductivity | umho/cm | 550 | 510 | 1.0 | 8264573 |
| Total Dissolved Solids | mg/L | 300 | 275 | 10 | 8268681 |
| Total Kjeldahl Nitrogen (TKN) | mg/L | 0.30 | 0.34 | 0.10 | 8267568 |
| Dissolved Organic Carbon | mg/L | 10 | 10 | 0.40 | 8264812 |
| Orthophosphate (P) | mg/L | <0.010 | <0.010 | 0.010 | 8264278 |
| pH | pH | 8.21 | 8.22 | | 8264574 |
| Phenols-4AAP | mg/L | <0.0010 | <0.0010 | 0.0010 | 8276949 |
| Total Phosphorus | mg/L | 0.007 | 0.006 | 0.004 | 8268584 |
| Dissolved Sulphate (SO4) | mg/L | <1.0 | <1.0 | 1.0 | 8264282 |
| Alkalinity (Total as CaCO3) | mg/L | 250 | 240 | 1.0 | 8264568 |
| Dissolved Chloride (Cl-) | mg/L | 29 | 23 | 1.0 | 8264279 |
| Nitrite (N) | mg/L | <0.010 | <0.010 | 0.010 | 8264755 |
| Nitrate (N) | mg/L | <0.10 | <0.10 | 0.10 | 8264755 |
| Nitrate + Nitrite (N) | mg/L | <0.10 | <0.10 | 0.10 | 8264755 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2S5745
Report Date: 2022/10/14

GM BluePlan Engineering Limited
Client Project #: 213085
Site Location: BENTINCK LANDFILL
Sampler Initials: JW

## ELEMENTS BY ATOMIC SPECTROSCOPY (SURFACE WATER)

| Bureau Veritas ID | | TXA678 | TXA679 | | TXC718 | TXC718 | TXC719 | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling Date | | 2022/09/29 | 2022/09/29 | | 2022/09/29 | 2022/09/29 | 2022/09/29 | | |
| COC Number | | NA | NA | | n/a | n/a | n/a | | |
| | UNITS | SW-4 | SW-5 | QC Batch | SW-2 | SW-2 Lab-Dup | SW-2A | RDL | QC Batch |
| **Metals** | | | | | | | | | |
| Total Calcium (Ca) | ug/L | 59000 | 57000 | 8268264 | 76000 | 75000 | 64000 | 200 | 8271001 |
| Total Iron (Fe) | ug/L | <100 | <100 | 8268264 | <100 | <100 | <100 | 100 | 8271001 |
| Total Magnesium (Mg) | ug/L | 27000 | 27000 | 8268264 | 26000 | 26000 | 24000 | 50 | 8271001 |
| Total Manganese (Mn) | ug/L | 8.2 | 6.8 | 8268264 | 24 | 23 | 17 | 2.0 | 8271001 |
| Total Phosphorus (P) | ug/L | <100 | <100 | 8268264 | <100 | <100 | <100 | 100 | 8271001 |
| Total Potassium (K) | ug/L | 890 | 830 | 8268264 | 1800 | 1800 | 2000 | 200 | 8271001 |
| Total Sodium (Na) | ug/L | 4100 | 4000 | 8268264 | 16000 | 15000 | 11000 | 100 | 8271001 |

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2S5745
Report Date: 2022/10/14

GM BluePlan Engineering Limited
Client Project #: 213085
Site Location: BENTINCK LANDFILL
Sampler Initials: JW

## TEST SUMMARY

**Bureau Veritas ID:** TXA678
**Sample ID:** SW-4
**Matrix:** Surface Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8267466 | N/A | 2022/10/06 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8267263 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8267473 | N/A | 2022/10/06 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8267652 | N/A | 2022/10/06 | Nimarta Singh |
| Hardness (calculated as CaCO3) | | 8266488 | N/A | 2022/10/07 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 8268264 | N/A | 2022/10/07 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269423 | N/A | 2022/10/12 | Chandra Nandlal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8267229 | N/A | 2022/10/06 | Chandra Nandlal |
| pH | AT | 8267474 | 2022/10/05 | 2022/10/06 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8279815 | N/A | 2022/10/13 | Mandeep Kaur |
| Orthophosphate | KONE | 8267272 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8267271 | N/A | 2022/10/06 | Samuel Law |
| Total Dissolved Solids | BAL | 8267161 | 2022/10/06 | 2022/10/07 | Shaneil Hall |
| Total Kjeldahl Nitrogen in Water | SKAL | 8269445 | 2022/10/06 | 2022/10/07 | Massarat Jan |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268534 | 2022/10/06 | 2022/10/06 | Sachi Patel |

**Bureau Veritas ID:** TXA679
**Sample ID:** SW-5
**Matrix:** Surface Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8267466 | N/A | 2022/10/06 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8267263 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8267473 | N/A | 2022/10/06 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8267652 | N/A | 2022/10/06 | Nimarta Singh |
| Hardness (calculated as CaCO3) | | 8266488 | N/A | 2022/10/07 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 8268264 | N/A | 2022/10/06 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269423 | N/A | 2022/10/12 | Chandra Nandlal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8267229 | N/A | 2022/10/06 | Chandra Nandlal |
| pH | AT | 8267474 | 2022/10/05 | 2022/10/06 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8279815 | N/A | 2022/10/13 | Mandeep Kaur |
| Orthophosphate | KONE | 8267272 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8267271 | N/A | 2022/10/06 | Samuel Law |
| Total Dissolved Solids | BAL | 8267161 | 2022/10/06 | 2022/10/07 | Shaneil Hall |
| Total Kjeldahl Nitrogen in Water | SKAL | 8269445 | 2022/10/06 | 2022/10/06 | Massarat Jan |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268534 | 2022/10/06 | 2022/10/06 | Sachi Patel |

**Bureau Veritas ID:** TXA679 Dup
**Sample ID:** SW-5
**Matrix:** Surface Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Chloride by Automated Colourimetry | KONE | 8267263 | N/A | 2022/10/06 | Alina Dobreanu |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8267652 | N/A | 2022/10/06 | Nimarta Singh |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2S5745
Report Date: 2022/10/14

GM BluePlan Engineering Limited
Client Project #: 213085
Site Location: BENTINCK LANDFILL
Sampler Initials: JW

## TEST SUMMARY

**Bureau Veritas ID:** TXA679 Dup
**Sample ID:** SW-5
**Matrix:** Surface Water
**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Orthophosphate | KONE | 8267272 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8267271 | N/A | 2022/10/06 | Samuel Law |

**Bureau Veritas ID:** TXC718
**Sample ID:** SW-2
**Matrix:** Surface Water
**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8264812 | N/A | 2022/10/06 | Chandra Nandlal |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 8271001 | N/A | 2022/10/07 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269747 | N/A | 2022/10/09 | Amanpreet Sappal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264755 | N/A | 2022/10/07 | Chandra Nandlal |
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Dissolved Solids | BAL | 8268681 | 2022/10/06 | 2022/10/07 | Shaneil Hall |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268584 | 2022/10/06 | 2022/10/07 | Sachi Patel |

**Bureau Veritas ID:** TXC718 Dup
**Sample ID:** SW-2
**Matrix:** Surface Water
**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Total Metals Analysis by ICPMS | ICP/MS | 8271001 | N/A | 2022/10/07 | Azita Fazaeli |

**Bureau Veritas ID:** TXC719
**Sample ID:** SW-2A
**Matrix:** Surface Water
**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| Alkalinity | AT | 8264568 | N/A | 2022/10/08 | Kien Tran |
| Chloride by Automated Colourimetry | KONE | 8264279 | N/A | 2022/10/06 | Alina Dobreanu |
| Conductivity | AT | 8264573 | N/A | 2022/10/08 | Kien Tran |
| Dissolved Organic Carbon (DOC) | TOCV/NDIR | 8264812 | N/A | 2022/10/06 | Chandra Nandlal |
| Hardness (calculated as CaCO3) | | 8262635 | N/A | 2022/10/06 | Automated Statchk |
| Total Metals Analysis by ICPMS | ICP/MS | 8271001 | N/A | 2022/10/07 | Azita Fazaeli |
| Total Ammonia-N | LACH/NH4 | 8269747 | N/A | 2022/10/09 | Amanpreet Sappal |
| Nitrate & Nitrite as Nitrogen in Water | LACH | 8264755 | N/A | 2022/10/07 | Chandra Nandlal |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2S5745
Report Date: 2022/10/14

GM BluePlan Engineering Limited
Client Project #: 213085
Site Location: BENTINCK LANDFILL
Sampler Initials: JW

## TEST SUMMARY

**Bureau Veritas ID:** TXC719
**Sample ID:** SW-2A
**Matrix:** Surface Water

**Collected:** 2022/09/29
**Shipped:**
**Received:** 2022/10/03

| Test Description | Instrumentation | Batch | Extracted | Date Analyzed | Analyst |
|---|---|---|---|---|---|
| pH | AT | 8264574 | 2022/10/04 | 2022/10/08 | Kien Tran |
| Phenols (4AAP) | TECH/PHEN | 8276949 | N/A | 2022/10/12 | Mandeep Kaur |
| Orthophosphate | KONE | 8264278 | N/A | 2022/10/07 | Samuel Law |
| Sulphate by Automated Colourimetry | KONE | 8264282 | N/A | 2022/10/05 | Samuel Law |
| Total Dissolved Solids | BAL | 8268681 | 2022/10/06 | 2022/10/07 | Shaneil Hall |
| Total Kjeldahl Nitrogen in Water | SKAL | 8267568 | 2022/10/05 | 2022/10/07 | Rajni Tyagi |
| Total Phosphorus (Colourimetric) | SKAL/P | 8268584 | 2022/10/06 | 2022/10/07 | Sachi Patel |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## GENERAL COMMENTS

**Results relate only to the items tested.**



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

# QUALITY ASSURANCE REPORT



| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 8264278 | Orthophosphate (P) | 2022/10/07 | 103 | 75 - 125 | 98 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |
| 8264279 | Dissolved Chloride (Cl-) | 2022/10/06 | NC | 80 - 120 | 103 | 80 - 120 | <1.0 | mg/L | 0.53 | 20 | | |
| 8264282 | Dissolved Sulphate (SO4) | 2022/10/05 | 117 | 75 - 125 | 102 | 80 - 120 | <1.0 | mg/L | 2.9 | 20 | | |
| 8264568 | Alkalinity (Total as CaCO3) | 2022/10/08 | | | 92 | 85 - 115 | <1.0 | mg/L | 0.34 | 20 | | |
| 8264573 | Conductivity | 2022/10/08 | | | 102 | 85 - 115 | <1.0 | umho/cm | 1.2 | 25 | | |
| 8264574 | pH | 2022/10/08 | | | 101 | 98 - 103 | | | 0.13 | N/A | | |
| 8264755 | Nitrate (N) | 2022/10/07 | 95 | 80 - 120 | 99 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 8264755 | Nitrite (N) | 2022/10/07 | 107 | 80 - 120 | 109 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 8264812 | Dissolved Organic Carbon | 2022/10/06 | NC | 80 - 120 | 96 | 80 - 120 | <0.40 | mg/L | 0.60 | 20 | | |
| 8267161 | Total Dissolved Solids | 2022/10/07 | | | | | <10 | mg/L | 4.3 | 25 | 97 | 90 - 110 |
| 8267229 | Nitrate (N) | 2022/10/06 | 98 | 80 - 120 | 100 | 80 - 120 | <0.10 | mg/L | NC | 20 | | |
| 8267229 | Nitrite (N) | 2022/10/06 | 103 | 80 - 120 | 106 | 80 - 120 | <0.010 | mg/L | NC | 20 | | |
| 8267263 | Dissolved Chloride (Cl-) | 2022/10/06 | 120 | 80 - 120 | 103 | 80 - 120 | <1.0 | mg/L | 1.8 | 20 | | |
| 8267271 | Dissolved Sulphate (SO4) | 2022/10/06 | 90 | 75 - 125 | 105 | 80 - 120 | <1.0 | mg/L | 4.2 | 20 | | |
| 8267272 | Orthophosphate (P) | 2022/10/07 | 102 | 75 - 125 | 100 | 80 - 120 | <0.010 | mg/L | NC | 25 | | |
| 8267466 | Alkalinity (Total as CaCO3) | 2022/10/06 | | | 94 | 85 - 115 | <1.0 | mg/L | 0.050 | 20 | | |
| 8267473 | Conductivity | 2022/10/06 | | | 101 | 85 - 115 | <1.0 | umho/cm | 0 | 25 | | |
| 8267474 | pH | 2022/10/06 | | | 102 | 98 - 103 | | | 0.60 | N/A | | |
| 8267568 | Total Kjeldahl Nitrogen (TKN) | 2022/10/07 | 97 | 80 - 120 | 97 | 80 - 120 | <0.10 | mg/L | 18 | 20 | 92 | 80 - 120 |
| 8267652 | Dissolved Organic Carbon | 2022/10/06 | 92 | 80 - 120 | 93 | 80 - 120 | <0.40 | mg/L | 2.3 | 20 | | |
| 8268264 | Total Calcium (Ca) | 2022/10/06 | NC | 80 - 120 | 97 | 80 - 120 | <200 | ug/L | | | | |
| 8268264 | Total Iron (Fe) | 2022/10/06 | NC | 80 - 120 | 98 | 80 - 120 | <100 | ug/L | | | | |
| 8268264 | Total Magnesium (Mg) | 2022/10/06 | NC | 80 - 120 | 97 | 80 - 120 | <50 | ug/L | | | | |
| 8268264 | Total Manganese (Mn) | 2022/10/06 | NC | 80 - 120 | 95 | 80 - 120 | <2.0 | ug/L | | | | |
| 8268264 | Total Phosphorus (P) | 2022/10/06 | NC | 80 - 120 | 102 | 80 - 120 | <100 | ug/L | | | | |
| 8268264 | Total Potassium (K) | 2022/10/06 | NC | 80 - 120 | 97 | 80 - 120 | <200 | ug/L | | | | |
| 8268264 | Total Sodium (Na) | 2022/10/06 | NC | 80 - 120 | 97 | 80 - 120 | <100 | ug/L | | | | |
| 8268534 | Total Phosphorus | 2022/10/06 | 101 | 80 - 120 | 101 | 80 - 120 | <0.004 | mg/L | 13 | 20 | 102 | 80 - 120 |
| 8268584 | Total Phosphorus | 2022/10/07 | 106 | 80 - 120 | 105 | 80 - 120 | <0.004 | mg/L | NC | 20 | 102 | 80 - 120 |



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

## QUALITY ASSURANCE REPORT(CONT'D)



| | | | Matrix Spike | | SPIKED BLANK | | Method Blank | | RPD | | QC Standard | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| QC Batch | Parameter | Date | % Recovery | QC Limits | % Recovery | QC Limits | Value | UNITS | Value (%) | QC Limits | % Recovery | QC Limits |
| 8268681 | Total Dissolved Solids | 2022/10/07 | | | | | <10 | mg/L | 1.1 | 25 | 100 | 90 - 110 |
| 8269423 | Total Ammonia-N | 2022/10/12 | NC | 75 - 125 | 98 | 80 - 120 | <0.050 | mg/L | 0.49 | 20 | | |
| 8269445 | Total Kjeldahl Nitrogen (TKN) | 2022/10/06 | NC | 80 - 120 | 100 | 80 - 120 | <0.10 | mg/L | 2.1 | 20 | 91 | 80 - 120 |
| 8269747 | Total Ammonia-N | 2022/10/09 | NC | 75 - 125 | 98 | 80 - 120 | <0.050 | mg/L | 2.9 | 20 | | |
| 8271001 | Total Calcium (Ca) | 2022/10/07 | NC | 80 - 120 | 98 | 80 - 120 | <200 | ug/L | 1.1 | 20 | | |
| 8271001 | Total Iron (Fe) | 2022/10/07 | 102 | 80 - 120 | 98 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 8271001 | Total Magnesium (Mg) | 2022/10/07 | NC | 80 - 120 | 97 | 80 - 120 | <50 | ug/L | 2.2 | 20 | | |
| 8271001 | Total Manganese (Mn) | 2022/10/07 | 101 | 80 - 120 | 97 | 80 - 120 | <2.0 | ug/L | 5.6 | 20 | | |
| 8271001 | Total Phosphorus (P) | 2022/10/07 | 109 | 80 - 120 | 103 | 80 - 120 | <100 | ug/L | NC | 20 | | |
| 8271001 | Total Potassium (K) | 2022/10/07 | 102 | 80 - 120 | 99 | 80 - 120 | <200 | ug/L | 1.9 | 20 | | |
| 8271001 | Total Sodium (Na) | 2022/10/07 | 98 | 80 - 120 | 99 | 80 - 120 | <100 | ug/L | 2.4 | 20 | | |
| 8276949 | Phenols-4AAP | 2022/10/12 | 97 | 80 - 120 | 96 | 80 - 120 | <0.0010 | mg/L | NC | 20 | | |
| 8279815 | Phenols-4AAP | 2022/10/13 | 101 | 80 - 120 | 100 | 80 - 120 | <0.0010 | mg/L | NC | 20 | | |

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C2S5745
Report Date: 2022/10/14

GM BluePlan Engineering Limited
Client Project #: 213085
Site Location: BENTINCK LANDFILL
Sampler Initials: JW

## VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Anastassia Hamanov, Scientific Specialist

Cristina Carriere, Senior Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

# APPENDIX G:
# HISTORIC GROUNDWATER ELEVATIONS

**Appendix G**
**Bentinck Waste Disposal Site**
**Water Level Monitoring Data**

| Test Well | Ground Elevation (m) | Measuring Point Elevation (m) | 13-Jun-94 | | 7-Nov-94 | | 19-Jun-95 | | 30-Oct-95 | | 24-May-96 | | 15-Nov-96 | | 9-May-97 | | 19-Dec-97 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) |
| TH-1 | 99.21 | 99.78 | dry @ 3.30 | 96.48 | 3.00 | 96.78 | dry @ 3.32 | 96.46 | dry @ 3.3 | 96.48 | dry @ 3.3 | 96.48 | dry @ 3.3 | 96.48 | 3.00 | 96.78 | dry @ 3.3 | <96.48 |
| TH-2 | 99.54 | 100.13 | 3.90 | 96.23 | 4.07 | 96.06 | 4.12 | 96.01 | 4.30 | 95.83 | 3.92 | 96.21 | 4.20 | 95.93 | 3.88 | 96.25 | 4.105 | 96.03 |
| TH-3 | 102.91 | 103.52 | 6.37 | 97.15 | 6.85 | 96.67 | 6.62 | 96.90 | 7.50 | 96.02 | 6.40 | 97.12 | 6.70 | 96.82 | 6.4 | 97.12 | 6.85 | 96.67 |
| TH-4 | 103.88 | 104.33 | 7.10 | 97.23 | 7.50 | 96.83 | 7.30 | 97.03 | 7.65 | 96.68 | 7.07 | 97.26 | 7.35 | 96.98 | 7 | 97.33 | 7.6 | 96.73 |
| TH-5A | 102.88 | 102.88 | 6.56 | 96.32 | 7.00 | 95.88 | 6.82 | 96.06 | 7.25 | 95.63 | 6.60 | 96.28 | 6.80 | 96.08 | 6.56 | 96.32 | 7 | 95.88 |
| TH-5B | 102.88 | 103.19 | 8.00 | 95.19 | 7.05 | 96.14 | 7.12 | 96.07 | 7.56 | 95.63 | 6.90 | 96.29 | 7.10 | 96.09 | 6.56 | 96.63 | 7.3 | 95.89 |
| TH-6 | 101.42 | 102.31 | 5.87 | 96.44 | 6.20 | 96.11 | 6.08 | 96.23 | 6.44 | 95.87 | 5.88 | 96.43 | 6.00 | 96.31 | 5.69 | 96.62 | 6.25 | 96.06 |
| TH-7 | 96.80 | 97.92 | 1.87 | 96.05 | 2.04 | 95.88 | 2.05 | 95.87 | 2.26 | 95.66 | 1.90 | 96.02 | 2.00 | 95.92 | 1.8 | 96.12 | 2.5 | 95.42 |
| TH-8 | 103.03 | 103.75 | 6.68 | 97.07 | 7.25 | 96.50 | 6.90 | 96.85 | 7.43 | 96.32 | 6.68 | 97.07 | 7.00 | 96.75 | 6.6 | 97.15 | 7.105 | 96.65 |
| TH-9 | 98.96 | 99.80 | 2.38 | 97.42 | 2.75 | 97.05 | 2.62 | 97.18 | 3.05 | 96.75 | 2.42 | 97.38 | 2.63 | 97.17 | 2.38 | 97.42 | 2.84 | 96.96 |
| TH-10 | 95.60 | 96.10 | 1.45 | 94.65 | 1.28 | 94.82 | 1.63 | 94.47 | 1.64 | 94.46 | 1.40 | 94.70 | 1.40 | 94.70 | 1.32 | 94.78 | 1.55 | 94.55 |
| TH-11 | 96.25 | 97.51 | 1.74 | 95.77 | 1.74 | 95.77 | 1.83 | 95.68 | 1.92 | 95.59 | 1.73 | 95.78 | 1.75 | 95.76 | 1.7 | 95.81 | 1.8 | 95.71 |
| TH-12 | 98.25 | 99.00 | | | | | | | | | | | | | | | | |
| TH-13 | 97.08 | 98.11 | | | | | | | | | | | | | | | | |
| TH-14 | 104.18 | 105.26 | | | | | | | | | | | | | | | | |
| TP-3 | 97.50 | 97.80 | 0.91 | 96.89 | 1.24 | 96.56 | 1.14 | 96.66 | 1.51 | 96.29 | 0.79 | 97.01 | 1.00 | 96.80 | 0.7 | 97.10 | 1.26 | 96.54 |
| TP-5 | 97.71 | 98.12 | 1.10 | 97.02 | 1.42 | 96.70 | 1.26 | 98.86 | dry @1.58 | 96.54 | 0.95 | 97.17 | 1.23 | 96.89 | 0.9 | 97.22 | 1.4 | 96.72 |

**NOTES:**
1. WL means water level
2. MP means measuring point.
3. Elevations are based on onsite datum and assumed elevations provided in previous Annual Monitoring Reports
4 Units in meters below top of casing.
5. Units in meters above sea level (masl) using assumed elevations.
6. Water levels reported up to 2012 were summarized in the 2012 Annual Monitoring Report prepared by Genivar Inc.
7. na = Not Available
8. TH-12 reportedly installed by others in 2006. However, no measuring point or groundwater elevation data is available
9. TH-13 & TH-14 were installed by G&M in 2013

**Appendix G**
**Bentinck Waste Disposal Site**
**Water Level Monitoring Data**

| Test Well | Ground Elevation (m) | Measuring Point Elevation (m) | 13-May-98 | | 17-Dec-98 | | 7-Jul-00 | | 21-Dec-00 | | 11-Jul-01 | | 18-Oct-01 | | 18-Jun-02 | | 22-Oct-02 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) |
| TH-1 | 99.21 | 99.78 | dry @ 3.3 | <96.48 | dry @ 3.3 | <96.48 | dry @ 3.3 | <96.48 | dry @ 3.3 | <96.48 | dry | | 3.20 | 96.58 | 2.92 | 96.86 | 3.24 | 96.54 |
| TH-2 | 99.54 | 100.13 | 4.03 | 96.10 | 4.34 | 95.79 | 4.38 | 95.75 | 4.19 | 95.94 | 4.10 | 96.03 | 4.20 | 95.93 | 3.96 | 96.17 | 4.29 | 95.84 |
| TH-3 | 102.91 | 103.52 | 6.41 | 97.11 | 7.2 | 96.32 | 6.6 | 96.92 | 6.59 | 96.93 | 6.60 | 96.92 | 6.67 | 96.85 | 6.75 | 96.77 | 7.02 | 96.50 |
| TH-4 | 103.88 | 104.33 | 7.11 | 97.22 | 7.9 | 96.43 | 7.19 | 97.14 | 7.28 | 97.05 | 7.50 | 96.83 | 7.55 | 96.78 | 7.21 | 97.12 | 7.78 | 96.55 |
| TH-5A | 102.88 | 102.88 | 6.7 | 96.18 | 7.37 | 95.51 | 6.88 | 96.00 | 6.91 | 95.97 | 6.60 | 96.28 | 6.75 | 96.13 | 6.65 | 96.23 | 7.27 | 95.61 |
| TH-5B | 102.88 | 103.19 | 7 | 96.19 | 7.67 | 95.52 | 6.88 | 96.31 | 6.55 | 96.64 | 9.20 | 93.99 | 6.85 | 96.34 | 6.71 | 96.48 | 7.30 | 95.89 |
| TH-6 | 101.42 | 102.31 | 5.91 | 96.40 | 6.56 | 95.75 | 5.99 | 96.32 | 6.22 | 96.09 | 6.04 | 96.27 | 6.15 | 96.16 | 6.00 | 96.31 | 6.47 | 95.84 |
| TH-7 | 96.80 | 97.92 | 1.9 | 96.02 | 2.3 | 95.62 | 1.93 | 95.99 | 1.94 | 95.98 | 1.80 | 96.12 | 1.94 | 95.98 | 1.96 | 95.96 | 2.22 | 95.70 |
| TH-8 | 103.03 | 103.75 | 6.71 | 97.04 | 7.64 | 96.11 | 6.78 | 96.97 | 6.9 | 96.85 | 6.10 | 97.65 | 7.02 | 96.73 | 6.80 | 96.95 | 7.42 | 96.33 |
| TH-9 | 98.96 | 99.80 | 2.5 | 97.30 | 3.2 | 96.60 | 2.66 | 97.14 | 2.58 | 97.22 | -- | | -- | | 2.50 | 97.30 | 3.10 | 96.70 |
| TH-10 | 95.60 | 96.10 | 1.5 | 94.60 | 1.7 | 94.40 | 1.6 | 94.50 | 1.43 | 94.67 | 1.56 | 94.54 | 1.45 | 94.65 | 1.395 | 94.705 | 1.64 | 94.46 |
| TH-11 | 96.25 | 97.51 | 1.8 | 95.71 | 1.94 | 95.57 | 1.9 | 95.61 | 1.72 | 95.79 | 1.95 | 95.56 | 1.91 | 95.60 | 1.80 | 95.71 | 1.94 | 95.57 |
| TH-12 | 98.25 | 99.00 | | | | | | | | | | | | | | | | |
| TH-13 | 97.08 | 98.11 | | | | | | | | | | | | | | | | |
| TH-14 | 104.18 | 105.26 | | | | | | | | | | | | | | | | |
| TP-3 | 97.50 | 97.80 | 1 | 96.80 | 1.59 | 96.21 | 1.05 | 96.75 | -4 | - | -- | | -- | | 0.95 | 96.85 | 1.57 | 96.23 |
| TP-5 | 97.71 | 98.12 | 1.1 | 97.02 | 1.6 | 96.52 | 1.39 | 96.73 | 1.18 | 96.94 | 1.20 | 96.92 | dry | | 1.14 | 96.98 | dry | |

**NOTES:**
1. WL means water level
2. MP means measuring point.
3. Elevations are based on onsite datum and assumed elevations provided in previous Annual Monitoring Reports
4 Units in meters below top of casing.
5. Units in meters above sea level (masl) using assumed elevations.
6. Water levels reported up to 2012 were summarized in the 2012 Annual Monitoring Report prepared by Genivar Inc.
7. na = Not Available
8. TH-12 reportedly installed by others in 2006. However, no measuring point or groundwater elevation data is available
9. TH-13 & TH-14 were installed by G&M in 2013

**Appendix G**
**Bentinck Waste Disposal Site**
**Water Level Monitoring Data**

| Test Well | Ground Elevation (m) | Measuring Point Elevation (m) | 20-May-03 | | 1-Oct-03 | | 5-May-04 | | 29-Sep-04 | | 6-Apr-05 | | 21-Sep-05 | | 4-Apr-06 | | 25-Sep-06 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) |
| TH-1 | 99.21 | 99.78 | 2.90 | 96.88 | 3.10 | 96.68 | 2.80 | 96.98 | Dry | | Dry | | Dry | | Dry | | Dry | |
| TH-2 | 99.54 | 100.13 | 3.90 | 96.23 | 4.17 | 95.96 | 3.90 | 96.23 | 4.12 | 96.01 | 3.77 | 96.36 | 4.25 | 95.88 | 3.61 | 96.52 | 4.18 | 95.95 |
| TH-3 | 102.91 | 103.52 | 6.54 | 96.98 | 6.84 | 96.68 | 6.26 | 97.26 | 6.71 | 96.81 | 6.40 | 97.12 | 6.91 | 96.61 | 6.12 | 97.40 | 6.87 | 96.65 |
| TH-4 | 103.88 | 104.33 | 7.20 | 97.13 | 7.58 | 96.75 | 7.30 | 97.03 | 7.43 | 96.90 | 7.12 | 97.21 | 7.60 | 96.73 | 6.84 | 97.49 | 7.62 | 96.71 |
| TH-5A | 102.88 | 102.88 | 6.67 | 96.21 | 7.05 | 95.83 | 6.48 | 96.40 | 6.90 | 95.98 | 6.48 | 96.40 | 7.16 | 95.72 | 6.37 | 96.51 | 7.04 | 95.84 |
| TH-5B | 102.88 | 103.19 | 6.69 | 96.50 | 7.08 | 96.11 | 6.54 | 96.65 | 6.94 | 96.25 | 6.56 | 96.63 | 7.17 | 96.02 | 6.40 | 96.79 | 7.12 | 96.07 |
| TH-6 | 101.42 | 102.31 | 6.00 | 96.31 | 6.30 | 96.01 | 5.78 | 96.53 | 6.23 | 96.08 | 5.86 | 96.45 | 6.40 | 95.91 | 5.56 | 96.75 | 6.32 | 95.99 |
| TH-7 | 96.80 | 97.92 | 1.97 | 95.95 | 2.19 | 95.73 | 1.80 | 96.12 | 2.11 | 95.81 | 1.79 | 96.13 | 2.23 | 95.69 | 1.61 | 96.31 | 2.16 | 95.76 |
| TH-8 | 103.03 | 103.75 | 6.81 | 96.94 | 7.21 | 96.54 | 6.56 | 97.19 | 7.05 | 96.70 | 6.74 | 97.01 | 7.30 | 96.45 | 6.36 | 97.39 | 7.23 | 96.52 |
| TH-9 | 98.96 | 99.80 | 2.48 | 97.32 | 2.88 | 96.92 | 2.31 | 97.49 | 2.73 | 97.07 | 2.38 | 97.42 | 3.00 | 96.80 | 2.26 | 97.54 | 2.92 | 96.88 |
| TH-10 | 95.60 | 96.10 | 1.43 | 94.67 | 1.56 | 94.54 | 1.33 | 94.77 | 1.73 | 94.37 | 1.21 | 94.89 | 1.85 | 94.25 | 1.24 | 94.86 | 1.60 | 94.50 |
| TH-11 | 96.25 | 97.51 | 1.82 | 95.69 | 1.83 | 95.68 | 1.75 | 95.76 | 1.90 | 95.61 | 1.65 | 95.86 | 1.95 | 95.56 | 1.57 | 95.94 | 1.86 | 95.65 |
| TH-12 | 98.25 | 99.00 | | | | | | | | | | | | | | | | |
| TH-13 | 97.08 | 98.11 | | | | | | | | | | | | | | | | |
| TH-14 | 104.18 | 105.26 | | | | | | | | | | | | | | | | |
| TP-3 | 97.50 | 97.80 | 1.05 | 96.75 | 1.36 | 96.44 | 0.69 | 97.11 | 1.27 | 96.53 | 0.83 | 96.97 | Dry | | 1.29 | 96.51 | 1.48 | 96.32 |
| TP-5 | 97.71 | 98.12 | 1.15 | 96.97 | 1.59 | 96.53 | 0.96 | 97.16 | 1.44 | 96.68 | 0.98 | 97.14 | Dry | | 0.82 | 97.30 | Dry | |

**NOTES:**

1. WL means water level
2. MP means measuring point.
3. Elevations are based on onsite datum and assumed elevations provided in previous Annual Monitoring Reports
4 Units in meters below top of casing.
5. Units in meters above sea level (masl) using assumed elevations.
6. Water levels reported up to 2012 were summarized in the 2012 Annual Monitoring Report prepared by Genivar Inc.
7. na = Not Available
8. TH-12 reportedly installed by others in 2006. However, no measuring point or groundwater elevation data is available
9. TH-13 & TH-14 were installed by G&M in 2013

**Appendix G**
**Bentinck Waste Disposal Site**
**Water Level Monitoring Data**

| Test Well | Ground Elevation (m) | Measuring Point Elevation (m) | 13-Apr-07 | | 9-Oct-07 | | 15-Apr-08 | | 17-Sep-08 | | 30-Apr-09 | | 1-Oct-09 | | 12-May-10 | | 9-Nov-10 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) |
| TH-1 | 99.21 | 99.78 | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | |
| TH-2 | 99.54 | 100.13 | 3.66 | 96.47 | 4.27 | 95.86 | 3.50 | 96.63 | 4.00 | 96.13 | 3.70 | 96.43 | 4.08 | 96.05 | 4.01 | 96.12 | 4.03 | 96.10 |
| TH-3 | 102.91 | 103.52 | 6.12 | 97.40 | 6.96 | 96.56 | 5.85 | 97.67 | 6.61 | 96.91 | 6.20 | 97.32 | 6.76 | 96.76 | 6.25 | 97.27 | 6.63 | 96.89 |
| TH-4 | 103.88 | 104.33 | 6.80 | 97.53 | Not Sampled | | 6.64 | 97.69 | 7.35 | | 6.92 | 97.41 | 7.51 | 96.82 | 7.31 | 97.02 | 7.33 | 97.00 |
| TH-5A | 102.88 | 102.88 | 6.35 | 96.53 | 7.19 | 95.69 | 6.26 | 96.62 | 6.77 | 96.11 | 6.37 | 96.51 | 6.92 | 95.96 | 6.78 | 96.10 | 6.80 | 96.08 |
| TH-5B | 102.88 | 103.19 | 6.41 | 96.78 | 7.24 | 95.95 | Dry | | 6.85 | 96.34 | 6.42 | 96.77 | 6.98 | 96.21 | 6.84 | 96.35 | 6.57 | 96.62 |
| TH-6 | 101.42 | 102.31 | 5.59 | 96.72 | 6.42 | 95.89 | 5.39 | 96.92 | 6.11 | 96.20 | 5.66 | 96.65 | 6.21 | 96.10 | 6.11 | 96.20 | 6.18 | 96.13 |
| TH-7 | 96.80 | 97.92 | 1.68 | 96.24 | 2.24 | 95.68 | 1.60 | 96.32 | 2.00 | 95.92 | 1.73 | 96.19 | 2.05 | 95.87 | 2.00 | 95.92 | 1.99 | 95.93 |
| TH-8 | 103.03 | 103.75 | 6.34 | 97.41 | 7.36 | 96.39 | 6.24 | 97.51 | 6.96 | 96.79 | 6.48 | 97.27 | 7.14 | 96.61 | 6.93 | 96.82 | 6.97 | 96.78 |
| TH-9 | 98.96 | 99.80 | 2.25 | 97.55 | 3.05 | 96.75 | 2.17 | 97.63 | 2.59 | 97.21 | 2.27 | 97.53 | 2.72 | 97.08 | 2.60 | 97.20 | 2.61 | 97.19 |
| TH-10 | 95.60 | 96.10 | 1.30 | 94.80 | 1.79 | 94.31 | 1.26 | 94.84 | 1.45 | 94.65 | 1.41 | 94.69 | 1.58 | 94.52 | 1.62 | 94.48 | 1.64 | 94.46 |
| TH-11 | 96.25 | 97.51 | 1.62 | 95.89 | 1.95 | 95.56 | 1.56 | 95.95 | 1.77 | 95.74 | 1.66 | 95.85 | 1.80 | 95.71 | 1.84 | 95.67 | 1.80 | 95.71 |
| TH-12 | 98.25 | 99.00 | | | | | | | | | | | | | | | | |
| TH-13 | 97.08 | 98.11 | | | | | | | | | | | | | | | | |
| TH-14 | 104.18 | 105.26 | | | | | | | | | | | | | | | | |
| TP-3 | 97.50 | 97.80 | 1.32 | 96.48 | 1.52 | 96.28 | 1.23 | 96.57 | 1.1 | 96.70 | 0.67 | 97.13 | 1.19 | 96.61 | 1.18 | 96.62 | 1.20 | 96.60 |
| TP-5 | 97.71 | 98.12 | 0.83 | 97.29 | Dry | | 0.73 | 97.39 | 1.31 | 96.81 | 0.82 | 97.30 | 1.41 | 96.71 | 1.29 | 96.83 | 1.32 | 96.80 |

**NOTES:**
1. WL means water level
2. MP means measuring point.
3. Elevations are based on onsite datum and assumed elevations provided in previous Annual Monitoring Reports
4 Units in meters below top of casing.
5. Units in meters above sea level (masl) using assumed elevations.
6. Water levels reported up to 2012 were summarized in the 2012 Annual Monitoring Report prepared by Genivar Inc.
7. na = Not Available
8. TH-12 reportedly installed by others in 2006. However, no measuring point or groundwater elevation data is available
9. TH-13 & TH-14 were installed by G&M in 2013

**Appendix G**
**Bentinck Waste Disposal Site**
**Water Level Monitoring Data**

| Test Well | Ground Elevation (m) | Measuring Point Elevation (m) | 2-May-11 | | 21-Sep-11 | | 12-Apr-12 | | 22-Nov-12 | | 7-May-13 | | 26-Nov-13 | | 1-May-14 | | 4-Nov-14 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) |
| TH-1 | 99.21 | 99.78 | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | |
| TH-2 | 99.54 | 100.13 | 3.70 | 96.43 | 4.18 | 95.95 | 3.91 | 96.22 | 4.13 | 96.00 | na | | 3.79 | 96.34 | 3.56 | 96.57 | 4.00 | 96.13 |
| TH-3 | 102.91 | 103.52 | 6.25 | 97.27 | 6.83 | 96.69 | 6.43 | 97.09 | 6.86 | 96.66 | 6.10 | 97.42 | 6.25 | 97.27 | 6.01 | 97.51 | 6.57 | 96.95 |
| TH-4 | 103.88 | 104.33 | 6.96 | 97.37 | 7.55 | 96.78 | 7.13 | 97.20 | 7.61 | 96.72 | 6.86 | 97.47 | 6.95 | 97.38 | 6.71 | 97.62 | 7.29 | 97.04 |
| TH-5A | 102.88 | 102.88 | 6.41 | 96.47 | 7.02 | 95.86 | 6.60 | 96.28 | 7.02 | 95.86 | 6.38 | 96.50 | 6.43 | 96.45 | 6.30 | 96.58 | 6.70 | 96.18 |
| TH-5B | 102.88 | 103.19 | 6.45 | 96.74 | 7.07 | 96.12 | 6.64 | 96.55 | 7.10 | 96.09 | 6.43 | 96.76 | 6.48 | 96.71 | 6.24 | 96.95 | 6.77 | 96.42 |
| TH-6 | 101.42 | 102.31 | 5.73 | 96.58 | 6.32 | 95.99 | 5.96 | 96.35 | 6.29 | 96.02 | 5.66 | 96.65 | 5.75 | 96.56 | 5.47 | 96.84 | 6.09 | 96.22 |
| TH-7 | 96.80 | 97.92 | 1.75 | 96.17 | 2.15 | 95.77 | 1.89 | 96.03 | 2.13 | 95.79 | 1.78 | 96.14 | 1.78 | 96.14 | 1.64 | 96.28 | 1.98 | 95.94 |
| TH-8 | 103.03 | 103.75 | 6.56 | 97.19 | 7.18 | 96.57 | 6.72 | 97.03 | 7.24 | 96.51 | 6.39 | 97.36 | 6.51 | 97.24 | 6.24 | 97.51 | 6.87 | 96.88 |
| TH-9 | 98.96 | 99.80 | 2.30 | 97.50 | 2.85 | 96.95 | 2.45 | 97.35 | 2.92 | 96.88 | 2.29 | 97.51 | 2.33 | 97.47 | 2.19 | 97.61 | 2.58 | 97.22 |
| TH-10 | 95.60 | 96.10 | 1.45 | 94.65 | 1.77 | 94.33 | 1.57 | 94.53 | 1.71 | 94.39 | 1.58 | 94.52 | 1.51 | 94.59 | 1.40 | 94.70 | 1.68 | 94.42 |
| TH-11 | 96.25 | 97.51 | 1.67 | 95.84 | 1.88 | 95.63 | 1.78 | 95.73 | 1.87 | 95.64 | na | | 1.68 | 95.83 | 1.60 | 95.91 | 1.79 | 95.72 |
| TH-12 | 98.25 | 99.00 | | | | | | | | | | | 2.78 | 96.22 | 2.64 | 96.36 | 2.96 | 96.04 |
| TH-13 | 97.08 | 98.11 | | | | | | | | | | | 2.20 | 95.91 | 2.03 | 96.08 | 2.32 | 95.79 |
| TH-14 | 104.18 | 105.26 | | | | | | | | | | | 7.90 | 97.36 | 7.67 | 97.59 | 8.19 | 97.07 |
| TP-3 | 97.50 | 97.80 | 0.71 | 97.09 | 1.32 | 96.48 | 0.98 | 96.82 | 1.34 | 96.46 | 0.75 | 97.05 | 0.83 | 96.97 | 0.48 | 97.32 | 1.09 | 96.71 |
| TP-5 | 97.71 | 98.12 | 0.86 | 97.26 | Dry | | 1.12 | 97.00 | Dry | | 0.90 | 97.22 | 0.97 | 97.15 | 0.71 | 97.41 | 1.27 | 96.85 |

**NOTES:**

1. WL means water level
2. MP means measuring point.
3. Elevations are based on onsite datum and assumed elevations provided in previous Annual Monitoring Reports
4 Units in meters below top of casing.
5. Units in meters above sea level (masl) using assumed elevations.
6. Water levels reported up to 2012 were summarized in the 2012 Annual Monitoring Report prepared by Genivar Inc.
7. na = Not Available
8. TH-12 reportedly installed by others in 2006. However, no measuring point or groundwater elevation data is available
9. TH-13 & TH-14 were installed by G&M in 2013

**Appendix G**
**Bentinck Waste Disposal Site**
**Water Level Monitoring Data**

| Test Well | Ground Elevation (m) | Measuring Point Elevation (m) | 20-Apr-15 | | 3-Nov-15 | | 20-Apr-16 | | 26-Oct-16 | | 16-May-17 | | 27-Nov-17 | | 10-Apr-18 | | 15-Nov-18 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) |
| TH-1 | 99.21 | 99.78 | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | |
| TH-2 | 99.54 | 100.13 | 3.83 | 96.30 | 4.16 | 95.97 | 3.61 | 96.52 | 4.23 | 95.90 | 3.74 | 96.39 | 3.84 | 96.29 | 3.85 | 96.29 | 4.02 | 96.11 |
| TH-3 | 102.91 | 103.52 | 6.47 | 97.05 | 6.89 | 96.63 | 5.98 | 97.54 | 7.00 | 96.52 | 6.13 | 97.39 | 0.82 | 102.70 | 6.37 | 97.15 | 6.71 | 96.81 |
| TH-4 | 103.88 | 104.33 | 7.16 | 97.17 | 7.61 | 96.72 | 5.52 | 98.81 | 7.51 | 96.82 | 6.93 | 97.40 | 7.07 | 97.26 | 7.07 | 97.26 | 7.47 | 96.86 |
| TH-5A | 102.88 | 102.88 | 6.58 | 96.30 | 7.51 | 95.37 | 6.62 | 96.26 | 7.19 | 95.69 | 6.58 | 96.30 | 6.55 | 96.34 | 6.56 | 96.32 | 6.81 | 96.07 |
| TH-5B | 102.88 | 103.19 | 6.65 | 96.54 | 7.10 | 96.09 | 6.33 | 96.86 | 7.23 | 95.96 | 6.41 | 96.78 | 6.49 | 96.70 | 6.64 | 96.55 | 6.87 | 96.32 |
| TH-6 | 101.42 | 102.31 | 5.95 | 96.36 | 6.32 | 95.99 | 5.52 | 96.79 | 6.39 | 95.92 | 5.63 | 96.68 | 5.86 | 96.45 | 5.88 | 96.43 | 6.18 | 96.13 |
| TH-7 | 96.80 | 97.92 | 1.90 | 96.02 | 2.17 | 95.75 | 1.65 | 96.27 | 1.18 | 96.74 | 1.77 | 96.15 | 1.84 | 96.08 | 1.85 | 96.07 | 2.02 | 95.90 |
| TH-8 | 103.03 | 103.75 | 6.75 | 97.00 | 7.32 | 96.43 | 6.25 | 97.50 | 7.36 | 96.39 | 3.41 | 100.34 | 6.65 | 97.10 | 6.66 | 97.09 | 7.09 | 96.66 |
| TH-9 | 98.96 | 99.80 | 2.45 | 97.35 | 2.98 | 96.82 | 2.20 | 97.60 | 3.05 | 96.75 | 2.29 | 97.51 | 2.40 | 97.40 | 2.41 | 97.39 | 2.71 | 97.09 |
| TH-10 | 95.60 | 96.10 | 1.48 | 94.62 | 1.87 | 94.23 | 1.55 | 94.55 | 1.19 | 94.91 | 1.70 | 94.40 | 2.60 | 93.50 | 1.48 | 94.62 | 1.72 | 94.38 |
| TH-11 | 96.25 | 97.51 | 1.96 | 95.55 | 1.87 | 95.64 | 1.64 | 95.87 | 1.94 | 95.57 | 1.69 | 95.82 | 1.72 | 95.79 | 1.73 | 95.78 | 1.81 | 95.70 |
| TH-12 | 98.25 | 99.00 | 2.83 | 96.17 | 3.08 | 95.92 | 2.65 | 96.35 | 3.15 | 95.85 | 2.75 | 96.25 | 2.83 | 96.17 | 2.84 | 96.16 | 2.97 | 96.03 |
| TH-13 | 97.08 | 98.11 | 2.22 | 95.89 | 2.42 | 95.69 | 2.09 | 96.02 | 2.47 | 95.64 | 2.18 | 95.93 | 2.21 | 95.90 | 2.21 | 95.90 | 2.18 | 95.93 |
| TH-14 | 104.18 | 105.26 | 8.10 | 97.16 | 8.58 | 96.68 | 7.67 | 97.59 | 8.65 | 96.61 | 7.77 | 97.49 | 7.99 | 97.27 | 7.99 | 97.27 | 8.36 | 96.90 |
| TP-3 | 97.50 | 97.80 | 0.98 | 96.82 | 1.37 | 96.43 | 2.68 | 95.12 | 1.26 | 96.54 | 0.80 | 97.00 | 0.82 | 96.98 | 0.92 | 96.88 | - | |
| TP-5 | 97.71 | 98.12 | 1.09 | 97.03 | 1.53 | 96.59 | 0.75 | 97.37 | Dry | | 0.93 | 97.19 | 1.06 | 97.06 | 1.06 | 97.06 | 1.45 | 96.67 |

**NOTES:**
1. WL means water level
2. MP means measuring point.
3. Elevations are based on onsite datum and assumed elevations provided in previous Annual Monitoring Reports
4 Units in meters below top of casing.
5. Units in meters above sea level (masl) using assumed elevations.
6. Water levels reported up to 2012 were summarized in the 2012 Annual Monitoring Report prepared by Genivar Inc.
7. na = Not Available
8. TH-12 reportedly installed by others in 2006. However, no measuring point or groundwater elevation data is available
9. TH-13 & TH-14 were installed by G&M in 2013

**Appendix G**
**Bentinck Waste Disposal Site**
**Water Level Monitoring Data**

| Test Well | Ground Elevation (m) | Measuring Point Elevation (m) | 24-Apr-19 | | 20-Nov-19 | | 13-May-20 | | 12-Nov-20 | | 13-May-20 | | 12-Nov-20 | | 8-Apr-21 | | 7-Oct-21 | | 3-May-22 | | 29-Sep-22 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) | WL below MP (m) | WL Elevation (m) |
| TH-1 | 99.21 | 99.78 | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | | Dry | |
| TH-2 | 99.54 | 100.13 | 3.83 | 96.30 | 4.09 | 96.04 | 3.95 | 96.18 | 4.17 | 95.96 | 3.95 | 96.18 | 4.17 | 95.96 | 3.51 | 96.62 | 3.98 | 96.15 | 3.83 | 96.30 | 4.12 | 96.01 |
| TH-3 | 102.91 | 103.52 | 6.25 | 97.27 | 6.84 | 96.68 | 6.41 | 97.11 | 6.94 | 96.58 | 6.41 | 97.11 | 6.94 | 96.58 | 6.52 | 97.00 | 6.60 | 96.92 | 6.35 | 97.17 | 6.74 | 96.78 |
| TH-4 | 103.88 | 104.33 | 6.93 | 97.40 | 7.57 | 96.76 | 7.17 | 97.16 | Dry | | 7.17 | 97.16 | Dry | | 7.15 | 97.18 | Dry | | 7.00 | 97.33 | 7.45 | 96.88 |
| TH-5A | 102.88 | 102.88 | 6.35 | 96.53 | 6.96 | 95.92 | 6.60 | 96.28 | 7.07 | 95.81 | 6.60 | 96.28 | 7.07 | 95.81 | 6.57 | 96.31 | 6.76 | 96.12 | Dry | | - | |
| TH-5B | 102.88 | 103.19 | 6.41 | 96.78 | 7.01 | 96.18 | 4.47 | 98.72 | 7.10 | 96.09 | 4.47 | 98.72 | 7.10 | 96.09 | 6.68 | 96.51 | 6.73 | 96.46 | 6.50 | | - | |
| TH-6 | 101.42 | 102.31 | 5.63 | 96.68 | 6.23 | 96.08 | 5.90 | 96.41 | 6.29 | 96.02 | 5.90 | 96.41 | 6.29 | 96.02 | 5.84 | 96.47 | 6.04 | 96.27 | 5.68 | 96.63 | 6.18 | 96.13 |
| TH-7 | 96.80 | 97.92 | 1.78 | 96.14 | 2.12 | 95.80 | 1.93 | 95.99 | 2.16 | 95.76 | 1.93 | 95.99 | 2.16 | 95.76 | 1.95 | 95.97 | 1.98 | 95.94 | 1.85 | 96.07 | 2.07 | 95.85 |
| TH-8 | 103.03 | 103.75 | 6.52 | 97.23 | 7.22 | 96.53 | 6.71 | 97.04 | 7.38 | 96.37 | 6.71 | 97.04 | 7.38 | 96.37 | 6.75 | 97.00 | 6.96 | 96.79 | 6.63 | 97.12 | 7.09 | 96.66 |
| TH-9 | 98.96 | 99.80 | 2.25 | 97.55 | 2.86 | 96.94 | 2.46 | 97.34 | 2.97 | 96.83 | 2.46 | 97.34 | 2.97 | 96.83 | 2.48 | 97.32 | 2.67 | 97.13 | 2.39 | 97.41 | 2.78 | 97.02 |
| TH-10 | 95.60 | 96.10 | 1.68 | 94.42 | 1.73 | 94.37 | 1.67 | 94.43 | 1.86 | 94.24 | 1.67 | 94.43 | 1.86 | 94.24 | 1.68 | 94.42 | 1.75 | 94.35 | 1.85 | 94.25 | - | |
| TH-11 | 96.25 | 97.51 | 1.64 | 95.87 | 1.84 | 95.67 | 1.72 | 95.79 | 1.87 | 95.64 | 1.72 | 95.79 | 1.87 | 95.64 | 1.75 | 95.76 | 1.80 | 95.71 | - | | 1.85 | 95.66 |
| TH-12 | 98.25 | 99.00 | 2.67 | 96.33 | 3.03 | 95.97 | 2.88 | 96.12 | 3.09 | 95.91 | 2.88 | 96.12 | 3.09 | 95.91 | 2.83 | 96.17 | 2.96 | 96.04 | 2.81 | 96.19 | 3.05 | 95.95 |
| TH-13 | 97.08 | 98.11 | 2.07 | 96.04 | 2.37 | 95.74 | 2.11 | 96.00 | 2.42 | 95.69 | 2.11 | 96.00 | 2.42 | 95.69 | 2.22 | 95.89 | 2.32 | 95.79 | 1.21 | 96.90 | 2.38 | 95.73 |
| TH-14 | 104.18 | 105.26 | 7.86 | 97.40 | 8.49 | 96.77 | 8.04 | 97.22 | 8.67 | 96.59 | 8.04 | 97.22 | 8.67 | 96.59 | 8.11 | 97.15 | 8.30 | 96.96 | 7.96 | 97.30 | 8.40 | 96.86 |
| TP-3 | 97.50 | 97.80 | - | | - | | - | | - | | - | | - | | - | | - | | - | | - | |
| TP-5 | 97.71 | 98.12 | 0.83 | 97.29 | 1.49 | 96.63 | 1.13 | 96.99 | Dry | | 1.13 | 96.99 | Dry | | 0.99 | 97.13 | Dry | | 1.05 | 97.07 | Dry | |

**NOTES:**
1. WL means water level
2. MP means measuring point.
3. Elevations are based on onsite datum and assumed elevations provided in previous Annual Monitoring Reports
4 Units in meters below top of casing.
5. Units in meters above sea level (masl) using assumed elevations.
6. Water levels reported up to 2012 were summarized in the 2012 Annual Monitoring Report prepared by Genivar Inc.
7. na = Not Available
8. TH-12 reportedly installed by others in 2006. However, no measuring point or groundwater elevation data is available
9. TH-13 & TH-14 were installed by G&M in 2013

# APPENDIX H:
# BOREHOLE LOGS/MONITORING WELL CONSTRUCTION DETAILS

Ontario Environment

# WATER WELL RECORD

| | | | |
|---|---|---|---|
| Grey | Twp. of Bentinck | Con. 7 | 16 |
| Twp. of Bentinck | R.R. # 1, ELMWOOD, Ont., N0G 1S0 | 13 - 02 - 84 | |

## LOG OF OVERBURDEN AND BEDROCK MATERIALS

| General Colour | Most common material | Other materials | General description | Depth (ft) From | To |
|---|---|---|---|---|---|
| | sand | | | 0 | 6 |
| | gravel | | | 6 | 7 |
| | sand | & gravel | | 7 | 10 |
| | gravel | | | 10 | 15 |
| | gravel | & sand | | 15 | 20 |
| | gravel | & clay | | 20 | 23 |

Obs. Well 1

## WATER RECORD

## CASING & OPEN HOLE RECORD

| | | | | From | To |
|---|---|---|---|---|---|
| 5 | | | plastic pipe | 0 | 23 |

## SCREEN

| | | | |
|---|---|---|---|
| hacksaw | 1.6 | 4 | |
| plastic pipe | | 19 | |

## PLUGGING & SEALING RECORD

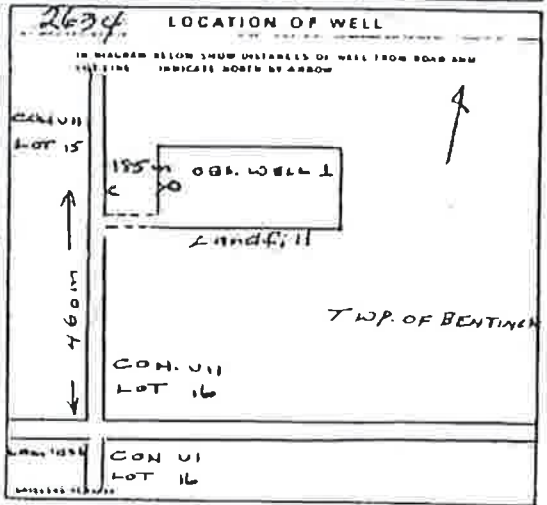
## PUMPING TEST

No test

5.69

## LOCATION OF WELL

2634




| | |
|---|---|
| FINAL STATUS OF WELL | ☐ water supply ☒ observation well ☐ test hole ☐ dewatered well ☐ abandoned, insufficient supply ☐ abandoned, poor quality ☐ monitoring |
| WATER USE | ☐ domestic ☐ commercial ☐ stock ☐ municipal ☐ irrigation ☐ public supply ☐ industrial ☐ cooling or air conditioning ☐ other ☐ not used |
| METHOD OF DRILLING | ☐ cable tool ☐ diamond ☐ boring ☐ rotary (conventional) ☐ jetting ☐ rotary (reverse) ☐ digging ☐ rotary (air) ☐ driving ☐ air percussion |

## CONTRACTOR

HIGHLAND WELL DRILLING — 2576

293 Garafraxa St.S., DURHAM, Ontario

Erich Wilson — 5478

1 - 06 - 84

CONTRACTOR'S COPY

## OFFICE USE ONLY

of the Environment
Ontario

# WATER WELL RECORD

| County or District | Township, Village, Town or City | Concession | Lot |
|---|---|---|---|
| Grey | Twp. of Bentinck | Con. 7 | 16 |
| **Township of Bentinck** | **R.R.#1, ELMWOOD, Ontario, N0G 1S0** | **Date Completed** 21 02 84 | |

## LOG OF OVERBURDEN AND BEDROCK MATERIALS

| Depth From | Depth To | General Colour | Most common material | Other materials | General Description |
|---|---|---|---|---|---|
| 0 | 1 | | topsoil | | |
| 1 | 8 | | sand | & gravel | |
| 8 | 16 | | gravel | | |
| 16 | 36 | | gravel | & sand | |
| 36 | 42 | | clay | & gravel | |

Obs. Well 5 - Piezo. 5A & 5B

## WATER RECORD

| Water found at Depth | Kind of Water |
|---|---|
| 16 | X Fresh ☐ Salty ☐ Sulphur ☐ Mineral |
| 42 | X Fresh ☐ Salty ☐ Sulphur ☐ Mineral |

## CASING & OPEN HOLE RECORD

| Inside Diameter | Material | Weight | Depth From | Depth To |
|---|---|---|---|---|
| 5 | X Steel ☐ Galvanized ☐ Concrete ☐ Plastic ☐ Fibreglass ☐ Open hole | 0.188 | +3 | 22 |

## SCREEN

| Make | Model | Diameter | Type |
|---|---|---|---|
| hacksaw | 1.5 | 4 | |
| plastic pipe | 27 | Ft. | |

## PLUGGING & SEALING RECORD

| Depth Set at | Material and Type | Length | Diameter |
|---|---|---|---|
| | | | |

## PUMPING TEST

No test

| Static Level | Pumping Level | Time | Water Level |
|---|---|---|---|
| 20.52 | 21.92 | | |

## FINAL STATUS OF WELL

X Observation Well ☐ Water Supply ☐ Abandoned, Insufficient Supply ☐ Abandoned, Poor Quality ☐ Test Hole ☐ Recharge Well ☐ Dewatering Well ☐ Abandoned, Other

## WATER USE

☐ Domestic ☐ Commercial ☐ Stock ☐ Municipal ☐ Irrigation ☐ Public Supply ☐ Industrial ☐ Cooling or Air Conditioning ☐ Other ☐ Not Used

## METHOD OF DRILLING

X Cable Tool ☐ Auger ☐ Rotary (Conventional) ☐ Boring ☐ Rotary (Reverse) ☐ Diamond ☐ Jetting ☐ Driving ☐ Digging ☐ Air Percussion

## CONTRACTOR

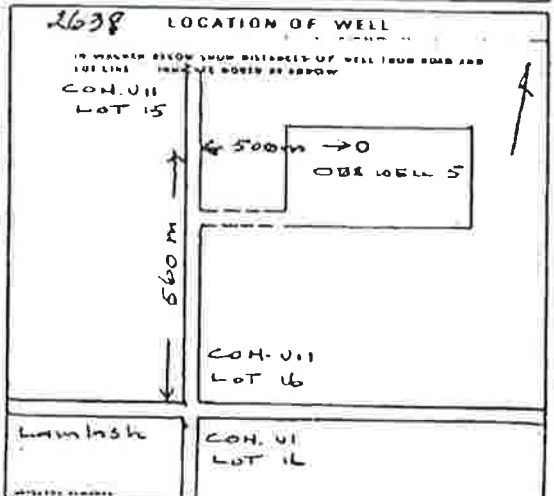
| Name of Well Contractor | Contractor's Licence No. |
|---|---|
| HIGHLAND WELL DRILLING | 2576 |
| **Address** 293 Garafraxa St.S., Durham, Ont. | |
| **Name of Well Technician** Erich Wilson | **Technician's Licence No.** 5478 |
| **Signature of Technician and Contractor** | **Date Completed** 1 06 84 |

CONTRACTOR'S COPY

## LOCATION OF WELL

2638

In which lot or township show distances of well from road and lot line. Indicate north by arrow.




## OFFICE USE ONLY

Ontario Ministry of the Environment

# WATER WELL RECORD

| | | | |
|---|---|---|---|
| Grey | Twp. of Bentinck | Con. 7 | Lot 16 |
| Twp.of Bentinck | R.R.#1, ELMWOOD, Ont., N0G 1S0 | | 09 02 84 |

## LOG OF OVERBURDEN AND BEDROCK MATERIALS

| Colour | Material | Other Materials | General Description | Depth (ft) From | Depth (ft) To |
|---|---|---|---|---|---|
| | sand | | | 0 | 8 |
| | sand | & gravel & clay | | 8 | 12 |
| | sand | & gravel | | 12 | 21 |

Obs. Well 2

## WATER RECORD

| Water Found At Depth | Kind of Water |
|---|---|
| | X Fresh ☐ Salty ☐ Sulphur ☐ Mineral |

## CASING & OPEN HOLE RECORD

| Inside Diameter | Material | Depth (ft) From | Depth (ft) To |
|---|---|---|---|
| 5 | X Plastic | 0 | 26 |

## SCREEN

| Material | Diameter | Slot No. |
|---|---|---|
| hacksaw | 1.5 | 4 |
| plastic pipe | Depth to Top (ft) 17 | |

## PLUGGING & SEALING RECORD

## PUMPING TEST

No test

Static Water Level: 10.52

## FINAL STATUS OF WELL

X Observation Well

## WATER USE

☐ Domestic ☐ Commercial ☐ Municipal ☐ Public Supply ☐ Cooling or Air Conditioning ☐ Other ☐ Not Used

## METHOD OF DRILLING

X Cable Tool ☐ Diamond ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air Percussion

## LOCATION OF WELL

2635

CON. VII LOT 15

>0 OBS. WELL #2

landfill

TWP OF BENTINCK

760 ft

CON. VII LOT 16

Lambash

CON. VI LOT 16

## CONTRACTOR

HIGHLAND WELL DRILLING

2576

293 Garafraxa St. S., DURHAM, Ont.

Erich Wilson

5478

1 06 85

CONTRACTOR'S COPY

OFFICE USE ONLY

of the Environment
Ontario

# WATER WELL RECORD

| | | | |
|---|---|---|---|
| Grey | Twp. of Bentinck | Con. 7 | 16 |
| Twp. of Bentinck | R.R.#1, ELMWOOD, Ont., NOG 1S0 | | 14 02 84 |

## LOG OF OVERBURDEN AND BEDROCK MATERIALS

| GENERAL COLOUR | MOST COMMON MATERIAL | OTHER MATERIALS | GENERAL DESCRIPTION | DEPTH FEET | |
|---|---|---|---|---|---|
| | topsoil | & gravel | | 0 | 2 |
| | sand | | | 2 | 5 |
| | gravel | | | 5 | 10 |
| | sand | & gravel | | 10 | 18 |
| | sand | | | 18 | 19 |
| | sand | & gravel | | 19 | 26 |

Obs. Well 3

## WATER RECORD

| | | | | | | |
|---|---|---|---|---|---|---|
| 18 | X | | | | | |

## CASING & OPEN HOLE RECORD

| | | | | |
|---|---|---|---|---|
| 5 | | | 0 | 26 |
| | A | | plastic pipe | |

## SCREEN

| | | | |
|---|---|---|---|
| Jackson | | 1.5 | 4 |
| plastic pipe | | 22 | |

## PLUGGING & SEALING RECORD

## PUMPING TEST

NO test

18 89

## FINAL STATUS OF WELL

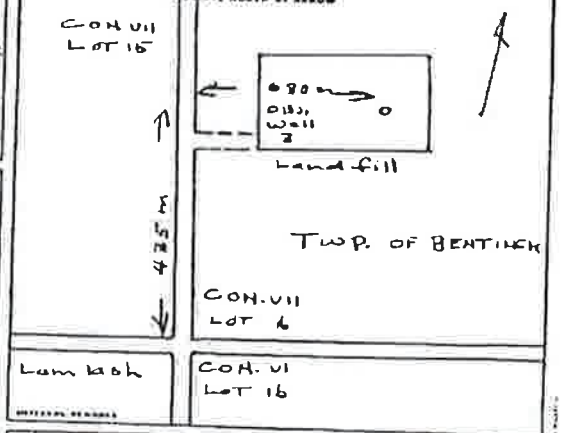
X Observation well

## WATER USE

## METHOD OF DRILLING

X Cable tool

## 2636 LOCATION OF WELL




## CONTRACTOR

HIGHLAND WELL DRILLING — 2576

293 Garafraxa St. S., DURHAM, Ontario

Erich Wilson — 5478

1 06 84

CONTRACTOR'S COPY

## OFFICE USE ONLY

Ministry of the Environment

Ontario

The Ontario Water Resources Act

# WATER WELL RECORD

| | | | |
|---|---|---|---|
| County or District: Grey | Township, Village, Town, Borough or City: Twp. of Bentinck | Lot: Con. 7 | 16 |
| Township, Village, Town, Borough or City: Twp. of Bentinck | Address of Well Location: R.R.#1, ELMWOOD, Ontario, NOG 1SO | Date Completed: 16 02 82 | |

## LOG OF OVERBURDEN AND BEDROCK MATERIALS

| General Colour | Most Common Material | Other Materials | General Description | Depth From | Depth To |
|---|---|---|---|---|---|
| | topsoil | | | 0 | 1 |
| | sand, | & gravel, | | 1 | 15 |
| | sand | | | 15 | 17 |
| | gravel | & sand | | 17 | 26 |

Obs. Well 4

## WATER RECORD

| Water Found at Depth | Kind of Water |
|---|---|
| 15 | Fresh |

## CASING & OPEN HOLE RECORD

| Inside Diameter | Material | Weight | Depth From | Depth To |
|---|---|---|---|---|
| 5 | Steel | | 0 | 26 |
| | | | plastic pipe | |

## SCREEN

| Make | Slot No. | Diameter |
|---|---|---|
| hacksaw | 1.5 | 4 |
| plastic pipe | | 22 |

## PLUGGING & SEALING RECORD

## PUMPING TEST

No test

22.4.2.

## FINAL STATUS OF WELL

Water Supply

## WATER USE

Domestic

## METHOD OF DRILLING

Rotary (Conventional)

## CONTRACTOR

HIGHLAND WELL DRILLING — 2576

293 Garafraxa St.S., DURHAM, Ontario

Erich Wilson — 5478

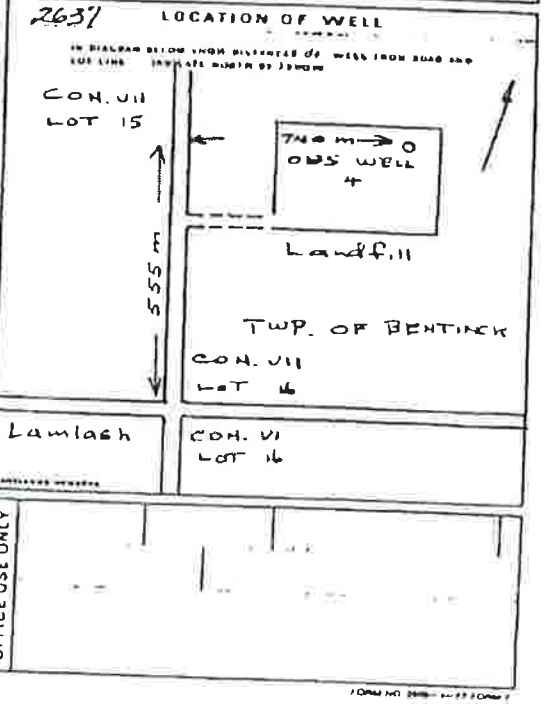
1 06 82

CONTRACTOR'S COPY

## OFFICE USE ONLY

## LOCATION OF WELL

2637



GAMSBY AND MANNEROW LIMITED
people engineering environments
Guelph, Owen Sound, Listowel, Kitchener, Exeter
1260 Second Avenue East, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gamsby.com

# MONITORING WELL ID: TH-13



**CLIENT** Municipality of West Grey
**PROJECT NAME** Bentinck Landfill Site
**PROJECT NUMBER** 213085
**PROJECT LOCATION** West Grey
**DATE COMPLETED** 09/30/13
**CONTRACTOR** London Soil Test
**LOGGED BY** ALE
**METHOD** Hollow Stem Auger
**WELL CONSTRUCTION** 2" PVC
**NOTES**

| DEPTH (m) | DEPTH (ft) | ELEVATION (m) | SAMPLE TYPE NUMBER | RECOVERY % | BLOW COUNTS (N VALUE) | SPT N VALUE 20 40 60 80 | GRAPHIC LOG | MATERIAL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | -2 | | | | | | | |
| | -1 | | | | | | | |
| 0 | 0 | | | | | | | 0.00 Ground Surface |
| | 1 | | | | | | | Light brown sandy topsoil with plant roots and rootlets. |
| | 2 | | | | | | | 0.30 Light brown sand and gravel with fines. dry. |
| 1 | 3 | | | | | | | |
| | 4 | | | | | | | |
| | 5 | | | | | | | |
| | 6 | | SS 1 | 50 | 6-7-9-9 (16) | | | |
| 2 | 7 | | | | | | | |
| | 8 | | | | | | | |
| | 9 | | | | | | | |
| 3 | 10 | | | | | | | 3.05 |
| | 11 | | SS 2 | 55 | 3-6-7-3 (13) | | | Light brown coarse sand with some fines. Wet. |
| | 12 | | | | | | | |
| 4 | 13 | | | | | | | |
| | 14 | | | | | | | |
| | 15 | | | | | | | |
| | 16 | | SS 3 | 100 | 10-13-14-10 (27) | | | |
| 5 | 17 | | | | | | | |
| | 18 | | | | | | | |

WELL DIAGRAM

- Concrete Seal
- Native sand and gravel
- Bentonite Seal
- Water Level 2.38 m below TOC (recorded on 09/30/13)
- Silica Sand Filter Pack
- 10 ft slotted screen riser
- Native sand blow back into base of well.

Borehole Terminated at 5.49 m.

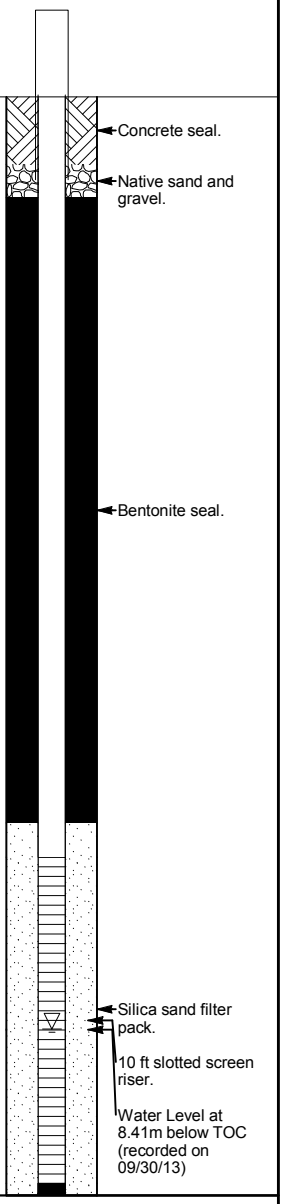
GAMSBY AND MANNEROW LIMITED
people engineering environments
Guelph, Owen Sound, Listowel, Kitchener, Exeter
1260 Second Avenue East, Owen Sound, ON N4K 2J3
519-376-1805 Fax 519-376-8977 www.gamsby.com

# MONITORING WELL ID: TH-14



**CLIENT** Municipality of West Grey
**PROJECT NAME** Bentinck Landfill Site
**PROJECT NUMBER** 213085
**PROJECT LOCATION** West Grey
**DATE COMPLETED** 09/30/13
**CONTRACTOR** London Soil Test
**LOGGED BY** ALE
**METHOD** Hollow Stem Auger
**WELL CONSTRUCTION** 2" PVC
**NOTES**

| DEPTH (m) | DEPTH (ft) | ELEVATION (m) | SAMPLE TYPE NUMBER | RECOVERY % | BLOW COUNTS (N VALUE) | SPT N VALUE 20 40 60 80 | GRAPHIC LOG | MATERIAL DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 0.00 Ground Surface |
| | | | | | | | | 0.15 Light brown silty clay with stones. Dry. |
| | | | | | | | | Refuse and black organics. Moist. |
| | | | | | | | | 6.10 |
| | | | SS 1 | 55 | 14-15 (29) | | | Light grey coarse sand with fines. Leachate odour observed. Moist. |
| | | | SS 2 | 85 | 10-8-10-11 (18) | | | Becoming wet at 8.23 m bgs. |
| | | | SS 3 | 100 | 8-10 (18) | | | |




Borehole Terminated at 9.91 m.