May 14, 2024

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**Subject: 2023 Annual Monitoring Report
Peterborough County/City Waste Management Facility**

This annual report was prepared pursuant to Conditions 10(18) and 10(19) of Amended Environmental Compliance Approval No. A341508 governing operation of the Peterborough County/City Waste Management Facility for the reporting period of January 1, 2023 to December 31, 2023.

If you have any questions, please contact me at 289-678-0344 or by e-mail at Ishrak.Hasan@wsp.com.

Yours sincerely,

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2023 ANNUAL MONITORING REPORT

Peterborough County/City Waste Management Facility

County/City of Peterborough

Project No.: CA0008825.1917
Date: May 2024

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TABLES

FIGURES

APPENDICES

References to Conditions of Environmental Compliance Approval No. A341508

Condition No.	Condition Description	Location in Report
10(19) a. i)	An updated Landfill site plan showing the areas of fill, buffer zones, present contours, monitoring locations and surface water control systems;	Figure 2.1
10(19) a. ii)	A calculation of the remaining capacity of the Landfill, an estimate of the remaining Landfill life and a comparison of actual capacity used to approved Landfill capacity;	Table 2.4
10(19) a. iii)	The optimization of remaining Landfill capacity with respect to refining final contours, having regard to minimizing the potential for off-site impacts;	Section 2 and Figure 2.2
10(19) a. iv)	Approved changes to the operation of the Landfill;	Section 3
10(19) a. v)	Procedures at the Landfill;	Section 3
10(19) a. vi)	Areas of landfilling operation during the reporting period;	Section 3 and Figure 2.1
10(19) a. vii)	Areas of intended operation during the next reporting period;	Section 3
10(19) a. viii)	Areas of excavation during the reporting period;	Section 3
10(19) a. ix)	The progress of final cover, vegetative cover, and any intermediate cover application;	Section 3 and Figure 2.1
10(19) a. x)	Calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Landfill during the reporting period and a calculation of the total volume of Landfill capacity used during the reporting period;	Section 2 and Table 2.4
10(19) a. xi)	Calculations of the amount of contaminated soil used as alternative cover at the Landfill;	Section 2

Condition No.	Condition Description	Location in Report
10(19) a. xii)	The amount of contaminated soil stored at the Landfill at the end of the previous year;	Section 2
10(19) a. xiii)	Summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Landfill;	Section 2
10(19) a. xiv)	A summary of recycling efforts undertaken at the Public Drop-Off and Reuse Centre including the amount of recyclable received;	Section 3
10(19) a. xv)	A summary of the requirements outlined in Condition 6(22) of the Approval regarding the use of contaminated soil for daily/intermediate landfill cover;	Section 2
10(19) c. i)	Results in tabular format and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring and flaring, including an assessment of the need to amend the monitoring programs;	Sections 4, 5, 6 and 7 and Appendices C, D, E, F, G, H, and I
10(19) c. ii)	The interpretive analysis referred to in Sub-condition i. above shall include a discussion of groundwater parameters and compliance with the Reasonable Use Policy at the property boundary as well as recommendations for future action (contingency measures) that may be necessary should the monitoring program detect failure of the design;	Section 5
10(19) c. iii)	Groundwater flow and contaminant migration analyses for the Site;	Section 5
10(19) c. iv)	Surface water quality with respect to Provincial Drinking Water Objectives;	Section 6
10(19) c. v)	Site plans showing all surface and ground water monitoring locations and the existing contours of the Site;	Figures 2.1 and 5.1

Condition No.	Condition Description	Location in Report
10(19) c. vi)	A report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;	Section 5
10(19) c. vii)	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/environmental emergency plan;	Section 3 and Section 8
10(19) c. viii)	An assessment of potential and actual impacts, if any, of the leachate on the Peterborough Water Pollution Control Plant;	Section 4.1.4 and Appendix D
10(19) c. ix)	Leachate characterization results and a discussion of the potential impacts on the Water Pollution Control Plant;	Section 4 and Appendix D
10(19) c. x)	Total leachate volumes collected weekly, monthly and annually and the disposition of the collected leachate;	Section 4, Tables 4.1 and 4.2
10(19) c. xi)	A summary of any equipment changes;	Section 3
10(19) c. xii)	Facilities installed during the reporting period;	Section 2
10(19) c. xiii)	Site preparations and facilities planned for installation during the next reporting period;	Section 2
10(19) c. xiv)	Summary of any complaints received and the responses made;	Section 3 and Table 3.2
10(19) c. xv)	Any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site or identified during the facility inspections and any mitigative actions taken;	Section 3

Condition No.	Condition Description	Location in Report
10(19) c. xvi)	Any changes to the Emergency Response and Contingency Plan, the Operations Manual or the Closure Plan that have been approved by the Director or the District Manager since the last Annual Report;	Section 3 and 8
10(19) c. xvii)	A descriptive summary of any spills, incidents or other emergency situations which have occurred at this Site, any remedial measures taken, and the measures taken to prevent future occurrences;	Section 10
10(19) c. xviii)	Any other information with respect to the Site which the District Manager may require from time to time;	Section 10
10(19) c. xix)	Summary of inspections undertaken at the Site;	Table 3.1
10(19) c. xx)	Any changes in operations, equipment or procedures employed at the Site;	Section 3
10(19) c. xxi)	Any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs in this regard;	Section 12
10(19) c. xxii)	An annual summary of any deficiencies, items of non-compliance or process aberrations that occurred at this Site and any remedial/mitigative action taken to correct them to ensure that future non-compliance does not occur; and	Section 10
10(19) c. xxiii)	A statement regarding compliance with all conditions of this Approval and other relevant Ministry requirements, guidelines and regulations.	Sections 5 and 11

1 Introduction

This annual report was prepared pursuant to Conditions 10(18) & 10(19) of Amended Environmental Compliance Approval (ECA) No. A341508 governing operation of the Peterborough County/City Waste Management Facility (PCCWMF) for the year ending December 31, 2023. The ECA was recently amended in June 2023 to include construction and operation of the Organics Facility at the PCCWMF. The ECA dated September 7, 2018 has been revoked and replaced with the new ECA dated June 23, 2023. A copy of the ECAs are provided in Appendix A. The preceding table provides details of ECA Conditions outlining requirements of the annual report and indicates sections of the report in which Conditions are addressed.

The PCCWMF encompasses 197 hectares (ha) and is located at 1260 Bensfort Road in the Township of Otonabee-South Monaghan, in the County of Peterborough. The PCCWMF is legally described as Part Lots 14 & 15, Concession 13 and Part Lots 13, 14, & 15, southern Part Lot 16, Concession 14, Township of Otonabee-South Monaghan, County of Peterborough. The PCCWMF is located 6.4 kilometers south of the City of Peterborough as shown on Figure 1.1. Property ownership around the PCCWMF is presented in Figure 1.2.

In 2023, waste disposal took place in Cells 2, 3 and 4 of the 9.5 ha North Fill Area (NFA). Cell 2, the first cell of the NFA, was constructed in 2010. Cell 4 was the last landfill cell to be constructed and approved to receive waste in December 2022. Site development and operations are discussed in Sections 2 and 3 of this report.

The scope of the 2023 monitoring program for groundwater, surface water, leachate, and landfill gas is summarized in Table 1.1. The results of the monitoring program are discussed and assessed in Sections 4, 5, 6 and 7 of this report. Section 8 provides an update on contingency plans and Section 9 outlines the 2024 monitoring program.

1.1 Site Approvals Status and Background

In June 2002, the PCCWMF became the joint property of the County and City of Peterborough (County/City). The South Fill Area (SFA) was in operation from 1981 to 2012. The NFA began receiving waste in 2010 and is currently in operation.

Most recently, an amended ECA No. A341508 was issued on June 23, 2023 to include the construction and operation of a 13.45 ha Organics Facility north of the existing landfill. A copy of the current ECAs applicable to this report are included in Appendix A. Operation of the Organics Facility will not commence until 2024 and a summary of the operations will be incorporated into the annual monitoring program for 2024.

The landfill is currently being operated under contract to the City by R.W. Tomlinson Limited of Ottawa. R.W. Tomlinson began operating the site on September 1, 2012.

1.2 Waste Disposal By-Law and Tipping Fees

The City of Peterborough By-law Number 07-027 was enacted in 2007 to regulate the disposal of waste, including establishing tipping fees for the PCCWMF. By-law Number 07-027 has been amended by By-law Numbers 09-108, 14-095, and 15-132. By-law Number 07-027 and associated amendments are included in Appendix B.

2 Site Development

Pursuant to ECA Condition 10(19) a. i), Figure 2.1 – *Existing Conditions SFA & NFA (2023)*, was prepared to provide a record of current SFA and NFA contours, monitoring locations, stockpiles, active fill areas in 2023, site infrastructure, and current development of the site. Figure 2.2 shows the approved final contours for the SFA and NFA. Current and historical cell designations are shown on Figure 2.3.

Waste received in 2023 was placed in Cells 2, 3 and 4. Cell 4 construction was substantially completed on December 22, 2022, however the City did not start landfilling in Cell 4 until 2023.

Various outstanding items to be competed as part of the Cell 4 construction contract were unable to be completed in 2022 and were completed in the Spring of 2023. This included the construction of a perimeter access road with drainage ditches and litter fencing around Cell 4 as well as three (3) access ramps for access to manholes on the south side of Cell 2 and 3 for maintenance accessibility.

Earthworks for the Organics Facility north of the existing landfill commenced in summer 2021 and continued throughout 2023. Construction of the Organics Facility was expected to be completed in 2023. However, due to a few setbacks to the construction schedule, the Organics Facility is expected to be substantially completed in May of 2024.

2.1 Cell Development

Construction of Cell 4 was substantially complete on December 22, 2022 and approved to receive waste. Cell 4 was the last approved landfill cell to be constructed on site as per the approved ECA.

2.2 Landfill Volumes and Site Life

In 2023, approximately 43,259 tonnes[1] of waste was disposed at the PCCWMF. Waste was placed in Cells 2, 3 and 4 of the NFA. Table 2.1 provides a monthly breakdown of waste quantities, diverted materials, and contaminated soil received in 2023. Table 2.2 provides a weekly breakdown of incoming material to the PCCWMF.

Historical annual waste quantities disposed at the site since 1981 are presented in Table 2.3. Approximately 2,358,520 tonnes of waste have been disposed at the PCCWMF to December 31, 2023. This total excludes contaminated soil.

As per ECA Condition 10(19) a. xiii), a summary of the maximum daily quantity (tonnes) of waste received at the site is to be included in the Annual Report. The highest daily quantity of material received on site in 2023 was 1,571.81 tonnes, received on January 17, 2023. This amount consisted of the following:

Asbestos	5.53 tonnes
Construction & Demolition	1.19 tonnes
Contaminated Soil – Cover	1,404.23 tonnes
Corrugated Cardboard	0.06 tonnes
Drywall	0.37 tonnes
Mattress	0.77 tonnes
Mixed Solid Waste	159.66 tonnes

The SFA reached capacity in 2012 and was under final cover in 2013. The SFA is closed and no longer receiving waste.

A topographic survey of Cells 2, 3 and 4 of the NFA was completed on December 22, 2023 to satisfy the requirements of Condition 10(19) a. i) of the ECA. Table 2.4 shows information on Cells 2, 3 and 4 of the NFA including volume used to December 2023 and the remaining site life estimates for the entire NFA.

The total approved airspace of the NFA is 1,527,000 m^3. The approved airspace is expected to provide capacity for approximately 1,023,0390 tonnes of waste assuming an apparent waste density of 0.67 tonnes/m^3.

In 2023, 43,259 tonnes of waste was disposed in the NFA. This is a 6.7% decrease from the 46,379 tonnes of waste disposed in 2022. The combined apparent density of

[1] The total quantity of waste disposed of at the PCCWMF is exclusive of contaminated soil.

all waste disposed to date in the NFA is 0.67 tonnes/m^3. This is similar to the 0.67 tonnes/m^3 assumed apparent waste density used in remaining site life calculations.

The remaining waste disposal capacity of the PCCWMF is calculated annually based on the average incoming waste quantity over the past five years and an apparent waste density of 0.67 tonnes/m^3. The average incoming waste quantity over the past five years (i.e., 2019 to 2023) was 46,350 tonnes, which was an decrease from 46,600 tonnes used in AMR 2022.

It is estimated that the NFA will provide waste disposal capacity for approximately 10.5 years from December 22, 2023, assuming an annual waste disposal rate of 46,350 tonnes and an apparent waste density of 0.67 tonnes/m^3. If waste quantities received or apparent waste densities differ significantly from those assumed, the calculation of remaining site life will be adjusted accordingly.

2.2.1 Soil Balance – Including Alternative Daily Cover

In 2023, approximately 10,898.04 tonnes of material was received at the site for use as alternative daily cover. The material was comprised of the following:

Clean wood/wood chips	1,232.02 tonnes
Contaminated soil	9,666.02 tonnes

Cover soil for 2024 will be obtained from on-site stockpiles and imported material. Topsoil for final cover placement will be obtained from on-site stockpiles.

Soil stockpiles north and south of Cell 4 were surveyed during the December 2023 topographic survey for the site. Stockpile locations are shown on Figure 2.1 for reference. Soil currently available on-site within the stockpile locations is approximately 174,390 m^3. Stockpile volumes increased from the 146,822 m^3 of material stockpiled in 2022 due to construction of the Organics Facility. Excess soil excavated during construction of the Organics Facility infrastructure was hauled to the stockpile north of Cell 4 in 2023.

In 2023, soil was not hauled off site and is not anticipated being hauled off site in the foreseeable future. The soil will remain on site and used for daily cover or other on-site uses.

The estimated remaining quantity of daily, interim and final cover required for the NFA (Cells 2, 3 and 4) is approximately 221,505 m^3. Contaminated soil will continue to be received at the site for use as alternative daily cover. Clean fill may be required in the future depending on annual quantities of incoming contaminated soil received on site for daily cover. Quantities will continue to be reviewed to determine future needs.

2.2.2 Diverted Materials

County/City residents have access to curbside blue box collection services, public drop-off depots, or local Township transfer stations and/or landfill sites for diverted materials. Material drop-off is available at the PCCWMF. Approximately 6,286 tonnes of recyclable material, not including materials received for use as alternate daily cover, were diverted from disposal at the on-site Public Drop-off Depot at the PCCWMF in 2023.

Blue Box recyclables are also accepted, at no charge, at the City-owned Materials Recycling Facility (MRF) at 390 Pido Road. The recycling depot at the MRF is open 24 hours per day, 7 days a week.

The City operates a permanent Household Hazardous Waste (HHW) facility, at 400 Pido Road, which is open to County and City residents every Wednesday to Saturday. In addition, the County owns and operates four seasonal HHW facilities and funds one facility for the Township of Otonabee-South Monaghan. The County offers Waste Electrical and Electronic Equipment (WEEE) drop-off at all HHW facilities, and some Townships accept WEEE at local transfer stations.

Scrap metal is accepted at the City-owned MRF and the PCCWMF, and is diverted to a scrap metal recycling facility.

The City provides weekly "green waste" curbside collection from April to November. Green waste, also known as yard waste, includes grass clippings, yard plants, trimmings and brush. Green waste can be dropped off at the PCCWMF and is transferred to the Harper Road compost site. The City received approval in 2023 to proceed with the construction of an Organics Facility at the PCCWMF to replace the Harper Road compost site. Most County residents have access to green waste collection at local Township transfer stations and/or landfill sites. The County initiated a curbside leaf and yard material collection program in Lakefield, Bridgenorth, Norwood and Havelock in the fall of 2013. This program has been extended to other locations in the County in subsequent years.

The City has implemented a weekly curbside organic waste collection and composting program within the City of Peterborough that began on October 31, 2023. Organic waste includes items such as food waste, paper waste, house plants, household pet waste, etc. Organic waste was anticipated to be hauled and processed at the newly constructed Organics Facility at the PCCWMF in 2023. However, setbacks to the construction of the Organics Facility deferred the diversion of organics to the facility until substantial completion in 2024. Organic waste collected between October 31, 2023 until the new Composting Facility at the PCCWMF becomes operational in May of 2024, was weighed at the PCCWMF and transferred to the Harper Road compost site. A total of 1,213 tonnes of organic waste was collected in 2023 from October 31 to the end of December 2023.

A full-scale mattress diversion program began on September 2014. Customers pay a fee of $20.00 per unit fewer than ten (10) and $25 per unit for bulk loads of 10 or more to partially cover the cost of recycling mattresses. In 2023, a total of 258 tonnes of mattresses were received on site and diverted from disposal.

2.2.3 Non-Hazardous Contaminated Soil

The PCCWMF accepts non-hazardous contaminated soil for use as daily and intermediate cover as approved by Condition 6(22) of the ECA. The City completes Soil Acceptance Forms for contaminated soil received at the PCCWMF to ensure the requirements of ECA Condition 6(22) are adhered to. Copies of all soil acceptance forms and associated analytical test results are kept on site and/or at City offices.

ECA Condition 6(23) limits the amount of contaminated soil stored on site to three months of the annual daily/interim cover material volume required. Based on landfill volume utilized in 2023 shown in Table 2.4, the quantity of daily/interim cover soil required over a three-month period was calculated to be 3,880 m^3. This value was calculated assuming a waste to cover ratio of 4:1. In 2023 there were no violations of Condition 6(23) of the ECA where contaminated soil stockpiled onsite exceeded this amount.

2.3 Summary of Site Works

The following summarizes the work that was undertaken at the PCCWMF in 2023:

1. The Landfill Gas Utilization Plant (LGUP) was offline from January 4 to 10 for a sensor replacement. The flare was operational during the LGUP downtime.
2. A large volume of daily cover was received on January 18 from a nearby stormwater pond cleanup project completed by the City.
3. Landfill scales were calibrated on January 25.
4. Tri-land Excavating was onsite periodically throughout the month of January, grinding wood waste.
5. Barry Electric was onsite periodically throughout the month of January to install new leachate quantity tracking meters on the leachate collection system (LCS) in the SFA.
6. New SFA leachate quantity tracking equipment installed at MH-J3 and MH4 became operational on February 1.
7. Forcemain pump and hour meters in the SFA were reset to 0.0 hours on February 1.

8. Barry Electric was onsite February 16 to complete maintenance work on the LFG flare.

9. Final cover was placed on the east slope of Cell 2 on February 22.

10. Peterborough Utility Group (PUG) was onsite March 3 and 6 to drain condensate from LFG sub-headers in the SFA.

11. New condensate pump was installed in the SFA on March 27.

12. Todd Brothers and WSP were onsite from April to June to complete various tasks associated with the Cell 4 construction contract including construction of a perimeter access road and ditches around Cell 4, litter fence installation, and construction of access ramps on the south side of Cells 2 and 3.

13. Landfill scales were calibrated for a second time in May.

14. Maple Reinders, GHD, and D.M. Wills were onsite in June 2023 and continued construction of the Organics Facility north of the landfill into 2024. Behan Construction Ltd. was onsite periodically between September to November to complete earthworks.

15. Final cover was placed on the slopes of Cells 2 and 3 during the month of June and July.

16. A portion of the LCS in the SFA was flushed and video inspected on June 21.

17. LGUP was offline for 1.5 hours on July 28 for maintenance. The flare was not operating during the LGUP downtime.

18. LGUP was offline for maintenance on August 6. The flare was operational during the maintenance work.

19. LGUP was offline for engine repairs from August 30 to September 22. PUG was awaiting delivery of replacement valves for the engine. The flare was operational during the maintenance work.

20. Final cover was placed on the east slopes of Cell 2 during the month of September.

21. Two spare condensate pumps were delivered to site in September and October for future use.

22. Traffic arrows, lines, parking spaces and curb stops were painted on landfill access roads on October 23.

23. The LCS and holding tanks in the SFA and NFA were flushed and video inspected in September and October.

24. Tri-land Excavating was onsite November 16 and 17, grinding wood waste.

25. Barry Electric was onsite November 21 and 23 to install a conduit for future fiber optic cables for communications needs at the scale house.

26. Tomlinson's site trailer was swapped out for a new trailer on November 24.

27. LGUP was offline for 2 hours on November 24 for maintenance. The flare was not operating during of the LGUP downtime.

28. Barry Electric was present onsite December 6 and 8.

29. Tri-Land Excavating was onsite December 8 to grind the waste woodpile material. Wood chips were utilized within the landfill waste limits on access roads where road conditions were poor and the remaining material was hauled to the compost processing facility.

30. A Concrete pad was poured near the scale house for installation of a new generator on December 15. Conduits for electrical services were also installed. The generator is expected to be installed in 2024.

31. Topsoil was placed on the side slopes of Cell 2 in December. Seeding is expected to be completed in the spring of 2024.

3 Operations and Maintenance

The PCCWMF has been operated under contract by R.W. Tomlinson since September 2012. The site operator is responsible for the following:

1. Acceptance of waste at the site. Hours of operation are from 8:00 a.m. to 4:45 p.m. Monday to Friday and from 8:00 a.m. to 3:45 p.m. on Saturdays;
2. Operation of the weigh scale;
3. Placement and compaction of waste;
4. Application of daily, interim and final cover;
5. Maintenance and operation of the public drop-off depot;
6. Construction of perimeter berms;
7. Litter control; and

8. Segregation of recyclable materials from the waste stream at the public drop-off depot.

City staff carry out daily, weekly, monthly and quarterly inspections to verify the site is being operated in accordance with the operating contract and the requirements of the ECA. Inspection forms are kept on file by the City in accordance with ECA Condition 10(1). Table 3.1 summarizes monthly results of inspections undertaken in 2023.

No changes to the Landfill Operations Manual, Closure Plan or Emergency Response Plan have been completed since the last annual monitoring report.

3.1 Waste Disposal

When waste arrives at the site the weigh scale attendant obtains relevant information about the material to be disposed in order to screen for potential ECA violations. The attendant then directs the hauler to the disposal area. Signs also direct vehicles to the disposal area where drivers remove their tarps, if applicable, and back their vehicles into the tipping face as directed.

At the start of each day, the operator will excavate a hydraulic connection to the underlying waste layer to facilitate leachate movement to the drainage layer at the bottom of the landfill for collection. Waste is then placed in lifts approximately 0.5 meters (m) thick and compacted. Each daily lift of waste is approximately 2 m thick. Daily cover soil or alternative daily cover material is then spread over the waste to a depth of 0.15 m.

Grade stakes are periodically placed around the fill area to assist the operator in filling to approved final contours. At the end of each workday heavy equipment is cleaned, fueled and serviced. Prior to waste layers reaching adjacent ground elevations, a soil berm will be constructed around the perimeter of the fill area to isolate leachate impacted water and contain it within the active fill area.

Weigh scale records indicate that 43,259 tonnes of waste were disposed of on site in 2023. Non-commercial vehicles were directed to the Public Drop-off Depot where roll-off containers receive waste and recyclables. As waste containers reach capacity, they are hauled to the fill area. Containers with recyclable materials are taken off site for processing.

Further details of site operations are contained in the landfill operations contract. The Landfill Operations and Maintenance Manual (May 2013) provides additional information and is available for review.

ECA Condition 6(1) limits the disposal of waste to solid non-hazardous municipal, commercial and industrial wastes generated within the County/City. If it is found that haulers are bringing materials to the landfill that are not accepted under ECA Condition 6(1) or are materials that are banned under the solid waste By-law, a violation notice is issued. To ensure proper waste handling procedures are followed, daily inspections are carried out by City staff.

Violation notices are issued to site users that do not abide with site regulations. Violators are warned that repeated violations will result in a fine. The following violations were reported in 2023:

- 2 warnings were issued for material brought into site that was banned;
- 5 occurrences where the public did not confirm where garbage was generated;
- 38 occurrences where a vehicle did not weigh out, fines were issued to some offenders;
- 5 offenses where direction from City staff was not obeyed;
- 1 offence where the load was refused;
- 3 occurrences of misrepresentation of facts;
- 57 occurrences where members of the public were from outside of the City/County of Peterborough;
- 84 violations where members of the public refused to pay and fines were subsequently issued to some offenders; and
- 3 untarped open load violations.

In accordance with City By-laws, users are charged a surcharge of $100 to $300 per load when the load does not conform to the By-law. The By-law does not permit loads with greater than 10 percent of recyclable material to be disposed of at the site. In 2023, there were no violations for loads containing excessive recyclables.

3.2 Daily, Interim and Final Cover

The site operator is responsible for hauling and placement of daily, interim and final cover at the landfill. The cover materials used in 2023 were obtained from the following sources:

1. On-site stockpiles of soil;
2. Contaminated soil received at the site; and
3. Clean wood/wood chips received at the site.

In 2023, final cover soil was placed on the slopes of Cells 2 and 3. A total of 2.25 ha of the NFA is currently under final cover. The approximate measured change in area under final cover from 2022 to 2023 is 0.24 ha.

In 2024, clean fill, contaminated soil, clean wood/wood chips, and compost screening overs will continue to be used as daily cover as required.

3.3 Equipment

Equipment used to operate the PCCWMF is owned, operated, and maintained by the site operator. The equipment used by the site operator was satisfactory to operate the landfill in 2023. The following equipment was used to operate the landfill in 2023:

1. 2012 CAT 826H Compactor;
2. 2012 CAT D6TXL Dozer;
3. 2012 CAT 329EL Excavator;
4. John Deere 250D Rock Truck;
5. 2012 CAT 950H Front End Loader;
6. International Paystar Service Truck;
7. 420F IT Backhoe;
8. Kubota 72-inch mower; and
9. 2012 GMC 2500 Series Crew Cab Truck.

There were no changes to equipment utilized by the site operator in 2023, but it is noted that the 826H compactor and 250D rock truck underwent full dealer refurbishments.

3.4 Public Drop-Off Area

Currently, there are eighteen 40 cubic yard collection bins being utilized at the Public Drop-Off Depot. The bins are designated for waste, blue box recyclables, construction and demolition material, drywall, cardboard, green waste, tires, shingles, WEEE, scrap metal, Freon-containing appliances, and untreated wood.

3.5 Signs

At the site entrance a sign identifies hours of operation, 24-hour emergency contact phone number, tipping fees, regulations, acceptable wastes, and landfill bans. Other signs include:

1. Speed limit and traffic routing signs;

2. "No Entry" signs at maintenance and monitoring roads and at two secondary entrances;
3. Individual material designation signs, at the Public Drop-Off Depot;
4. “Operational Issues Inquire” sign required as per Ministry regulations; and
5. Public information signs at the scale house regarding site operations and respect to employees.

3.6 Liaison Committee and Resident Concerns

The Site Liaison Committee (SLC) met in-person on February 7, 2023 and July 4, 2023. The key items discussed in 2023 were as follows:

1. February 7, 2023 meeting items included:
    a. The City provided an overview of their Waste Management Facility update report.
    b. The public was informed that the reuse centre had reopened following a brief closure due to the pandemic.
    c. WSP indicated that the next phase of LFG collection system will include 7 to 9 wells connecting to the existing LFG headers previously installed.
    d. City staff elaborated on the rental property rate increase from 2022, stating the increase was in line with the Consumer Price Index (CPI) of approximately 5% in 2022.
2. July 4, 2023 meeting items included:
    a. A review of the 2022 Annual Monitoring Report was presented to the committee by WSP.
    b. The Township retained Cambium to complete the Annual Monitoring Report review.
    c. Overview of Cambium’s annual landfill site inspection completed on June 6, 2023 was presented to the committee. The following items were noted by Cambium:
        i. Litter fence repairs were required at the time of inspection. The City confirmed the liter fence had been remediated shortly after the inspection.
        ii. Odours were only observed at the tipping face where daily cover had yet to be applied, minimal odours were observed onsite.
        iii. No leachate seeps were observed in the NFA or SFA during the inspection.
        iv. Committee member acknowledged odours have been very low over the last couple months.

d. The City provided an overview of their Waste Management Facility update report.

e. Committee member expressed concerns regarding litter on Bensfort Rd and side roads. City acknowledged litter concerns and discussed their continued focus on resources utilized in 2023 for litter picking operations. The City will continue their focus on litter picking and un-tarped load enforcement onsite. The County is to follow up with the recycling contractor retained by the County to reiterate expectations to control litter leaks from recycling transfer trucks.

3.7 Site Maintenance

The landfill is inspected regularly to ensure operation in accordance with ECA Condition 2(1). City staff complete daily, weekly, and monthly inspections. These inspections are documented on appropriate information collection forms. In addition, landfill operations and maintenance meetings are attended by the Owner, the Operator, and the Consultant on a regular basis to discuss and address site related matters.

3.7.1 Road Maintenance

Maintenance of the access and service roads in 2023 included the following:

1. Construction of perimeter access road around Cell 4 in the NFA was completed in spring;

2. In the Spring of 2023, three access ramps were constructed on the south side of Cells 2 and 3, to allow access to manholes for maintenance and inspection of the leachate system;

3. Water was used to aid in dust control from June to November;

4. Traffic arrows, lines, parking spaces and curb stops were painted on October 23;

5. Snow plowing during winter months;

6. Placement of granular material or wood chips as necessary to provide access to the active fill area and cover material stockpiles; and

7. Sweeping of paved areas, as needed.

3.7.2 Final Cover

Final cover soil was placed on the entire SFA by 2013. Placement of topsoil and seeding on the SFA was completed in 2014. In 2020, localized capping enhancements on the northwest side of the SFA commenced and have been ongoing since. Upon completion of the final cover capping, standpipe installation and LFG repairs are proposed to be completed prior to tree planting in the SFA. Planting of trees in the SFA as per the closure plan, originally planned for 2018, was postponed due to ongoing site works.

Final cover placement in the NFA is completed as waste is landfilled to approved elevations. Currently 2.25 ha of the NFA is under final cover.

3.7.3 Litter Control

The following measures were undertaken in 2023 to minimize wind-blown litter:

1. On and off-site cleanup of litter was completed as needed;
2. Litter fence was installed along the southern and western perimeter of Cell 4; and
3. Maintenance of litter fence as required throughout the year.

3.7.4 Dust Control

To minimize dust, the main site access road is paved. Unpaved service and haul roads are watered as needed to reduce dust. In 2023, no dust complaints were received.

3.7.5 Vermin Control

To minimize odours and to discourage use of the site by rodents and birds, soil or alternate cover is placed daily. Progressive placement of final cover further reduces the potential for odour, litter and vermin impacts.

The City requested renewal of Permit No. DA 2723 from Environment Canada to scare or cull gulls in 2022. An application to renew the gull culling program to December 31, 2023 was submitted by the City and approved on February 16, 2023. No complaints related to gulls were received in 2023. The City will continue to evaluate the program on an annual basis.

3.7.6 Complaints Received in 2023

ECA Condition 4 requires the County/City to record and respond to complaints received regarding site operations. A Complaint Action Form is utilized for this purpose.

In 2023, six (6) complaints were received and documented in the complaints log. A summary of complaints received in 2023 is shown on Table 3.2. Complaints received are detailed below.

1. Five (5) complaints were related to potential odours from the PCCWMF observed off-site of the landfill. Four (4) of the five (5) odour complaints were unrelated to the landfill and occurred due to farming operations. The last complaint was related to

odours from Neal Drive. It was noted that an extreme rain event caused high system pressures on the sewer system and the system was inspected by the Odour Control Unit to ensure the system was operating efficiently.

2. One (1) complaint was related to excess litter observed along Baseline Road. A crew was sent to the area that afternoon to clean up litter.

4 Leachate Collection System

The SFA LCS and NFA LCS collect leachate generated within the waste, along with groundwater collected by the site's interceptor trench, and convey it to the City's Waste Water Treatment Plant (WWTP). A description of the LCS is provided in Appendix C. The LCS is shown on Figure C.1, Appendix C.

4.1 Leachate Monitoring

4.1.1 Leachate Quantity

Pursuant to ECA Condition 10(19) c. x), Table 4.1 presents a monthly summary of leachate/groundwater collected and transferred to the sanitary sewer at Neal Drive. Also, Table 4.2 presents the weekly amount of leachate/groundwater collected and transferred to the sanitary sewer. The volume of leachate and groundwater removed in 2023 was 91,727 m^3. This is a 92.7% increase from the 47,603 m^3 removed in 2022.

The largest amount of leachate removed from site in one year was 107,981 m^3, which occurred in 2011. Table C.1 (Appendix C) provides a historical comparison of recorded leachate/groundwater volumes.

Of the 91,727 m^3 of leachate and groundwater removed in 2023, 41,175 m^3 or 44.9% was from the SFA and 50,552 m^3 or 55.1% was from the NFA. In comparison, 47,603 m^3 of leachate and groundwater removed in 2022, with 24,700 m^3 or 51.9% from the SFA and 22,903 m^3 or 48.1% from the NFA. The ratio of precipitation to leachate generation from the SFA is expected to be relatively consistent on an annual basis as the entire SFA is under final cover. The volume of leachate produced within the NFA has increased greatly, since the Cell 4 became operational in December 2022. This increase in leachate volume in the NFA is expected to continue until waste elevations reach final contours and final cover placement begins in Cell 4. Leachate quantities collected from both the NFA and SFA in 2023 were much greater than 2022 quantities. This also corresponds to weather patterns throughout the year and the higher volume of precipitation received on site in 2023.

4.1.2 Meteorological Data and Water Balance Analysis

To evaluate LCS performance, an assessment was made for the contributing factors to leachate production at the site. The data and calculations are included in Tables C.1 and C.2 (Appendix C) and are discussed below. The monthly leachate/groundwater volumes discharged to the sewer are provided in Table 4.1.

The total precipitation received at the Peterborough Airport in 2023 was measured to be 817 mm (Environment Canada, 2023), which is 7.2% increase from the precipitation received at this location in 2022, and less than the climate normal of 855 mm recorded at the Peterborough Airport from 1981-2010. It is noted that the annual precipitation totals for 2021 through 2023 at the Peterborough Airport climate station have been supplemented by data from other, nearby climate stations for days in which data was unavailable at the Peterborough Airport station; for the calculations and interpretations within the 2023 monitoring report. A list of the supplemented data is on file. Approximately 49% of the collected leachate within the SFA during 2023 is attributed to precipitation infiltration through the landfill cap and refuse, with the remaining portion of the collected leachate attributed to groundwater inflow at various locations surrounding the cell. Appendix C provides a description of the calculations completed for the water balance.

The volume of leachate collected within the NFA in 2023 was a 121% increase compared to the volume collected within the NFA in 2022. This corresponds with Cell 4 becoming operational in late 2022, which increased the capture area for precipitation in 2023. The collected leachate within the NFA resulting from precipitation infiltration is approximately 77%, compared to 49% in the SFA, which is not unexpected, as the SFA is completely under final cover.

4.1.3 Leachate Quality

In 2023, leachate was characterized by samples collected from the collection system (holding tanks within the NFA and SFA, and maintenance hole MHT6-94) and from refuse monitor 23B. These locations were selected to ensure that representative samples are obtained which reflect actual leachate quality. The quality of the groundwater in the interceptor trench was characterized by samples collected from MH4.

The 2023 leachate chemistry from the collection system (holding tanks and MHT6-94), refuse monitor 23B, and interceptor trench MH4 is summarized in Table 4.3. Historical leachate quality data is also provided for comparison. In general, the 2023 leachate quality at the site was within the range of representative concentrations for municipal landfills in Ontario (Freeze & Cherry, 1979 and the Ministry of the Environment, 1993) with the exception of:

- Alkalinity concentrations at the SFA holding tank in April and at MHT6-94 in October, which were above the representative concentration range;

- Potassium concentrations at the SFA holding tank in October, the NFA holding tank in October, at refuse monitor 23B in April and at MH4 in October, which were below the typical representative range;

- TKN concentrations at the SFA holding tank in April and October, the NFA holding tank in April and MHT6-94 in October, which were above the representative concentration range;

- Chemical oxygen demand (COD), magnesium and sodium concentrations at refuse monitor 23B in April, which were below the typical representative range; and

- The ammonia concentration at MHT6-94 during the October sampling event, which was above the representative concentration range.

A summary of the 2023 leachate chemical results and background overburden and bedrock wells is provided in Table 4.4. The table presents results for parameters which were analyzed in the leachate at the Site. A combination of parameters with higher or lower concentrations in leachate relative to the background water quality can be used as leachate indicator parameters to identify landfill leachate influence in groundwater.

As shown in Table 4.4, leachate at the Site is characterized by elevated concentrations of alkalinity, ammonia, boron, COD, chloride, iron, manganese, phosphorus, potassium, sodium and TKN when compared with background “fresh” overburden and bedrock groundwater quality. In comparison with the deep background bedrock groundwater quality classified as “brine”, leachate at the Site is characterized by elevated concentrations of alkalinity, ammonia, boron, COD, iron, manganese, phosphorus, potassium and TKN. In comparison with the deeper background bedrock groundwater quality classified as “concentrated brine”, leachate at the Site is characterized by elevated concentrations of only alkalinity, ammonia, iron, manganese, phosphorus and TKN. As such, these elevated parameters were chosen as diagnostic leachate indicator parameters for the discussion of the applicable downgradient groundwater quality.

Historically, chloride, TKN, alkalinity and iron have been used as the primary leachate indicator parameters. They continue to be considered the primary leachate indicator parameters, with the exception of chloride for the groundwater quality classified as brine and concentrated brine, as noted previously.

4.1.3.1 In-Waste Leachate Characterization

In-waste monitor 23B is located at the south end of Cell 1 – South (SFA). The laboratory results for the sampling events in 2023 at this monitor, along with the historical results since 2018, are contained in Table C.5, Appendix C, and the long-term time-concentration graphs are presented in Figures C.8 and C.9.

As shown in the time-concentration graphs, concentrations of alkalinity, COD, chloride, iron, manganese, phosphorus, potassium, and TKN have generally fluctuated within a lower range since 2005 compared to the concentration ranges between 1986 and 1993 and have generally decreased between 2005 and 2023. Iron and manganese concentrations have fluctuated over a large range between 2004 and 2023. In the short term, concentrations for most parameters in 2023 were similar to or lower than in 2022. It is noted there is no chemistry data available between 1993 and 2005 for monitor 23B, based on the historical data provided by the City. The fluctuations between sampling events are attributed to the variable nature of leachate within the refuse. The leachate quality at this location is typical of older leachate.

Monitor 23B provides a general understanding of the leachate quality over time at the Site. Installation of additional in-waste monitors within the SFA is not warranted at this time.

4.1.3.2 Leachate Collection System Leachate Quality Characterization

Full historic laboratory results for the leachate holding tanks and MHT6-94 are summarized in Tables C.3 and C.4, respectively. Time-concentration graphs for the samples obtained from the holding tanks are presented in Figures C.6 and C.7, Appendix C. As shown in the graphs, parameter concentrations at the SFA leachate holding tank generally fluctuated within a narrow range between 1991 and 2003, but the fluctuating range was greater between 2004 and 2007, returning to a narrower range since that time. Parameter concentrations generally fluctuated between 2015 and 2023, with no definitive increasing or decreasing trends. As shown in the figures, the parameter concentrations at the NFA leachate holding tank were generally similar to, or lower than, the concentrations at the SFA holding tank in 2011 and 2012, but parameter concentrations within the NFA holding tank have increased and were similar to or greater than the concentrations within the SFA holding tank between 2013 and 2023, reaching a peak in 2022. The lower parameter concentrations within the NFA holding tank during 2011 and 2012 were not unexpected, since refuse started being placed in Cell 2 of the NFA in late 2010.

The concentrations of most organic parameters analyzed for the leachate holding tank samples in 2023 were below the method detection limit for both sampling events, with the exception of those parameters listed in Table 4.3. In general, the detected parameters were similar to historical results, with the exception of elevated concentrations of 1,4-dichlorobenzene, benzene, cis-1,2-dichloroethylene, ethylbenzene, xylenes and styrene in April 2023 at the NFA holding tank.

Based on the leachate chemistry results within the leachate holding tanks, the 2023 leachate quality generally satisfied criteria contained in Sewer Use By-law No. 15-075 with the exceptions of the following:

8. Total Kieldahl Nitrogen (TKN) in the SFA holding tank in April and October 2023, and in the NFA holding tank sampled in April 2023.

9. Nonyl-phenols in the SFA holding tank sampled in October 2023.

As shown in Figures C.6 and C.7, the concentrations of several analyzed parameters from holding tank leachate samples have fluctuated over the long term, and more noticeably since 2004. The parameter concentrations during 2023 were within the lower portion of the recent concentration ranges for the SFA and NFA holding tanks. Since the SFA holding tank receives the groundwater pumped from the interceptor trench (MH4) and from the LCS, the concentration of leachate parameters will be affected by the relative proportion of groundwater that is in the holding tank at the time of sampling. The relative age of the existing waste at the site, along with the new waste recently placed in the NFA, also contributes to the variability of the leachate characteristics in the NFA holding tank.

Grab samples collected from the holding tank when it has a higher proportion of groundwater will have lower concentrations of the parameters shown in Figures C.6 and C.7. Grab samples collected from the holding tank when groundwater is not discharging from MH4 will have higher concentrations of the parameters shown in Figures C.6 and C.7. Other operational factors, such as regulating the leachate discharge rate from cells, will also impact the characteristics of the leachate in the holding tanks. On this basis, the following conditions for collection of leachate quality samples from the holding tanks should continue to be implemented:

1. No discharge from the leachate interceptor trench pumping station (MH4) to the holding tank for 24 hours prior to sampling event. Record the MH4 pump hour records for the day before the sampling event and the day of the sampling event.
2. Conduct sampling at least 72 hours after a precipitation event.
3. Record the position of the leachate control valves at MHT6-94 and TDCO-A0-05.

The above conditions were met during the collection of leachate samples obtained in 2023.

4.1.3.3 Interceptor Quality Characterization

Laboratory results for the October 2023 sampling event at MH4 for the interceptor trench are contained in Table C.6, Appendix C, and long-term time-concentration graphs are presented in Figures C.10 and C.11. In general, parameter concentrations fluctuate with no distinguishable trend, although chloride and sodium concentrations have exhibited generally increasing trends since 2004. It is noted that, following a general decreasing trend between 2012 and 2015, concentrations for alkalinity, iron, TKN, potassium, and sodium increased in 2016 and have fluctuated since this time, with levels decreasing to historical lows for some parameters in 2021 and rebounding in 2022/2023. The concentration increases may be attributed to the relatively low amount of precipitation received during the year but continued monitoring will permit a further assessment of the long-term trend for the interceptor trench.

It is noted that concentrations of some parameters prior to 1993, including potassium, biochemical oxygen demand, and TKN, were elevated compared to concentrations during the following years. The subsequent decrease after 1992 is attributed to the discontinuation of the direct release of leachate into this system. The groundwater in the interceptor system is characterized as somewhat degraded due to natural conditions and brine influences, along with low levels of some residual leachate related parameters.

4.1.4 Waste Water Treatment Plant

ECA Condition 10(19) c. viii) requires that the annual monitoring report include an assessment of potential and actual impacts, if any, of leachate on the WWTP. A detailed assessment is provided in Appendix D.

The impact of leachate on the WWTP was evaluated based on the quantity and quality of leachate discharged. The mass loading of key leachate components was compared to the overall loading of parameters entering the WWTP. Key observations from 2023 and recommendations for 2024 are summarized below:

1. Samples were collected in April and October 2023 for analysis and compared to selected parameters in the City of Peterborough Sewer Use By-law;
2. February had the highest average daily flow of leachate with 485 m^3/day;
3. October had the lowest average daily flow rate of leachate with 73 m^3/day;
4. The average daily leachate flow rate in 2023 was 253 m^3/day. This was a 272% increase from 2022;
5. In 2023, the average influent volume from the PCCWMF to the WWTP was 0.53% of total influent volume, which is considered insignificant in terms of hydraulic load;
6. In February 2023, the PCCWMF conveyed its highest fraction of influent, providing 0.91% of the total WWTP influent hydraulic load;
7. The leachate samples satisfied the By-Law criteria with the exceptions of TKN in the SFA holding tank sampled both in April and October 2023, TKN in the NFA holding tank sampled April 2023, and nonyl-phenols in the SFA holding tank sampled in October 2023.
8. BOD_5, TSS, phosphorus, and COD loads on the WWTP from landfill leachate are low and represent only a small portion of the WWTP capacity; and
9. TKN load on the WWTP appears to be in the range of 1.0% and 3.8%.

Based on the analysis of this data, it is concluded that leachate from the PCCWMF had little effect on the loadings at the WWTP.

4.2 Leachate Collection System Performance

4.2.1 Leachate Head Monitoring Locations

Leachate levels were monitored at standpipes and inclined standpipes within the SFA. Standpipes are located in the vicinity of the leachate toe drain along the eastern and northern limit of waste. Inclined standpipes are located along the limit of waste for Cell 1 - South and at the base of the waste below the east side of Cell 1 - North. The locations of all monitors in the SFA are shown on Figure 2.1 and Figure 5.1.

Inclined standpipes, designated ISP15 and ISP16, are installed in Cell 2 and Cell 3 of the NFA. Inclined standpipes are installed at the time of construction of the landfill cells and monitor leachate levels within the cells. The results for 2023 at these locations are included in Table E.4, Appendix E. A new incline standpipe, designated ISP17, was installed during Cell 4 construction in 2022, to monitor leachate levels within Cell 4 of the NFA. The locations of the NFA inclined standpipe are shown on Figure 2.1 and Figure 5.1.

4.2.2 Leachate Mound Assessment

A summary of the standpipe and inclined standpipe monitoring results are presented in Tables E.3 and E.4, Appendix E, respectively. The long-term hydrograph for refuse Monitor 23B is shown in Figure E.6, Appendix E. As shown in Figure E.6, the leachate levels within monitor 23B generally decreased between 2007 and 2010 and remained at this lower level until September 2022, when it increased to a historical high, before decreasing again into 2023. Based on data obtained at standpipes in 2023, the following presents key observations:

10. The standpipes were generally dry for 2023 with the exception of SP7-90, SP8-90 and SP14-94 on at least one occasion in 2023. The levels within SP14-94 confirm the leachate level and the hydraulic connection to the leachate holding tank. The other monitors had measurable levels during monitoring events in February, August and/or November and were likely related to seasonal precipitation. In general, the standpipe levels (with the exception of SP14-94) were observed to be dry during the monitoring event following a measured level.

11. Inclined standpipes generally had low levels, with the exception of ISP7-95 and ISP15, which is similar to historical results. Levels obtained from inclined standpipe ISP7-95 indicate there is some leachate mounding present within the upper cell of Cell 1-South, but the low levels are generally consistent with historical data. These low levels indicate the LCSs in these locations are performing as designed and there is no evidence of significant mounding. Data obtained by the City for monitor ISP15 are approximate readings as there were often issued collecting the measurements within the pipe. Monitor ISP15 appears to have been damaged, but this monitor will

be replaced with a vertical refuse monitor during the LFGCS Phase 4 works in the spring of 2024. The installation of the refuse monitor within Cell 2 will be in accordance with the recommendations in the D&O report.

12. Levels obtained from inclined standpipes ISP16 and ISP17 indicate there is minimal leachate present within the south sides of the NFA Cells 3 and 4.

In summary, the leachate level mounding results at the monitored locations confirms the SFA is performing as designed, and the minimal leachate mounding is comparable to historical results; but continued monitoring and additional field investigations regarding monitor condition should be considered. Consideration should also be given to the repair of several corroded casings, if conditions allow without further compromising the integrity of the standpipes. Continued monitoring will permit ongoing assessments of potential mounding, in the future.

4.3 Surface Seepage Monitoring

As part of the surface water management strategy, inspection for evidence of leachate seepage is undertaken on a regular basis. In 2023, a small seep was noted on the south and east side of the NFA landfill by WSP during the LFG monitoring event on March 29. The landfill manager was notified, and the two areas were repaired the following day by Tomlinson. Throughout the remainder of the year, the seep was observed to be contained and was not observed after March 2023.

4.4 Leachate System and Interceptor Trench Inspection and Maintenance

During 2023, the City regularly inspected the operation of the leachate management system as part of the site inspection process. Table 3.1 summarizes the key maintenance activities that were undertaken on a monthly basis in 2023, for the entire site including the leachate management system.

4.4.1 Flushing and Video Inspection

ECA Condition 6(42) requires the LCS to be video inspected every two years and newly installed LCS to be video inspected annually for 5 years following the installation. In 2023 all of the NFA and SFA were required to be flushed and video inspected as per the terms in the ECA.

The NFA and SFA LCS and Interceptor Line were flushed and video inspected during multiple site visits between June to October 2023 by the City. A summary of inspection and flushing completed in 2023 is included in Table 4.5. Figures 4.1 and 4.2 illustrate the locations of the collection piping flushed in 2023.

On Figures 4.1 and 4.2, it can be seen that portions of the LCS were only partially flushed. Typically, this is due to flushing equipment having to climb up-slope through the LCS pipes. When the flushing equipment can no longer climb the slope, flushing is ceased. Cell 3 and part of Cell 2 in the NFA were flushed and video inspected 2023. MHL5 and MHL6 in the north half of Cell 2 were not accessible due to existing ground conditions limiting access to the manholes. As part of Cell 4 construction, access ramps to manholes on the south side of Cells 2 and 3 were constructed in early 2023 to allow better accessibility to manholes for maintenance. Due to miscommunication with the Cell 4 contractor, flushing and video inspection of Cell 4 was missed in 2023 and was instead completed on March 28, 2024. Review of the 2024 data shows the LCS in Cell 4 is functioning as designed. Majority of the SFA was flushed with the exception of some of the LCS pipes central to the waste mound. Access to these pipes are limited due to equipment unable to pass couplings or bends in the pipes on top of equipment having to climb upslope through the LCS pipes.

Video inspected LCS pipes were observed to be in good condition with minor issues noted. Table 4.4 summarizes findings observed during the video inspection of LCS pipes in the NFA and SFA. The following was observed within the LCS pipes during the video inspection completed in 2023:

1. During 2021 pipe references 179461 and179456, in the SFA, were observed to have objects within the 150mm diameter perforated LCS pipe within the SFA. Objects observed was a piece of rebar and part of an HDPE pipe fitting. The objects observed during the 2023 video inspection and were not observed to be obstructing flow.

2. During the 2021 video inspection, pipe reference 179443 in the SFA was observed to have a few stones within the pipe. During the 2023 video inspections the stones were observed to have been flushed.

3. Pipe references 179536,179441,179439,179437,179435, 179445, 179451, 179476, 1794500, 179485, 179492 in the SFA were observed to be anywhere from 10-90% full. During the video inspection fluid within the pipe was observed to be flowing and mostly translucent. Prior to the video inspection of these pipes heavy precipitation was received onsite and is expected to be the cause of loading on the LCS. During the inspection the pump station in the SFA was noted to be operating at low levels.

4. Pipe reference 179463 in the SFA was unable to be video inspected due to buildup of calcite around the pipe at the cleanout. The flow was not observed to be obstructed due to build up. It is recommended the flushing and inspection crew revisit the area in 2024 to complete additional flushing.

5. Manhole HC03-94 wasn’t accessible due to broken manhole lid. It is recommended that the manhole cover be replaced prior to the 2024 inspection event.

In conclusion, there were no obstructions to flow of leachate and the LCS continues to function as designed. The City will continue to flush the NFA and SFA LCS on an annual basis. As per Condition 6(42) of the ECA, Cell 4 will be required to be video inspected annually until 2027. Condition 6(42) a) requires the LCS to be video inspected every two years, in odd years. The LCS in the SFA, Cell 2 and Cell 3 will be video inspected again in 2025. Should conditions change, the frequency of maintenance and inspection will be re-evaluated.

4.4.2 Leachate Pump Stations and Forcemains

In 2010, Cell 2 of the NFA was constructed. Construction included a new pump station and forcemain to convey leachate from the NFA to the sanitary sewer manhole on Bensfort Road. The pump station and forcemain have been operational since July 2010. The NFA pump station and forcemain are operating as designed. These services will be maintained in accordance with the requirements of the ECA.

The following site works and maintenance activities related to the pump stations and forcemains were completed in 2023:

1. New SFA leachate quantity tracking equipment installed in MH-J3 and MH4 February 1.

2. Forcemain pump and hour meters in the SFA were reset to 0.0 hours February 1.

3. New SFA condensate pump was installed on March 27.

4. Forcemain was pressure tested on July 20.

5. Holding tanks were cleaned out in October.

6. Two spare condensate pumps were delivered to site in September and October for future use.

5 Groundwater Monitoring

5.1 Site Geology and Hydrogeology

The geological features on, and surrounding, the site have been documented by others in previous reports. Groundwater flow is controlled by the drumlin, till plain and weathered limestone bedrock underlying the Site.

The Site geology and hydrogeology for the SFA are further detailed in the document entitled Gartner Lee 1991a, which includes findings from investigations and studies back to 1976. An additional description of the Site geology and hydrogeology was provided in the 2002 Application for Certificate of Approval for the Site[2], as well as in previous annual monitoring reports.

The PCCWMF is situated in the Peterborough Drumlin Field physiographic region (Chapman and Putnam, 1984). This physiographic region is characterized by a series of elongated hills known as drumlins rising above a glacial till plain. Local portions of the area are veneered with glaciolacustrine fine sands, silt and clay that were deposited in ponded glacial meltwaters. Beach deposits of sand and/or gravel can occur on drumlin sides. At some locations wetlands have formed in depressions between the drumlins.

The NFA is dominated by a glacial till plain that slopes towards the southeast. This till plain merges with a high relief drumlin which dominates the south part of the PCCWMF, in which the SFA is located. There is a wetland area, known as the Crystal Springs Wetland, that separates the NFA from the SFA. This wetland is relatively flat and poorly drained. It is mostly underlain by glaciolacustrine silt and clay soils, similar to those overlying the glacial till to the east of the SFA. Boundaries between the geologic features are poorly defined.

5.1.1 Overburden Geology

5.1.1.1 TILL

The glacial till plain is comprised predominantly of a silty sand till. The till thickness is variable and is controlled by the surface topography and bedrock elevations. In the NFA, the total thickness of the soil profile over the bedrock is between 11.0 m and 20.7 m at the borehole locations.

The silty sand till is bouldery in nature, and typically increases in density with depth. The upper portion of the till, generally within 5 m of surface, is weathered, as characterized by the brown colouration and fractures. The deeper unweathered portion of the till is typically grey.

Within the till matrix zones of generally coarser textured soil were intersected at most borehole locations. It is noted that the thickness of the zones vary considerably from less than 0.3 m up to 3.4 m. As well, there is no consistency to the horizontal occurrence of these zones.

5.1.1.2 SILT AND CLAY

Shallow surficial deposits of mainly silt and clay were intersected in some boreholes drilled in parts of the Crystal Springs Wetland. Based on borehole data, the thickness of

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[2] Earth Tech Canada Inc., *Application for Provisional Certificate of Approval for the Proposed Oton-1 Landfill Site*, 2002.

the fine grained soils in the Crystal Springs Wetland area varied between 1.9 m and 8.4 m.

5.1.2 Bedrock Geology

Underlying the overburden, there is a grey, finely crystalline Paleozoic limestone of the Verulam Formation. The bedrock surface is topographically high beneath the glacial till plain. From the topographic high area, the bedrock slopes downward toward a lower area beneath the Crystal Springs Wetland. The data in past studies indicates a depression in the bedrock from the Crystal Springs Wetland that trends easterly.

The limestone is characterized as containing shaley laminae and some shaley interbeds. Few vugs were observed in the limestone. The rock appeared unweathered at boreholes 86, 90, 104 and 107, while at other locations the rock surface appeared weathered.

5.1.3 Hydrogeologic Setting

In general, the geologic units correspond to hydrostratigraphic units. The hydrostratigraphic units and characteristics have been generally characterized in past studies as follows:

- Weathered Till – unconsolidated, fractured soil
- Unweathered Till – unconsolidated, porous soil
- Bedrock – consolidated, fractured material

Hydraulic conductivity testing was conducted for the detailed hydrogeologic study of the NFA (Jagger Hims, 2004), as part of the NFA Design and Operations report (Earth Tech Canada Inc., 2004); the results are summarized in the following table:

Unit	Hydraulic Conductivity	
	Geometric Mean(m/s)	One Standard Deviation(m/s)
Unweathered Till	2.0×10^{-7}	4.7×10^{-8} to 8.5×10^{-7}
Bedrock	2.9×10^{-7}	1.7×10^{-8} to 4.8×10^{-6}

The NFA is situated on a rolling glacial till plain. This till plain merges with a high relief drumlin which dominates the south portion of the PCCWMF. Soil within these features is a silty sand till deposited by glacial action. Discontinuous sand seams occur randomly in the till. There is a topographical low area within the southern portion of the NFA that is partially occupied by the Crystal Springs Wetland. Clay and silt veneer the till within the lowland. Soil thickness over the bedrock is between approximately 12 and 21 m. The upper part of the bedrock is a groundwater aquifer.

Groundwater in both the soil and rock naturally flows at relatively slow rates from the topographically higher portions of the till plain southeasterly towards the wetland, at flow rates summarized further in Sections 5.3.3 and 5.3.4 below. The wetland is generally a groundwater discharge zone. Water quality is generally considered potable in the till and weathered bedrock. Deeper into the rock and locally near the rock surface, some groundwater is characterized as a brine.

As further described in Section 5.4 of this report, the groundwater quality at the site has been grouped into four categories, for ease of comparison and discussion. Based upon the interpretation of historical monitoring results and their unique groundwater quality, the monitoring locations have been classified as overburden, fresh bedrock, brine or concentrated brine. Overburden monitoring locations are screened within the weathered and unweathered till, while the fresh bedrock, brine and concentrated brine monitoring locations are screened within the bedrock.

5.2 Groundwater Monitoring Program

Groundwater monitoring was conducted in accordance with the current programs for the SFA and NFA, as shown in Table 1.1. A rationalized groundwater monitoring program was presented in the 2006 Annual Monitoring Report with the objectives to:

1. Update the program to reflect existing Site conditions (i.e., property limits and NFA approval);
2. Establish baseline monitoring in the NFA; and
3. Rationalize the SFA program in advance of closure of this area.

The rationalized program was implemented for the 2008 monitoring period (commencing January 1, 2008). Details of the rationalized program are provided in the 2006 Annual Monitoring Report. A summary of the groundwater monitor details is provided in Table E.1, Appendix E.

Upon completion of the NFA Cell 2 construction, additional groundwater monitoring nests, identified as monitoring locations 108, 109, and 110, were installed adjacent to Cell 2 in late 2010, in accordance with the recommendations provided in the Design and Operations Report (D&O Report) for the site. Monitors 63-I,II,III and 75-I,II were incorporated into the routine monitoring program in Fall 2014, in accordance with Ministry comments and ECA Amendment Notice No. 1, dated January 5, 2015.

In December 2016, additional groundwater monitoring nests, identified as 111 and 112, were installed adjacent to Cell 3, in accordance with the recommendations in the D&O Report for the site. The three monitors at monitoring location 70 were decommissioned in 2016 and replaced with three new groundwater monitors at monitoring location 113.

The monitors at monitoring location 70 were decommissioned due to persistent flooded conditions at the monitoring location, and the replacement location permits compliance with Ontario Regulation (O.Reg.) 903. The new monitors were incorporated into the routine monitoring program in 2017.

In 2020, monitor 52-II was reported as damaged, and monitor 109-II was noted to be compromised. Monitors 52-II and 109-II were both replaced in September 2022.

It is noted that Monitor 84-II was unable to be monitored in spring 2023, due to well damage during construction of Cell 4. Repairs were completed on June 2, 2023, and the well was reinstated to the monitoring program in the fall of 2023.

In February 2024, additional groundwater monitoring nests, identified as 114 and 115, were installed adjacent to Cell 4, in accordance with the recommendations in the D&O Report for the site. These wells will be incorporated into the annual monitoring program for 2024.

The groundwater monitoring program is carried out by City of Peterborough staff, and field notes are maintained by City staff during each sampling event. Based on a review of information provided by the City of Peterborough, the groundwater monitors included in the monitoring network are capped, locked, and protected from damage in general compliance with O.Reg. 903. It is noted that monitors which require monitor cap replacements and minor repairs are generally repaired by the City, or their consultant, on an ongoing basis.

The existing on-site groundwater monitoring locations are used for monitoring purposes at the site and will continue to be included in the 2024 program.

Private well monitoring was undertaken based on the sampling program identified in the City of Peterborough/Township of Otonabee-South Monaghan Agreement.

5.3 Groundwater Elevations and Flow

A summary of the 2023 water level elevations is presented in Table 5.1. The groundwater monitoring locations are shown on Figure 5.1. The 2023 and historical water elevations are presented in Table E.2, and water elevation graphs for each of the monitoring wells are presented in Figures E.1 to E.53, in Appendix E.

5.3.1 Overburden Flow System

Water level elevations at the overburden flow system wells during 2023 were generally comparable to historical values, with seasonal and climatic variations present. Based on the groundwater elevation graphs, the following notable trends are observed:

13. The water level at Monitor 19B decreased slightly between 2007 and late 2010 and has seasonally fluctuated at the lower range since that time. In recent years, the seasonal high water levels observed at Monitor 19B are similar to the pre-2007 results, while the seasonal low levels are lower than the levels observed pre-2007. Similar trends are observed at bedrock Monitor 19A. It is noted that Monitors 19A and 19B are located within the southeast corner of the landfill site property. The reason for the slight water level decline from 2007 to 2010 is unknown at this time, but the lower water level elevations at these locations were still consistent with the overall groundwater patterns within this portion of the site at the time.

14. The magnitude of seasonal fluctuation displayed at Monitor 40-II (Figure E.8) increased abruptly in 2016. The seasonal high levels recorded since 2016 are consistent with the pre-2016 results; however, the seasonal low levels have been up to 1 m lower than observed prior to 2016. The 2023 results were consistent with the water levels recorded since 2016.

15. In late 2016, monitoring well nest 70 was replaced with nest 113. As shown in Figure E.22, the water level data measured at Monitors 113-II and 113-III since 2016 has been generally consistent with the pre-2016 results from Monitors 70-II and 70-III.

16. The water level at Monitor 91-II exhibited a decreasing trend between 2005 and 2010 and have remained at the lower levels since that time. The bedrock water levels at this location (Monitor 91-I) exhibited a similar trend. The 2023 water levels were consistent with the results measured at the well since 2011.

17. Water levels at Monitors 104-II and 104-III (Figure E.40) seasonally fluctuated over the long term but decreased slightly in 2012 and have remained at the lower level since that time. This decrease is likely an influence of the Cell 2 construction and operation.

An interpretation of the shallow groundwater flow regime, based on the Fall 2023 groundwater elevation data, is presented in Figure 5.2. In the SFA, a drumlin forms a topographical high and groundwater recharge area, with radial groundwater flow and discharge to the adjacent surface water features near the base of the drumlin.

Flow through the refuse and overburden to the east is captured by the landfill underdrain systems and toe drains. Additionally, some groundwater is removed from an interceptor system to the east of the SFA between the fill area and Bensfort Road. The NFA is characterized by the till plain with lower relief, and a gradual slope toward the wetland in the central portion of the Site.

The influence of the groundwater interceptor trench in the SFA is indicated by the lower groundwater level elevations in the vicinity of the trench at monitors T1 and T5, and at adjacent monitoring wells 17, 18, 19 and 20.

In the NFA, shallow groundwater flow is in a general southeasterly direction, towards the wetland area, with the exception of shallow groundwater within close proximity of Cells 2 and 3. As shown in Figure 5.2, shallow groundwater in close proximity of the cells is towards the refuse cells, since the leachate/liquid levels within the cells are maintained at a level near the base of each cell, due to the underdrain LCS. The configuration of the shallow groundwater flow within the area of Cell 2, Cell 3, and Cell 4 indicates the "hydraulic trap" for the cell is functioning properly and as designed, as measured during monitoring events in 2023 and as shown in Figure 5.4.

5.3.2 Bedrock Flow System

Water level elevations during 2023 were generally comparable to historical values, with seasonal and climatic variations present. Based on the groundwater elevation graphs, the following notable trends are observed, in addition to those already described within the overburden flow system section:

18. Water level elevations at deep bedrock Monitor 5-IV (Figure E.1) remained within an established range between 1999 and 2014, but sharply increased by approximately 7 m into 2015. Since 2015, the water level has decreased and stabilized at an elevation that is at least 4 m higher than the pre-2014 results.

19. Water levels at Monitor 16A (Figure E.2) decreased between 2007 and late 2010, reaching historical lows in October 2010, but rebounded between 2011 and 2016. Water levels measured since 2016 have been consistent with pre-2007 results.

20. Water levels at deep bedrock Monitor 44-I (Figure E.10) increased from 1998 until 2014, when they generally stabilized.

21. Water levels at Monitor 46-I (Figure E.11) fluctuated and increased over the long term, plateauing between 2013 and 2017. The water elevations within this bedrock monitor were similar to the levels within the shallow monitors at this nest location between 2012 and 2017, which suggested that the monitor may be compromised. However, the bedrock water level decreased significantly in 2018 and water levels measured since mid-2018 have been consistent with historic elevations prior to 2011. Continued monitoring is required to assess the long-term trends at this location.

22. Water levels at replacement Monitor 62-IR are similar to, or slightly lower than, the low range of the historical water level range at Monitor 62-I (Figure E.18). Monitor 62-IR was installed in 2014 to replace Monitor 62-I, since the integrity of the original monitor was suspect.

23. Water levels at Monitor 75-I have exhibited a decreasing trend since resumption of monitoring activities at the well in 2014, and now fall within the former historic range of water levels recorded at the well in 1999 through 2007 (Figure E.24).

24. Water levels at Monitor 76-I remained within an established range between 1999 and 2012 but exhibited an increase from 2012 to 2020, and have fluctuated around this level through the end of 2023 (Figure E.25). It is not known if this increase is attributed to climatic conditions, or other potential factors. Continued monitoring is required to access the long-term tends at this location.

25. Water levels within Monitor 104-I decreased approximately 4 m during 2012 and 2013 (Figure E.40), which is likely attributed to the construction and operation of Cell 2. The water level fluctuated at the lower level from 2013 through 2019 before increasing by over 4 m in 2019. Since 2019, the water level has fluctuated within a 4 m range that is lower than the pre-2012 results but higher than the 2013-2019 results from the monitor. Continued monitoring is required to assess the long-term trend at this location.

An interpretation of the groundwater potentiometric elevations within the shallow bedrock is presented in Figure 5.3. As shown in Figure 5.3, the bedrock groundwater flow pattern generally mirrors the flow directions within the overburden.

The bedrock topography forms a top of bedrock high beneath the drumlin and a low beneath surface water features, forming a subdued replica of the ground topography. Groundwater is typically found at about 10 m below ground surface near the crest of the drumlin, about 5 m or less below ground surface on the till plain, and near surface or discharging at surface water features.

As described above, the SFA is characterized by the high relief drumlin and the waste filling areas, with radial groundwater flow to the east towards the central watercourse and north toward the Crystal Springs Wetland. The groundwater interceptor trench has reduced the potential for off-site groundwater flow from the upgradient drumlin and waste filling areas and the potential discharge of leachate to the central watercourse. In the NFA, groundwater flow is controlled by the glacial till plain topography. In general, groundwater flow in the NFA is southerly toward the Crystal Springs Wetland.

5.3.3 Horizontal Hydraulic Gradients

As shown in groundwater contour Figures 5.2 and 5.3, higher horizontal gradients are generally anticipated in the SFA, where contours are more closely spaced.

In 2023, the calculated horizontal gradients across the Site were:

- SFA Overburden – 0.045 m/m (March) and 0.044 m/m (September);
- SFA Shallow Bedrock – 0.031 m/m (March) and 0.033 m/m (September);
- NFA Overburden – 0.024 m/m (March) and 0.024 m/m (September); and
- NFA Shallow Bedrock – 0.021 m/m (March) and 0.021 m/m (September).

5.3.4 Vertical Hydraulic Gradients

Vertical hydraulic gradients between hydrostratigraphic units can be evaluated at monitoring wells where multiple well screens have been installed at the same location, but at varying depths. The 2023 vertical hydraulic gradients calculated from the nested well locations are presented in Table 5.2 and are summarized below:

- Flowing conditions were observed at shallow bedrock Monitors 18A and 44-II in March, and indicated upward gradients between the overburden and shallow bedrock at the Monitor nest locations. Monitor 18A is located adjacent to the central watercourse and Monitor 44-II is located west of the low-lying Crystal Springs Wetland area, near the western watercourse.

- Within the Cell 1 South area, downward gradients were observed between the overburden and shallow bedrock at Monitor nest 19, shallow bedrock and deep bedrock at Monitor nests 41 and 44, and overburden and deep bedrock at Monitor nest 62. Downward gradients were observed between the overburden and deep bedrock at Monitor nest 62.

- Upward gradients were observed between the overburden and shallow bedrock at Monitor nests 18 and 20, located near the Groundwater Interceptor Trench. Upward gradients were also observed between the overburden and bedrock at Monitor nests 44, 52 and 64, which are located in the Cell 1 South area.

- Within the Cell 1 North area, neutral to weak upward vertical gradients were observed between the overburden and deep bedrock at Monitor nest 63 and weakly downward gradients were observed between the overburden and deep bedrock at Monitor nest 66.

- Flowing conditions were observed at bedrock Monitor 113-I in March, which indicated an upward gradient was present between the overburden and shallow bedrock. Monitor 113 is located within the low-lying Crystal Springs Wetland area between the North and South Fill Areas. An upward gradient was also calculated between the overburden and shallow bedrock at Monitor nest 113 in September.

- Within the Cell 1 North area, neutral gradients were generally observed between the overburden and shallow bedrock at Monitor nests 50 and 61. Downward gradients were observed between the overburden and shallow bedrock at Monitor nests 46, 75, 81 and 101 in 2023, with the strongest downward gradients observed at nest 75.

- Within the North Fill Area, vertical gradients between the overburden and shallow bedrock were typically weakly downward. The exceptions include weak upward gradients at Monitor nests 86 and 92, and neutral gradients at Monitor nest 106 in March and Monitor nest 89 in September. It is noted that the downward gradients observed at Monitor nest 91 are stronger than at the other nested wells in the North Fill Area.

As described in Section 5.3.1, the hydraulic conductivity of the overburden material in which the monitoring wells are screened was historically estimated to be between 4.7 x 10^{-8} to 8.5 x 10^{-7} m/s. A typical average porosity of 0.4 was assumed for the overburden material (conservative assumption), based upon the range identified for silt and clay (Freeze and Cherry, 1979). Considering the measured in-situ hydraulic conductivity and an average hydraulic gradient of 0.14 in 2023, a hypothetical groundwater flow rate of between 0.5 m/year and 9.6 m/year is predicted within the SFA overburden material. For the NFA, a hypothetical flow rate of between 0.2 m/year and 3.2 m/year is predicted, for the 2023 hydraulic gradient average of 0.05.

5.3.5 Groundwater Interpretation Groupings

Based on the interpretation of the groundwater regimes, established flow patterns in 2023 were similar to 2022 and are presented in Figures 5.2 and 5.3. Monitors are grouped into areas relative to the direction of groundwater flow and their relative proximity to the refuse cells. These monitor designations are provided on Table 5.3. The areas have been divided as follows:

1. SFA Cell 1–South (including former Cells A, B, C and D and part of former Phase 1); which is representative of easterly flow toward the interceptor trench.
2. SFA Cell 1–North – east side (including Cells I and J); which is representative of north-easterly flow toward Bensfort Road.
3. SFA Cell 1–North – north side (including Cells G and H); which is representative of northerly flow toward the Crystal Springs Wetland.
4. SFA Cell 1–North – north and west side (including Phase 2); which is representative of northwesterly flow toward the Crystal Springs Wetland, and
5. NFA, which is representative of southerly flow toward the Crystal Springs Wetland

5.4 Groundwater Quality

The 2023 groundwater chemical results are presented in Table 5.4. The historical results for the groundwater monitors are contained in Table F.1 and Table F.2, Appendix F. Table 5.3 shows the monitors and their relative position.

5.4.1 QA/QC Results

As part of the field QA/QC program, groundwater duplicate samples were obtained in 2023 for the spring and fall sampling events and submitted for chemical analyses. Results of statistical comparisons between original and duplicate samples for inorganic and organic parameters in groundwater are provided in Tables G.1 and G.2, respectively, in Appendix G.

It is considered that the results of samples for which the relative percent differences (RPD) are less than 20%, applied to parameter concentrations that are at least 5 times greater than the Method Detection Limit (MDL), can generally be interpreted with confidence. For sample results that are less than 5 times the MDL, a difference of less than 2 times the MDL is deemed acceptable. As shown in Tables I.1 and I.2, the RPD values for the groundwater duplicate samples generally satisfy the 20% or less than 2 times the MDL guideline with the exception of the following:

- COD – 106-I (March) and 63-II (April); and
- TDS – 106-I (March).

It is noted that the concentrations for the original and duplicate samples referenced above were within the historical range for these monitors, and/or the concentrations within these samples were only slightly above the 20% RPD or 5 times detection limit guideline.

Field blanks were also submitted to the laboratory to provide additional quality assurance. The results for the field blanks are provided in Table G.4, Appendix G. As shown in Table G.4, the parameter concentrations in 2023 were generally lower than the laboratory MDL, with the exception of:

- Conductivity and pH in each field blank;
- Ammonia in the March 7th hydrasleeve field blank and in the March 27th field blank; and
- Iron in the June 13th field blank.

The ammonia concentrations in the field blanks were reported at the MDL. The low detected levels in the field blank samples are satisfactory for the sampling program at this site, as the natural concentrations within the groundwater and surface water are typically higher than the concentrations within the field blanks.

It is noted that two field/trip blanks for organic parameters were completed in 2023 and there were no parameters over the method detection limits (Table G.4).

Based on the results of the QA/QC program, it is concluded the overall chemistry results are accurate and precise for interpretation purposes.

5.4.2 Discussion of Results

As previously mentioned, the groundwater quality at the site has been classified as overburden, fresh bedrock, brine, concentrated brine, based on the interpretation of historical monitoring results at specific monitoring locations. The 2023 groundwater results are provided in Table 5.4. Tables 5.5, 5.6, 5.7 and 5.8 present summaries of the 2023 overburden, fresh bedrock, brine and concentrated brine groundwater quality results, respectively. The tables include results for the selected leachate indicator parameters identified in Section 4.1.3 and provide a comparison to the leachate and reference quality ranges for each unit. Time-concentration graphs for the primary leachate indicator parameters (chloride, alkalinity, iron, and TKN) at monitors sampled in 2023 are presented in Figures F.1 to F.59, Appendix F.

5.4.2.1 Overburden

Groundwater quality from Monitor 44-III, located in the SFA, and Monitor 88-III, located in the NFA, are used to represent reference quality for the overburden. As shown in Table 4.4, concentrations of hardness consistently exceed the ODWQS at both wells, while concentrations of DOC, iron, manganese and TDS have occasionally exceeded the Ontario Drinking Water Quality Standards (ODWQS).

South Fill Area

At the overburden wells located in the SFA, the 2023 ODWQS exceedances for inorganic parameters were similar to the reference quality, with the following exceptions:

- Alkalinity concentrations exceeded the ODWQS at Monitors 18B (September only), 19B, 48, 66-II, 66-III, 81-II and 81-III;
- Arsenic concentrations exceeded the ODWQS at Monitor 66-III;
- Nitrate concentrations exceeded the ODWQS at Monitor 63-III;
- Concentrations of barium, chloride (March only) and sodium (March only) exceeded the ODWQS at Monitor 19B; and
- Chloride concentrations exceeded the ODWQS at Monitors 50-II and 52-II.

The 2023 nitrate concentrations at Monitor 63-III and the April 2023 chloride concentrations at Monitors 50-II and 52-II were elevated compared to the historical results from the wells; however, the remaining ODWQS exceedances were consistent with historical results for each well. As previously noted, Monitor 52-II was replaced in September 2022 after the well was damaged in 2020.

As shown in Table 5.5, the leachate indicator parameter concentrations at the SFA overburden wells were generally similar to, or lower than, the reference groundwater quality. At several wells, concentrations of some of the leachate indicator parameters were elevated compared to the reference quality; however, at most locations, only three or fewer parameters were elevated. The exceptions included:

- Monitor 19B located in the Cell 1 South area between the fill area and the groundwater interceptor trench, which had elevated concentrations of most leachate indicator parameters.

- Monitor 52-II located in the Cell 1 South area beyond the groundwater interceptor trench, which had elevated concentrations of alkalinity, COD, chloride and sodium compared to the reference quality. Monitor 52-II was not sampled between 2020 and 2022 as the well was damaged. The well was replaced in September 2022.

- Monitors 48 and 81-III, which are located adjacent to the waste, east of the Cell 1 North fill area. At Monitor 48, concentrations of alkalinity, chloride, iron, manganese and sodium were elevated compared to the reference quality. At Monitor 81-III, concentrations of alkalinity, ammonia, iron, manganese and TKN were elevated compared to the reference quality.

- Monitors 66-II and 66-III, which are located within an area of known leachate impacts adjacent to the Cell 1 North fill area. Concentrations of most leachate indicator parameters were elevated at these wells compared to the reference quality.

The concentration-time graphs (Figures F.1 to F.39) typically show consistent primary leachate indicator parameter concentrations over the long term, with values remaining constant or fluctuating within a range. The notable exceptions are summarized below:

- Monitor nest 18 is located between the interceptor trench and central watercourse. Chloride concentrations at Monitor 18B (Figure F.2) exhibited a relative peak in/prior to 1989, followed by a decrease between 1989 and 1995. Chloride concentrations continued to decrease between 1995 and 2013 at a more gradual rate but have subsequently increased between 2013 and 2023. The increase in chloride concentrations was also accompanied by a comparable increase for sodium concentrations over the same period, although the concentrations of both parameters remain within the historical range.

- Monitor nest 19 is located immediately downgradient of the refuse but not past the groundwater interceptor trench. Parameter concentrations at Monitor 19B (Figure F.3) fluctuate over the long term, but chloride, alkalinity, and TKN exhibit relative peaks prior to 1992, followed by decreases up to 1994. Chloride concentration “highs” have increased since 1994 although concentrations remained within the lower portion of the historical range between March 2010 and early 2014, prior to renewing the fluctuating trend in late 2014 and through

2023. Alkalinity and TKN concentrations have exhibited a slight decreasing trend since 1994.

- At Monitor 52-II (Figure F.10), located beyond the central watercourse and adjacent to Bensfort Road, chloride concentrations have fluctuated but generally increased from 1993 through to 2023, with a significant increase observed in the April 2023 sample compared to the April 2019 sample. The Monitor became damaged in late 2019/early 2020 and, therefore, samples were not collected between 2020 and 2022. The well was replaced in September 2022. As such, the April 2023 sample was the first sample collected from the replacement well.

- Alkalinity concentrations at Monitor 48 (Figure F.8) have fluctuated, but generally increased between 1990 and 2001, exhibiting a relative plateau between 2001 and 2011, and have decreased since that time. Monitor 48 is located adjacent to a landfill service road, to the east of Cell 1 North. The long-term iron concentrations at Monitor 48 fluctuate over a large range but exhibited an increasing trend through 2022. In 2023, the iron concentrations were notably lower than in 2022. Chloride concentrations have fluctuated over a large range, with concentrations exhibiting a general increasing trend between 2012 and 2019, and subsequently decreasing to historical pre-2012 levels into 2023.

- Chloride concentrations within overburden Monitor 74-III (Figure F.16) have decreased over the long term, whereas the chloride concentrations within overburden Monitor 74-II have remained steady over the long term. Alkalinity concentrations within these monitors exhibit fluctuating and increasing trends over the long term, although the trend is more distinguished within Monitor 74-II. Monitor nest 74 is located adjacent to a landfill service road, north of Cell 1 North.

- At Monitor nest 81, located adjacent to a landfill service road along the east side of Cell 1 North, chloride concentrations decreased significantly at both overburden Monitors 81-II and 81-III between 2000 and 2004 (Figure F.18). Chloride concentrations gradually increased within Monitor 81-II between 2008 and 2014 but have decreased since that time; whereas chloride concentrations within Monitor 81-III exhibited a slight increase between 2004 and 2008, followed by a continuing decreasing trend to 2011 and have remained at the lower level since that time. Iron concentrations at Monitor 81-III fluctuate within a 70 mg/L range whereas concentrations within monitor 81-II fluctuate within a 20 mg/L range.

- At Monitor 46-II (Figure F.7), located on the east side of Bensfort Road, chloride concentrations decreased between 1995 and 2007, but have generally increased since that time. Alkalinity concentrations increased slightly between 1991 and 2005 and have marginally decreased since that time. A similar decreasing trend is observed in alkalinity concentrations at Monitor 46-III.

- Monitor nest 61 (Figure F.11) is also located within the buffer area on the east side of Bensfort Road. Chloride concentrations at Monitor 61-III exhibited a steady decrease between 1992 and 2007 and fluctuated at this lower level until 2017. From 2017 to 2019, a significant increase in concentrations reached historical highs for chloride in 2019, which has fluctuated within a wide range since. Chloride concentrations at Monitor 61-II have exhibited a slightly increasing trend since 2011. Alkalinity concentrations at Monitor 61-III have fluctuated with a slight decreasing trend since 2004.

- Monitors at nests 63 and 75 are located further east in the buffer lands and were monitored from 1991 to 2008 and taken out of the routine monitoring program in 2008. These monitors were then reincorporated back into the routine monitoring program in the fall of 2014. Chloride concentrations at Monitor 63-II had gradually increased over the long term (Figure F.13) while concentrations at Monitor 63-III were stable at a low concentration prior to 2008, and have been notably higher since monitoring resumed in 2014. Alkalinity concentrations at Monitor 63-III have decreased since 2014. Concentrations at Monitor 75-II (Figure F.17) have fluctuated within a generally consistent range over the long term. Both monitoring locations reside in active agriculture fields where influences on the monitoring wells related to agricultural practices.

- Located along the north side of Cell 1 North, chloride concentrations at Monitors 33-II and 33-III (Figure F.5) significantly increased between 1991 and 2007/2008 but concentrations decreased between 2008 and 2011, increasing to a peak again in 2015/2016 before following a decreasing trend through 2023. Alkalinity concentrations at these monitors fluctuate but have exhibited an overall increasing trend since 1991.

- At Monitor 66-II (Figure F.14), which is also located along the north side of Cell 1 North, concentrations of chloride, alkalinity and iron increased between 1992 and 2000 but have remained relatively stable since. Concentrations of TKN at Monitor 66-II have steadily increased over the long term until 2014 and have fluctuated since. Concentrations for TKN at Monitor 66-III also increased significantly between 1999 and 2007, and fluctuated within this higher range until 2012. Since that time, TKN concentrations have generally fluctuated and decreased through 2023.

- Parameter concentrations at Monitor 70-II (Figure F.15) were relatively constant, and concentrations within Monitor 70-III generally fluctuated over the long term; with no distinguishable trends noted. Monitors 70-II and 70-III were replaced by Monitors 113-II and 113-III in 2016, at a closer location to the SFA compared to borehole location 70. Chloride concentrations at replacement Monitor 113-II are noticeably higher compared to the historical range at 70-II, whereas the remaining parameter concentrations are comparable to the results from monitor nest 70. Chloride concentrations at Monitor 113-III have shown a steady increasing trend since 2016.

- Chloride concentrations within overburden Monitor 77-I (Figure F.17) fluctuate but exhibited a generally increasing trend to 2017; concentrations have been relatively stable since 2017. Iron, alkalinity and TKN are generally constant or fluctuate with no distinguishable trend. Monitor 77-I is located on the north side of Cell 1 North.

- Alkalinity concentrations within monitors 40-II and 44-III (Figure F.6) exhibited a fluctuating but decreasing trend between 2002 and 2017. Monitor 44-III shows an increasing alkalinity concentration trend from 2016 to 2023. Chloride concentrations at Monitor 40-II exhibited a general decreasing trend from 2008 to 2016 and have stabilized since. Monitor nests 40 and 44 are located to the west of the SFA, near the western watercourse and wetland areas.

As part of the monitoring program, analysis of VOCs is completed at select overburden wells. As shown in Table 5.4, there were no detections of VOC parameters at the overburden wells located in the SFA with the exceptions of Monitors 19B, 48, 66-III, 81-II and 81-III. The 2023 VOC detections were generally similar to historical results. The detected concentrations were generally slightly above the laboratory detection limit, and were lower than each respective ODWQS, with the exception of 1,4-dichlorobenzene at Monitor 81-III and benzene at 66-III and 81-III, which exceeded their respective ODWQS. Monitors 66-III and 81-III are located near the toe of the north and east slopes of the SFA, respectively, within the central portion of the site.

SUMMARY

As noted in previous annual monitoring reports, there are localized leachate impacts downgradient of Cell 1 South, in the vicinity of the groundwater interceptor trench, as indicated by the overburden groundwater quality at Monitor 19B. The extent of the impacts in 2023 remained similar to previous years; although some increasing parameter concentrations have been noted. Decreasing concentrations in the groundwater in this area are expected in the future as leachate concentrations decrease and the previously influenced area is ‘flushed’ by groundwater.

Elevated concentrations of sodium and chloride were observed at Monitor 52-II, located east of groundwater interceptor trench, in 2023. This monitor was replaced in fall of 2022 after it became damaged in 2020. The chloride concentration in April 2023 was notably higher than was observed at the original well prior to 2020. Given the location of the monitor adjacent to Bensfort Road, it is interpreted that road salt may be influencing sodium and chloride concentrations at this location.

The water quality in the area to the east of Cell 1 North is complicated by the application of road salt to the on-site road and Bensfort Road for snow and ice control. The monitoring wells included in the routine sampling program are adjacent to the landfill cells, therefore, many of the monitors in this area show road salt impacts, and some leachate influences, within the groundwater. At Monitor 48 and 81-III in particular, elevated concentrations of several leachate indicator parameters are observed, which indicates a leachate influence. Overall, the 2023 overburden groundwater quality results in this area of the Site were similar to previous years.

Similar to monitoring results from previous years, the overburden groundwater quality along the north side of Cell 1 North shows landfill and road salt influences. These monitors are located on the north side of the drumlin and refuse, between the SFA and Crystal Springs Wetland. Water quality during the sampling events in 2023 for this area is generally similar to previous years, with the exceptions noted above. Leachate impacts and road salt influences are indicated at overburden Monitors 66-II and 66-III.

Further away in the wetland to the northwest of the SFA, at monitor nests 40 and 44, the 2023 water quality was similar to historical results.

North Fill Area

At the overburden wells located in the NFA, the 2023 ODWQS exceedances for inorganic parameters were similar to the reference quality, with the following exceptions:

- Alkalinity concentrations exceeded the ODWQS at Monitors 109-III (September only) and 110-III (September only);
- Chloride concentrations exceeded the ODWQS at Monitors 85-I, 85-II and 86-III (March only); and
- Chloride concentrations exceeded the ODWQS at Monitors 106-II and 106-III; and
- Sodium concentrations exceeded the ODWQS at Monitors 106-II (March only) and 106-III.

The 2023 chloride concentrations at Monitor 85-I and the September 2023 alkalinity concentrations at Monitors 109-III and 110-III were marginally elevated compared to the recent results from the wells; however, the remaining ODWQS exceedances were consistent with historical results for each well.

As shown in Table 5.5, the leachate indicator parameter concentrations at the NFA overburden wells were generally similar to, or lower than, the reference groundwater quality. At several wells, concentrations of some of the leachate indicator parameters were elevated compared to the reference quality; however, at most locations, only three or fewer parameters were elevated. The exceptions included Monitors 92-III and 109-III. At Monitor 92-III, concentrations of alkalinity, chloride, iron, manganese, potassium and TKN were elevated compared to the reference quality. At Monitor 109-III, concentrations of alkalinity, ammonia, chloride, iron, manganese, potassium, sodium and TKN were elevated. The elevated concentrations of several leachate indicator parameters at Monitors 92-III and 109-III indicate a leachate influence is observed at the well locations.

The overburden and bedrock groundwater quality at the NFA wells are representative of the natural baseline conditions up to late 2010, as no landfilling activities took place in the NFA prior to the sampling events in 2010. The long-term concentration data presented in Figures F.1 to F.39 generally indicate consistent concentrations, with values remaining constant or fluctuating within a range, with the exception of the following:

- Alkalinity concentrations at Monitor 84-II (Figure F.19) have exhibited a generally increasing trend, with alkalinity reaching a peak in 2022. The 2023 alkalinity concentration was lower than the 2022 concentration, but remained elevated compared to the pre-2022 results. The 2023 iron concentration at 84-II also notably increased compared to the historic results.
- Chloride concentrations within Monitor 85-I (Figure F.20) were generally constant until 2015, and have since increased into 2023. Chloride concentrations within Monitor 85-II follow similar pattern, although they fluctuate within a greater range. Concentrations of iron, alkalinity and TKN have not displayed the same increasing trend at these wells.
- Chloride concentrations at Monitor 86-III (Figure F.21) exhibited a significant concentration increase in 2016 and have fluctuated within a large range since 2016, while displaying an overall increasing trend since 2016. Alkalinity concentrations experienced a similar trend, within a more muted concentration range.
- Chloride and alkalinity concentrations at Monitors 87-II and 87-III (Figure F.22) have increased since 2012. A historically high concentration of alkalinity occurred at Monitor 87-III in 2023. Iron concentrations at 87-III reached a historical high in the spring 2019, returning to historical range in 2019 to 2020, increasing again in 2021, decreasing to the normal range again in 2022, and increasing again in the fall of 2023.
- Chloride concentrations within monitors 88-II and 88-III (Figure F.23) exhibited a steady increase between 2012 and 2016, subsequently decreasing within both monitors to 2023. Iron concentrations with monitors 88-II and 88-III generally fluctuated within a large range until 2017. Since 2017, iron concentrations at Monitor 88-III have remained low, while iron concentrations at Monitor 88-II have continued to fluctuate with an increasing trend.
- Chloride and alkalinity concentrations have increased at Monitor 91-II (Figure F.26) since 2016.
- Concentrations for chloride at Monitor 92-III (Figure F.27) exhibited a significant increase in 2013, followed by a decrease during subsequent years. Concentrations for iron, alkalinity and TKN exhibit comparable increases in 2016/2017, followed by decreases in subsequent years. Of note, the iron concentration reported at
Monitor 92-III in March 2017 was similar to the concentration observed at refuse

well 23B. The iron concentrations from 2017 onwards were previously considered anomalous.

- Chloride concentrations within the overburden Monitors 93-II (Figure F.28), 94-II (Figure F.29), and 104-II (Figure F.32) are relatively low compared to the SFA monitors, and have remained relatively constant since 2006. Chloride concentrations within monitors 94-II and 104-III exhibited short-term spikes in 2017/2021, and 2013, respectively, but concentrations within these monitors returned to the historical ranges.
- Alkalinity and iron concentrations within the overburden Monitor 95-II (Figure F.30) have generally decreased since 2007, whereas chloride concentrations fluctuated but exhibited a slight increasing trend over the same time frame.
- Concentrations of chloride, iron and alkalinity have increased overall at Monitors 106-II and 106-III (Figure F.33) since 2016.
- Chloride and alkalinity concentrations at Monitors 107-II and 107-III (Figure F.34) have increased overall since 2012 and 2020, respectively. Iron and TKN concentrations have shown large fluctuations during occasional sampling events at Monitor 107-II since 2020.
- Concentrations of the primary leachate indicator parameters at Monitor 109-III (Figure F.36) have increased since 2016.
- Iron concentrations at Monitor 110-I (Figure F.37), chloride concentrations at Monitor 110-II, and alkalinity concentrations at Monitor 110-III, have steadily increased since 2011. Iron concentrations at Monitor 110-II and chloride concentrations at Monitor 110-III were exhibiting decreasing trend up to 2018, after which each monitor exhibited notable increases through 2023. Continued monitoring is required to assess the long-term trends at this borehole location as these monitors are located adjacent to the refuse area but are also downgradient of other infrastructure on site. It is noted that the timeframe for the concentration increases at monitoring location 110 is comparable to the timeframe for concentration increases at other monitors that are upgradient or laterally removed from the refuse area.
- The parameter concentrations within the recently installed monitors at borehole locations 111 (Figure F.38) and 112 (Figure F.39), adjacent to Cell 3, are generally similar to the other monitors installed adjacent to the refuse area in the NFA, and only 12 sampling events have been completed at these locations to date. Alkalinity concentrations appear to be slowly increasing at Monitors 112-I, 112-II, and 112-III, while chloride concentrations have decreased at Monitor 112-II since 2020. Continued monitoring is required to assess the long-term trends at these locations.

As part of the monitoring program, analysis of VOCs is completed at select overburden wells. As shown in Table 5.4, there were no detections of VOC parameters at the overburden wells located in the NFA with the exception of Monitor 109-II, which had a reported detection of m/p-xylenes in March 2023. The concentration was only slightly higher than the laboratory MDL and was appreciably lower than the ODWQS.

SUMMARY

Within Monitor 92-III (Figure F.27), the significant increases for concentrations for chloride, iron, TKN, and alkalinity at various times between 2013 and 2017 may be attributed to a localized perched condition within the waste, above grade, where leachate was not permitted to migrate downwards into the underlying waste due to the presence of interim cover or other soils. As a result, the leachate eventually migrated laterally through the waste and into the adjacent overburden. It is noted, however, that this condition may have been rectified during the construction of the landfill gas collection system (Phase 1) in the NFA, which was completed in 2015. Phase 1 included the installation of horizontal landfill gas collection pipes within Cell 2 which are placed in clear stone filled trenches. The installation of the stone filled trench would subsequently permit the perched leachate to migrate downwards into the underlying waste instead of through the adjacent overburden. This possibility is demonstrated by the subsequent decrease in concentrations of the identified parameters after the installation of the landfill gas system. The time lag between relative spikes and decreases for the parameters is attributed to the relative mobility of the parameters within the groundwater. Continued monitoring is required to confirm the trends for these parameters in the future.

The recent increase in parameter concentrations, between 2017 and 2023, at several monitoring locations, including 84, 85, 86, 104, 106, and 108, are not attributed to landfill leachate impacts in the NFA, as monitoring locations 104 and 108 are located upgradient of the NFA, 106 is located near the scale house and is laterally removed from the NFA, and 84, 85 and 86 are laterally removed from the fill area. The increase in chloride at these monitors may be associated with road salting on-site, due to the traffic increase from landfilling activities within the NFA, but continued monitoring is required to confirm the significance of the recent concentration increases.

A leachate influence is evident at Monitor 109-III, based on elevated concentrations of several leachate indicator parameters compared to the reference quality, and notably increasing concentrations of the primary leachate indicator parameters since 2016 (Figure F.36). Monitor 109-III is located immediately adjacent to the NFA. The leachate impacts are interpreted to be localized based on the lack of elevated leachate indicator parameter concentrations at downgradient Monitors 94-I and 94-II.

5.4.2.2 Fresh Bedrock

Groundwater quality from Monitor 101-I, located in the SFA, and Monitor 88-I, located in the NFA, are used to represent reference quality for fresh bedrock. As shown in Table 4.4, concentrations of hardness consistently exceed the ODWQS at both wells, while concentrations of DOC and iron have occasionally exceeded the ODWQS historically.

At the remaining fresh bedrock wells, the 2023 ODWQS exceedances were similar to the reference quality, with the following exceptions:

- The concentration of sodium at Monitor 63-I exceeded the ODWQS in April;
- Concentrations of alkalinity, barium and TDS exceeded the ODWQS at Monitor 81-I;
- The concentration of manganese at Monitor 92-I exceeded the ODWQS in September; and
- The concentrations of TDS at Monitors 106-I and 107-I exceeded the ODWQS in September.

The 2023 ODWQS exceedances are generally similar to historical results, although it is noted that the sodium concentration at Monitor 63-I was elevated compared to the recent results from the well.

As shown in Table 5.6, the leachate indicator parameter concentrations at the fresh bedrock wells were generally similar to the reference groundwater quality with some exceptions. At Cell 1 Monitors 5-V, 53-I, 81-I and 41-II, concentrations of two or less leachate indicator parameters exceeded the reference quality. At Monitor 63-I, located on the east side of Cell 1 North, concentrations of alkalinity, boron and sodium were elevated compared to the reference quality. Within the North Fill Area, concentrations of two or less leachate indicator parameters at Monitors 92-I, 104-I and 106-I exceeded the reference quality. At Monitor 107-I, concentrations of alkalinity, boron, manganese and sodium exceeded the reference quality.

The concentration-time graphs (Figures F.40 to F.59) typically show consistent primary leachate indicator parameter concentrations over the long term, with values remaining constant or fluctuating within a range. The notable exceptions are summarized below:

- Concentrations of chloride, alkalinity, and iron at Monitor 5-V (Figure F.40) generally increased between 2005 and 2009, but have decreased since that time and have been similar to the pre-2007 levels in recent years. Since 2016, TKN concentrations have exhibited a fluctuating pattern where higher TKN concentrations are reported in the spring sampling events.
- Alkalinity values at Monitor 53-I (Figure F.46) exhibit a slight increasing trend since 1998, while iron concentrations exhibited an increasing trend from 1998 until 2016 before decreasing into 2023.
- Monitor 63-I (Figure F.58) was monitored from 1991 to 2008, taken out of the routine monitoring program in 2008 and subsequently reincorporated into the routine monitoring program in the fall of 2014. Following reincorporation of the well into the monitoring program in 2014, concentrations of chloride and alkalinity

were lower than the pre-2008 results, while concentrations of iron and TKN were higher than the pre-2008 results. Since 2020, the primary leachate indicator parameter concentrations have stabilized at concentrations similar to the pre-2008 historical range.

- At Monitor 81-I (Figure F.49), chloride concentrations gradually increased from 1999 until 2017, decreased from 2017 to 2022 and have remained stable since. Alkalinity concentrations within Monitor 81-I have increased since 2013, reaching a historic high in 2023.

- Monitor 113-I was installed as a replacement for Monitor 70-I in 2016 and it is noted that Monitor nest 113 is located closer to the SFA compared to the original Monitor nest 70. Leachate indicator parameter concentrations at the replacement well have been similar to the concentrations from the original well (Figure F.47). A marginal increasing trend in chloride concentrations has been observed at this location since 2010.

- Chloride concentrations at Monitors 92-I and 92-I (Figure F.52) have marginally increased over the long term. TKN concentrations at both monitors spiked in September 2022, but decreased in 2023.

- Concentrations of chloride, iron and alkalinity have fluctuated with an overall increasing trend since about 2016 at Monitor 106-I (Figure F.54).

- Chloride concentrations at Monitor 107-I (Figure F.54) fluctuate over a large range, with concentrations increasing from 2009 to 2015, before generally decreasing until 2020 and remaining stable since.

As part of the monitoring program, analysis of VOCs is completed at select fresh bedrock wells. As shown in Table 5.4, there were no detections of VOC parameters at the fresh bedrock wells sampled in 2023, which is consistent with historical results.

Monitoring well 81-I is located in a known area of leachate impact close to the landfill that is being closely monitored. Alkalinity concentrations within Monitor 81-I have notably increased since 2013, while other leachate indicator parameter appear to be decreasing into 2023. No remedial action as part of the action plan, is required at the present time, as monitoring wells downgradient of this location do not display the same increase. Regardless, the noticeable concentration increase for alkalinity in recent sampling events will continue to be assessed during future sampling programs to determine potential long-term trends.

In addition, elevated concentrations of several leachate indicator parameters were observed at Monitor 63-I, also located east of Cell 1 North, and at Monitor 107-I, located east of the North Fill Area. Leachate indicator parameter concentrations have been stable at Monitors 63-I and 107-I since 2020.

5.4.2.3 Brine

Historical groundwater quality from Monitor 38-I is used to represent reference quality for the brine wells. As shown in Table 4.4, concentrations of chloride, iron, lead, manganese and sodium have occasionally exceeded the ODWQS at Monitor 38-I. At the remaining brine wells sampled on-site, the 2023 groundwater quality results typically exceeded the ODWQS for chloride, DOC, hardness, iron, manganese, sodium and TDS. In addition, concentrations of alkalinity and barium exceeded the ODWQS at Monitor 19A, and the concentration of alkalinity exceeded the ODWQS at Monitor 66-I.

As shown in Table 5.7, the leachate indicator parameter concentrations at the brine wells were generally similar to the reference groundwater quality with some exceptions. At Monitor 5-IV, 18A, 20A and 62-I, located in the Cell 1 South area of the Site, concentrations of two or less leachate indicator parameters were elevated above the reference quality range. At Monitor 19A, located in the Cell 1 South area, concentrations of alkalinity, COD, iron and manganese were elevated compared to the reference quality range. Within the Cell 1 North area of the Site, concentrations of two or less leachate indicator parameters were elevated at Monitors 46-I and 75-I, while concentrations of alkalinity, iron and manganese were elevated at Monitor 66-I.

The concentration-time graphs (Figures F.40 through F.59) typically show consistent primary leachate indicator parameter concentrations over the long term, with values remaining constant or fluctuating within a range. The notable exceptions are summarized below:

- At Monitor 5-IV (Figure F.55), concentrations for chloride, alkalinity, iron and TKN fluctuate over a large range. Parameter concentrations generally increased over the long term until approximately 2005 and have decreased since.

- At Monitor 19A (Figure F.42), concentrations for alkalinity and TKN have decreased over the long term. Chloride concentrations at Monitor 19A decreased between 1984 and 1993 but have generally fluctuated and increased since that time, reaching an historical high in 2015. Since 2015, chloride concentrations have fluctuated but remained relatively stable.

- Chloride concentrations within Monitor 18A (Figure F.41) decreased between 1987 and 1997 but subsequently increased until 2007 and have remained relatively constant since that time.

- Chloride concentrations at Monitor 16A (Figure F.41) increased between 2004 and 2014, reaching a historical high in 2014, but have decreased to within the historical range through 2023.

- Concentrations of chloride, alkalinity, iron and TKN at Monitor 62-IR (Figure F.57) have fluctuated with an overall decreasing trend since 2014. It is noted that the noticeable decrease in chloride, iron and TKN concentrations at Monitor 62-I in

2004 was attributed to compromised well integrity, and the monitor was replaced by Monitor 62-IR in 2014.

- Concentrations of alkalinity and iron at Monitor 66-I (Figure F.58) have fluctuated with an increasing trend since approximately 2010.

As part of the monitoring program, analysis of VOCs is completed at select brine wells. As shown in Table 5.4, there were no detections of VOC parameters at the brine wells tested in 2023, with the exception of a low-level detection of m/p-xylenes at Monitor 5-IV. The xylene detection at Monitor 5-IV is consistent with historical results.

In summary, based on elevated concentrations of several leachate indicator parameters, leachate impacts are interpreted at Monitor 19A, which is located immediately downgradient of the Cell 1 South area, prior to the groundwater interceptor trench. As discussed above, leachate indicator parameter concentrations have been stable overall since 2015. Leachate impacts are not evident at brine Monitors 20A and 52-I, located farther southeast of Monitor 19A. Leachate impacts are also interpreted at Monitor 66-I based on elevated concentrations of several leachate indicator parameters. Monitor 66-I is located immediately downgradient of the Cell1 North fill area.

5.4.2.4 Concentrated Brine

Three sampled wells are classified as ‘concentrated brine’ based on historical monitoring results and all three of the wells are located within the South Fill Area. Groundwater quality from Monitor 44-I is used to represent reference quality for the concentrated brine wells. As shown in Table 4.4, concentrations of chloride, hardness, sodium and TDS consistently exceed the ODWQS at the concentrated brine reference monitor. Concentrations of arsenic, boron, iron, manganese and nitrate have occasionally exceeded the ODWQS at Monitor 44-I.

At concentrated brine wells 41-I and 76-I, the 2023 groundwater quality results exceeded the ODWQS for chloride, hardness, iron, manganese (76-I only), sodium and TDS, which is consistent with the results from reference Monitor 44-I. As shown in Table 5.8, the leachate indicator parameter concentrations at the concentrated brine wells 41-I and 76-I were similar to the reference quality. Concentrations of the primary leachate indicator parameters have been generally consistent over the long term, with values remaining constant or fluctuating within a large range (Figures F.56 and F.59).

In summary, based on the available results, leachate impacts are not observed at the sampled concentrated brine wells.

5.4.3 Water Quality Compliance

5.4.3.1 Reasonable Use Guideline B-7

ECA Condition 184 x) requires an assessment of the criteria set out in the Ministry Reasonable Use Guideline B-7.

The following formula were used to calculate the criteria:

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

Where:

- Cm = Maximum acceptable concentration of a particular parameter.
- Cb = Natural background concentration of a particular parameter.
- Cr = Drinking Water Quality Standard for a particular parameter.
- X = Reduction Factor. For drinking water X equals 0.5 for non-health related parameters, and 0.25 for health-related parameters.

A comparison of the groundwater quality within the different stratigraphic units beneath the site was made between the upgradient monitors and the monitors located near the property boundary, based on the Guideline B-7 criteria. The results of this comparison for overburden and bedrock monitors are presented in Tables 5.9 and 5.10, respectively. Inorganic parameters which do not have an ODWQS were excluded from the analysis. Hardness and TDS were also excluded from the analysis, as concentrations of both parameters are naturally elevated above the ODWQS in the groundwater at the Site and are not considered leachate indicator parameters. The geometric mean of the historical results from each representative background well was used to determine the reference quality (Cb) for each hydrostratigraphic unit. For parameters with concentrations that were below the laboratory MDL, half of the MDL was used in the calculation, which is common industry practice.

I. Overburden

As shown in Table 5.9, the Guideline B-7 criteria developed using reference quality from overburden Monitor 44-III has been applied to overburden monitors at nests 64, 48, 46, 61, 63, 74 and 75, which are located near the property boundary within the SFA. The Guideline B-7 criteria developed using reference quality from overburden Monitor 88-III has been applied to overburden monitors at nests 86, 87, 89 and 104, which are located near the property boundary within the NFA.

South Fill Area

Within the South Fill Area, the 2023 groundwater quality met the Guideline B-7 criteria for all health-related ODWQS parameters with the exception of nitrate at Monitors 46-III and 63-III. The elevated nitrate concentrations at Monitors 46-III and 63-III are not attributed to the landfill since nitrate concentrations are low in the leachate (Table 4.4) and nitrate is not considered a leachate indicator parameter. Given the location of these wells, the source of nitrate is interpreted to be related to local agricultural land use. Additional Guideline B-7 criteria exceedances within the SFA overburden wells included:

- Alkalinity, DOC, iron and manganese at Monitor 48;
- Iron at Monitor 46-II;
- DOC at Monitors 46-III and 61-III;
- DOC (September only) and iron at Monitor 63-II;
- DOC (September only) at Monitor 63-III;
- Iron and manganese at Monitor 74-III; and
- DOC (September only) and iron (April only) at Monitor 75-II.

The exceedances observed at Monitor 48 are attributed to leachate impacts. The well is located adjacent to the waste fill area. It is noted the City/County of Peterborough currently owns the properties adjacent to the PCCWMF, as shown in Figure 1.2, which would provide additional attenuation capacity downgradient of Monitor 48. It is noted that leachate impacts are not interpreted at Monitors 61-III and 63-II, located downgradient of Monitor 48.

The occasional exceedances related to DOC, iron and/or manganese in the overburden at Monitor nests 46, 61, 63, 74 and 75 are not attributed to the landfill. As shown in Table 5.5, leachate indicator parameter concentrations at these wells are similar to the reference quality. Increasing chloride concentrations observed at nest 46, 61, 63 and 75 are accompanied by stable or decreasing concentrations of other leachate indicator parameters, which suggests that these wells are being impacted by road salt. These wells are located in close proximity to Bensfort Road. In addition, the presence of elevated nitrate in the overburden at nests 46 and 63 indicate that an off-site source is impacting the groundwater at these locations.

North Fill Area

Within the NFA, the 2023 overburden groundwater quality met the Guideline B-7 criteria for all health-related ODWQS parameters with the exception of barium at Monitor 86-III and nitrate at Monitor 89-III (September only) and Monitor 104-II. Barium has consistently been elevated at Monitor 86-III since monitoring of the well began. The elevated barium concentrations are not attributed to the landfill, given that the well is laterally removed from the fill area. The elevated nitrate concentrations at Monitors 89-III and 104-II are not attributed to the landfill since nitrate concentrations are low in the leachate (Table 4.4) and nitrate is not considered a leachate indicator parameter. Given the location of these wells near the perimeter of the Site, the source of nitrate is interpreted to be related to local agricultural land use. Additional Guideline B-7 criteria exceedances within the NFA overburden wells included:

- Sodium (March only) and chloride at Monitor 86-III;
- DOC (March only) and iron at Monitor 87-II;
- Alkalinity, iron and manganese at Monitors 87-III and 104-III in September; and
- DOC and sulphate at Monitor 104-III.

As discussed in Section 5.4.2.1, elevated sodium and chloride concentrations at Monitor 86-III are attributed to road salting activities, since the Monitor is laterally removed from the fill area. The elevated concentrations observed at Monitors 87-II and 87-III are not attributed to the landfill leachate impacts, as the well nest is located cross-gradient and laterally removed from the fill area. Elevated parameter concentrations at Monitor 104-III are not attributed to landfill leachate impacts in the NFA, as monitoring location 104 is located upgradient of the NFA.

II. **Bedrock**

As shown in Table 5.10, the Guideline B-7 criteria developed using reference quality from the upgradient bedrock wells has been applied to the bedrock monitors at nests 41, 46, 61, 63, 75 and 76 located near the property boundary within the SFA and at nests 86, 87 and 89 located near the property boundary within the NFA. It is noted that chloride, iron and sodium have been excluded from the brine and concentrated brine assessment as concentrations of these parameters are naturally elevated in these units due to the briny nature of the groundwater.

South Fill Area

Within the SFA, the 2023 groundwater quality met the Guideline B-7 criteria for all health-related ODWQS parameters within the fresh bedrock, brine bedrock and concentrated brine bedrock wells, with the exception of boron at brine Monitor 75-I. The 2023 boron concentration at Monitor 75-I is consistent with historical results. Boron concentrations are not elevated at fresh bedrock Monitors 81-I and 63-I, which are located upgradient to Monitor 75-I. With the exception of alkalinity, concentrations of other leachate indicator parameters at Monitor 75-I were similar to the reference quality (Table 5.7). As such, the elevated boron concentration observed at the well is not attributed to leachate impacts. Additional Guideline B-7 criteria exceedances within the SFA included:

- DOC, iron and manganese (each in September only) and alkalinity and sodium at fresh bedrock Monitor 63-I;
- Alkalinity and iron at fresh bedrock Monitor 41-II;

- Alkalinity at brine bedrock Monitor 46-I;
- DOC (April only) and alkalinity at brine bedrock Monitor 75-I; and
- Manganese at concentrated brine Monitor 76-I.

The Guideline B-7 exceedances observed at Monitor 63-I do not appear to be related to leachate impacts, as the parameter concentrations are generally similar to the reference quality (Table 5.6). The April 2023 concentration of sodium at Monitor 63-I was elevated compared to the recent results from the monitor; however, the 2023 concentrations of DOC, iron, manganese and alkalinity were consistent with recent results. Primary leachate indicator parameter concentrations have been stable at the monitor since 2020 (Figure F.58).

The Guideline B-7 criteria exceedances related to alkalinity and iron at Monitor 41-II are not considered to be related to leachate impacts, as the parameter concentrations are similar to the reference quality (Table 5.6) and primary leachate indicator concentrations have been stable over the long term (Figure F.44).

The Guideline B-7 criteria exceedance for alkalinity at Monitor 46-I is not considered to be related to leachate impacts, as alkalinity concentrations are only marginally higher at Monitor 46-I compared to the reference quality (Table 5.7). In addition, alkalinity concentrations have been stable over the long term (Figure F.45).

Concentrations of alkalinity have been elevated but generally stable at Monitor 75-I since 2000 (Figure F.48). With the exception of elevated alkalinity and boron, concentrations of leachate indicator parameters at Monitor 75-I are similar to the reference quality (Table 5.7). Based on the available results, the Guideline B-7 criteria exceedances do not appear to be related to leachate impacts.

As shown in Table 5.8, leachate indicator parameter concentrations at concentrated brine Monitor 76-I are similar to the reference quality. Therefore, the manganese Guideline B-7 exceedance is not considered to be attributed to leachate impacts.

North Fill Area

Within the NFA, groundwater quality met the Guideline B-7 criteria for all health-related ODWQS parameters. Guideline B-7 criteria exceedances for non-health related ODWQS parameters within the NFA included:

- Iron (September only) and alkalinity at fresh bedrock Monitor 87-I; and
- DOC (March only) at brine bedrock Monitor 89-I.

The Guideline B-7 criteria exceedances at 87-I are not considered to be attributed to landfill leachate impacts, since the concentrations observed are similar to the reference quality (Table 5.6) and concentrations have remained stable since landfilling in the NFA began in 2010 (Figure F.50). As shown in the interpreted potentiometric surface (Figure 5.2), Monitor 89-I is located upgradient of the waste fill areas at the Site. As such, the DOC Guideline B-7 exceedance is not attributed to landfill leachate impacts.

5.4.3.2 Groundwater Quality Trigger Level Compliance

ECA Conditions 9(8) to 9(10) require a comparison of the groundwater quality to trigger levels criteria set at 80% of the Guideline B-7 values for parameters that have an ODWQS value, as outlined in the D&O Report for the site. The results of the comparison indicate the parameter exceedances of the trigger levels were comparable to the exceedances that are outlined and discussed in Section 5.4.4.1, as shown on Tables 5.9 and 5.10, during the sampling events in 2023.

With the exception of overburden Monitor 48, which is interpreted to be impacted by leachate, the trigger level exceedances are generally not attributed to the landfill leachate impacts, but are considered to be naturally occurring or influenced by other sources; therefore, the groundwater quality at the selected boundary monitors satisfied the trigger levels established for the site. It is noted the City/County of Peterborough currently owns the properties adjacent to the PCCWMF, as shown in Figure 1.2. Therefore, the properties owned by the City/County are available and sufficient for attenuation of elevated landfill related parameters in the vicinity of Monitor 48.

6 Surface Water Monitoring

6.1 Surface Water Setting

The surface water that flows over and around the landfill site is ephemeral, having significant and continual flows on a seasonal basis (spring) and under storm conditions. The watercourses in proximity to the landfill outlet into the Otonabee River approximately 925 m southwest of the landfill site. The adjacent surface watercourses are shown in Figure 5.1 and are defined as the following:

26. The central watercourse, which parallels the southeastern property boundary. Water flow within this channel is towards the southwest. Stations SW1, SW2, SW3, SW18, SW19 (upstream) and SW20 (upstream) are established along this watercourse.

27. The Bensfort Road ditch which runs north-south along the east side of Bensfort Road. Stations SW17, SW21 (upstream) and SW23 are established along this watercourse.

28. The western watercourse, within the Crystal Springs Wetland area, in the central portion of the site that divides the SFA and NFA, where station SW24 is established. Inputs to the western watercourse area include the Bensfort Road ditch and the stormwater management pond.

6.2 Surface Water Flow

In 2023, surface water flows were monitored in the months of February, April, June, August, October, and December, using a Global Water FP111 propeller type flow meter, where possible. A summary of the results are shown in Table H.1, Appendix H. As shown in Table H.1, several surface water stations were frozen during the February event. In addition, all surface water stations were dry or had no measurable flow during the August and October sampling events, due to climatic conditions. Stations SW19, SW20, SW23 and SW24 were also dry or did not have measurable flow during the April, June and December 2023 events, with the exception of SW20 in April. It is noted, however, that water samples were obtained at the established stations if sufficient water was present.

6.3 Surface Water Quality

6.3.1 QA/QC Results

As part of the field QA/QC program, duplicate surface water samples were obtained in 2023 during the June and December sampling events and submitted for chemical analyses. Results of statistical comparisons between original and duplicate samples are provided for surface water samples in Table G.3 in Appendix G.

It is considered that the results of samples for which the relative percent differences (RPD) are less than 20%, applied to parameter concentrations that are at least 5 times greater than the Method Detection Limit (MDL), can generally be interpreted with confidence. For sample results that are less than 5 times the MDL, a difference of less than 2 times the MDL is deemed acceptable. The RPD values for the surface water duplicate samples, as shown in Table G.3, generally satisfy the 20% or less than 2 times the MDL guideline with the exception of the following:

- SW2: (June) Copper

It is noted that the copper concentrations for the original and duplicate samples referenced above were within the historical range for this station, and/or the concentrations within these samples were only slightly above the 2 times MDL guideline.

6.3.2 Concentration Trends

The surface water station locations are shown on Figure 5.1. The surface water monitoring program included the collection of water samples at the surface water stations in February, April, June and December 2023, when sufficient water was present. Field measurements were obtained for pH, conductivity, temperature, and dissolved oxygen. Laboratory chemical results for the events completed in 2023 are summarized in Table H.2, Appendix H. Time-concentration graphs for the historical concentrations of chloride, alkalinity, iron and TKN are contained in Figures H.1 to H.5, Appendix H. Generally, over the long term, and through 2023, these chemistry parameters show fluctuating values, with no distinguishable trends, with the following exceptions:

29. Parameter concentrations at the on-site and downstream stations, along the central watercourse, are generally comparable to the water quality at the upstream locations SW19 and SW20 (Figure H.3), although chloride concentrations at the on-site stations, SW1 and SW2 (Figure H.2), are generally higher compared to the upstream stations. It is noted, however, that the chloride concentrations at stations SW1 and SW2 are comparable to, or lower than, the chloride concentrations at the stations within the Bensfort Road ditch, including SW17, SW21, and SW23 (Figure H.4). This pattern indicates the chloride concentrations at stations SW1 and SW2 are likely a reflection of the influence of a road salt usage and are not landfill related.

30. Parameter concentrations at station SW24 (Figure H.5), along the western watercourse within the Crystal Springs Wetland Area, have historically been similar to, or lower than, the values at the upstream stations along the central watercourse (SW19 and SW20) as well as the Bensfort Road ditch (SW21). Chloride concentrations at station SW24 were lower than the upstream locations of the central watercourse and Bensfort Road ditch in 2023.

31. Chloride concentrations at the stations within the ditch beside Bensfort Road generally fluctuate within a range but are generally elevated compared to the concentrations at the surface water stations along the central watercourse. This pattern is attributed to the effect of road salt operations along Bensfort Road. Parameter concentrations at stations SW17, SW21, and SW23, along the ditch are generally similar during specific sampling events.

6.3.3 Water Quality Compliance

The 2023 surface water chemical results are summarized in Table 6.1. Surface water quality at the surface water stations generally complied with the Provincial Water Quality Objectives (PWQO) during the sampling events in 2023, with the exceptions of the results that are bolded/shaded in Table 6.1. The exceedances were limited to dissolved oxygen (field), iron and phosphorus concentrations at several stations. Dissolved oxygen exceedances were found at upstream station SW20 in April and June (central watercourse) and at SW21 (along Bensfort Road) in February. Phosphorous exceedances were found at the upstream stations SW19 in April and SW20 in June (central watercourse). Phosphorous exceedances were also found at upstream station SW21 (along Bensfort Road) in April, June and December. Iron exceedances were found at upstream stations SW20 (central watercourse) and SW21 (along Bensfort Road) in June.

The magnitudes of the dissolved oxygen, iron and phosphorus exceedances at the downstream stations have historically been generally similar to, or lower than, the exceedances at the upstream stations. This pattern has indicated that the exceedances which occur at the downstream stations are generally attributed to other sources upstream of the landfill site.

It is noted that in June 2023, iron and phosphorus concentrations exceeded the PWQO at downgradient stations SW1 and SW2 (central watercourse) at concentrations that were higher than concentrations at the upgradient stations (SW19 and SW20). In addition, although the iron and phosphorus concentrations at all stations along Bensfort Road exceeded their respective PWQOs in June, the concentrations of iron and phosphorus at downstream stations SW17 and SW23 were higher than the upstream concentrations at SW21 in June. At downgradient station SW24 within the Crystal Springs Wetland Area, iron and phosphorus concentrations in June 2023, as well as the phosphorus concentration in December 2023, exceeded the PWQO at concentrations that were higher than concentrations at the upgradient stations (SW19, SW20 and SW21).

The PWQO exceedances for iron and phosphorus are likely attributed to sediment within the water at the time of sampling. The exceedances of phosphorus during multiple events at both of the upstream stations suggests the exceedances are mainly associated with sediment within the water and stagnant water located at the sampling location, and are not attributed to the landfill site. Iron levels have historically had greater exceedances at the Site and have not been attributed to the landfill.

The dissolved oxygen concentrations that exceeded the PWQO at downgradient station SW17 in June and station SW23 in April and June were lower (i.e. greater exceedance of the PWQO) than the upstream concentrations at SW21. It is inferred that these lower dissolved oxygen levels are attributable to the low to no measurable flow at the stations, as discussed in Section 6.2.

Stations SW18 and SW3 are established along the central water course, downstream of the refuse area; with station SW3 located downstream of station SW18. As shown in Table 6.1, there were no PWQO exceedances at station SW18 during the February and April 2023 sampling events. PWQO exceedances occurred at stations SW3 in June (iron and phosphorus) and December (phosphorus) and the concentrations were comparable to the exceedances exhibited at the upstream stations.

A comparison of the downstream alkalinity concentrations to the upstream water quality indicates that the surface water quality at the downstream stations satisfied the PWQO (permitting a 25% decrease compared to upstream water quality) along both surface water channels in 2023.

Based on the surface water chemical analyses, there is no measurable landfill influence on the surface water quality on or off-site. Continued monitoring is required to identify and assess any possible trends in the concentrations of parameters measured.

Surface water runoff that has been in contact with waste is treated as leachate. Berms and temporary swales are employed to contain potentially impacted stormwater within the active disposal area as required. Potentially impacted stormwater was directed into the LCS.

ECA Condition 6(38) states that leachate is to be removed from the collection system in a manner that prevents the overflow of leachate to any surface watercourse. During the 2023 reporting period, there was no overflow of leachate to adjacent surface watercourses.

6.3.4 Surface Water Quality Trigger Level Compliance

ECA Conditions 9(16) to 9(18) require a comparison of the surface water quality to trigger levels that are related to the PWQO and to the upstream surface water quality; similar to the comparison provided in Section 6.3.3. As indicated in Section 6.3.3, water quality at the downstream surface water stations generally satisfied the PWQO, with exceedances for iron and phosphorus at some of the stations during events in 2023. The magnitudes of the exceedances at the upstream stations were generally similar to the exceedances at the downstream stations, with the exceptions noted in Section 6.3.3. This pattern indicates the exceedances which occur at the downstream stations are generally attributed to other causes/sources and are not landfill related.

Based on results of the sampling events in 2023, the surface water quality satisfied the trigger levels established for the site.

6.4 Stormwater Pond Monitoring

The stormwater management system is approved and operated under a separate ECA (Amended ECA No. 2231-8YCPHG, September 28, 2012) under the Ontario Water Resources Act (OWRA). The ECA is provided in Appendix A. The stormwater management pond is located southeast of the NFA, as shown in Figure 5.1. The stormwater management pond is intended to store, attenuate and discharge stormwater into the western watercourse within the Crystal Springs Wetland. The pond consists of two 900 mm inlet culverts, which discharge the collected stormwater from the drainage ditches into the sediment forebay of the pond. The stormwater management pond is lined with compacted processed native till. A 250 mm diameter pipe then discharges the water from the forebay into the main cell. Water is discharged from the stormwater management pond via a 1500 mm diameter corrugated steel pipe riser outlet structure onto a rip rap splash pad, and a subsequent deep grassed outlet channel into the creek.

OWRA ECA Condition 6 outlines the monitoring program for the effluent from the stormwater management pond to provide a performance record for future references and to trigger corrective action proactively and voluntarily before environmental impairment occurs. Water samples were able to be obtained from the pond inlet on April 5, 2023; and from the pond outlet on January 5, April 5, June 12, July 13, August

4, August 10 and December 27, 2023. The ponds were utilized for site dust control in 2023. It is noted that no discharge occurred during many additional attempts to sample the pond in 2023; Table H.3 lists the inlet and outlet sampling events that were attempted in 2023. The chemical results of the stormwater pond effluent monitoring program are summarized in Tables H.4 and H.5 in Appendix H. The City had sediment levels in their storm water receiving pond checked by City Staff throughout the year, and it was determined that they were within acceptable levels; therefore, no service was required.

OWRA ECA Condition 7 outlines the Pond Effluent Objectives (PEO) for discharge from the outlet of the stormwater management pond, which are included in Table H.4. As shown in Table H.4, the effluent water quality generally satisfied the Pond Effluent Objectives during the sampling events in 2023 for the parameters analyzed with the exception of the following:

1. Iron (April 5); and
2. Turbidity (Jan 5, April 5).

As shown in Table H.5, organic parameters were not detected within the samples obtained at the inflow or outflow, for the parameters analysed, during the sampling events in 2023 with one exception. Toluene was detected at a concentration of 1.2 μg/L in the outlet sample collected on April 5, 2023.

The elevated turbidity concentrations during the January event is attributed to high sediment content and limited stormwater retention time within the pond. The sampling event in January occurred after several days of rainfall that occurred while the pond surface was still frozen. This resulted in the bulk of stormwater flow travelling over the top of the frozen pond surface, thereby limiting the retention time of the stormwater within the pond and the pond's ability to mitigate sediment before discharge.

The elevated concentrations during the April event are attributed to high sediment content. The sampling event on April 5th occurred immediately following the receipt of 28.2 mm of precipitation. If there was a significant volume of water within the pond prior to the precipitation event, the pond would not have had suitable available capacity to mitigate sediment during the precipitation event.

Continued monitoring of the water quality from the stormwater management pond is required to confirm the ongoing operation and performance of the pond.

7 Landfill Gas Control System

The LFGCS is operated as required by the ECA. The major components of the LFGCS are the gas collection fields in the SFA and NFA, the LGUP, and the landfill gas flare. Figure 7.1 presents the current layout of the LFGCS.

Soil gas probe monitoring is undertaken at the landfill to determine whether landfill gas is migrating outside the limit of waste. Soil gas probe monitoring was conducted in March, July, September and November in 2023. There were no exceedances to the 1 percent by volume (v/v) methane trigger level in 2023. During the monitoring events, the maximum concentration was found to be 0.3 percent methane (v/v), which indicates landfill gas is generally not migrating outside the limit of waste. The locations of soil gas probes are shown on Figure 2.1 and Figure 5.1. Gas probe monitoring results from 2023 are presented in Table 7.1 and discussed further in Section 7.4.

7.1 Landfill Gas Control System Development, Modifications and Maintenance

In December 2016, a new soil gas monitoring probe was installed north of Cell 3 to monitor potential migrating landfill gas from the recently constructed cell. Monitoring of the new soil gas probe, GP10, began in 2017.

In November 2019, replacement soil gas monitoring probes were installed near the original locations of GP2 and GP3, and the new gas probes were incorporated into the gas monitoring program in 2020.

Construction of Phase 3 of the landfill gas collection system in the NFA started in December of 2019 and was substantially completed February 12, 2020. Phase 3 included the installation of three vertical landfill gas extraction wells in Cell 2 and two horizontal landfill gas collection pipes in Cell 3.

During Cell 4 construction, the LFG main header was expanded around the exterior of Cell 4. Approximately 520 m of header pipe was installed with eight (8) capped branch saddles for future connections.

The Phase 4 landfill gas collection system in the NFA is anticipated to be constructed in the spring of 2024. This phase of the LFG system is expected to have a total of 7 to 9 new gas extraction wells installed in Cells 2 and 3 to aid in the collection of LFG as waste placement progresses.

Gas probe GP-1 was damaged during winter maintenance operations and is scheduled to be replaced early in 2024.

7.2 Landfill Gas Control System Monitoring

In 2023, data collection took place at extraction points in the LFGCS to assist with balancing and maintaining efficient operation of the LFGCS. The pressure and concentration of LFGCS were monitored on a regular basis by the City and PUG staff. Monthly monitoring as required by the ECA is completed by the City's engineer on record for the PCCWMF.

During monitoring, measurements of static pressure, percent methane, carbon dioxide and oxygen were obtained from each extraction point in the system. Adjustment of the collection field was undertaken based on monitoring results by the City or PUG staff. Appendix I includes a summary of the landfill gas monitoring program as well as the results of the monthly landfill gas monitoring for 2023.

During flare operations, the exhaust temperature was monitored in accordance with ECA Condition 6.(46). The flare temperature was monitored by a programmable logic controller (PLC) and recorded by an on-site data-logger. The reliability of the data logger was greater than 99.5 percent. The landfill gas flare PLC is configured to automatically shut down when the flame temperature falls below or exceeds the operating temperature range. PUG records and retains temperature data. During 2023, the LFGCS operated in accordance with the ECA.

The LGUP is generally operational full time on site. PUG is responsible for the operation and maintenance of the LGUP system. When methane concentrations are too low to support the operation of the generator, the system automatically shuts down. After analysis of the shutdown, the flare is manually started to collect LFG from the NFA and SFA. When methane levels increase the LUGP system is restarted. During 2023, the LFGCS operated in compliance with the ECA.

7.3 Landfill Gas Surface Monitoring

A landfill gas surface monitoring program was undertaken on July 18 and September 28, 2023. Due to an unexpected precipitation late morning on July 18, THC and combustible gas monitoring was aborted. Monitoring resumed on September 28 when weather permitted and was successfully completed that day. The associated report dated January 2, 2024 is included in Appendix I.

The report states that the majority of the SFA is covered with vegetation, with some small barren areas and unpaved roads. Total hydrocarbon (THC) concentrations greater than 500 ppm were measured at 12 of 224 sample locations. All THC concentrations greater than 500 ppm were found near maintenance holes. It is likely that landfill gas is entering the LCS and being released through these maintenance holes. Both manholes and barren area with elevated THC readings recorded during the 2022 survey were no longer elevated above 500ppm during the site visit.

The report recommended further effort to remediate elevated THC concentrations emanating from manholes, suggesting possible upgrades to the existing manhole covers.

7.4 Perimeter Soil Gas Monitoring

Landfill gas migration monitoring is undertaken at soil gas probes along the north, east and south boundaries of the SFA and near BH106, MHG2, and north of Cells 2 and 3 in the NFA. The probes are equipped with stopcock and hose barb assemblies to prevent atmospheric air intrusion. The LFGCS monitoring program consists of recording: percent by volume (v/v) for methane, carbon dioxide, oxygen and water levels in the probes.

Perimeter gas probe monitoring events were completed in 2023 to monitor soil gas quality and water levels. Monitoring was conducted at ten locations, GP1 through GP10, as shown on Figure 5.1.

Typically, pressure readings are collected first, followed by combustible gas and oxygen readings. Water levels were measured to determine if the probe screen was flooded or not (i.e. if water level was above the screen). Table 7.1 summarizes the results of the perimeter soil gas probe monitoring in 2023.

The gas migration monitoring program shows no evidence of off-site landfill gas migration or potential for imminent off-site landfill gas migration. There has been no indication to date that landfill gas is migrating in the subsurface from the site.

Trigger Condition

If the 20 percent Lower Explosive Limit (1 percent methane (v/v)) trigger level is exceeded at any gas probe during two successive monitoring events it may be necessary to increase the monitoring frequency and to establish and monitor other landfill gas probes in the vicinity of the affected probe.

During the 2023 monitoring events, no wells were found to exceed 1 percent methane (v/v).

8 Status of Contingency Plans

In accordance with ECA Conditions 9(8), 9(9), 9(10) and 9(11), the following presents an overview of the status of the Contingency Plans for the SFA and NFA. Contingency Plans are documented in the *Peterborough County/City Waste Management Facility Final Design, South Fill Area, Design & Operations Report – Volume 1* report dated January 2004 (Final Design Report).

The updated contingency plans included measures to address the following:

32. Leachate migration;
33. Leachate head build-up;
34. Leachate seepage; and
35. Landfill gas control.

Monitoring and inspection data for 2023 were reviewed relative to the requirements of the contingency plans. The results of the review indicate that none of the relevant trigger levels have been exceeded and the contingency measures related to leachate or landfill gas are therefore not required at this time.

9 Proposed 2024 Annual Monitoring Program

The monitoring program, as undertaken in 2023, is presented in Table 1.1. Alterations to the established monitoring program for the site were implemented in 2015 as required under Condition 9(4) of the ECA.

Pursuant to Section 2.7 of the Ministry Site Inspection Report of March 28, 2013, sampling and analysis of PCB within the collection system leachate will be continued on a quarterly basis as part of the 2024 monitoring program. The results of the PCB sampling will continue to be reported under a separate document prepared for the WWTP.

No further additional changes to the landfills annual monitoring program are recommended for 2024. As noted previously, the Organics Facility monitoring program will commence in 2024 and will be included in the next annual monitoring report for the PCCWMF.

10 Additional Information Requested in 2023

In 2023, there was no additional information requested by the Ministry (ECA Condition 10(19) c. xviii) that is not included elsewhere in the 2023 Annual Monitoring Report.

11 Summary of Key Observations and Conclusions

The following presents the key observations and conclusions resulting from the 2023 annual monitoring program for the PCCWMF:

Site Development

1. Construction of the Organics Facility at the PCCWMF started in 2023 and continued into 2024. The Organics Facility is expected to become operational in May of 2024 and details of the operation of the system will be incorporated into the annual monitoring program for 2024.
2. R.W. Tomlinson is the Landfill Site Operator. They have operated the site since September 2012.
3. In 2023, 43,259 tonnes of waste was placed in the NFA.
4. 2,358,520 tonnes of waste have been disposed in the PCCWMF to December 31, 2023.
5. The highest daily quantity of material received on site in 2023 was 1,571.81 tonnes, received on January 17, 2023.
6. The NFA will provide capacity for approximately 1,023,090 tonnes of waste based on air space of 1,527,000 m^3 and an apparent waste density of 0.67 tonnes/m^3.
7. Remaining waste disposal capacity for the County/City at the PCCWMF is approximately 10.5 years (from December 22, 2023) based on an assumed annual waste disposal rate of 46,350 tonnes and an apparent waste density of 0.67 tonnes/m^3.
8. Various outstanding items, to be competed as part of the Cell 4 construction contract, were unable to be completed in 2022 and was completed in the Spring of 2023. This included the construction of a perimeter access road with drainage ditches around Cell 4 as well as construction of three (3) access ramps for access to manholes on the south side of Cell 2 and 3 for maintenance accessibility.
9. There is approximately 174,390 m^3 of soil currently available in on-site stockpiles. The stockpiled soil will be used as daily cover and other site needs. The estimated remaining quantity of daily, interim and final cover required for the NFA is 221,505 m^3. Contaminated soil will continue to be received at the site for use as daily cover.
10. Approximately 6,286 tonnes of recyclable material, not including materials received for use as alternate daily cover, were diverted from disposal at the on-site Public Drop-off Depot at the PCCWMF in 2023.
11. The City has implemented a weekly curbside organic waste collection and composting program that began on October 31, 2023. Organic waste was anticipated to be hauled and processed at the newly constructed Organics Facility at the PCCWMF in 2023. However, setbacks to the construction of the Organics Facility deferred the diversion of organics to the facility until substantial completion in 2024. Organic waste collected between October 31, 2023 until the new Composting Facility at the PCCWMF becomes operational in May of 2024, was weighed at the PCCWMF and transferred to the Harper Road compost site.
12. In 2023 there were no violations of Condition 6(23) of the ECA where contaminated soil stockpiled onsite exceeded the three months of annual daily interim cover material volume required.

Operations and Maintenance

13. Final cover was placed within Cell 2 and 3 in 2023 covering approximately 0.24 ha.

14. The Site Liaison Committee (SLC) met in-person on February 7, 2023 and on July 05, 2023. Key information discussed at the meetings included review of the 2022 monitoring report, site operations, complaints, capital works, and other related topics.

15. In 2023, six (6) complaints were received and documented:

    a. Five (5) complaints were related to potential odours from the PCCWMF, observed off-site of the landfill. Four (4) of the five (5) odour complaints were unrelated to the landfill and occurred due to farming operations. The last complaint was related to odours from Neal Drive. It was noted that an extreme rain event caused high pressures on the sewer system and the system was reviewed by the Odour Control Unit to ensure the system was operating efficiently.

    b. One (1) complaint was related to excess litter observed along Baseline Road. A crew was sent to the area that afternoon to clean up litter.

Leachate Collection System Monitoring, Operation and Maintenance

16. The volume of leachate and groundwater removed in 2023 was approximately 91,727 m^3, a 92.7% increase from the 47,603 m^3 removed in 2022.

17. The quantity of leachate collected within the NFA and SFA increased in 2023, compared to the amount collected in 2022. The increase in the volume of leachate is attributed to Cell 4 becoming operational in late 2022, which increased the capture area for precipitation as well as an increase in precipitation in 2023.

18. Monitor ISP15 is planned be replaced with a vertical refuse monitor during the LFGCS Phase 4 works in the spring of 2024. The installation of the refuse monitor within Cell 2 would be in accordance with the recommendations in the D&O report.

19. The quality of leachate generated in 2023 generally satisfied Sewer Use By-law No.15-075 criteria with the exception of TKN in the SFA holding tank in April and October, TKN in the NFA holding tank in April, and nonyl-phenols in the SFA holding tank in October. Historically, TKN and nonyl-phenols concentrations have periodically exceeded Sewer Use By-law criteria.

20. Leachate at the Site is generally characterized by elevated concentrations of alkalinity, ammonia, boron, COD, chloride, iron, manganese, phosphorus, potassium, sodium and TKN when compared with background overburden and bedrock groundwater quality. In comparison with the deep background bedrock groundwater quality classified as "brine", leachate at the Site is characterized by elevated concentrations of alkalinity, ammonia, boron, COD, iron, manganese, phosphorus, potassium and TKN. In comparison with the deeper background bedrock groundwater quality classified as "concentrated brine", leachate at the Site is characterized by elevated concentrations of only alkalinity, ammonia, iron, manganese, phosphorus and TKN. As such, these elevated parameters were

chosen as diagnostic leachate indicator parameters for the discussion of the applicable downgradient groundwater quality. Chloride, TKN, alkalinity and iron continued to be considered the primary leachate indicator parameters, with the exception of chloride for the groundwater quality classified as brine and concentrated brine, as noted previously.

21. In-waste leachate concentrations of alkalinity, COD, chloride, iron, manganese, phosphorus, potassium, and TKN have generally fluctuated within a lower range since 2005 compared to the concentration ranges between 1986 and 1993, and have generally decreased between 2005 and 2023. The concentration fluctuations are attributed to the variable nature of leachate within refuse although it is expected that parameter concentrations within the refuse will decrease over the long term. Installation of additional in-waste monitors is not warranted at this time.

22. Groundwater interceptor leachate quality, in general, has fluctuated with no distinguishable trends. The groundwater in the interceptor system is somewhat degraded due to natural conditions, brine influences and low levels of some residual leachate related parameters. Several concentrations decreased to historic lows in 2021, but have rebounded into 2022/2023.

23. The quantity of leachate discharged to the City's sewer system in 2023 was within historical rates and is considered insignificant with respect to leachate hydraulic loading on the WWTP. Leachate contributed less than 1 percent of the total influent volume of the WWTP in 2023.

24. BOD_5, TSS, phosphorus, and COD loads on the WWTP from landfill leachate are low and represent only a small portion of the WWTP capacity.

25. TKN load on the WWTP in 2023 appears to be in the range of 1.0% to 3.8%.

26. A small seep was noted on the south and east side of the NFA landfill by WSP during the LFG monitoring event on March 29. The landfill manager was notified, and the two areas were repaired the following day by Tomlinson. Throughout the remainder of the year, the seep was observed to be contained.

27. Both the SFA and NFA LCS were flushed in 2023 with the exception of the north half of Cell 2 (due to accessibility with flushing equipment) and Cell 4. Due to miscommunication with the Cell 4 contractor, flushing and video inspection of Cell 4 was missed in 2023 and was instead completed on March 28, 2024. Review of the 2024 data shows the LCS in Cell 4 is functioning as designed. The City will continue to flush the LCS on an annual basis.

28. The NFA Cells 2 and 3 and SFA LCS was video inspected in 2023. NFA Cell 4 LCS will be video inspected in 2024 as per ECA Condition 6(42) c. and every year thereafter until 2027. NFA Cells 2 and 3 and the SFA will be video inspected in 2026 as per ECA Condition 6(42) a. and every other year thereafter.

Groundwater Monitoring Assessment

29. Monitors ISP8 and ISP9 were decommissioned in 2020 due to localized cap enhancements in the SFA and replacement vertical standpipes will be installed at a later date.
30. In February 2024, additional groundwater monitoring nests, identified as 114 and 115, were installed adjacent to Cell 4, in accordance with the recommendations in the D&O Report for the site. These wells will be incorporated into the annual monitoring program for 2024.
31. Water quality effects from the landfill consist of leachate impacts and historical road salt effects to the east and north of the SFA, similar to previous annual monitoring results. Leachate influences are limited to overburden monitors immediately downgradient of the waste in these areas.
32. During 2023, organic parameters were detected within the overburden at Monitors 19B, 48, 66-III, 81-II/III and 109-II, which is similar to historical results. The majority of these monitors are located at the toe of the northern and eastern slopes of the SFA.
33. The Reasonable Use Policy limits that were exceeded are generally related to road salt or natural groundwater quality variability at the site and are not attributed to landfill leachate, with the exception of interpreted leachate impacts resulting in exceedances within the overburden at Monitor 48. Groundwater quality downgradient of Monitor 48 complied with the Guideline B-7 criteria. The monitoring program results from 2023 demonstrate that no contingency measures are required at this time.
34. The NFA overburden and bedrock groundwater quality is generally representative of the natural baseline conditions, as no landfilling activities took place until late 2010. Based on the 2023 results and previous monitoring, the groundwater quality indicates fresh overburden and bedrock groundwater, with brine influenced bedrock groundwater at two monitor locations, 86-I and 89-I. Concentrations for select parameters, including chloride, alkalinity, and iron have increased at several monitors within the NFA, but since several of these increases have also occurred at the upgradient monitors, these increases are generally not attributed to the landfill site. The exception is a localized leachate influence interpreted at overburden Monitor 109-III, which is located immediately adjacent to the NFA.

Surface Water Monitoring

35. Surface water quality during 2023 was similar to previous years. Water quality generally satisfied the PWQO with the exception of dissolved oxygen, iron and phosphorus at surface water stations, during at least one sampling event in 2023. The magnitudes of the dissolved oxygen, iron and phosphorus exceedances at the downstream stations have historically been generally similar to, or lower than, the exceedances at the upstream stations. Dissolved oxygen, iron and phosphorous exceedances were observed at upstream station SW20 (central watercourse), as well as at upstream station SW21 (along Bensfort Road) in 2023. These exceedances at the upstream stations indicate that PWQO exceedances at the

downstream stations are considered to be naturally occurring or the result of runoff from the roadway and/or adjacent lands; the exceedances are mainly associated with sediment within the water and/or stagnant water located at the sampling location. The landfill site does not have a measurable influence on the water quality within the adjacent surface water bodies.

36. Effluent from the stormwater management pond satisfied the PEO during the sampling events in 2023 for the parameters analysed, with the exception of iron in April, and turbidity in January and April. The current configuration of the stormwater management pond is adequate for reducing the majority of parameter concentrations from discharging to the adjacent watercourse.

Landfill Gas Odour Control System

37. During 2023, the LFGCS operated in compliance with the ECA.

38. Landfill gas surface monitoring was undertaken on July 18 and September 28, 2023. Due to an unexpected precipitation late morning on July 18, THC and combustible gas monitoring was aborted. Monitoring resumed on September 28 when weather permitted and was successfully completed that day. Total hydrocarbon (THC) concentrations greater than 500 ppm were measured at 12 of 224 sample locations. THC concentrations greater than 500 ppm were found near maintenance holes.

39. Soil gas probe monitoring was completed four times in 2023. Soil gas probe monitoring from 2023 shows no evidence of gas migration beyond the property boundary.

Contingency Plans

40. Monitoring shows the implementation of contingency measures is not required at this time.

Compliance with ECA

41. No violations of ECA conditions were noted in 2023.

12 Recommendations

The following recommendations are based on the results of the 2023 annual monitoring program and other information collected in 2023:

1. THC levels should continue to be monitored in manholes where high levels were observed during 2023 surface monitoring, and remedial action should be taken as required.
2. Odour complaints continue to be addressed through operation and expansion of the LFGCS as required.
3. Monitors ISP8 and ISP9 should be replaced with vertical standpipe monitors upon completion of the localized capping activities.

4. Several standpipe casings were observed to be corroded during the 2023 monitoring program. Standpipe casings should be assessed and replaced as necessary during the 2024 monitoring program if conditions allow without further compromising the integrity of the standpipes.

13 Glossary of Terms

COD: Chemical Oxygen Demand

County/City: County of Peterborough/City of Peterborough

D&O Report: Design and Operations Report

ECA: Environmental Compliance Approval

ha: hectare

HHW: Household Hazardous Waste

LCS: Leachate Collection System

LFG: Landfill Gas

LFGCS: Landfill Gas Control System

LOQ: Limit of Quantitation

LGUP: Landfill Gas Utilization Plant

m: meters

Ministry: Ontario Ministry of the Environment, Conservation and Parks

MRF: Materials Recycling Facility

NFA: North Fill Area

ODWQ: Ontario Drinking Water Quality

O.Reg.: Ontario Regulation

OWRA: Ontario Water Resources Act

PCCWMF: Peterborough County/City Waste Management Facility

PEO: Pond Effluent Objectives

PLC: Programmable Logic Controller

PUG: Peterborough Utilities Group

PWQO: Provincial Water Quality Objectives

RPD: Relative Percent Differences

SFA: South Fill Area

SLC: Site Liaison Committee

TDS: Total Dissolved Solids

THC: Total Hydrocarbon

TKN: Total Kjeldahl nitrogen

(v/v): Percent by Volume

WEEE: Waste Electrical and Electronic Equipment

WWTP: Waste Water Treatment Plant

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TABLES

TABLE 1.1
2023 Monitoring Program
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

GROUNDWATER

Group	Monitoring Designation	Monitoring Events		Comments
		March / April	September / October	
G1	18A, 18B, 19A, 19B, 20B, 48, 63-I, 63-II, 63-III, 66-III, 75-I, 75-II, 81-I, 81-II, 81-III	Water Levels Analysis List 1 Analysis List 2 Analysis List 3	Water Levels Analysis List 1	
G2	16A, 20A, 33-II, 33-III, 40-II, 41-I, 41-II, 44-I, 44-II, 44-III, 46-I, 46-II, 46-III, 50-I, 50-II, 52-I, 52-II, 53-I, 54-II, 61-I, 61-II, 61-III, 62-IR, 64-I, 64-II, 66-I, 66-II, 74-II, 76-I, 77-I, 101-I, 101-II, 101-III, 113-I, 113-II, 113-III	Water Levels Analysis List 1	Water Levels	
G3	5-V, 5-VI, 62-II	Water Levels Analysis List 1	Water Levels Analysis List 1	
G4	5-IV, 16C, 50-III, 74-III	Water Levels Analysis List 1	Water Levels Analysis List 3	
G5	84-I, 84-II, 85-I, 85-II, 86-I, 86-II, 86-III, 87-I, 87-II, 87-III, 88-I, 88-II, 88-III, 89-I, 89-II, 89-III, 91-I, 91-II, 91-III, 92-I, 92-II, 92-III, 93-I, 93-II, 94-I, 94-II, 95-I, 95-II, 104-I, 104-II, 104-III, 106-I, 106-II, 106-III, 107-I, 107-II, 107-III, 108-I, 108-II, 108-III, 109-I, 109-II, 109-III, 110-I, 110-II, 110-III, 111-I, 111-II, 111-III, 112-I, 112-II, 112-III	Water Levels Analysis List 1 Analysis List 2 Analysis List 3	Water Levels Analysis List 1	

PRIVATE WELLS

Group	Monitoring Designation	Monitoring Events	Comments
		March / April	
P1	In accordance with the agreement between the Corporation of the City of Peterborough and the Corporation of the Township of Otonabee – January 1993 as amended by previous annual reports	Analysis List 4	As per agreement

TABLE 1.1
2023 Monitoring Program
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

SURFACE WATER

Group	Monitoring Designation	Monitoring Events						Comments
		January / February	March / April	May / June	July / August	September / October	November / December	
S1	SW1, SW2, SW3, SW17, SW18, SW19, SW20, SW21, SW23, SW24	Flow Rate Analysis List 1 Analysis List 6	Flow Rate Analysis List 1 Analysis List 6	Flow Rate Analysis List 1 Analysis List 6	Flow Rate Analysis List 1 Analysis List 6	Flow Rate Analysis List 1 Analysis List 6	Flow Rate Analysis List 1 Analysis List 6	

LEACHATE

Group	Monitoring Designation	Monitoring Events						Comments
		January / February	March / April	May / June	July / August	September / October	November / December	
L1	Holding Tank		By-Law + COD			By-Law + COD Analysis List 5a		
L2	MHT6-94					Analysis List 5		
L3	23B		Leachate Levels Analysis List 1			Leachate Levels Analysis List 2		In-waste leachate monitors

TABLE 1.1
2023 Monitoring Program
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Group	Monitoring Designation	Monitoring Events						Comments
		January / February	March / April	May / June	July / August	September / October	November / December	
L4	ISPL-1, ISPL-2, ISPL2-1, ISPL2-2, ISP7-95, ISP8, ISP9, ISP11, ISP12, ISP13, ISP14, ISP15, ISP16, ISP17, SP1-90, SP2-90, SP3-90, SP4-90, SP6-90, SP7-90, SP8-90, SP10-94, SP11-94, SP14-91, SP15-91, SP16-91, SP18-96, SP19-96, SP20-96	Leachate Level	Leachate Level	Leachate Level	Leachate Level	Leachate Level	Leachate Level	

INTERCEPTOR TRENCH

Group	Monitoring Designation	Monitoring Events						Comments
		January / February	March / April	May / June	July / August	September / October	November / December	
T1	MH-4					Analysis List 5		

TABLE 1.1
2023 Monitoring Program
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

LANDFILL GAS

Group	Monitoring Designation	Monitoring Events						Comments
		January / February	March / April	May / June	July / August	September / October	November / December	
LFG-1	GP1-96, GP2-96, GP3-96, GP4-96, GP5-96, GP6-96, GP7-13, GP8-13, GP9-13 and GP10-16		monitor		monitor	monitor	monitor	Soil gas monitoring

Analysis List 1: Ca, Mg, Na, K, Cl, SO_4, Alkalinity, NO_3, NO_2, NH_3, TKN, pH, Conductivity, Fe, Mn, As, DOC, COD, Total Phenolics, Total P, P (dissolved), field pH and field conductivity, Anion Sum, Cation Sum, Bicarbonate, Carbonate, Hardness, Ion Balance, Orthophosphate (as P), field temperature, and Total Dissolved Solids (TDS).

Analysis List 2: Al, Ba, Be, B, Cd, Cr, Co, Cu, Pb, Mo, Ni, and Zn.

Analysis List 3: VOC Scan

Analysis List 4: pH, conductivity, Alkalinity, Cl, SO_4, Total P, Soluble P, TKN, NH_3, NO_2, NO_3, K, Mg, Ca, Na, Fe, COD, DOC, Phenols, field pH and field conductivity.

Analysis List 5: cBOD5, BODs, TSS, TKN, NH_4, Phenolics, Fe, Cl, Sr, Br, Alkalinity, K, Na, field pH and field conductivity.

Analysis List 5a: cBOD5, Sr, Br, Alkalinity, K, Na, field pH and field conductivity.

Analysis List 6: BOD5, TOC, TSS, TDS, Turbidity, Fe (field filtered), temperature, DO, field pH and field conductivity.

By-Law + COD: City of Peterborough By-Law 05-104 Schedule 'H', Table 1 "Sanitary and Combined Sewer Discharge Limits."

Soil Gas Monitoring: percent by volume (v/v) for methane, carbon dioxide, oxygen, and water level in the probe.

TABLE 2.1
Summary of Monthly Disposal Quantities
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Monthly Disposal Quantities in Tonnes (1)						
Month	**Total Waste**	**Daily/Interim Cover (2)**	**Diverted Materials (3)**	**Total Waste, Cover, and Diverted Materials (4)**	**Total Contaminated Soil**	**Total Hazardous Waste**
January	3,348.05	432.50	284.95	4,065.50	3,980.70	0.00
February	2,827.54	8.66	192.74	3,028.94	54.04	0.00
March	3,489.76	427.95	280.79	4,198.50	244.23	0.00
April	4,199.42	16.55	469.29	4,685.26	456.35	0.00
May	4,285.92	0.00	554.03	4,839.95	1,619.33	0.00
June	3,869.48	9.62	550.17	4,429.27	792.26	0.00
July	3,936.05	15.46	581.31	4,532.82	1,039.19	0.17
August	4,409.89	63.92	511.25	4,985.06	551.21	0.04
September	3,657.32	41.93	429.20	4,128.45	224.63	0.00
October	3,641.35	98.18	476.57 (5)	3,739.53	260.42	0.00
November	2,902.63	28.24	1168.47 (5)	2,930.87	185.71	0.00
December	2,692.08	89.01	787.75 (5)	2,781.09	257.96	0.00
Totals	**43,259**	**1,232**	**6,286**	**50,777**	**9,666**	**0.21**

Notes:

1. Information provided by the City of Peterborough.
2. Daily/Interim Cover includes clean wood/woodchips and compost screening overs.
3. Diverted Materials include C&D, green waste, scrap metal, tires, drywall, electronics, cardboard/boxboard, other mixed recyclables, mattresses, re-use materials and organics.
4. Quantities exclude contaminated soil and hazardous waste.
5. City started weekly curbside collection of organics on October 31, 2023. Material was weighed at the landfill and then diverted to Harper Road for composting until construction of the organics facility north of the landfill is operational.

TABLE 2.2

Weekly Summary of Inbound Material in 2023
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Week	Clean Wood/ Woodchips	Contaminated Soil - Cover	Compost Screening Overs	Construction & Demolition	Green Waste	Scrap Metal	Tires	Drywall	Electronics	Cardboard/ Boxboard	Mixed Recyclables	Mattress	Hazardous Waste	Re-use Material	Textile Diversion	Organics	Mixed Solid Waste	Total Weekly Inbound
Jan 1-8	402.29	16.33		34.08	5.06	4.88	47.44	13.65	4.81	4.19		8.36		0.95			754.88	1296.92
Jan 9-15	30.21	8.87		29.65	5.56	4.78		9.12		4.35	1.57	1.69		0.77			871.80	968.37
Jan 16-22		3479.90		29.12		1.32		10.01		2.34		2.17		1.39	0.12		836.82	4363.19
Jan 23-29		468.14		25.85		2.31				4.44				0.43	0.03		663.91	1165.11
Jan 30-Feb 5		23.88		28.40		3.00		10.39		1.69	1.46	5.76		1.83			687.35	763.76
Feb 6-12	4.37	6.13		20.69		0.71		12.62		2.77				0.31	0.03		745.30	792.93
Feb 13-19		31.49		26.05	9.91	2.30				4.65		3.89		0.78	0.02		817.86	896.95
Feb 20-26				36.75		2.16	4.07	11.02	3.11	1.05		5.03		0.61			549.30	613.10
Feb 27-March 5	4.29	20.03		23.78		1.56		20.53		4.15	2.01	1.73		0.57	0.03		717.48	796.16
March 6-12		7.50		23.95		6.54		9.33		3.26				0.73			694.99	746.30
March 13-19		47.45		33.98		3.76	1.17	11.83		4.37	1.27	5.42		0.70			664.11	774.06
March 20-26	425.64	112.59		36.72		3.85			4.65	2.73		5.45		0.89			828.67	1421.19
March 27-April 2	2.31	56.66		47.36		3.76		21.64		4.50		3.93		0.70	0.16		888.11	1029.13
April 3-9	7.00	56.46		28.52	15.19	2.04		12.51		2.06	1.39	5.74		0.42			710.28	841.61
April 10-16	6.98	178.93		60.78	34.38	6.56			2.76	5.65		3.18		0.65	0.05		1286.32	1586.24
April 17-23	2.57	159.69		68.83	18.92	5.40		19.70		4.59	1.60	8.23		0.63	0.10		1078.02	1368.28
April 24-30		61.27		49.39	84.38	5.32		9.35		3.24		7.29		0.41			1069.57	1290.22
May 1-7		664.55		46.55	24.58	6.60				4.87		2.82		0.91	0.05		989.89	1740.82
May 8-14		337.24		70.69	44.12	8.32	23.99	12.54	5.75	5.02	1.35	7.81		0.89	0.08		964.01	1481.81
May 15-21		290.27		63.56	33.00	6.86		10.63		3.96		4.25		0.93			944.88	1358.34
May 22-28		256.52		35.16	27.13	5.71		11.51		3.53	1.14	4.39		0.54	0.15		878.83	1224.61
May 29-June 4	2.04	91.70		66.38	32.18	8.76		10.16		4.37		6.57		1.18	0.02		901.67	1125.03
June 5-11	5.46	211.12		50.65	36.50	7.25		9.83	3.79	3.72		9.56		1.10	3.64		822.64	1165.26
June 12-18	2.12	317.74		75.45	35.89	6.04				3.96	1.43	3.83		0.81	0.05		900.64	1347.96
June 19-25		95.13		65.79	49.17	6.21		11.18		3.59		8.37		1.33	0.02		893.12	1133.91
June 26-July 2		147.32		43.53	25.80	5.91		12.17		3.63		3.88		1.04	0.07		859.72	1103.07
July 3-9	13.47	168.61			26.24	6.16		8.53	4.73	4.47	1.56	2.48	0.07	0.53	0.07		1004.54	1241.46
July 10-16	1.99	282.11			39.96	4.50				5.38		8.26		1.08	0.10		1054.27	1397.65
July 17-23		364.27			41.46	6.16	29.54	12.57		2.87		0.23	0.08	0.37	0.15		1009.38	1467.08
July 24-30		215.30			38.61	5.88		10.50		5.74	1.72	12.97	0.02	0.38			1003.61	1294.73

TABLE 2.2

Weekly Summary of Inbound Material in 2023
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Week	Clean Wood/ Woodchips	Contaminated Soil - Cover	Compost Screening Overs	Construction & Demolition	Green Waste	Scrap Metal	Tires	Drywall	Electronics	Cardboard/ Boxboard	Mixed Recyclables	Mattress	Hazardous Waste	Re-use Material	Textile Diversion	Organics	Mixed Solid Waste	Total Weekly Inbound
July 31-Aug 6		226.64		318.98	37.42	8.64		11.66	3.52	4.17		3.97	0.02	1.01			743.90	1359.93
Aug 7-13	27.57	100.77		34.55	35.85	2.34		10.87		2.97	0.98	2.11	0.01	0.46			859.44	1077.92
Aug 14-20	9.68	106.74		45.61	30.35	7.29	10.83	10.26		3.93		10.12		1.50	0.23		1044.40	1280.94
Aug 21-27	22.13	54.78		59.43	32.58	6.13		10.05		2.14	0.88	7.48		0.51	0.07		937.16	1133.34
Aug 28-Sept 3	4.54	71.18		59.75	29.51	7.36		12.10	4.80	4.78	1.06	1.52	0.01	0.46	0.15		919.85	1117.07
Sept 4-10	6.58	18.23		39.02	16.86	5.38	13.91			3.53		10.47		0.53			842.30	956.81
Sept 11-17	9.79	18.62		43.71	33.29	4.55		10.04		3.87		7.80		0.44			871.09	1003.20
Sept 18-24	18.82	44.66		55.46	37.81	6.10		9.99		3.26	0.71	3.90		0.75			846.21	1027.67
Sept 25-Oct 1	6.74	143.11		41.52	20.67	6.03		11.44		2.85		3.45		0.58	0.05		867.11	1103.55
Oct 2-8	10.21	61.91		43.50	26.48	5.12		10.57	3.74	3.63		6.99		1.10	0.05		893.12	1066.42
Oct 9-15	20.18	22.10		39.04	21.34	2.36		10.55		1.99	1.37	5.56		0.67			836.59	961.75
Oct 16-22	8.51	100.46		66.91	27.74	8.28		10.69		4.04		5.17		0.69	0.09		879.27	1111.85
Oct 23-29	49.92	60.05		35.58	31.94	5.27		10.55		3.77	1.33	5.25		1.04	0.10		856.11	1060.91
Oct 30-Nov 5	20.35	39.36		51.18	80.54	5.24				3.81		3.49		0.97	0.08	17.86	829.95	1052.83
Nov 6-12		37.87		37.01	41.33	4.26		11.13	5.80	4.90		6.23		1.38	0.07		800.37	950.35
Nov 13-19	9.30	65.43		44.96	41.18	7.39	4.31	21.00		4.72	1.93	5.75		0.93	0.07		816.62	1023.59
Nov 20-26	7.95	29.06		55.69	24.80	3.86	12.39			3.45		4.76		1.23	0.01		733.50	876.70
Nov 27-Dec 3	2.88	34.41		36.78	19.78	4.36		10.10		4.38	0.99	5.45		1.05	0.03	659.06	90.45	869.72
Dec 4-10	37.38	61.26		37.19	18.77	2.38		9.52		1.91		3.74		0.99	0.10		857.46	1030.70
Dec 11-17	27.18	66.79		36.67	13.22	4.18		12.06		4.18		3.52		0.94	0.07		779.69	948.50
Dec 18-24	21.57	118.23		25.51		2.01		11.67	3.96	6.85	1.50	4.75		0.49	0.05		809.43	1006.02
Dec 25-Dec 31		7.16		15.23	9.19					4.30		3.55		0.19		535.91	53.53	629.06
Yearly Total	**1232.02**	**9666.02**	**0.00**	**2344.94**	**1258.69**	**253.14**	**147.65**	**485.57**	**51.42**	**198.57**	**27.25**	**258.32**	**0.21**	**41.77**	**6.16**	**1212.83**	**43259.52**	**60444.08**

Notes:
1. All values are in tonnes.
2. There will be some discrepancies between the weekly data and the monthly data (shown on Table 2.1) due to weekly data being recorded on inbound traffic only, whereas data used for the monthly values is recorded on both inbound and outbound traffic.
3. City started weekly curbside collection of organics on October 31, 2023. Material was weighed at the landfill and then diverted to Harper Road for composting until construction of the organics facility north of the landfill is operational.

TABLE 2.3
Historical Waste Quantities
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Year	Amount of Waste Disposed Annually			
	Peterborough (1) (tonnes)	Commercial Haulers (2) (tonnes)	Total Waste (tonnes)	Cumulative Total Waste (tonnes)
1981	18,277	52,635 tons	64,331	64,331
1982	18,533	not recorded	NA (3)	104,331
1983	19,174	34,445 tons & 10,176 yd^3	50,259	154,590
1984	19,168	297,277 yd^3	64,585	219,175
1985	19,613	296,119 yd^3	64,805	283,980
1986	20,571	146,559 yd^3 & 28,403 tons	67,697	351,677
1987	19,644	58,023 tons	70,460	422,137
1988	18,512	58,065 tons	69,470	491,607
1989	23,669	54,441 tons	70,861	562,468
1990 (4)	19,052	35,495 tonnes	54,548	617,016
1991	26,510	17,350 tonnes	43,860	660,876
1992	16,260	19,975 tonnes	36,235	697,111
1993	16,335	18,236 tonnes	34,571	731,682
1994	15,760	17,007 tonnes	32,767	764,449
1995	14,014	29,702 tonnes	43,716	808,165
1996	13,731	30,247 tonnes	43,978	852,143
1997	12,349	30,825 tonnes	43,174	895,317
1998	12,126	34,120 tonnes	46,296	941,613
1999	12,672	36,753 tonnes	48,882	990,495
2000	13, 092	35,425 tonnes	48,517	1,039,012
2001	15, 201	39,748 tonnes	53,802	1,092,814
2002 (5)	-	-	59,716	1,152,530
2003	27,136	41,380 tonnes	68,516	1,221,046
2004	38,146	44, 214 tonnes	82,360	1,303,406
2005	28,752	48,632 tonnes	77,374	1,380,780
2006 (6)	35,185	47,634 tonnes	82,819	1,463,599

TABLE 2.3
Historical Waste Quantities
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Year	Amount of Waste Disposed Annually			
	Peterborough (1) (tonnes)	Commercial Haulers (2) (tonnes)	Total Waste (tonnes)	Cumulative Total Waste (tonnes)
2007	32,796	41,422	74,218	1,537,817
2008	29,278	38,692	67,970	1,605,787
2009 (7)	N/A	N/A	69,282	1,675,069
2010	46,754	13,494	60,248	1,735,317
2011	50,154	12,969	63,123	1,798,440
2012	38,931	21,151	60,082	1,858,522
2013	37,926	13,454	51,380	1,909,901
2014	32,393	12,571	44,964	1,954,865
2015	28,787	12,386	41,173	1,996,038
2016	31,454	10,194	41,649	2,037,687
2017	34,563	10,000	44,563	2,082,250
2018	37,897	6,743	44,640	2,126,890
2019	40,982	6,056	47,038	2,173,927
2020	40,703	7,076	47,779	2,221,706
2021	41,311	5,865	47,176	2,268,882
2022	38,539	7,840	46,379	2,315,261
2023	36,619	6,640	43,259	2,358,520

Notes:
1. Waste tonnage for the City of Peterborough and the Townships of Otonabee-South Monaghan and Havelock-Belmont-Methuen. Tonnage from July 1, 2002 is from City and County of Peterborough.
2. Prior to 1990, all volumes in cubic yards were converted into tonnes (tons) assuming a density of 210 kg/m^3 (350 lb/yd^3). These volumes are based on assumed truck capacities prior to placement in the landfill and compaction.
3. Assumed 40,000 tonnes total waste for 1982.
4. Annual waste tonnages for 1990 to present are based on data from the computerized scale records.
5. Determination of waste based on these catagories not made.
6. Peterborough waste tonnage calculated based on report, "Details of Peterborough County by Material Source Code", printed on January 24, 2007.
7. Commercial Hauler waste tonnage based on difference between total waste tonnage and Peterborough waste tonnage.

TABLE 2.4
Summary of Remaining Landfill Capacity, Soil Quantities and Site Life - North Fill Area (Cells 2, 3 and 4)
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

No.	Description	Unit	Jan-23	Jan-24
1	Approved 9.5 ha NFA volume (including final cover)	m^3	1,622,000	1,622,000
2	Volume of final cover for 9.5 ha NFA	m^3	95,000	95,000
3	Approved 9.5 ha NFA volume (excluding final cover)	m^3	1,527,000	1,527,000
4	Cells 2, 3 & 4 - Volume utilized (excluding final cover)	m^3	732,900	800,100
5	Cells 2, 3 & 4 - Volume **operational airspace*** remaining (excluding final cover)	m^3	794,100	726,900
6	Cells 2, 3 & 4 - Volume utilized in calendar year	m^3	68,430	67,200
7	Cells 2, 3 & 4 - Cumulative quantity of waste landfilled	tonne	492,450	535,709
8	Cells 2, 3 & 4 - Final cover placed	ha	2.01	2.25
9	Cells 2, 3 & 4 - Remaining area requiring final cover	ha	7.49	7.25
10	Cells 2, 3 & 4 - Total fill area	ha	9.50	9.50
11	Cells 2, 3 & 4 - Volume required for final cover	m^3	78,645	76,125
12	Cells 2, 3 & 4 - Volume remaining daily/intermediate cover required	m^3	158,820	145,380
13	Cells 2, 3 & 4 - Apparent waste density	$tonnes/m^3$	0.67	0.67
14	Estimated annual volume	m^3/yr	69,552	69,179
15	Cells 2, 3 & 4 Remaining operational site life	yr	11.4	10.5
16	NFA - Cells 2, 3 and 4 - Total site life remaining	yr	11.4	10.5
17	NFA - Cells 2, 3 and 4 - Total volume remaining (excluding final cover)	m^3	794,100	726,900

Notes:

1. *** "Operational air space"** is defined as the volume of waste and daily cover that can be placed within the engineered part of the landfill.

Row No.	Additional Information
1	Volume from design of NFA.
2	Volume from design of NFA.
3	Equal to total NFA Volume (Row 1) minus Volume of Final Cover for NFA (Row 2)
4	Volume from topographic mapping.
5	Volume from topographic mapping.
6	Volume utilized in calendar year from topographic mapping.
7	Volume from City weighscale records.
8 to 10	Area from topographic mapping.
11	Volume based on depth of 0.9m of compacted soil and 0.15m of topsoil over area of Cells 2,3 and 4.
12	Volume equal to 1/5th of total air space remaining for waste and daily cover (i.e. waste to daily cover ratio = 4:1).
13	Equal to total waste placed divided by total volume utilized from site opening for waste and daily cover only (Row 6 / Row 4).
14	2022 - Estimated annual volume assumed based on a 5 year average of 46,600 tonnes of waste per year and apparent waste density of 0.67 tonnes/cubic metre.. 2023 - Estimated annual volume assumed based on a 5 year average of 46,350 tonnes of waste per year and apparent waste density of 0.67 tonnes/cubic metre.
15	Volume remaining for waste and daily cover in NFA (Row 5) divided by estimated volume required per year (Row 13).
16	Total Volume of NFA excluding final cover (Row 3) minus Landfill Volume Utilized (Row 4) divided by estimated volume required per year (Row 13).
17	Total Volume of NFA excluding final cover (Row 3) minus Landfill Volume Utilized (Row 4).

TABLE 3.1
2023 Daily Inspection Reports Summary
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Month	Activities
January 2023	• Peterborough Utilities Group (PUG) was onsite periodically throughout the month of January to complete maintenance work at the Landfill Gas Utilization Plant (LGUP). • High flow of leachate was observed in the North Fill Area (NFA) on January 2 due to rain/snow melt and the addition of newly constructed Cell 4 to the leachate collection system (LCS). • LGUP was offline for a sensor replacement from January 4 to January 10. The flare was operational during the maintenance work. • A large volume of daily cover was received on January 18 from a stormwater pond cleanup project completed by the City. • City completed a site tour with the City of Kawartha Lakes on January 23. • Landfill scales were calibrated on January 25. • Bald eagles and turkey vultures were observed periodically throughout the month of January. • Barry Electric was onsite periodically throughout the month of January to install new tracking meters for the South Fill Area (SFA) LCS. • Tri-land excavating was onsite periodically throughout the month of January. • Wind-blown litter was collected on site during four (4) days in January.
February 2023	• New tracking equipment installed in the SFA LCS became operational on February 1 for J3 and M4. Hour meters and the totalizer was reset to zero (0). • Bald eagles and turkey vultures were observed periodically throughout the month of February. • Barry Electric was onsite February 16 to complete LFG flare maintenance. • Tomlinson placed final cover on the east slope of Cell 2 on February 22. • LGUP was operational during the entire month of February. • Holding tank levels in the NFA in February were observed to be higher than usual due to heavy precipitation and the addition of newly constructed Cell 4 to the LCS. • Wind-blown litter was collected on site during two (2) days in February.
March 2023	• PUG staff was onsite March 3 and 6 to drain condensate from LFG sub-headers in the SFA. • LGUP was operational during the entire month of March. • Bald eagles and turkey vultures were observed periodically throughout the month of March.

TABLE 3.1
2023 Daily Inspection Reports Summary
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Month	Activities
	• A new SFA condensate pump was installed with an anode attachment on March 27.
April 2023	• LGUP was operational during the entire month of April. • Todd Bros. and WSP were onsite periodically near the end of April to complete construction of a perimeter access road around Cell 4 and other miscellaneous work. • Wind-blown litter was collected on site during six (6) days in April.
May 2023	• High levels of leachate was observed within the pump stations on May 1 due to heavy precipitation. Pump stations kept up with the surcharge and returned to their normal range within six (6) to ten (10) hours. • LGUP was operational during the entire month of May. • Todd Brothers and WSP were onsite throughout the month of May to complete construction of a perimeter access road around Cell 4 and other miscellaneous work. • Bald eagles and turkey vultures were observed periodically throughout the month of May.
June 2023	• Fog-like conditions were observed on June 5 and 6 due to smoke and poor air quality from forest fires in Ontario. • Maple Reinders mobilized onsite June 28 to start construction of the organics facility. • LGUP was operational during the entire month of June. • Todd Brothers and WSP were onsite throughout the month of June to to complete construction of a perimeter access road around Cell 4 and other miscellaneous work. • Bald eagles and turkey vultures were observed periodically throughout the month of June. • Clay was hauled and placed on slopes Cells 2 and 3 for final cover throughout the month of June.
July 2023	• Maple Reinders, GHD, and D.M. Wills were onsite throughout the month of July for construction of the organics facility. • Turkey vultures were observed periodically throughout the month of July. • Forcemain was pressure tested on July 20. • LGUP was offline for one and a half (1.5) hours on July 28 for maintenance. • Grading of clay for final cover was completed on the east, north and south sides of Cells 2 and 3.

TABLE 3.1
2023 Daily Inspection Reports Summary
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Month	Activities
August 2023	• Maple Reinders, and D.M. Wills were onsite throughout the month of August for construction of the organics facility. • Bald eagles and turkey vultures were observed periodically throughout the month of August. • LGUP was offline for maintenance on August 6. The flare was operational during the maintenance work. • Wind-blown litter was collected on site during one (1) day in August.
September 2023	• LGUP was offline for valve replacements on the engine from August 30 to September 22. The flare was operational during the maintenance work. • A spare condensate pump ordered in late 2022 arrived on September 27. • Maple Reinders, Behan, GHD and D.M. Wills were onsite throughout the month of September for construction of the organics facility. • Bald eagles and turkey vultures were observed periodically throughout the month of September. • Tomlinson completed final cover placement on the east slope of Cell 2 during the month of September. • Wind-blown litter was collected on site during four (4) days in September.
October 2023	• Traffic arrows, lines, parking spaces and curb stops were painted on paved landfill access roads on October 23. • A second spare condensate pump arrived on October 27 and is ready for use when necessary. • LGUP was operational during the entire month of October. • Maple Reinders, Behan and D.M. Wills were onsite throughout the month of October for construction of the organics facility. • Turkey vultures were observed periodically throughout the month of October. • Wind-blown litter was collected on site during four (4) days in October.
November 2023	• Maple Reinders, Behan and D.M. Wills were onsite throughout the month of November for construction of the organics facility. • Bald eagles and turkey vultures were observed periodically throughout the month of November. • Road salt was applied to site access roads on November 9 and 28 due to freezing rain. • A complaint regarding wind-blown litter along Baseline Road was received on November 16. Litter along Baseline Road was cleaned up that afternoon by Tomlinson staff.

TABLE 3.1
2023 Daily Inspection Reports Summary
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Month	Activities
	• Tri-land was on site November 16 and 17 to complete wood waste grinding. • Barry Electric was onsite November 21 and 23 to install a conduit for future fiber optic cables for communications needs at the scale house. Fiber optic cables to be installed at a later date. • Tomlinson's site trailer was replaced with a new site trailer on November 24. • LGUP was offline for maintenance for two (2) hours on November 29. • Wind-blown litter was collected on-site during ten (10) days in November.
December 2023	• Barry Electric was on site December 6 and 8. • Tri-Land Excavating was on site December 8 to grind waste woodpile material. Wood chips were utilized within the landfill waste limits on access roads where road conditions were poor and the remaining material was hauled offiste for compost processing. • A Concrete pad was poured near the scale house for installation of a new generator on December 15. Conduits for electrical services were also installed. The generator is expected to be installed in 2024. • Tomlinson placed topsoil on the side slopes of Cell 2 in December. Seeding is expected to be completed in the spring of 2024. • LGUP was operational during the entire month of December. • Maple Reinders, D.M. Wills, Lundy Plumbing and Summit Mechanical were onsite throughout the month of December for construction of the organics facility. • Wind-blown litter was collected on-site during two (2) days in December.

TABLE 3.2
2023 Landfill Complaints
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Complaint Number	Date of Complaint	Date of Incident /Complaint	Complaint Received By	Complaint	Reason/Outcome
1	January 3rd	January 3rd, odour complaint from Gord Milburn at 584 Neal Drive	Don Briand	Odour issue complaint received by email on January 3rd to Don Briand	Odour was found to be a plumbing issue at the complainants building and not related to the landfill.
2	April 15th	Richard Conlin - 1382 Cloverdale Line, odour complaint	Don Briand	Odour issue complaint by email on April 15th from Richard concerned about the smell	Don emailed Richard back and advised him he is investigating the odour concern but has not found a source related to the landfill. Don noted to Richard that a local farm was spreading manure.
3	April 19th	April 15th, odour complaint from Art Weloch of Stewart Hall	Don Briand	Odour issue complaint received by phone to Don Briand - Re: Odour on Saturday morning (April 15th)	Don spoke to the concern directly and said he has been investigating but have not found a specific cause related to the landfill. Observation of a local farmer spreading manure was noted to potentially be the cause.
4	June 13th	Neal Drive Complaint - Kerr's Home Improvement, odour complaint on Neal Drive	Don Briand	Odour concerns from Kerr's Home Improvement	Had an extreme rain event and the excess liquid pumping caused high pressure on the sewer system. Reviewed with odour control unit operations to ensure it is working properly. Barry Campbell (City Staff) visited the site.
5	September 28th	Jay Schiller - 1353 Cloverdale Line at 8:12 pm	Don Briand	Odour concerns from 1353 Cloverdale Line at 8:12 pm - odour for a few nights	Don went to Cloverdale at 9:15 pm to check concern and was unable to detect odour, although a nearby farm had recently spread manure. Don visited 2 neighbours the next day and had nothing to report on odour concerns. Don called him back and advised of what was completed to check into concern.
6	November 16th	Mike Taylor	Don Briand	Garbage in ditch by his home	Don sent Tomlinson crew to clean up the area. Area was cleaned up in approximately 2 hours from the time the complaint was received.

TABLE 4.1
Leachate / Groundwater Volume to Sanitary Sewer
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Month	SFA Lift Station - Leachate Pumped(1) (cubic metres)	NFA Lift Station - Leachate Pumped(1) (cubic metres)	Cumulative Volume (cubic metres)	2023 Monthly Leachate Flow to Sewer (cubic metres/month)
January	5,367	6,090	11,457	11,457
February	6,473	7,106	25,036	13,579
March	6,050	7,712	38,798	13,762
April	5,571	6,092	50,461	11,663
May	5,129	3,461	59,051	8,590
June	2,687	5,028	66,766	7,715
July	1,986	5,967	74,719	7,953
August	2,678	2,057	79,454	4,735
September	1,840	600	81,894	2,440
October	1,173	1,083	84,150	2,256
November	1,040	1,209	86,399	2,249
December	1,181	4,147	91,727	5,328
2023 Total	**41,175**	**50,552**		**91,727**

Notes:

1. Volumes provided by the City of Peterborough.

TABLE 4.2
Weekly Leachate/Groundwater Volume to Sanitary Sewer
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

From	To	SFA	NFA	TOTAL
1-Jan	7-Jan	2,063.5	3,237.5	5,301.0
8-Jan	14-Jan	1,044.7	1,824.7	2,869.3
15-Jan	21-Jan	931.3	545.2	1,476.5
22-Jan	28-Jan	1,168.1	316.2	1,484.2
29-Jan	4-Feb	636.3	359.8	996.1
5-Feb	11-Feb	1,406.6	1,356.8	2,763.4
12-Feb	18-Feb	2,106.0	3,022.5	5,128.5
19-Feb	25-Feb	1,559.8	2,015.3	3,575.1
26-Feb	4-Mar	1,253.0	453.4	1,706.5
5-Mar	11-Mar	864.5	574.4	1,438.9
12-Mar	18-Mar	1,543.4	2,399.3	3,942.6
19-Mar	25-Mar	1,177.2	3,453.7	4,630.9
26-Mar	1-Apr	2,168.1	1,906.4	4,074.5
2-Apr	8-Apr	1,015.0	2,363.9	3,378.9
9-Apr	15-Apr	1,714.9	1,241.4	2,956.3
16-Apr	22-Apr	1,164.1	858.9	2,023.0
23-Apr	29-Apr	1,150.4	1,176.5	2,326.9
30-Apr	6-May	1,513.0	1,075.0	2,588.0
7-May	13-May	1,198.1	381.8	1,579.9
14-May	20-May	1,162.3	733.0	1,895.3
21-May	27-May	872.7	808.0	1,680.7
28-May	3-Jun	609.7	574.3	1,184.0
4-Jun	10-Jun	783.1	476.1	1,259.2
11-Jun	17-Jun	524.0	1,520.7	2,044.7
18-Jun	24-Jun	603.1	1,196.7	1,799.8
25-Jun	1-Jul	671.7	1,373.9	2,045.6
2-Jul	8-Jul	566.8	356.5	923.3
9-Jul	15-Jul	585.9	1,185.5	1,771.4
16-Jul	22-Jul	376.3	1,812.0	2,188.3
23-Jul	29-Jul	530.0	2,175.4	2,705.3
30-Jul	5-Aug	454.1	1,210.0	1,664.1
6-Aug	12-Aug	750.9	627.7	1,378.5
13-Aug	19-Aug	728.4	305.1	1,033.4
20-Aug	26-Aug	443.0	210.7	653.7
27-Aug	2-Sep	461.7	168.2	629.9
3-Sep	9-Sep	222.8	156.9	379.7
10-Sep	16-Sep	604.5	137.2	741.7
17-Sep	23-Sep	590.2	140.6	730.9
24-Sep	30-Sep	180.6	111.0	291.6
1-Oct	7-Oct	275.3	247.1	522.4
8-Oct	14-Oct	195.1	280.9	476.1
15-Oct	21-Oct	222.1	205.8	427.9
22-Oct	28-Oct	412.1	232.1	644.2
29-Oct	4-Nov	242.8	242.1	484.9
5-Nov	11-Nov	176.2	453.6	629.8
12-Nov	18-Nov	306.8	154.6	461.4
19-Nov	25-Nov	248.3	330.2	578.5
26-Nov	2-Dec	250.6	336.8	587.3
3-Dec	9-Dec	202.5	481.9	684.4
10-Dec	16-Dec	542.1	466.4	1,008.5
17-Dec	23-Dec	182.2	1,105.4	1,287.6
24-Dec	31-Dec	243.2	2,026.7	2,269.9
	2023 TOTAL	**40,899.3**	**50,405.6**	**91,304.9**

Note:
1. Leachate totals vary from those found in Table 4.1 due to the time readings were obtained.
2. Leachate volumes in Table 4.2 are based on totalizer readings recorded in person during operational hours onsite.

TABLE 4.3
2023 Leachate Quality Summary
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	BY-LAW [1]	ODWQS	TYPICAL LANDFILL LEACHATE	Holding Tank - SFA			Holding Tank - NFA			Refuse Well 23B			Maintenance Hole T6-94	Maintenance Hole 4
					HISTORICAL RANGE [8]	Apr-23	Oct-23	HISTORICAL RANGE [8]	Apr-23	Oct-23	HISTORICAL RANGE [8]	Apr-23	Sep-23	Oct-23	Oct-23
Alkalinity	mg/L		30-500 *	300 - 2,000[B]	1590 - 4290		2060	852 - 2900		716	446 - 3120	756		2680	778
Aluminum	mg/L	50	0.1 *	<0.1 - 2[B]	<0.02 - 3.51	0.061	0.098	<0.02 - 3.01	0.225	0.170	<0.025 - 0.52		<0.025		
Ammonia (as N)	mg/L			5 - 100[B]	53 - 290						18.2 - 500	42.1		402	52.6
Arsenic	mg/L	1	0.025 *	0.01 - 0.04[B]	<0.005 - 0.03	<0.005	<0.005	0.006 - 0.047	0.013	0.013	0.0006 - 0.007	<0.0005			
Barium	mg/L		1 **	0.1 - 2[B]	0.285 - 0.569			0.117 - 0.228			0.396 - 0.713		0.51		
Beryllium	mg/L			<0.0005[B]	<0.0002 - <0.001			<0.0002 - <0.001			<0.0001 - <0.001		<0.0005		
Boron	mg/L		5 **	0.5 - 10[B]	2.31 - 6.84			0.68 - 1.74			1.05 - 1.91		1.22		
Cadmium	mg/L	0.7	0.005 **	<0.01[B]	0.0003 - 0.004	<0.001	<0.001	<0.0003 - 0.0004	<0.001	<0.001	<0.0001 - 0.005		<0.0001		
Calcium	mg/L			100 - 1,000[B]	164 - 210			284 - 284			101 - 187	163			
Chemical Oxygen Demand	mg/L			150 - 6,000[B]	120 - 1070	200	400	50 - 1510	580	220	40 - 426	50			
Chloride	mg/L	1500	250 *	20 - 2,500[B]	230 - 1120	179	557	9.7 - 1430	399	316	58.9 - 645	62.6		560	435
Chromium	mg/L	3	0.05 **	<0.010 - 0.5[B]	0.004 - 0.059	0.01	0.028	0.006 - 0.181	0.07	0.04	0.001 - 0.012		0.004		
Cobalt	mg/L	5			<0.002 - 0.02	0.004	0.011	0.0009 - 0.024	0.009	0.007	0.0022 - 0.01		0.0058		
Conductivity - field	µS/cm				2820 - 9340	3220	4570	1680 - 10600	4260	2420	1050 - 7040	1620	3310	5410	2360
Copper	mg/L	2	1 *	<0.008 - 1[B]	0.002 - 0.01	<0.005	<0.005	0.0021 - 0.022	0.005	0.014	<0.0004 - 0.016		<0.0005		
Dissolved Organic Carbon	mg/L		5 *								4.4 - 108	16.2			
Hardness	mg/L		80-100 *	400 - 2,000[B]							352 - 1020	567			
Iron	mg/L	50	0.3 *	1 - 1,000[A]	3.21 - 73.4	16.7	17.5	0.35 - 7.27	1.22	1.63	3.02 - 30.3	7.22		17.1	1.06
Lead	mg/L	1	0.01 **	<5[A]	<0.0015 - 0.0603	<0.01	<0.01	<0.0015 - 0.0366	<0.01	<0.01	<0.0005 - 0.05		<0.0005		
Magnesium	mg/L			100 - 1,500[A]	46 - 122			45.4 - 57.4			22.4 - 216	38.9			
Manganese	mg/L	5	0.05 *	0.01 - 100[A]	0.282 - 0.922	0.614	0.406	0.115 - 1.27	0.453	0.214	0.072 - 0.48	0.394			
Molybdenum	mg/L	5			<0.005 - 0.008	<0.005	<0.005	<0.005 - 0.018	<0.005	<0.005	<0.0005 - 0.002		0.0005		
Nickel	mg/L	3		0.01 - 1[A]	0.014 - 0.08	0.015	0.047	0.01 - 0.139	0.05	0.036	0.014 - 0.054		0.014		
pH	units	6.0-10.5			6.63 - 7.63	6.71	7.03	6.48 - 8.15	7.46	7.68	6.44 - 7.23	6.64			
pH - field	units				6.25 - 7.42	6.5	6.8	6.43 - 7.99	7.19	7.49	6.27 - 7.2	6.45	6.51	7.73	6.59
Phenols	µg/L										0.033 - 25	2		2	2
Phosphate	mg/L			1 - 10[B]							<0.02 - 0.82				
Phosphorus	mg/L	10			0.3 - 3.37	1.15	2.43	0.25 - 3.16	1.66	0.82	0.04 - 0.84	0.08			
Potassium	mg/L			200 - 1,000[A]	97.2 - 337		165	38 - 392		101	21.5 - 239	34.6		220	50
Sodium	mg/L		200 *	200 - 1,200[A]	3 - 877		492	6 - 1130		293	50.5 - 386	62.6		529	283
Sulphate	mg/L	1500	500 *	<1 - 300[B]	9.9 - 98.4	20.7	19.6	18.4 - 581	310	255	<0.3 - 37.7	20.3			
Total Dissolved Solids	mg/L		500 *								580 - 2240	470			
Total Kjeldahl Nitrogen	mg/L	100		1 - 100[B]	68 - 670	158	275	20.8 - 467	160	93.5	31.6 - 508	42.1		415	66.3
Zinc	mg/L	2	5 *	0.1 - 100[A]	<0.01 - 0.15	0.01	0.01	<0.02 - 0.26	0.04	0.02	0.0017 - 0.09		<0.005		

NOTES:
1) By-law criteria is based on City of Peterborough By-law 15-075 to regulate discharge.
2) ODWQS - Ontario Drinking Water Quality Standards (2006)
3) * = Operational Guideline or Aesthetic Objective (non-health related)
4) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
5) [A] - Typical leachate characteristics data from Freeze and Cherry (1979).
6) [B] - Typical leachate characteristics data from Ministry of the Environment (1993).
7) Blank indicates parameter not analyzed.
8) Historical range of parameter concentrations dating back to 2006, based upon available data.

TABLE 4.3
2023 Leachate Quality Summary
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	BY-LAW [1]	ODWQS	Holding Tank - SFA			Holding Tank - NFA		
				HISTORICAL RANGE [8]	Apr-23	Oct-23	HISTORICAL RANGE [8]	Apr-23	Oct-23
1,1-Dichloroethane	µg/L			<0.5 - 2	<0.5	<0.5	<0.25 - 5	<0.5	<0.5
1,2-Dichloroethane	µg/L		5 **	<0.5 - 0.8	<0.5	<0.5	<0.4 - 11	**1.4**	<0.5
1,3-Dichloropropene	µg/L			<0.5 - 15	<0.5	<0.5	<0.4 - <5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	80	1 *, 5 **	<2 - 11	**5.1**	**5.7**	<0.5 - 0.9	**3.0**	<0.5
Benzene	µg/L	10	1 **	<0.5 - 11	**1.9**	<0.5	<0.2 - 1.8	**4.0**	<0.5
Chlorobenzene	µg/L		30 *, 80 **	<0.5 - 15.3	**5.6**	**3.6**	<0.2 - <5	<0.5	<0.5
Chloroform	µg/L	40		<0.2 - 2	<0.5	<0.5	<0.2 - 0.27	<0.5	<0.5
cis-1,2-Dichloroethylene	µg/L	4000		<0.5	<0.5	<0.5	<0.5	**0.6**	<0.5
Dichloromethane	µg/L	1000	50 **	<0.5 - <200	<0.5	<0.5	<0.5 - 7.7	**0.7**	<0.5
Ethyl Benzene	µg/L	160	1.6 *, 140 **	<0.5 - 150	<0.5	<0.5	<0.2 - 5.5	**15.7**	<0.5
m/p-Xylenes	µg/L		20 *, 90 **	<0.5 - 160	**6.9**	**0.7**	<0.25 - 18	**37.6**	<0.5
nonyl-Phenols	µg/L	1		<0.02 - 9	<4	**2.7**	<1 - 6	<4	<1
o-Xylene	µg/L		20 *, 90 **	<0.5 - 54	**3.9**	**0.5**	<0.2 - 4	**16.9**	<0.5
Phenols - total	µg/L	1000		3 - 92	<2	<2	1 - 828	**91**	<2
Styrene	µg/L			<0.5	<0.5	<0.5	<0.5	**1.8**	<0.5
Tetrachloroethylene	µg/L	16	30 **	<0.5 - <200	<0.5	<0.5	<0.25 - 0.6	<0.5	<0.5
Toluene	µg/L	400	24 *, 60 **	<0.5 - 100	**0.5**	<0.5	<0.5 - 90	**22.7**	<0.5
trans-1,2-Dichloroethylene	µg/L	2		<0.5 - 0.6	<0.5	<0.5	<0.2 - <5	<0.5	<0.5
Trichloroethylene	µg/L	400	5 **	<0.5 - <200	<0.5	<0.5	<0.25 - 4	<0.5	<0.5
Trichlorofluoromethane	µg/L			<1 - <200	<5	<5	0.42 - 2.2	<5	<5
Vinyl Chloride	µg/L	2	1 **	<0.2 - 3	<0.2	<0.2	<0.2 - <10	**0.6**	<0.2
Xylenes - total	µg/L	1400	20 *, 90 **	<0.5 - 380	**10.9**	**1.2**	<0.25 - 22	**54.5**	<0.5

NOTES:
1) By-law criteria is based on City of Peterborough By-law 15-075 to regulate discharge.
2) ODWQS - Ontario Drinking Water Quality Standards (2006)
3) * = Operational Guideline or Aesthetic Objective (non-health related)
4) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
5) [A] - Typical leachate characteristics data from Freeze and Cherry (1979).

TABLE 4.4
2023 Leachate and Background Quality Comparison
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	Reference Groundwater Quality									
			Fresh Overburden					Fresh Bedrock				
			88-III			44-III		88-I			101-I	
			HISTORICAL RANGE 2006 - 2022	Mar-23	Sep-23	HISTORICAL RANGE 1989 - 2022	Apr-23	HISTORICAL RANGE 2006 - 2022	Mar-23	Sep-23	HISTORICAL RANGE 1999 - 2022	Mar-23
Alkalinity	mg/L	30-500	184 - 240	219	232	170 - 260	253	178 - 237	211	215	80 - 299	166
Aluminum	mg/L	0.1	<0.02 - <0.025	<0.025				<0.02 - 0.193	<0.025			
Ammonia (as N)	mg/L		<0.1 - 0.3	0.1	<0.1	0.03 - 0.7	0.1	<0.1 - 0.4	0.3	0.3	0.05 - 1.3	0.7
Arsenic	mg/L	0.025	<0.0005 - 0.01	0.0008	0.0010	<0.0005 - **0.047**	<0.0005	<0.0005 - 0.0008	<0.0005	<0.0005	<0.0005 - 0.005	0.0012
Barium	mg/L	1 *	0.045 - 0.075	0.054		<0.01 - 0.29		0.093 - 0.157	0.163			
Beryllium	mg/L		<0.0001 - <0.001	<0.0005		<0.001 - <0.004		<0.0001 - <0.001	<0.0005			
Boron	mg/L	5 *	0.0221 - 0.62	0.0474		<0.01 - 0.03		0.09 - 0.18	0.115			
Cadmium	mg/L	0.005 *	<0.0001 - <0.001	<0.0001				<0.0001 - <0.001	<0.0001			
Calcium	mg/L		52.2 - 73.9	140.0	91.5	40 - 104	101	33.4 - 45.3	43.4	51.1	10.5 - 148	23.6
Chemical Oxygen Demand	mg/L		<10 - 50	<10	<10	0.34 - 41.6	<10	<10 - 50	<10	<10	4 - 134	10
Chloride	mg/L	250	2.8 - 13.2	7.9	5.5	3.71 - 43.3	12	0.7 - 3.7	3.9	4.7	1.6 - 130	2.7
Chromium	mg/L	0.05 *	<0.0005 - <0.002	<0.0005				<0.0005 - <0.002	<0.0005			
Cobalt	mg/L		<0.0001 - <0.002	<0.0005				<0.0001 - <0.002	<0.0005			
Conductivity	µS/cm		470 - 643	1120	831	332 - 648	602	382 - 446	405	472	276 - 995	452
Copper	mg/L	1	<0.0005 - 0.0026	0.0009				<0.0005 - 0.0013	<0.0005			
Dissolved Organic Carbon	mg/L	5	<1.0 - **19.9**	1.5	<1.0	<1.0 - 2.8	<1.0	<1.0 - 4.1	1.2	<1.0	1.2 - **7.8**	3.3
Hardness	mg/L	80-100	**241** - **323**	**642**	**468**	**213** - **339**	**356**	**159** - **221**	**215**	**237**		**103**
Iron	mg/L	0.3	0.008 - **0.75**	0.011	<0.005	0.005 - **0.9**	<0.005	<0.05 - **0.342**	0.020	0.223	0.01 - **0.51**	0.049
Lead	mg/L	0.01 *	<0.0005 - 0.0029	<0.0005				<0.0005 - 0.0028	<0.0005			
Magnesium	mg/L		22.5 - 36.3	71.1	50.0	12.7 - 23.9	25.3	17.7 - 26.2	25.8	26.6	3.72 - 18.4	10.6
Manganese	mg/L	0.05	0.0011 - 0.023	<0.0005	0.0062	<0.001 - **0.334**	0.0012	<0.001 - 0.021	0.0010	0.0080	0.001 - 0.017	0.0111
Molybdenum	mg/L		0.0005 - 0.005	0.0006				<0.0005 - 0.0007	<0.0005			
Nickel	mg/L		<0.002 - <0.005	<0.002				<0.002 - 0.003	<0.002			
Nitrate	mg/L	10.0 *	<0.05 - <0.5	0.21	<0.05	<0.05 - 7.98	2.63	<0.05 - 0.23	0.25	0.27	<0.05 - 0.42	<0.05
Nitrite	mg/L	1.0*	<0.05 - <0.5	<0.05	<0.05	<0.001 - 0.022	<0.05	<0.05 - 0.5	<0.05	<0.05	<0.05 - 0.07	<0.05
pH	units		7.52 - 8.08	7.63	7.56	7.35 - 8.45	7.61	7.69 - 8.30	8.11	7.80	7.41 - 8.36	7.9
Phenols	µg/L		<1 - 2	<1	<1	<1 - 76	<1	<1 - 4	<1	<1	<1 - 1	<1
Phosphate	mg/L		<0.01 - 0.04	<0.02	<0.02	<0.01 - 0.02		<0.01 - 0.04	<0.02	<0.02	0.005 - 0.03	<0.02
Phosphorus	mg/L		<0.02 - 0.05	<0.02	<0.02	<0.002 - 0.5	<0.01	<0.02 - 0.03	<0.02	<0.02	<0.01 - 0.09	0.03
Potassium	mg/L		1.77 - 3.0	3.3	3.8	0.54 - 3.7	1.1	2.51 - 3.57	3.1	3.3	1.69 - 6.93	4.2
Sodium	mg/L	200	2.57 - 9.1	12.0	9.0	4.39 - 56	7.4	9.39 - 36.3	14.0	16.8	30.1 - 69.9	60.3
Sulphate	mg/L	500	47.6 - 101	390	217	19.6 - 99	57.4	9.6 - 21.2	20.5	23.6	32.4 - 110	61.4
Total Dissolved Solids	mg/L	500	122 - 420	**840**	**540**	250 - **532**	360	154 - 260	280	280	118 - 300	290
Total Kjeldahl Nitrogen	mg/L		<0.1 - 3.1	0.1	<0.3	<0.1 - 1.92	<2.0	<0.1 - 2.8	0.3	0.3	<0.1 - 2.8	<0.3
Zinc	mg/L	5	<0.0005 - 0.003	0.0007				<0.0005 - 0.0026	0.0012			

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standards (2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) Bold and italicized parameters are notable leachate indicator parameters.
5) Blank indicates parameter not analyzed.
6) Bold and shaded results exceed the ODWQS

TABLE 4.4
2023 Leachate and Background Quality Comparison
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	Reference Groundwater Quality			Leachate Quality								
			Brine	Concentrated Brine		Holding Tank - SFA			Holding Tank - NFA			Refuse Well 23B		
			38-I	44-I										
			HISTORICAL RANGE 1989 - 2007	HISTORICAL RANGE 1989 - 2022	Apr-23	HISTORICAL RANGE 2006 - 2022	Apr-23	Oct-23	HISTORICAL RANGE 2011 - 2022	Apr-23	Oct-23	HISTORICAL RANGE 1986 - 2022	Apr-23	Sep-23
Alkalinity	mg/L	30-500	152 - 280	52.4 - 207	153	**1590** - **4290**		**2060**	**852** - **2900**		**716**	446 - **3120**	**756**	
Aluminum	mg/L	0.1	0.001 - 0.066			<0.02 - **3.51**	0.061	0.098	<0.02 - **3.01**	**0.225**	**0.17**	<0.025 - **0.52**		<0.025
Ammonia (as N)	mg/L		0.14 - 7.3	11.1 - 27.8	22.3	53 - 290						18.2 - 500	42.1	
Arsenic	mg/L	0.025	0.001 - 0.005	0.0006 - **0.033**	<0.005	<0.005 - **0.03**	<0.005	<0.005	0.006 - **0.047**	0.013	0.013	0.0006 - 0.007	<0.0005	
Barium	mg/L	1 *	0.005 - 0.543			0.285 - 0.569			0.117 - 0.228			0.396 - 0.713		0.51
Beryllium	mg/L		0.0001 - 0.0025			<0.0002 - <0.001			<0.0002 - <0.001			<0.0001 - <0.001		<0.0005
Boron	mg/L	5 *	0.005 - 0.5	0.37 - **20**		2.31 - **6.84**			0.68 - 1.74			1.05 - 1.91		1.22
Cadmium	mg/L	0.005 *	0.00025 - 0.0025			0.0003 - 0.004	<0.001	<0.001	<0.0003 - 0.0004	<0.001	<0.001	<0.0001 - 0.005		<0.0001
Calcium	mg/L		34.7 - 321	833 - 2691	1780	164 - 210			284 - 284			101 - 187	163	
Chemical Oxygen Demand	mg/L		0.5 - 62.6	9.09 - 1100	<400	120 - 1070	200	400	50 - 1510	580	220	40 - 426	50	
Chloride	mg/L	250	4.9 - **2400**	**8470** - **60509**	**17500**	230 - **1120**	179	**557**	9.7 - **1430**	**399**	**316**	58.9 - **645**	62.6	
Chromium	mg/L	0.05 *	0.0005 - 0.025			0.004 - **0.059**	0.01	0.028	0.006 - **0.181**	**0.07**	0.04	0.001 - 0.012		0.004
Cobalt	mg/L		0.0005 - 0.03			<0.002 - 0.02	0.004	0.011	0.0009 - 0.024	0.009	0.007	0.0022 - 0.01		0.0058
Conductivity	µS/cm		392 - 12500	16000 - 56700	56000							1120 - 6470	1480	
Copper	mg/L	1	0.0005 - 0.01			0.002 - 0.01	<0.005	<0.005	0.0021 - 0.022	0.005	0.014	<0.0004 - 0.016		<0.0005
Dissolved Organic Carbon	mg/L	5		<1.0 - 4.4	<1.0							4.4 - **108**	**16.2**	
Hardness	mg/L	80-100		**4490** - **9730**	**9470**							**352** - **1020**	**567**	
Iron	mg/L	0.3	0.005 - **5.42**	0.06 - **23.9**	**0.408**	**3.21** - **73.4**	**16.7**	**17.5**	**0.35** - **7.27**	**1.22**	**1.63**	**3.02** - **30.3**	**7.22**	
Lead	mg/L	0.01 *	0.0001 - **0.04**			<0.0015 - **0.0603**	<0.01	<0.01	<0.0015 - **0.0366**	<0.01	<0.01	<0.0005 - **0.05**		<0.0005
Magnesium	mg/L		17.8 - 182	570 - 1581	1220	46 - 122			45.4 - 57.4			22.4 - 216	38.9	
Manganese	mg/L	0.05	0.001 - **0.072**	<0.01 - **0.54**	**0.103**	**0.282** - **0.922**	**0.614**	**0.406**	**0.115** - **1.27**	**0.453**	**0.214**	**0.072** - **0.48**	**0.394**	
Molybdenum	mg/L		0.001 - 0.05			<0.005 - 0.008	<0.005	<0.005	<0.005 - 0.018	<0.005	<0.005	<0.0005 - 0.002		0.0005
Nickel	mg/L		0.0005 - 0.02			0.014 - 0.08	0.015	0.047	0.01 - 0.139	0.05	0.036	0.014 - 0.054		0.014
Nitrate	mg/L	10.0 *	0.0025 - 0.988	<0.01 - **39**	<5.0							<0.05 - 9	0.17	
Nitrite	mg/L	1.0*	0.0005 - 0.3	<0.001 - 0.1	<5.0							<0.05 - 0.6	<0.05	
pH	units		7.39 - 8.45	7.04 - 7.82	7.35	6.63 - 7.63	6.71	7.03	6.48 - 8.15	7.46	7.68	6.44 - 7.23	6.64	
Phenols	µg/L		0.5 - 7.3	<1 - 13	6							0.033 - 25	2	
Phosphate	mg/L			<0.02 - 0.07								<0.02 - 0.82		
Phosphorus	mg/L		0.001 - 0.43	<0.002 - 0.99	0.37	0.3 - 3.37	1.15	2.43	0.25 - 3.16	1.66	0.82	0.04 - 0.84	0.08	
Potassium	mg/L		1.3 - 26.2	65.2 - 432	101	97.2 - 337		165	38 - 392		101	21.5 - 239	34.6	
Sodium	mg/L	200	3.7 - **1000**	**656** - **8182**	**5580**	3 - **877**		**492**	6 - **1130**		**293**	50.5 - **386**	62.6	
Sulphate	mg/L	500	20 - 43	<0.2 - 46.2	<20	9.9 - 98.4	20.7	19.6	18.4 - **581**	310	255	<0.3 - 37.7	20.3	
Total Dissolved Solids	mg/L	500		**20200** - **30400**	**26900**							**580** - **2240**	470	
Total Kjeldahl Nitrogen	mg/L		0.025 - 8.4	1.5 - 69	22	68 - 670	158	275	20.8 - 467	160	93.5	31.6 - 508	42.1	
Zinc	mg/L	5	0.001 - 0.18			<0.01 - 0.15	0.01	0.01	<0.02 - 0.26	0.04	0.02	0.0017 - 0.09		<0.005

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standards (2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) Bold and italicized parameters are notable leachate indicator parameters.
5) Blank indicates parameter not analyzed.
6) Bold and shaded results exceed the ODWQS

Peterborough Waste Management Facility

Leachate Collection System Inspection & Cleaning Checklist

Date Started: June 2023

Date Completed: October 2023

Completed By: Tim Haffam (City of Peterborough)

NORTH FILL AREA									
DATE	**PIPE REFERENCE**	**DESCRIPTION**	**PIPE SIZE**	**GAS ALARM**	**MANHOLE VACUUM**	**FLUSHED DISTANCE (m)**	**VIDEO DISTANCE (m)**	**PIPE CONDITION**	**COMMENTS**
N/A	308080	MHL1 (S. Inv.) - PS (Holding Tank)	Diameter = 200mm Length = ±40m	Yes No	Yes No	-	-	Poor Good	Can't go through valve
2023-10-02	308090	MHL1 (NE. Inv.) - MHL5 East Line	Diameter = 200mm Length = ±222m	Yes No	Yes No	182.9	180.0	Poor Good	
2023-10-02	308088	MHL1 (N. Inv.) - MHL5 Central Line	Diameter = 200mm Length = ±185m	Yes No	Yes No	155.5	168.4	Poor Good	
2023-10-02	308086	MHL1 (NW. Inv.) - MHL5 West Line	Diameter = 200mm Length = ±184m	Yes No	Yes No	121.9	80.0	Poor Good	
2023-10-02	308092	MHL1 (SW. Inv.) - MHL2	Diameter = 200mm Length = ±57m	Yes No	Yes No	57.0	55.7	Poor Good	
-	308090	MHL5 (E. Inv.) - MHL1 East Line	Diameter = 200mm Length = ±222m	Yes No	Yes No	-	-	Poor Good	Not Accessible
-	308088	MHL5 (SE. Inv.) - MHL1 Central Line	Diameter = 200mm Length = ±185m	Yes No	Yes No	-	-	Poor Good	Not Accessible
-	308086	MHL5 (S. Inv.) - MHL1 West Line	Diameter = 200mm Length = ±184m	Yes No	Yes No	-	-	Poor Good	Not Accessible
-	No Pipe Reference	MHL5 (W. Inv.) - MHL6	Diameter = 200mm Length = ±50m	Yes No	Yes No	-	-	Poor Good	Not Accessible
2023-10-02	308084	MHL2 (N. Inv.) - MHL6 East Line	Diameter = 200mm Length = ±213m	Yes No	Yes No	155.5	191.9	Poor Good	
2023-10-02	308082	MHL2 (NW. Inv.) - MHL6 West Line	Diameter = 200mm Length = ±208m	Yes No	Yes No	152.4	200.7	Poor Good	
2023-10-02	308096	MHL2 (SW. Inv.) - MHL3	Diameter = 200mm Length = ±53m	Yes No	Yes No	48.8	53.2	Poor Good	
-	308084	MHL6 (SE. Inv.) - MHL2 East Line	Diameter = 200mm Length = ±213m	Yes No	Yes No	-	-	Poor Good	Not Accessible
-	308082	MHL6 (S. Inv.) - MHL2 West Line	Diameter = 200mm Length = ±208m	Yes No	Yes No	-	-	Poor Good	Not Accessible
2023-09-27	308298	MHL3 (N. Inv.) - MHL7 East Line	Diameter = 200mm Length = ±274m	Yes No	Yes No	106.7	69.8	Poor Good	
2023-09-27	308296	MHL3 (N. Inv.) - MHL7 East Central Line	Diameter = 200mm Length = ±244m	Yes No	Yes No	76.2	127.7	Poor Good	
2023-09-28	308292	MHL3 (NE. Inv.) - MHL7 West Central Line	Diameter = 200mm Length = ±240m	Yes No	Yes No	45.7	95.7	Poor Good	
2023-09-28	308288	MHL3 (NE. Inv.) - MHL7 West Line	Diameter = 200mm Length = ±264m	Yes No	Yes No	91.4	86.0	Poor Good	
2023-09-28	316530	MHL3 (W. Inv.) - Capped End	Diameter = 200mm Length = ±88m	Yes No	Yes No	98.8	97.4	Poor Good	
2023-10-05	308298	MHL7 (E. Inv.) - MHL3 East Line	Diameter = 200mm Length = ±274m	Yes No	Yes No	76.2	93.2	Poor Good	
2023-10-05	308296	MHL7 (SE. Inv.) - MHL3 East Central Line	Diameter = 200mm Length = ±244m	Yes No	Yes No	76.2	110.6	Poor Good	
2023-10-05	308292	MHL7 (SE. Inv.) - MHL3 West Central Line	Diameter = 200mm Length = ±240m	Yes No	Yes No	76.2	95.0	Poor Good	
2023-10-05	308288	MHL7 (S. Inv.) - MHL3 West Line	Diameter = 200mm Length = ±264m	Yes No	Yes No	85.3	80.5	Poor Good	

Note: Please provide comments if pipe condition is found to be "Poor".

NORTH FILL AREA									
DATE	**PIPE REFERENCE**	**DESCRIPTION**	**PIPE SIZE**	**GAS ALARM**	**MANHOLE VACUUM**	**FLUSHED DISTANCE (m)**	**VIDEO DISTANCE (m)**	**PIPE CONDITION**	**COMMENTS**
-	Cell 4 - P4	MHL4 (N. Inv.) - MHL8 East Line	Diameter = 200mm Length = ±290m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	Cell 4 - P3	MHL4 (NW. Inv) - MHL8 East Central Line	Diameter = 200mm Length = ±265m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	Cell 4 - P2	MHL4 (NW. Inv) - MHL8 West Central Line	Diameter = 200mm Length = ±265m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	Cell 4 - P1	MHL4 (W. Inv.) - MHL8 West Line	Diameter = 200mm Length = ±300m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	316530	MHL4 (E. Inv.) - MHL3	Diameter = 200mm Length = ±98m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	Cell 4 - P4	MHL8 (E. Inv.) - MHL4 East Line	Diameter = 200mm Length = ±290m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	Cell 4 - P3	MHL8 (SE. Inv.) - MHL4 East Central Line	Diameter = 200mm Length = ±265m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	Cell 4 - P2	MHL8 (SE. Inv.) - MHL4 West Central Line	Diameter = 200mm Length = ±265m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.
-	Cell 4 - P1	MHL8 (S. Inv) - MHL4 West Line	Diameter = 200mm Length = ±300m	Yes No	Yes No	-	-	Poor Good	- Wasn't flushed or video inspected in 2023.

Note: Please provide comments if pipe condition is found to be "Poor".

TABLE 4.5
Leachate Collection System Inspection Checklist
2023 ANNUAL MONITORING REPORT
Peterborough Waste Management Facility
The County and The City of Peterborough

SOUTH FILL AREA									
DATE	**PIPE REFERENCE**	**DESCRIPTION**	**PIPE SIZE**	**GAS ALARM**	**MANHOLE VACCUM**	**FLUSHED DISTANCE (m)**	**VIDEO DISTANCE (m)**	**PIPE CONDITION**	**COMMENTS**
2023-09-21	179538	MHT10-07 - South Invert Underdrain	Diameter = 150mm Length = ±157m	Yes No	Yes No	109.0	30.0	Poor Good	
2023-06-22	179540	MHT10-07 - MHT9-94 Gravity Drain	Diameter = 200mm Length = ±89m	Yes No	Yes No	79.2	87.3	Poor Good	
2023-09-21	179543	MHT9-94 - South Invert Underdrain	Diameter = 150mm Length = ±95m	Yes No	Yes No	61.0	30.0	Poor Good	
2023-06-22	179544	MHT9-94 - MHT8-94 Gravity Drain	Diameter = 200mm Length = ±39m	Yes No	Yes No	39.6	41.7	Poor Good	
2023-09-21	179547	MHT8-94 - South Invert Underdrain	Diameter = 150mm Length = ±116m	Yes No	Yes No	61.0	30.0	Poor Good	
2022-06-22	179548	MHT7-94 - MHT8-94 Gravity Drain	Diameter = 200mm Length = ±40m	Yes No	Yes No	40.2	-	Poor Good	Not Accessible
2023-09-21	179551	MHT7-94 - South Invert Underdrain	Diameter = 150mm Length = ±172m	Yes No	Yes No	-	-	Poor Good	Not Accessible
2023-09-21	179552	MHT7-94 - MHT6-94 Gravity Drain	Diameter = 200mm Length = ±61m	Yes No	Yes No	75.3	-	Poor Good	Not Accessible (valve)
2023-09-12	179554	MH-T5 - MHT6-94 Gravity Drain	Diameter = 200mm Length = ±86m	Yes No	Yes No	70.1	84.3	Poor Good	
2023-09-22	179580	MH-T5 - MH-G Gravity Drain	Diameter = 200mm Length = ±11m	Yes No	Yes No	11.0	11.0	Poor Good	
2023-09-12	179574	MH-G - East Cleanout Toe Drain	Diameter = 150mm Length = ±34m	Yes No	Yes No	-	30.0	Poor Good	Not Accessible
2023-09-21	179578	MH-G - West Cleanout Toe Drain	Diameter = 150mm Length = ±51m	Yes No	Yes No	50.9	30.0	Poor Good	
2023-09-21	179567 179561	MH-G - South Invert Toe Drain	Diameter = 150mm Length = ±80m	Yes No	Yes No	-	30.0	Poor Good	Do Not Attempt Flushing
2023-09-12	179581	MH-T4 - MH-T5 Gravity Drain	Diameter = 250mm Length = ±118m	Yes No	Yes No	128.0	117.7	Poor Good	
2023-09-12	179583	MH-T3 - MH-T4 Gravity Drain	Diameter = 250mm Length = ±118m	Yes No	Yes No	109.1	119.3	Poor Good	
2023-09-12	179585	MH-T2 - MH-T3 Gravity Drain	Diameter = 250mm Length = ±87m	Yes No	Yes No	88.4	86.5	Poor Good	
2023-09-12	179587	MH-T1 - MH-T2 Gravity Drain	Diameter = 250mm Length = ±66m	Yes No	Yes No	65.5	65.2	Poor Good	
2023-09-13	179597 179595	MH-I2 - MH-I1 Underdrain	Diameter = 200mm Length = ±155m	Yes No	Yes No	140 123.7	154.5	Poor Good	
2023-09-13	179599	MH-I2 - MH-I3 Gravity Drain	Diameter = 200mm Length = ±27m	Yes No	Yes No	27.3	27.2	Poor Good	
2023-09-21	179602	MH-I3 - West Invert Underdrain	Diameter = 150mm Length = ±170m	Yes No	Yes No	91.4	30.0	Poor Good	
2023-09-13	179603	MH-I3 - MH-I4 Gravity Drain	Diameter = 200mm Length = ±31m	Yes No	Yes No	31.4	30.0	Poor Good	
2023-09-21	179606	MH-I4 - West Invert Underdrain	Diameter = 150mm Length = ±135m	Yes No	Yes No	93.0	30.0	Poor Good	
2023-09-13	179607	MH-I4 - MH-I5 Gravity Drain	Diameter = 200mm Length = ±30m	Yes No	Yes No	29.6	31.1	Poor Good	

Note: Please provide comments if pipe condition is found to be "Poor".

2023-09-21	179610	MH-I5 - West Invert Underdrain	Diameter = 150mm Length = ±122m	Yes	No	Yes	No	91.0	30.0	Poor	Good	Mini camera utilized
2023-09-13	179611	MH-I5 - MH-J1 Gravity Drain	Diameter = 200mm Length = ±30m	Yes	No	Yes	No	30.2	30.0	Poor	Good	
2023-09-21	179614	MH-J1 - West Invert Underdrain	Diameter = 150mm Length = ±114m	Yes	No	Yes	No	91.4	30.0	Poor	Good	
2023-09-25	179589	MH-J2 - MH-T1 Gravity Drain	Diameter = 200mm Length = ±9m	Yes	No	Yes	No	7.6	6.1	Poor	Good	
2023-09-25	179615	MH-J2 - MH-J1 Gravity Drain	Diameter = 200mm Length = ±30m	Yes	No	Yes	No	30.2	26.7	Poor	Good	
-	179711	MH-J2 - West Invert Underdrain	Diameter = 150mm Length = ±94m	Yes	No	Yes	No	-	-	Poor	Good	Not Accessable
2023-09-25	179591	MH-J2 - MH-J3 Gravity Drain	Diameter = 200mm Length = ±30m	Yes	No	Yes	No	29.0	31.1	Poor	Good	
-	179710	MH-J3 - West Invert Underdrain	Diameter = 150mm Length = ±103m	Yes	No	Yes	No	-	-	Poor	Good	Not Accessable
2023-09-25	179593	MH-D2 - MH-J3 Gravity Drain	Diameter = 200mm Length = ±34m	Yes	No	Yes	No	91.4	33.4	Poor	Good	
2023-09-25	179534, 179526, 179518, 179514, 179510	MH-D2 - West Invert Underdrain	Diameter = 150mm Length = ±174m	Yes	No	Yes	No	12.2	30.0	Poor	Good	
2023-09-25	179536	MH-D2 - PS (Holding Tank)	Diameter = 200mm Length = ±117m	Yes	No	Yes	No	112.8	95.9	Poor	Good	- Observed liquid at 90m, not far from pump station.
2023-09-20	179655	MH-5 - MH-6 Intercept Drain	Diameter = 200mm Length = ±62m	Yes	No	Yes	No	63.7	62.4	Poor	Good	
2023-09-20	179656	MH-4 - MH-5 Intercept Drain	Diameter = 200mm Length = ±69m	Yes	No	Yes	No	68.6	68.4	Poor	Good	
-	179657	MH-4 - PS (Holding Tank) 179536	Diameter = 75mm Length = ±37m	Yes	No	Yes	No	-	-	Poor	Good	Flushing Not Required
2023-09-20	179654	MH-4 - MH-3 Intercept Drain	Diameter = 300mm Length = ±91m	Yes	No	Yes	No	86.9	91.3	Poor	Good	
2023-09-20	179653	MH-3 - MH-2 Intercept Drain	Diameter = 300mm Length = ±108m	Yes	No	Yes	No	76.2	107.4	Poor	Good	
2023-09-20	179652	MH-2 - MH-1 Intercept Drain	Diameter = 250mm Length = ±86m	Yes	No	Yes	No	89.9	86.4	Poor	Good	
-	316534	TDCO-A1 - North Invert Toe Drain	Diameter = 150mm Length = ±360m	Yes	No	Yes	No	-	-	Poor	Good	Not Accessable
2023-09-19	179428	TDCO-A1 - TDCO-A2 Toe Drain	Diameter = 150mm Length = ±56m	Yes	No	Yes	No	30.5	30.0	Poor	Good	
2023-09-19	179431	TDCO-A2 - TDCO-A3 Toe Drain	Diameter = 150mm Length = ±60m	Yes	No	Yes	No	30.5	30.0	Poor	Good	Mini camera utilized
2023-09-19	179433	TDCO-A3 - MH-A1 Toe Drain	Diameter = 150mm Length = ±48m	Yes	No	Yes	No	50.6	30.0	Poor	Good	
2023-09-20	179435	MH-A1 - TDCO-A4 Toe Drain	Diameter = 150mm Length = ±58m	Yes	No	Yes	No	60.7	30.0	Poor	Good	-Observed pipe flowing 20% pipe full. Clear liquid.

Note: Please provide comments if pipe condition is found to be "Poor".

2023-09-20	179437	MH-B1 - TDCO-A4 Toe Drain	Diameter = 150mm Length = ±46m	Yes	No	Yes	No	50.9	30.0	Poor	Good	- Mini camera utilized. Observed pipe flowing 30% pipe full. Clear liquid.
2023-06-21	179463	MH-B1 - LCO3-94 Transfer Piping	Diameter = 150mm Length = ±42m	Yes	No	Yes	No	42.7	2.0	Poor	Good	Cannot CCTV pipe because of calcite buildup. Observed pipe to be flowing.
2023-09-21	179439	MH-C1 - MH-B1 Toe Drain	Diameter = 200mm Length = ±104m	Yes	No	Yes	No	111.3	30.0	Poor	Good	Length of pipe CCTV full of liquid. Clear to murky liquid.
2023-09-21	179441	MH-C1 - PS (Holding Tank)	Diameter = 200mm Length = ±101m	Yes	No	Yes	No	114.3	30.0	Poor	Good	Observed pipe flowing 60% pipe full. Clear to murky liquid.
2023-06-21	179503	MH-C1 - LCO5-94 Transfer Piping	Diameter = 150mm Length = ±37m	Yes	No	Yes	No	42.7	-	Poor	Good	
2023-06-21	179443	HCO1-94 - HCO2-94 Phase 1 Header	Diameter = 150mm Length = ±78m	Yes	No	Yes	No	76.2	30.0	Poor	Good	
2023-06-21	179445, 179451, 179457, 179464, 179470, 179472	HCO2-94 (North Invert) - HCO3-94 Phase 1 Header	Diameter = 150mm Length = ±190m	Yes	No	Yes	No	106.7	30.0	Poor	Good	Camera under water (clear), some build up but water flowing.
-	179472, 179470, 179464, 179457, 179451, 179445	HCO3-94 (South Invert) - HCO2-94 Phase 1 Header	Diameter = 150mm Length = ±190m	Yes	No	Yes	No	-	-	Poor	Good	No Access due to broken manhole lid.
2023-06-21	179476, 179500, 179496, 179490, 179483, 179482	HCO4-95 (North Invert) - HCO5-95 Phase 1 Header	Diameter = 150mm Length = ±202m	Yes	No	Yes	No	121.9	30.0	Poor	Good	- Observed the first 25m of pipe full of water (Clear liquid) remainder of pipe CCTV was open.
2023-06-21	179482, 179483, 179490, 179496, 179500, 179476	HCO5-95 (South Invert) - HCO4-95 Phase 1 Header	Diameter = 150mm Length = ±202m	Yes	No	Yes	No	7.3	30.0	Poor	Good	Observed flow in pipe, pipe was 10% full.
-	179529	HCO91-1 - South Invert Cell J Header	Diameter = 150mm Length = ±75m	Yes	No	Yes	No	-	-	Poor	Good	Not Accessable
2023-06-21	179447 179449	LCO1-94 - VC1-94 Underdrain	Diameter = 150mm Length = ±101m	Yes	No	Yes	No	4.6	30.0	Poor	Good	-Observed ponding at first 8m (liquid clear). - Flushing equipment couldn't pass T-Joint at 5m.
2023-06-21	179456 179454	LCO2-94 - VC2-94 Underdrain	Diameter = 150mm Length = ±118m	Yes	No	Yes	No	4.3	4.0	Poor	Good	- Observed HDPE fitting within LCS pipe at cleanout. Video terminated at object at 4.0m. - Flushing equipment couldn't pass object stuck at t-joint.
2023-06-21	179461 179460	LCO3-94 - VC3-94 Underdrain	Diameter = 150mm Length = ±133m	Yes	No	Yes	No	6.7	30.0	Poor	Good	-Observer rebar lodged through LCS pipe at 14m. Camera was able to get by. - Sag observed in pipe at approximately 20m. - Flushing equipment couldn't pass T-Joint at 7m.
2023-06-21	179469 179467	LCO4-94 - VC4-94 Underdrain	Diameter = 150mm Length = ±138m	Yes	No	Yes	No	5.8	30.0	Poor	Good	-Observed ponding in the first 20m of the LCS pipe. Liquid observed to be clear. Pipe clears at approximately 20m. - Flushing equipment couldn't pass T-Joint at 6m.
2023-06-21	179501 179499	LCO5-94 - VC5-94 Underdrain	Diameter = 150mm Length = ±152m	Yes	No	Yes	No	6.1	30.0	Poor	Good	-Observed ponding at first 5m (liquid clear). - Flushing equipment couldn't pass T-Joint at 6m.
2023-06-21	179492 179495	LCO6-94 - VC6-94 Underdrain	Diameter = 150mm Length = ±160m	Yes	No	Yes	No	7.0	30.0	Poor	Good	-Observed ponding at first 5m (liquid clear). - Flushing equipment couldn't pass T-Joint at 7m.
2023-06-21	179485 179489	LCO7-94 - VC7-94 Underdrain	Diameter = 150mm Length = ±168m	Yes	No	Yes	No	7.3	30.0	Poor	Good	-Observed ponding at first 5m (liquid clear). - Flushing equipment couldn't pass T-Joint at 7m.

Note: Please provide comments if pipe condition is found to be "Poor".

TABLE 5.1
2023 Groundwater Elevations
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Well	T.O.P. ELEVATION (mASL)	Measured Groundwater Level							
		1-Mar-23		19-Jun-23		1-Sep-23		28-Nov-23	
		(mbTOP)	(mASL)	(mbTOP)	(mASL)	(mbTOP)	(mASL)	(mbTOP)	(mASL)
5-IV	196.30	6.06	190.24			5.98	190.32		
5-V	187.98	3.12	184.87			4.01	183.98		
5-VI	194.05	2.83	191.22			4.03	190.02		
16A	196.64	4.50	192.14			5.19	191.45		
18A	190.00	Flowing	Flowing			0.61	189.39		
18B	189.71	1.35	188.36			1.92	187.79		
19A	193.87	4.23	189.64			5.26	188.61		
19B	193.84	3.86	189.98			4.93	188.91		
20A	190.95	0.98	189.97			1.79	189.16		
20B	190.79	1.26	189.53			2.12	188.67		
23B	207.41	8.66	198.75			9.48	197.92		
33-II	197.16	0.70	196.46			1.18	195.98		
33-III	197.10	1.49	195.61			1.57	195.53		
40-II	196.24	1.23	195.01			1.62	194.62		
41-I	198.19	1.16	197.03			1.86	196.33		
41-II	198.19	0.07	198.12			0.87	197.32		
44-I	197.64	2.32	195.32			3.79	193.85		
44-II	197.73	Flowing	Flowing			0.30	197.43		
44-III	197.73	1.30	196.44			1.47	196.26		
46-I	194.71	6.26	188.45			7.55	187.16		
46-II	194.86	1.05	193.81			1.69	193.17		
46-III	194.89	1.83	193.06			2.34	192.55		
48	196.59	3.90	192.69			4.76	191.83		
50-I	194.58	2.59	191.99			3.92	190.66		
50-II	194.74	2.91	191.83			4.18	190.56		
50-III	194.48	2.57	191.91			4.01	190.47		
52-I	189.95	0.57	189.38			1.16	188.79		
52-II	190.31	1.14	189.17			1.69	188.63		
53-I	196.73	4.14	192.59			5.12	191.61		
54-II	196.05	2.41	193.64			4.39	191.66		
61-I	195.60	2.31	193.29			3.01	192.59		
61-II	195.76	2.10	193.66			2.71	193.05		
61-III	195.66	2.40	193.26			2.71	192.95		
62-IR	191.95	5.70	186.25			6.73	185.23		
62-II	192.01	1.27	190.74			2.32	189.69		
63-I	193.29	1.52	191.77			2.39	190.90		
63-II	193.28	1.68	191.60			2.63	190.65		
63-III	192.98	1.30	191.68			2.42	190.57		
64-I	190.10	0.27	189.83			1.02	189.09		
64-II	190.16	0.96	189.20			1.70	188.46		
66-I	199.06	2.77	196.29			3.45	195.61		
66-II	199.13	2.41	196.72			3.00	196.13		
66-III	198.92	1.87	197.05			2.51	196.41		
74-II	195.91	1.50	194.41			1.99	193.93		
74-III	195.99	0.94	195.06			1.62	194.38		
75-I	191.18	8.78	182.40			8.90	182.28		
75-II	191.23	1.30	189.93			1.90	189.33		
76-I	190.49	6.48	184.01			6.87	183.62		
77-I	195.36	0.54	194.83			1.14	194.22		
81-I	199.85	7.54	192.31			7.74	192.11		
81-II	199.90	5.70	194.20			6.27	193.63		
81-III	200.00	4.57	195.44			5.90	194.10		
84-I	202.17	3.81	198.36	4.08	198.09	4.23	197.95	4.62	197.56
84-II	202.12	1.22	200.90	3.83	198.29	4.06	198.07	4.35	197.77
85-I	198.80	0.44	198.36	0.83	197.97	1.08	197.72	0.85	197.95
85-II	198.75	0.85	197.90	1.10	197.65	1.45	197.30	1.28	197.47

Notes:
T.O.P. - Top of Pipe
mbTOP - metres below Top of Pipe
mASL - metres Above Sea Level
Blank indicates water level not measured.

TABLE 5.1
2023 Groundwater Elevations
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Well	T.O.P. ELEVATION (mASL)	Measured Groundwater Level							
		1-Mar-23		19-Jun-23		1-Sep-23		28-Nov-23	
		(mbTOP)	(mASL)	(mbTOP)	(mASL)	(mbTOP)	(mASL)	(mbTOP)	(mASL)
86-I	195.73	0.10	195.64	0.37	195.36	0.62	195.11	0.05	195.68
86-II	195.69	0.59	195.10	0.78	194.91	0.97	194.72	0.74	194.95
86-III	195.75	0.89	194.86	1.07	194.69	1.26	194.49	1.00	194.76
87-I	200.35	2.03	198.32	2.96	197.39	3.13	197.23	2.50	197.85
87-II	200.31	1.91	198.40	2.84	197.47	3.01	197.30	2.46	197.85
87-III	200.39	1.68	198.71	2.08	198.31	2.24	198.15	2.42	197.97
88-I	207.52	1.46	206.06	1.72	205.80	1.95	205.57	2.54	204.98
88-II	207.52	1.21	206.32	1.42	206.10	1.75	205.77	2.16	205.37
88-III	207.37	0.87	206.50	1.12	206.25	1.51	205.86	1.82	205.55
89-I	202.77	2.98	199.79	3.54	199.23	3.79	198.98	4.55	198.22
89-II	203.14	3.30	199.84	3.89	199.25	4.55	198.59	5.35	197.79
89-III	203.22	2.57	200.65	3.39	199.83	4.20	199.02	5.20	198.02
91-I	206.55	7.12	199.43	7.38	199.17	7.52	199.03	7.88	198.67
91-II	206.56	7.69	198.87	7.91	198.65	8.06	198.51	8.34	198.22
91-III	206.69	2.98	203.71	6.12	200.58	6.13	200.56	6.12	200.57
92-I	200.46	1.37	199.10	2.02	198.44	2.32	198.15	1.80	198.66
92-II	200.47	2.26	198.22	2.60	197.87	2.70	197.77	2.77	197.70
92-III	200.43	1.74	198.69	2.32	198.11	2.56	197.87	2.71	197.72
93-I	197.67	0.88	196.79	1.09	196.59	1.43	196.24	1.36	196.31
93-II	197.76	1.21	196.55	1.31	196.45	1.84	195.92	1.40	196.36
94-I	196.80	0.78	196.02	0.98	195.82	1.20	195.60	1.29	195.51
94-II	196.88	1.54	195.34	1.93	194.95	2.10	194.78	2.02	194.86
95-I	195.51	Flowing	Flowing	0.15	195.36	0.06	195.45	0.06	195.46
95-II	195.49	0.88	194.61	0.94	194.55	1.05	194.44	0.95	194.54
101-I	219.70	13.93	205.77			14.11	205.59		
101-II	219.64	6.36	213.28			7.01	212.63		
101-III	219.51	2.90	216.61			3.83	215.68		
104-I	205.53	2.06	203.47	3.07	202.46	3.21	202.32	4.57	200.96
104-II	205.58	1.95	203.64	2.07	203.51	2.29	203.29	2.32	203.26
104-III	205.53	1.82	203.71	2.00	203.53	2.26	203.27	2.42	203.11
106-I	199.80	1.74	198.06	2.51	197.29	3.01	196.79	2.23	197.57
106-II	199.75	1.68	198.07	2.02	197.73	2.24	197.51	1.99	197.76
106-III	199.71	1.67	198.04	1.80	197.91	2.02	197.69	1.92	197.79
107-I	195.99	Flowing	Flowing	Flowing	Flowing	Flowing	Flowing	Flowing	Flowing
107-II	196.09	Flowing	Flowing	Flowing	Flowing	Flowing	Flowing	Flowing	Flowing
107-III	196.08	0.82	195.26	1.05	195.03	1.21	194.87	0.99	195.10
108-I	206.32	5.14	201.18	5.59	200.73	5.64	200.68	5.68	200.64
108-II	206.13	3.00	203.13	3.18	202.95	3.21	202.93	3.29	202.84
108-III	205.91	1.20	204.71	1.37	204.54	1.56	204.35	1.23	204.68
109-I	199.19	3.10	196.09	3.33	195.86	3.53	195.66	3.66	195.53
109-II	200.10	3.98	196.11	4.22	195.87	4.43	195.66	4.58	195.51
109-III	199.04	2.63	196.41	2.61	196.43	3.22	195.81	3.31	195.73
110-I	202.55	3.77	198.78	4.05	198.49	4.15	198.40	4.43	198.12
110-II	202.73	4.15	198.57	4.41	198.32	4.50	198.23	4.79	197.94
110-III	202.55	2.32	200.22	3.12	199.43	3.14	199.40	4.41	198.14
111-I	200.28	3.98	196.30	4.08	196.21	4.40	195.89	4.34	195.94
111-II	200.29	4.57	195.73	4..742	195.55	4.86	195.43	4.92	195.38
111-III	200.41	3.29	197.12	3.51	196.90	3.77	196.64	3.93	196.48
112-I	208.59	3.81	204.79	4.35	204.25	4.65	203.95	5.17	203.42
112-II	208.59	2.83	205.76	3.56	205.03	3.89	204.70	4.71	203.87
112-III	208.60	1.86	206.74	2.49	206.11	2.96	205.64	3.82	204.78
113-I	195.34	Flowing	Flowing			0.06	195.29		
113-II	195.31	Flowing	Flowing			0.31	195.00		
113-III	195.25	0.68	194.57			0.94	194.31		

Notes: T.O.P. - Top of Pipe
mbTOP - metres below Top of Pipe
mASL - metres Above Sea Level
Blank indicates water level not measured.

TABLE 5.2
Vertical Hydraulic Gradients
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

WELL PAIRING	STRATIGRAPHY	LOCATION	CALCULATED VERTICAL HYDRAULIC GRADIENT	
			Mar-23	Sep-23
18B / 18A	Overburden -> Shallow Bedrock	Cell 1 - South	-0.45 *	0.11
19B / 19A	Overburden -> Shallow Bedrock	Cell 1 - South	0.10	0.10
20B / 20A	Overburden -> Shallow Bedrock	Cell 1 - South	-0.11	-0.13
41-II / 41-I	Shallow Bedrock -> Deep Bedrock	Cell 1 - South	0.24	0.22
44-III / 44-II	Overburden -> Shallow Bedrock	Cell 1 - South	-0.09 *	-0.08
44-II / 44-I	Shallow Bedrock -> Deep Bedrock	Cell 1 - South	0.51 *	0.75
52-II / 52-I	Overburden -> Shallow Bedrock	Cell 1 - South	-0.04	-0.03
62-II / 62-I	Overburden -> Deep Bedrock	Cell 1 - South	0.83	0.91
64-II / 64-I	Overburden -> Deep Bedrock	Cell 1 - South	-0.15	-0.16
46-III / 46-I	Overburden -> Shallow Bedrock	Cell 1 - North	0.27	0.32
50-III / 50-I	Overburden -> Shallow Bedrock	Cell 1 - North	-0.01	-0.03
61-III / 61-I	Overburden -> Shallow Bedrock	Cell 1 - North	-0.002	0.02
63-III / 63-I	Overburden -> Deep Bedrock	Cell 1 - North	-0.005	-0.02
66-III / 66-I	Overburden -> Deep Bedrock	Cell 1 - North	0.07	0.08
75-II / 75-I	Overburden -> Shallow Bedrock	Cell 1 - North	1.19	1.17
81-III / 81-I	Overburden -> Shallow Bedrock	Cell 1 - North	0.30	0.20
101-III / 101-I	Overburden -> Shallow Bedrock	Cell 1 - North	0.37	0.35
113-III / 113-I	Overburden -> Shallow Bedrock	Cell 1 - North	-0.05 *	-0.06
86-III / 86-I	Overburden -> Shallow Bedrock	North Fill Area	-0.05	-0.04
87-III / 87-I	Overburden -> Shallow Bedrock	North Fill Area	0.03	0.07
88-III / 88-I	Overburden -> Shallow Bedrock	North Fill Area	0.03	0.02
89-III / 89-I	Overburden -> Shallow Bedrock	North Fill Area	0.05	0.003
91-III / 91-I	Overburden -> Shallow Bedrock	North Fill Area	0.41	0.17
92-III / 92-I	Overburden -> Shallow Bedrock	North Fill Area	-0.04	-0.03
104-III / 104-I	Overburden -> Shallow Bedrock	North Fill Area	0.01	0.05
106-III / 106-I	Overburden -> Shallow Bedrock	North Fill Area	-0.001	0.07

Notes:
- positive gradient values indicates downward flow
- negative gradient values indicates upward flow
- * denotes the gradient was calculated using the top of pipe elevation for at least one well, as well was flowing.

TABLE 5.3
Groundwater Monitor Location Summary
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

RELATIVE LOCATION		OVERBURDEN	SHALLOW BEDROCK	DEEP BEDROCK
CELL 1 - SOUTH	Downgradient of refuse, before interceptor	5-VI, 17B, 19B, 59-I, 59-II	5-V, 17A, 19A	5-IV, 17-I
	Between interceptor trench and central water course	18B, 20B, 21B, 21C, 62-II, 64-II	18A, 20A, 21A	62-I, 64-I
	Beyond central water course	15A, 15B, 16C, 30-II, 52-II, 53-II, 54-II	16A, 30-I, 52-I, 53-I	54-I
CELL 1 - NORTH East Side	Adjacent to landfill service roads	45, 47, 48, 49, 65-I, 74-II, 74-III, 81-II, 81-III	74-I, 81-I	
	Buffer zone on east side of Bensfort Road	46-II, 46-III, 50-II, 50-III, 61-II, 61-III	46-I, 50-I, 61-I	
	Further east in buffer lands	31-II, 75-II, 63-II, 63-III, 76-III, 76-IV	31-I, 75-I, 76-II	63-I, 76-I
CELL 1 - NORTH North side	Flow is towards central wetland	8-II, 8-III, 33-II, 33-III, 66-II, 66-III, 71-II, 71-III, 72-II, 72-III, 77-I, 78-I, 113-II, 113-III	8-I, 71-I, 72-I, 113-I	33-I, 66-I
CELL 1 - NORTH North and West side	Vicinity of former Phase 2	38-II, 38-III, 42-I, 42-II, 42-III, 100-II, 100-III, 101-II, 101-III	100-I, 101-I	38-I
Flow is towards Central wetland	Further away in wetland to northwest	37-II, 40-II, 41-III, 44-III	37-I, 40-I, 41-II, 44-II	41-I, 44-I
NFA	Southerly flow toward central wetland	82-I, 83-I, 84-I, 84-II, 85-I, 85-II, 86-II, 86-III, 87-II, 87-III, 88-II, 88-III, 89-II, 89-III, 91-II, 91-III, 92-II, 92-III, 93-I, 93-II, 94-I, 94-II, 95-I, 95-II, 104-II, 104-III, 106-II, 106-III, 107-II, 107-III, 108-I, 108-II, 108-III, 109-I, 109-II, 109-III, 110-I, 110-II, 110-III, 111-I, 111-II, 111-III, 112-I, 112-II, 112-III	86-I, 87-I, 88-I, 89-I, 91-I, 92-I, 104-I, 106-I, 107-I	

TABLE 5.4

2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	5-IV		5-V		5-VI		16A	18A		18B		19A		19B		20A	20B		33-II	33-III	40-II	41-I
			Apr-23	Sep-23	Apr-23	Sep-23	Apr-23	Sep-23	Mar-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Mar-23	Sep-23	Mar-23	Mar-23	Mar-23	Mar-23
General/Inorganic Parameters																								
Alkalinity	mg/L	30-500 *	223		223	226	248	359	244	433	258	438	**554**	**562**	**574**	**671**	**836**	317	240	335	381	391	257	216
Aluminum	mg/L	0.1 *								<0.025		<0.025		<0.025		<0.025			<0.025					
Ammonia (as N)	mg/L		5.3		0.1	0.2	0.2	0.1	0.2	3.9	0.9	0.4	0.6	2	3.1	2.4	11	1.2	0.1	<0.1	0.1	0.1	0.1	8.9
Anion sum	meq/L		265		4.79	4.83	4.98	7.2	5.69	13.1	10.3	11.5	14	41.3	59.3	29.3	22.7	17.3	5.18	7.11	10.3	10.3	5.78	127
Arsenic	mg/L	0.010 **	<0.005		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	0.0022	0.001	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
Barium	mg/L	1 **								0.464		0.128		**2.69**		**1.40**			0.022					
Beryllium	mg/L									<0.0005		<0.0005		<0.0005		<0.0005			<0.0005					
Bicarbonate	mg/L		223		221	224	247	358	243	432	257	437	554	562	574	671	836	316	239	334	380	390	256	215
Boron	mg/L	5 **								0.259		0.076		0.200		0.167			0.009					
Cadmium	mg/L	0.005 **								<0.0001		<0.0001		<0.0001		<0.0001			<0.0001					
Calcium	mg/L		1020		42.6	53.9	81.2	132	81.1	120	79.7	140	171	216	357	217	289	75.8	83.7	119	134	155	67.8	433
Carbonate	mg/L		<1		2	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	1	<1
Cation sum	meq/L		229		4.62	5.45	4.8	7.65	5.51	12.9	10.1	10.1	13.5	36.6	69.5	26.9	25.3	13.7	5.07	7.16	10.7	10.8	5.95	122
Chemical Oxygen Demand	mg/L		<250		210	20	10	10	20	20	40	20	20	80	180	70	60	20	20	10	20	20	20	460
Chloride	mg/L	250 *	**9270**		8.8	8.7	1.5	1.0	27.8	151	157	90.4	98.8	**1070**	**1710**	**567**	233	**392**	6.6	7.5	43.8	34.4	5.5	**4370**
Chromium	mg/L	0.05 **								<0.0005		<0.0005		<0.0005		<0.0005			<0.0005					
Cobalt	mg/L									<0.0005		0.0008		0.0013		<0.0005			<0.0005					
Conductivity	µS/cm		30600		450	463	436	672	455	1160	1080	1080	1280	4940	7190	3790	2280	1750	479	665	821	846	499	13200
Conductivity - field	µS/cm		32700	29000	689	418	471	600	520	1290	927	1030	1220	4240	5700	3100	2080	1280	476	604	936	920	506	12700
Copper	mg/L	1 *								<0.0005		0.0007		0.0006		<0.0005			0.0006					
Dissolved Organic Carbon	mg/L	5 *	**7.4**		1.6	2.8	1.9	3.3	1.9	**5.8**	2.6	4.5	**6.8**	**12.2**	**19.1**	**9.9**	**16.2**	2.0	2.5	3.3	4.5	**5.1**	1.9	<1.0
Hardness	mg/L	80-100 *	**5160**		**200**	**246**	**233**	**374**	**235**	**454**	**344**	**426**	**544**	**921**	**1600**	**812**	**893**	**387**	**234**	**332**	**412**	**448**	**275**	**2560**
Ion Percentage	%		7.45		1.76	6.07	1.87	3.06	1.58	0.82	0.79	6.46	1.81	6.08	7.89	4.13	5.29	11.4	1.13	0.39	1.62	2.48	1.44	1.98
Iron	mg/L	0.3 *	**3.05**		0.022	**0.431**	<0.005	**0.551**	<0.005	**5.29**	0.16	**0.486**	**1.66**	**8.87**	**21.6**	**11.6**	**40.1**	**2.32**	0.013	0.27	0.032	<0.005	0.017	**3.47**
Lead	mg/L	0.01 **								<0.0005		<0.0005		<0.0005		<0.0005			<0.0005					
Magnesium	mg/L		634		22.8	27.1	7.44	10.9	7.86	37.6	35.1	18.5	28.3	92.7	171	65.5	41.6	47.9	6.06	8.44	18.7	14.9	25.7	358
Manganese	mg/L	0.05 *	**0.0652**		0.0007	0.0305	<0.0005	**0.253**	<0.0005	**0.155**	0.0132	**0.175**	**0.34**	**0.142**	**0.167**	**0.472**	**0.662**	**0.0927**	0.0014	**0.142**	0.0107	0.0056	0.0305	0.0300
Molybdenum	mg/L									<0.0005		<0.0005		<0.0005		<0.0005			<0.0005					
Nickel	mg/L									0.005		0.005		0.018		0.012			<0.002					
Nitrate	mg/L	10.0 **	<5.0		<0.05	<0.05	<0.05	<0.05	1.28	<0.05	<0.05	0.26	<0.05	<0.5	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	0.43	0.71	<0.05	<0.5
Nitrite	mg/L	1.0 **	<5.0		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5
pH	units		6.96		7.95	7.87	7.43	7.32	7.62	7.18	7.53	7.16	6.96	6.92	6.81	6.8	6.56	7.51	7.67	7.36	7.25	7.26	7.65	7.45
pH - field	units		6.09	6.39	7.77	7.6	7.29	6.98	7.24	6.95	7.13	6.99	6.6	6.74	6.52	6.56	6.28	7.12	7.34	6.94	7	6.98	7.34	7
Phenols	µg/L		3		<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L					<0.02		<0.02	<0.02		<0.02		<0.02	0.03	0.05	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L		<3.0		<0.03		<0.03			<0.03		<0.03							<0.03					
Phosphorus	mg/L		0.24		0.03	<0.02	0.03	<0.02	<0.01	0.01	<0.02	0.01	<0.02	0.03	<0.02	0.02	<0.02	0.06	<0.01	<0.02	<0.02	<0.02	<0.02	<0.2
Potassium	mg/L		53.6		1.9	2.4	<0.5	1	1.2	8	6	1.6	2.9	7.9	13.8	7.8	12.2	6.9	<0.5	<0.5	1.4	1.2	1.6	42.7
Sodium	mg/L	200 *	**2830**		12.4	9.7	2.4	2.6	17.4	75.6	68.5	35.2	56.1	**408**	**846**	**236**	144	131	8.5	11.7	54.2	41.4	8.5	**1590**
Sulphate	mg/L	500 *	<20		11	10.1	6.8	10.9	4.5	23.4	41.0	24.2	22.1	16.0	1.0	14.9	<0.2	4.1	17	19.9	80.8	82.7	31.4	<0.2
Temperature - field	°C		8	9.4	7.1	10.4	4.6	11.3	6.6	6.7	10	3.4	13.3	9.6	11.5	7.4	12.4	6.9	3.5	14	8.3	5.5	5.2	7
Total Dissolved Solids	mg/L	500 *	**14400**		280	270	260	380	290	**840**	**550**	**730**	**730**	**2850**	**4200**	**1840**	**1220**	**870**	240	350	**590**	**570**	280	**6860**
Total Kjeldahl Nitrogen	mg/L		6.2		<2.0	<0.3	<0.3	<0.3	<0.3	4	0.9	0.5	0.9	4.5	6.2	4.1	12.5	3.2	<2.0	2.2	0.4	<0.3	<0.3	8.9
Zinc	mg/L	5 *								<0.005		<0.005		<0.005		<0.005			<0.005					
Detected VOC Parameters																								
1,1-Dichloroethane	µg/L			<0.5						<0.5		<0.5		<0.5		<0.5			<0.5					
1,4-Dichlorobenzene	µg/L	1 *, 5 **		<0.5						<0.5		<0.5		<0.5		<0.5			<0.5					
Benzene	µg/L	1 **		<0.5						<0.5		<0.5		<0.5		<0.5			<0.5					
Chlorobenzene	µg/L	30 *, 80 **		<0.5						<0.5		<0.5		<0.5		0.9			<0.5					
cis-1,2-Dichloroethylene	µg/L			<0.5						<0.5		<0.5		<0.5		<0.5			<0.5					
Ethyl Benzene	µg/L	1.6 *, 140 **		<0.5						<0.5		<0.5		<0.5		<0.5			<0.5					
m/p-Xylenes	µg/L	20 *, 90 **		0.6						<0.5		<0.5		<0.5		<0.5			<0.5					
Toluene	µg/L	24 *, 60 **		<0.5						<0.5		<0.5		<0.5		<0.5			<0.5					
Xylenes - total	µg/L	20 *, 90 **		0.8						<0.5		<0.5		<0.5		<0.5			<0.5					

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	41-II	44-I	44-II	44-III	46-I	46-II	46-III	48		50-I	50-II	50-III	52-I	52-II	53-I	54-II	61-I	61-II	61-III	62-I
			Mar-23	Apr-23	Apr-23	Apr-23	Mar-23	Mar-23	Mar-23	Mar-23	Sep-23	Mar-23	Mar-23	Mar-23	Apr-23	Apr-23	Apr-23	Mar-23	Mar-23	Mar-23	Mar-23	Mar-23
General/Inorganic Parameters																						
Alkalinity	mg/L	30-500 *	269	153	202	253	370	273	185	**570**	**651**	220	308	193	255	336	318	272	176	189	270	279
Aluminum	mg/L	0.1 *								<0.025												
Ammonia (as N)	mg/L		0.2	22.3	1.1	0.1	4.9	0.2	0.1	0.6	1.4	0.2	0.2	0.1	2.6	0.1	0.2	0.2	0.3	0.1	0.1	5.3
Anion sum	meq/L		6.15	496	5.47	6.62	40.4	7.67	4.49	12.2	14.6	7.6	14.2	6.09	35.7	27	6.8	7.55	4.54	5.35	5.62	73.5
Arsenic	mg/L	0.010 **	<0.0005	<0.005	<0.0005	<0.0005	0.006	0.0012	<0.0005	0.0016	0.0008	<0.0005	0.0009	<0.0005	<0.0005	<0.0005	0.0019	<0.0005	<0.0005	0.0015	<0.0005	<0.0005
Barium	mg/L	1 **								0.113												
Beryllium	mg/L									<0.0005												
Bicarbonate	mg/L		268	153	201	252	369	272	184	570	651	219	307	192	254	336	317	271	174	186	269	278
Boron	mg/L	5 **								0.007												
Cadmium	mg/L	0.005 **								<0.0001												
Calcium	mg/L		78.9	1780	54.3	101	104	93.1	77.2	190	197	74.5	117	69.1	169	332	97.2	120	20.1	27	87.6	205
Carbonate	mg/L		<1	<1	1	<1	1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	2	3	1	<1
Cation sum	meq/L		6.32	437	6.67	7.52	37.9	7.82	4.36	11.2	14.2	7.28	12.4	5.43	37.9	25.9	6.32	7.14	4.35	5.12	5.25	66.3
Chemical Oxygen Demand	mg/L		<10	<400	<10	<10	160	30	20	20	20	20	<10	20	<250	70	<10	20	<10	<10	10	530
Chloride	mg/L	250 *	4.3	**17500**	37.6	12	**1180**	60.8	9.9	19.2	67	96.9	**255**	62	**1090**	**650**	0.7	47.8	17.1	44.9	10.5	**2400**
Chromium	mg/L	0.05 **								<0.0005												
Cobalt	mg/L									0.0006												
Conductivity	µS/cm		565	56000	536	602	4900	692	439	1080	1350	783	1440	594	4520	2600	547	691	447	525	519	9820
Conductivity - field	µS/cm		552	43100	540	612	4440	731	434	1150	1190	767	1400	588	4220	2740	613	707	440	512	522	8150
Copper	mg/L	1 *								<0.0005												
Dissolved Organic Carbon	mg/L	5 *	1.5	<1.0	1.0	<1.0	1.2	1.7	4.2	**5.6**	**6.4**	**5.1**	2.0	4.2	<1.0	<1.0	2.6	**5.1**	1.4	1.9	3.3	<1.0
Hardness	mg/L	80-100 *	**299**	**9470**	**253**	**356**	**532**	**356**	**208**	**522**	**556**	**245**	**431**	**205**	**850**	**1140**	**304**	**319**	**132**	**166**	**247**	**1100**
Ion Percentage	%		1.31	6.26	9.91	6.37	3.22	1	1.5	4.51	1.52	2.15	7.13	5.73	2.99	2.15	3.66	2.73	2.16	2.17	3.33	5.14
Iron	mg/L	0.3 *	**0.307**	**0.408**	**0.476**	<0.005	**0.67**	0.184	0.011	**6.48**	**7.54**	0.031	**1.15**	0.007	**1.28**	0.019	0.148	0.008	<0.005	<0.005	<0.005	0.091
Lead	mg/L	0.01 **								<0.0005												
Magnesium	mg/L		24.8	1220	28.5	25.3	66.1	30.1	3.63	11.6	15.5	14.4	33.8	7.79	104	75.3	14.8	4.75	19.8	23.9	6.85	142
Manganese	mg/L	0.05 *	0.0084	**0.103**	0.0079	0.0012	0.0240	0.0215	0.0009	**0.651**	**0.380**	0.0222	0.0277	0.0021	**0.0532**	**0.282**	0.0161	0.001	0.0024	<0.0005	<0.0005	0.0279
Molybdenum	mg/L									<0.0005												
Nickel	mg/L									<0.002												
Nitrate	mg/L	10.0 **	<0.05	<5.0	<0.05	2.63	<0.5	<0.05	5.5	<0.05	<0.05	<0.05	<0.05	0.88	<0.5	0.06	<0.05	<0.05	0.19	0.76	0.37	<0.5
Nitrite	mg/L	1.0 **	<0.05	<5.0	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5
pH	units		7.59	7.35	7.81	7.61	7.47	7.49	7.5	6.61	6.77	7.76	7.5	7.74	7.4	7	7.32	7.47	8.05	8.17	7.64	7.4
pH - field	units		7.26	6.98	7.83	7.69	6.97	7.21	7.21	6.42	6.37	7.45	7.11	7.39	7.25	6.9	6.93	7.16	7.94	7.86	7.3	7.24
Phenols	µg/L		<1	6	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02				0.17	<0.02	<0.02	<0.02	<0.02							<0.02	0.25		<0.02	<0.02
Phosphorus - Dissolved	mg/L			<3.0	<0.03	<0.03						<0.03	<0.03	<0.03	<0.3	<0.03	<0.03					
Phosphorus	mg/L		<0.02	0.37	<0.01	<0.01	0.17	<0.01	0.02	<0.02	<0.02	0.02	<0.01	0.02	0.02	0.01	<0.02	0.02	0.26	0.39	<0.01	<0.02
Potassium	mg/L		1.8	101	3.3	1.1	20	2.7	<0.5	0.5	1.6	4.4	3.1	1.4	16.9	2.6	1.2	<0.5	3.2	1.9	<0.5	32.6
Sodium	mg/L	200 *	5.6	**5580**	32.7	7.4	**605**	13.2	4.4	14.7	66.8	51.2	82.5	29.6	**463**	68	4.1	16.9	36.5	39.6	6.8	**989**
Sulphate	mg/L	500 *	39.7	<20	24.2	57.4	<2.0	32.3	11.7	31.1	7.0	29.4	52.9	26.5	1.3	107	30.0	45.0	30.6	17.8	3.4	22.9
Temperature - field	°C		8	7.9	7.7	4.7	8.8	8	3.8	7.4	14.3	8.8	7.6	2	7.7	5.9	7.2	5.6	9	8.5	6.3	8
Total Dissolved Solids	mg/L	500 *	350	**26900**	370	360	**2390**	440	310	**710**	**820**	390	**790**	330	**2260**	**1760**	380	410	260	240	280	**4710**
Total Kjeldahl Nitrogen	mg/L		<0.3	22	0.8	<2.0	5.9	<0.3	<0.3	0.8	1.4	0.4	<0.3	<0.3	3.3	<0.3	<0.3	0.8	<0.3	<0.3	<0.3	6.1
Zinc	mg/L	5 *								<0.005												
Detected VOC Parameters																						
1,1-Dichloroethane	µg/L									<0.5												
1,4-Dichlorobenzene	µg/L	1 *, 5 **								<0.5												
Benzene	µg/L	1 **								0.6												
Chlorobenzene	µg/L	30 *, 80 **								<0.5												
cis-1,2-Dichloroethylene	µg/L									<0.5												
Ethyl Benzene	µg/L	1.6 *, 140 **								<0.5												
m/p-Xylenes	µg/L	20 *, 90 **								<0.5												
Toluene	µg/L	24 *, 60 **								<0.5												
Xylenes - total	µg/L	20 *, 90 **								<0.5												

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	62-II		63-I		63-II		63-III		64-I	64-II	66-I	66-II	66-III		70-I / 113-I	70-II / 113-II	70-II / 113-III	74-II	74-III		75-I	
			Mar-23	Sep-23	Apr-23	Sep-23	Apr-23	Sep-23	Apr-23	Sep-23	Apr-23	Apr-23	Mar-23	Mar-23	Mar-23	Sep-23	Mar-23	Mar-23	Mar-23	Mar-23	Mar-23	Sep-23	Apr-23	Sep-23
General/Inorganic Parameters																								
Alkalinity	mg/L	30-500 *	285	447	289	291	220	216	200	214	265	223	**592**	**1200**	**595**	**902**	163	279	311	173	249		487	498
Aluminum	mg/L	0.1 *			<0.025		<0.025		0.051						<0.025								<0.025	
Ammonia (as N)	mg/L		0.2	<0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.2	0.1	1	14.3	12.8	22.2	1	0.1	0.1	0.2	0.2		0.5	0.7
Anion sum	meq/L		7.31	10.7	7.95	7.9	5.29	5.19	6.69	7.04	8.97	4.56	14.5	28.3	14.7	19.5	3.8	9.61	8.36	4.83	4.98		13.3	13
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	0.0038	0.004	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	0.0057	**0.0282**	**0.0311**	<0.0005	0.0007	<0.0005	0.0010	0.0007		0.0009	0.0010
Barium	mg/L	1 **			0.091		0.104		0.032						0.278								0.220	
Beryllium	mg/L				<0.0005		<0.0005		<0.0005						<0.0005								<0.0005	
Bicarbonate	mg/L		284	446	285	286	219	215	199	213	264	222	591	1200	595	902	160	278	310	171	248		482	495
Boron	mg/L	5 **			0.616		0.020		<0.005						0.335								1.56	
Cadmium	mg/L	0.005 **			<0.0001		<0.0001		<0.0001						<0.0001								<0.0001	
Calcium	mg/L		118	171	7.8	7.4	61.7	59.2	130	131	51.1	70.1	145	230	181	272	21.6	121	105	34.8	84.6		30.9	28.1
Carbonate	mg/L		<1	<1	4	4	1	1	<1	<1	1	<1	<1	<1	<1	<1	3	<1	<1	2	<1		5	3
Cation sum	meq/L		7.19	11	8.82	8.5	6.21	5.35	7.14	7.25	7.99	4.24	18.1	26.1	14.3	23.5	3.68	9.79	8.62	4.96	5.07		14.7	12.1
Chemical Oxygen Demand	mg/L		20	20	<10	20	60	20	<10	20	<10	<10	50	90	50	80	20	<10	10	<10	<10		30	20
Chloride	mg/L	250 *	27.9	26.4	65.3	63.4	9.5	9.6	11.5	11.6	98	2.2	104	171	82	73.7	10.3	106	33.6	21	3.9		99.6	98.8
Chromium	mg/L	0.05 **			<0.0005		<0.0005		<0.0005						<0.0005								<0.0005	
Cobalt	mg/L				<0.0005		0.0015		<0.0005						0.0014								<0.0005	
Conductivity	µS/cm		667	942	804	745	495	494	648	705	869	424	1370	2620	1390	1780	373	957	780	443	454		1180	1280
Conductivity - field	µS/cm		706	884	799	669	488	409	664	592	869	430	1320	2340	1410	1610	358	923	763	478	474	588		1040
Copper	mg/L	1 *			0.0005		<0.0005		0.0005						<0.0005								0.0027	
Dissolved Organic Carbon	mg/L	5 *	**5.3**	**6.3**	1.2	3.8	<1.0	3.2	1.6	3.4	1.3	1.9	**14.8**	**29.1**	**9.5**	**25.2**	1.6	2.4	3.8	1.9	2.9		4.6	2.3
Hardness	mg/L	80-100 *	**318**	**481**	27.1	24.8	**287**	**247**	**349**	**353**	**241**	**206**	**604**	**837**	**524**	**811**	81.6	**403**	**385**	**155**	**244**		**176**	**129**
Ion Percentage	%		0.85	1.37	5.16	3.64	8.02	1.5	3.26	1.5	5.76	3.68	11.1	4.04	1.54	9.22	1.52	0.95	1.54	1.37	0.82		5.27	3.34
Iron	mg/L	0.3 *	0.056	**0.40**	0.012	0.15	**0.306**	**0.310**	0.066	<0.05	0.007	0.039	**7.38**	**23.2**	**16.2**	**40.3**	0.012	**1.48**	<0.005	0.019	**0.428**		0.163	0.070
Lead	mg/L	0.01 **			<0.0005		<0.0005		<0.0005						<0.0005								<0.0005	
Magnesium	mg/L		5.67	13.2	1.85	1.54	32.3	24	5.87	6.32	27.5	7.55	58.8	63.7	17.6	31.9	6.71	24.6	29.8	16.6	7.89		23.9	14.4
Manganese	mg/L	0.05 *	0.0372	**0.0702**	<0.0005	0.021	0.0123	0.011	0.0043	<0.001	0.0006	0.0123	**0.0829**	**0.151**	**0.819**	**0.77**	0.0036	0.0209	0.0494	0.0082	**0.0766**		0.007	0.003
Molybdenum	mg/L				<0.0005		0.0007		<0.0005						0.0011								0.0007	
Nickel	mg/L				<0.002		<0.002		<0.002						0.004								0.002	
Nitrate	mg/L	10.0 **	0.1	<0.05	0.25	0.05	<0.05	<0.05	**29.1**	**30.3**	0.66	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	<0.05		<0.05	0.07
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		<0.05	<0.05
pH	units		7.45	7.22	8.18	8.22	7.73	7.7	7.61	7.6	7.74	7.49	6.97	6.74	6.82	6.7	8.33	7.42	7.45	8.11	7.56		8.04	7.81
pH - field	units		7.25	6.78	8.25	7.95	7.76	7.4	7.7	7.16	7.41	7.18	6.76	6.53	6.63	6.42	7.82	7.03	7.06	7.76	7.17	6.79		7.38
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1		<1	<1
Phosphate	mg/L		<0.02	0.03		0.03		<0.02		<0.02			0.14	0.1	<0.02	<0.02	<0.02	<0.02		0.1	<0.02			<0.02
Phosphorus - Dissolved	mg/L				<0.03		<0.03		<0.03		<0.03	<0.03							<0.02				<0.03	
Phosphorus	mg/L		0.02	<0.02	0.03	0.03	<0.01	<0.02	<0.01	<0.02	<0.01	<0.02	0.09	0.03	0.08	<0.02	<0.02	<0.02	<0.02	0.15	<0.02		0.03	0.08
Potassium	mg/L		<0.5	1.2	3.6	4.2	1.5	2.2	<0.5	0.6	6.6	<0.5	6.6	26.2	13.4	20.7	4.9	2.4	1.4	1.7	<0.5		8.1	8.6
Sodium	mg/L	200 *	18.4	29.2	**238**	181	8.8	7.3	3.1	3.5	68.1	2.2	132	175	58	118	42.5	37.4	19.4	41	3.8		**252**	**213**
Sulphate	mg/L	500 *	48.2	60.7	24.2	23.1	36.8	35.6	20.0	19.5	49.6	8.9	6.0	13.4	44.4	0.5	17.0	58.9	67.0	42.5	2.8		49.7	26.6
Temperature - field	°C		4.2	13.6	8.6	10.2	8.8	9.5	4.8	13.8	5.4	3.5	8.8	8	6.2	12.4	7.9	8.6	5.2	8.5	4.6	12.6		9.4
Total Dissolved Solids	mg/L	500 *	460	**550**	490	470	240	320	450	**580**	**520**	330	**790**	**1320**	**820**	**970**	260	**580**	500	240	260		**826**	**730**
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<2.0	<0.3	<0.3	<0.3	2	26.6	17	24.1	<2.0	<0.3	2.2	<0.3	<0.3		2.1	0.9
Zinc	mg/L	5 *			<0.005		<0.005		<0.005						<0.005								<0.005	
Detected VOC Parameters																								
1,1-Dichloroethane	µg/L				<0.5		<0.5		<0.5						<0.5							<0.5	<0.5	
1,4-Dichlorobenzene	µg/L	1 *, 5 **			<0.5		<0.5		<0.5						0.5							<0.5	<0.5	
Benzene	µg/L	1 **			<0.5		<0.5		<0.5						**1.8**							<0.5	<0.5	
Chlorobenzene	µg/L	30 *, 80 **			<0.5		<0.5		<0.5						<0.5							<0.5	<0.5	
cis-1,2-Dichloroethylene	µg/L				<0.5		<0.5		<0.5						<0.5							<0.5	<0.5	
Ethyl Benzene	µg/L	1.6 *, 140 **			<0.5		<0.5		<0.5						<0.5							<0.5	<0.5	
m/p-Xylenes	µg/L	20 *, 90 **			<0.5		<0.5		<0.5						<0.5							<0.5	<0.5	
Toluene	µg/L	24 *, 60 **			<0.5		<0.5		<0.5						<0.5							<0.5	<0.5	
Xylenes - total	µg/L	20 *, 90 **			<0.5		<0.5		<0.5						<0.5							<0.5	<0.5	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, °C - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	75-II		76-I	77-I	81-I		81-II		81-III		84-I		84-II		85-I		85-II		86-I		86-II	
			Apr-23	Sep-23	Apr-23	Apr-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23
General/Inorganic Parameters																								
Alkalinity	mg/L	30-500 *	221	291	209	254	**530**	**619**	**786**	**816**	**765**	**735**	130	136	No	262	230	229	279	222	245	253	195	194
Aluminum	mg/L	0.1 *	<0.025				<0.025		<0.025		<0.025		<0.025		Sample		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.1	0.1	20.2	0.1	0.6	0.3	0.2	0.2	0.6	3.4	0.2	0.3		0.3	0.1	<0.1	0.4	0.2	1.4	1.5	0.1	0.1
Anion sum	meq/L		5.13	8.02	500	8.6	13.7	15.7	16.4	17.1	15.1	14.4	5.90	6.47	Well	6.57	17.2	19.7	19.3	22.2	11.3	13.1	4.31	4.27
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.005	0.0007	0.0008	0.0006	0.0007	0.0018	0.002	0.001	<0.0005	0.0005	Damaged	0.0013	<0.0005	<0.0005	0.0008	0.0009	<0.0005	<0.0005	0.0022	0.0024
Barium	mg/L	1 **	0.028				**1.91**		0.167		0.111		0.098				0.291		0.089		0.012		0.234	
Beryllium	mg/L		<0.0005				<0.0005		<0.0005		<0.0005		<0.0005				<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		220	290	209	253	529	617	785	815	765	735	129	135		261	230	229	279	222	244	252	193	193
Boron	mg/L	5 **	<0.005				0.233		0.043		0.005		0.493				0.012		0.228		0.249		0.063	
Cadmium	mg/L	0.005 **	<0.0001				<0.0001		<0.0001		<0.0001		<0.0001				<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		84.8	119	2190	115	72.4	72.6	188	213	184	250	22.8	23.0		66.9	228	232	213	289	59.7	72.7	20.8	25.6
Carbonate	mg/L		<1	<1	<1	<1	1	2	<1	<1	<1	<1	1	1		<1	<1	<1	<1	<1	1	<1	2	1
Cation sum	meq/L		5.45	8.38	474	9.3	14	14.5	16.5	19.3	10.6	14.4	6.52	6.54		6.32	19.5	20.4	19.0	24.4	10.6	13.8	3.96	4.69
Chemical Oxygen Demand	mg/L		<10	20	430	<10	10	20	20	20	50	40	20	20		<10	<10	20	20	20	<10	10	10	<10
Chloride	mg/L	250 *	24.5	71.2	**17600**	94.4	110	120	20.6	23.4	5.4	5	120	136		9.7	**385**	**471**	**388**	**582**	189	**252**	15.6	15.7
Chromium	mg/L	0.05 **	<0.0005				<0.0005		<0.0005		<0.0005		<0.0005				<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005				<0.0005		0.0005		<0.0005		<0.0005				<0.0005		0.0007		<0.0005		<0.0005	
Conductivity	µS/cm		446	770	42000	758	1220	1210	1360	1510	906	1210	663	717		617	1770	1980	1930	2530	1320	1410	412	428
Conductivity - field	µS/cm		476	658	77800	801	1310	1190	1520	1420	943	1180	742	653		553	1850	1880	2020	2120	2570	1470	454	449
Copper	mg/L	1 *	0.0005				<0.0005		<0.0005		0.0006		<0.0005				0.0007		<0.0005		<0.0005		0.0005	
Dissolved Organic Carbon	mg/L	5 *	3.0	3.8	1.5	1.8	3.2	**6.3**	**5.6**	**6.4**	**12.9**	**8.3**	3.0	3.8		2.6	1.2	2.4	3.6	2.8	1.3	<1.0	1.5	<1.0
Hardness	mg/L	80-100 *	**240**	**339**	**10600**	**424**	**597**	**626**	**704**	**831**	**512**	**691**	**108**	**104**		**298**	**709**	**710**	**663**	**928**	**308**	**372**	**162**	**194**
Ion Percentage	%		3.08	2.2	2.7	3.95	1.29	4.01	0.21	6.09	17.7	0.17	5.02	0.56		1.93	6.39	1.81	0.85	4.66	3.42	2.53	4.25	4.61
Iron	mg/L	0.3 *	0.267	0.060	**2.77**	**0.885**	0.175	0.080	**0.383**	**4.05**	**8.13**	**34.2**	0.068	0.168		**1.1**	<0.005	<0.005	**1.60**	**1.45**	0.006	0.026	0.071	0.078
Lead	mg/L	0.01 **	<0.0005				<0.0005		<0.0005		<0.0005		<0.0005				<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		6.78	10.2	1240	33.2	101	108	57	72.7	12.8	16.3	12.4	11.4		31.7	34.0	31.8	31.8	50.1	38.7	46.2	26.8	31.5
Manganese	mg/L	0.05 *	0.0163	0.004	**0.166**	0.0244	0.0159	0.0129	**0.067**	**0.065**	**0.475**	**1.05**	0.0047	0.0209		**0.0828**	0.0123	0.0076	**0.318**	**0.225**	0.0020	0.0018	0.0012	0.0007
Molybdenum	mg/L		<0.0005				0.0005		0.0013		<0.0005		0.0071				<0.0005		0.001		<0.0005		0.0012	
Nickel	mg/L		<0.002				<0.002		0.003		<0.002		<0.002				<0.002		0.003		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.05	0.12	<5.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		2.01	3.5	3.4	<0.05	1.04	<0.05	<0.05	0.08	<0.05
Nitrite	mg/L	1.0 **	<0.05	<0.05	<5.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		0.14	<0.05	<0.05	<0.05	0.1	<0.05	<0.05	<0.05	<0.05
pH	units		7.53	7.46	7.06	7.43	7.37	7.47	6.88	6.84	6.7	6.58	8.04	7.91		7.53	7.30	7.34	7.17	7.34	7.69	7.62	8.04	7.89
pH - field	units		7.18	6.92	6.46	7.28	7.03	6.93	6.67	6.27	6.38	6.12	7.77	7.70		7.19	7.16	6.99	6.98	6.99	7.25	7.22	8.04	7.56
Phenols	µg/L		<1	<1	9	<1	<1	<1	<1	<1	7	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L			<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02		<0.02		<0.02
Phosphorus - Dissolved	mg/L		<0.03		<3.0	<0.03															<0.03		<0.03	
Phosphorus	mg/L		0.01	<0.02	0.08	0.02	0.02	<0.02	<0.02	<0.02	0.06	0.03	<0.02	0.04		<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02
Potassium	mg/L		<0.5	1.2	140	1.6	6.8	6.2	4.8	5.4	0.9	2.2	2.2	3.2		1.8	9.8	10.0	8.4	6.6	7.1	8.2	1.9	2.1
Sodium	mg/L	200 *	14.7	35.5	**5880**	17	41.4	37.9	49.9	55.5	4.9	6.2	98.3	99.8		6.1	115	135	125	128	94	138	14.5	16.6
Sulphate	mg/L	500 *	7.7	18.1	<20	49.2	16.5	14.9	28.9	29.6	6.7	0.9	<0.2	0.4		51.5	77.3	82.3	143	68.8	60.3	54.2	4.5	3.8
Temperature - field	°C		4.2	12.2	11.3	6.5	8.9	12.6	8.6	12.5	8.1	15.4	7.8	11.8		11.0	9.6	10.6	7.5	12.4	8.9	13.9	7.2	12.9
Total Dissolved Solids	mg/L	500 *	260	480	**31700**	**540**	**880**	**690**	**1040**	**920**	**590**	**750**	390	330		350	**1250**	**1480**	**1350**	**1180**	**600**	**760**	210	260
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	20.3	<0.3	0.6	<0.3	<0.3	<0.3	1.2	4.3	<0.3	0.4		<0.3	<0.3	<0.3	0.5	<0.3	2.2	3.1	<0.3	<0.3
Zinc	mg/L	5 *	<0.005				<0.005		<0.005		<0.005		0.0007				<0.005		<0.005		<0.005		<0.005	
Detected VOC Parameters																								
1,1-Dichloroethane	µg/L		<0.5				<0.5		0.6		<0.5		<0.5				<0.5		<0.5		<0.5		<0.5	
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5				<0.5		<0.5		**6.0**		<0.5				<0.5		<0.5		<0.5		<0.5	
Benzene	µg/L	1 **	<0.5				<0.5		<0.5		**1.6**		<0.5				<0.5		<0.5		<0.5		<0.5	
Chlorobenzene	µg/L	30 *, 80 **	<0.5				<0.5		<0.5		2		<0.5				<0.5		<0.5		<0.5		<0.5	
cis-1,2-Dichloroethylene	µg/L		<0.5				<0.5		1		<0.5		<0.5				<0.5		<0.5		<0.5		<0.5	
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5				<0.5		<0.5		0.6		<0.5				<0.5		<0.5		<0.5		<0.5	
m/p-Xylenes	µg/L	20 *, 90 **	<0.5				<0.5		<0.5		6.1		<0.5				<0.5		<0.5		<0.5		<0.5	
Toluene	µg/L	24 *, 60 **	<0.5				<0.5		<0.5		4.5		<0.5				<0.5		<0.5		<0.5		<0.5	
Xylenes - total	µg/L	20 *, 90 **	<0.5				<0.5		<0.5		6.4		<0.5				<0.5		<0.5		<0.5		<0.5	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	86-III		87-I		87-II		87-III		88-I		88-II		88-III		89-I		89-II		89-III		91-I	
			Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23
General/Inorganic Parameters																								
Alkalinity	mg/L	30-500 *	325	291	193	205	250	262	312	480	211	215	257	241	219	232	305	304	103	102	320	300	179	176
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.1	0.4	0.4	0.2	0.2	0.1	0.1	0.3	0.3	0.2	0.2	0.1	<0.1	1.0	1.0	0.2	0.1	0.2	<0.1	0.2	<0.1
Anion sum	meq/L		19.6	11.5	4.42	5.30	6.06	6.34	6.86	10.00	4.64	4.80	8.60	7.21	12.60	9.16	12.9	12.3	2.23	2.21	6.97	6.83	4.97	5.02
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.0007	<0.0005	0.0015	<0.0005	<0.0005	0.0007	0.0012	0.0008	0.0010	0.0017	0.0021	0.0028	0.0031	<0.0005	<0.0005	0.0014	0.0006
Barium	mg/L	1 **	0.662		0.166		0.124		0.071		0.163		0.070		0.054		0.081		0.038		0.037		0.082	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		324	290	191	204	249	261	311	479	208	214	256	240	218	231	303	303	101	101	319	299	178	175
Boron	mg/L	5 **	0.157		0.0586		0.0291		0.0073		0.115		0.182		0.0474		0.800		0.105		0.006		0.023	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		142.0	105.0	32.3	36.3	68.2	79.8	119	160	43.4	51.1	103.0	91.4	140.0	91.5	21.7	29.4	8.6	9.2	124	138	54.7	53.3
Carbonate	mg/L		<1	<1	2	1	1	<1	<1	<1	3	1	1	<1	<1	<1	2	1	1	1	<1	<1	1	1
Cation sum	meq/L		20.9	13.7	4.70	5.58	6.30	6.89	7.22	10.20	5.03	5.61	9.04	8.06	13.50	9.91	12.6	14.9	2.30	2.50	6.79	7.76	5.37	5.22
Chemical Oxygen Demand	mg/L		<10	20	10	<10	<10	<10	10	10	<10	<10	<10	<10	<10	<10	40	30	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	**456**	195	4.8	23.6	9.5	9.1	17.6	11.1	3.9	4.7	4.6	6.0	7.9	5.5	247	228	8.3	8.3	9.2	8.8	15.0	17.2
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		2070	1220	382	533	550	607	580	889	405	472	715	686	1120	831	1300	1320	203	223	581	597	488	489
Conductivity - field	µS/cm		2110	1080	419	474	576	553	666	822	447	430	767	630	1100	752	1870	1250	236	234	660	606	504	450
Copper	mg/L	1 *	<0.0005		<0.0005		<0.0005		0.0013		<0.0005		<0.0005		0.0009		<0.0005		<0.0005		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	1.1	<1.0	1.6	1.0	3.3	1.2	2.8	2.1	1.2	<1.0	1.1	<1.0	1.5	<1.0	**6.5**	1.1	2.0	1.1	2.4	1.4	1.2	2.4
Hardness	mg/L	80-100 *	**658**	**454**	**206**	**240**	**295**	**324**	**342**	**483**	**215**	**237**	**423**	**369**	**642**	**468**	**108**	**129**	37.8	40.6	**330**	**377**	**244**	**237**
Ion Percentage	%		3.10	8.75	3.11	2.55	1.95	4.13	2.60	0.60	4.07	7.74	2.48	5.59	3.59	3.89	1.28	9.46	1.52	6.09	1.29	6.33	3.84	1.97
Iron	mg/L	0.3 *	0.021	0.015	0.065	0.129	**0.441**	**0.494**	0.022	**0.836**	0.020	0.223	**1.62**	**1.81**	0.011	<0.005	0.113	0.090	0.035	0.052	<0.005	<0.005	0.233	0.006
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		73.8	46.7	30.4	36.3	30.3	30.4	10.8	20.2	25.8	26.6	40.2	34.2	71.1	50.0	13.0	13.4	3.97	4.28	4.85	7.87	26.2	25.2
Manganese	mg/L	0.05 *	0.0072	0.0086	0.0055	0.0075	0.0164	0.0176	0.0091	**0.0721**	0.0010	0.0080	0.0264	0.0273	<0.0005	0.0062	0.0086	0.0098	0.0028	0.0035	<0.0005	<0.0005	0.0153	0.0020
Molybdenum	mg/L		<0.0005		0.0013		0.0006		<0.0005		<0.0005		0.0006		0.0006		0.0027		0.0036		<0.0005		0.0012	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.25	0.12	<0.05	<0.05	<0.05	<0.05	0.3	0.8	0.25	0.27	<0.05	<0.05	0.21	<0.05	<0.05	<0.05	<0.05	<0.05	2.4	5.3	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units		7.23	7.47	8.02	7.82	7.66	7.52	7.43	7.19	8.11	7.80	7.69	7.56	7.63	7.56	7.92	7.64	8.19	8.05	7.34	7.29	7.80	7.81
pH - field	units		7.04	7.08	7.62	7.36	7.22	7.05	7.04	6.68	7.68	7.39	7.25	7.07	7.28	7.11	7.41	7.40	8.04	7.91	6.91	6.87	7.24	7.40
Phenols	µg/L		<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																							
Phosphorus	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		3.3	2.8	2.0	1.9	1.7	1.7	0.5	1.2	3.1	3.3	3.0	3.0	3.3	3.8	7.2	7.5	<0.5	0.6	0.5	0.9	1.6	1.7
Sodium	mg/L	200 *	173	103	10.9	15.2	7.1	7.0	8.1	10.1	14.0	16.8	10.3	12.6	12.0	9.0	**233**	**277**	35.1	38.2	3.7	4.1	9.1	9.4
Sulphate	mg/L	500 *	23.3	17.5	26.4	32.2	45.9	48.7	14.5	18.5	20.5	23.6	168	114	390	217	1.1	0.8	0.3	0.3	16.7	19.4	52.2	54.1
Temperature - field	°C		5.4	14.2	8.7	10.6	8.9	10.8	4.9	14.9	8.4	9.8	8.2	9.9	6.4	12.4	7.1	10.1	6.4	9.4	5.8	9.9	7.2	11.5
Total Dissolved Solids	mg/L	500 *	**1250**	**680**	230	350	380	370	420	**530**	280	280	**520**	440	**840**	**540**	**840**	**690**	70	140	400	390	340	240
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	0.3	0.3	0.2	<0.3	0.1	<0.3	1.1	1.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Zinc	mg/L	5 *	<0.005		<0.0005		<0.0005		0.001		0.0012		<0.0005		0.0007		<0.005		<0.005		<0.005		<0.005	
Detected VOC Parameters																								
1,1-Dichloroethane	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Benzene	µg/L	1 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Chlorobenzene	µg/L	30 *, 80 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
cis-1,2-Dichloroethylene	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
m/p-Xylenes	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Toluene	µg/L	24 *, 60 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Xylenes - total	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	91-II		91-III		92-I		92-II		92-III		93-I		93-II		94-I		94-II		95-I		95-II	
			Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23
General/Inorganic Parameters																								
Alkalinity	mg/L	30-500 *	444	420	225	I	255	246	213	216	400	459	199	196	291	413	195	196	327	330	207	215	270	239
Aluminum	mg/L	0.1 *	<0.025		<0.025	N	0.039		<0.025		<0.025		<0.025		0.036		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.1	0.2	S	0.1	0.5	0.2	<0.1	0.2	0.6	0.2	0.2	0.1	<0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2
Anion sum	meq/L		11.8	10.2	4.88	U	6.44	6.08	5.17	5.32	14.4	14.3	5.07	5.05	7.53	10.3	5.21	5.33	8.56	8.87	6.03	6.36	8.45	7.20
Arsenic	mg/L	0.010 **	0.0005	0.0015	<0.0005	F	<0.0005	0.0035	0.0012	0.0023	0.0022	0.0066	0.0008	0.001	<0.0005	<0.0005	0.0018	0.0022	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0014
Barium	mg/L	1 **	0.119		0.027	F	0.046		0.125		0.084		0.238		0.064		0.058		0.142		0.056		0.107	
Beryllium	mg/L		<0.0005		<0.0005	I	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		443	419	224	C	254	245	211	215	399	459	197	195	290	412	193	195	326	329	206	214	269	238
Boron	mg/L	5 **	0.066		<0.005	I	0.0642		0.810		0.339		0.0264		0.0046		0.0424		0.0228		0.0120		0.0080	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001	E	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		190	164	90.8	N	109	96.2	48.7	52.5	190	194	62.4	60.2	128	178	61.9	64.0	140	140	89.0	83.6	119	107
Carbonate	mg/L		<1	<1	<1	T	1	<1	2	1	<1	<1	2	<1	1	<1	2	<1	1	<1	<1	<1	<1	<1
Cation sum	meq/L		12.7	10.8	4.90		6.86	7.08	5.69	5.94	15.4	15.5	5.18	5.22	7.71	10.8	5.56	5.60	9.51	9.41	6.48	6.19	8.63	7.53
Chemical Oxygen Demand	mg/L		<10	20	<10	V	<10	10	<10	<10	40	30	<10	<10	<10	10	<10	<10	<10	<10	10	30	10	<10
Chloride	mg/L	250 *	53.4	36.1	9.8	O	19.2	12.8	14.7	16.4	76.3	58.6	9.9	9.7	12.4	29.6	10.7	12.2	22.7	23.7	17.1	20.5	75.8	40.9
Chromium	mg/L	0.05 **	<0.0005		<0.0005	L	<0.0005		<0.0005		0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		0.0059		<0.0005	U	<0.0005		<0.0005		0.0037		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		990	861	439	M	555	582	475	508	1120	1310	446	479	674	866	482	498	757	767	548	605	841	700
Conductivity - field	µS/cm		1020		483	E	627	603	509	487	1360	1250	478	434	723	863	503	457	807	751	590	547	847	637
Copper	mg/L	1 *	0.0014		<0.0005		0.001		0.0007		<0.0005		<0.0005		0.0013		<0.0005		0.0009		0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	2.8	4.4	2.0		3.0	2.5	<1.0	1.0	**12.3**	**6.7**	<1.0	2.9	2.5	**5.4**	1.5	2.5	1.5	2.9	1.1	2.6	2.0	3.1
Hardness	mg/L	80-100 *	**577**	**493**	**237**		**303**	**320**	**239**	**252**	**617**	**613**	**238**	**238**	**371**	**519**	**257**	**259**	**451**	**446**	**308**	**294**	**387**	**354**
Ion Percentage	%		3.81	2.59	0.23		3.15	7.59	4.73	5.47	3.41	3.99	1.07	1.71	1.21	2.1	3.22	2.50	5.25	2.92	3.62	1.34	1.02	2.22
Iron	mg/L	0.3 *	0.159	**0.320**	<0.005		0.081	0.230	0.011	0.031	**2.73**	**4.93**	**0.365**	**0.757**	0.019	<0.005	**0.350**	**0.517**	<0.005	0.031	0.257	0.247	0.046	**0.508**
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		24.8	20.2	2.52		7.46	19.3	28.4	29.3	34.5	31.2	20	21.3	12.5	18.1	24.8	24.0	24.6	23.3	20.9	20.6	21.9	21.1
Manganese	mg/L	0.05 *	**0.458**	**0.523**	<0.0005		0.0027	**0.161**	0.0009	0.0187	**0.844**	**0.882**	0.0128	0.0127	0.002	<0.0005	0.0103	0.0105	0.0006	0.0100	0.0216	0.0229	**0.196**	**0.134**
Molybdenum	mg/L		0.0006		<0.0005		<0.0005		0.0025		0.0009		<0.0005		<0.0005		0.001		<0.0005		0.0006		0.0007	
Nickel	mg/L		0.002		<0.002		<0.002		<0.002		0.006		<0.002		<0.002		<0.002		<0.002		<0.002		0.008	
Nitrate	mg/L	10.0 **	<0.05	<0.05	0.06		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.64	0.13	<0.05	<0.05	0.47	0.67	<0.05	<0.05	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units		7.23	7.36	7.65		7.78	7.39	7.99	7.74	7.25	6.99	7.97	7.66	7.65	7.11	7.98	7.65	7.58	7.33	7.55	7.55	7.29	7.53
pH - field	units		6.92		7.20		7.28	7	7.58	7.31	6.86	6.57	7.47	7.22	7.11	6.69	7.50	7.41	7.04	6.93	7.29	7.23	7.10	7.19
Phenols	µg/L		<1	<1	<1		<1	11	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																							
Phosphorus	mg/L		<0.02	<0.02	<0.02		<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		1.3	1.3	<0.5		0.7	2.2	2.7	2.7	20	25.9	1.2	1.3	1.3	2.3	1.4	1.3	1.2	1.4	1.8	1.7	1.5	2.2
Sodium	mg/L	200 *	25.3	19.2	3.2		17.5	13.0	18.4	18.5	58.0	58.1	8.0	9.0	5.3	7.1	7.9	8.1	9.7	9.7	5.2	5.6	18.4	8.0
Sulphate	mg/L	500 *	81.0	51.5	11.9		46.3	46.0	30.6	32.8	217	183	45.2	47.2	72.2	72	54.5	57.2	75.0	85.1	73.9	77.9	52.6	68.4
Temperature - field	°C		8.3		6.5		10.2	15.1	10.6	16.4	9.4	20.2	7.8	8.5	3.4	13.2	7.6	8.9	4.0	13.0	8.4	9.5	3.0	13.5
Total Dissolved Solids	mg/L	500 *	**660**	500	240		350	350	320	300	**830**	**800**	320	180	500	390	300	260	490	380	380	320	470	370
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	<0.3		<0.3	0.5	<0.3	<0.3	1	3.6	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Zinc	mg/L	5 *	<0.005		<0.005		0.0015		<0.0005		<0.0005		<0.0005		0.0024		0.0009		0.0009		<0.005		<0.005	
Detected VOC Parameters																								
1,1-Dichloroethane	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Benzene	µg/L	1 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Chlorobenzene	µg/L	30 *, 80 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
cis-1,2-Dichloroethylene	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
m/p-Xylenes	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Toluene	µg/L	24 *, 60 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Xylenes - total	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	101-I	101-II	101-III	104-I		104-II		104-III		106-I		106-II		106-III		107-I		107-II		107-III	
			Mar-23	Mar-23	Mar-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23
General/Inorganic Parameters																							
Alkalinity	mg/L	30-500 *	166	131	410	290	286	292	298	240	477	170	242	280	253	221	374	288	292	292	302	268	329
Aluminum	mg/L	0.1 *				<0.025		0.034		<0.025		<0.025		<0.025		<0.025		0.089		<0.025		<0.025	
Ammonia (as N)	mg/L		0.7	0.1	0.1	0.1	<0.1	<0.1	<0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.6	1.0	0.1	<0.1	0.2	<0.1
Anion sum	meq/L		4.57	3.46	8.27	7.40	7.52	7.32	7.63	12.70	16.50	4.5	10.7	20.6	20.5	38.9	25.3	8.86	9.60	7.85	8.74	9.17	9.23
Arsenic	mg/L	0.010 **	0.0012	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **				0.199		0.058		0.111		0.053		0.123		0.449		0.099		0.082		0.061	
Beryllium	mg/L					<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		165	130	409	289	285	290	297	239	477	169	241	279	252	220	373	287	291	291	301	267	328
Boron	mg/L	5 **				0.276		0.0122		0.0466		0.0397		0.0257		0.0140		0.336		0.0160		0.0090	
Cadmium	mg/L	0.005 **				<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		23.6	13.5	140	90.6	97.3	92.6	102.0	222	306	61	169	170	186	327	197	91.9	71.9	122	135	116	138
Carbonate	mg/L		1	1	<1	1	<1	2	1	<1	<1	1	<1	<1	<1	<1	<1	1	1	<1	<1	<1	<1
Cation sum	meq/L		4.84	3.67	8.64	7.71	8.12	7.71	8.20	12.8	17.7	5.19	12.90	21.2	21.2	38.1	26.0	8.21	9.78	8.26	9.01	7.85	9.57
Chemical Oxygen Demand	mg/L		10	20	<10	<10	10	<10	10	20	20	50	<10	10	<10	20	20	<10	<10	<10	<10	<10	10
Chloride	mg/L	250 *	2.7	10.3	0.8	12.9	13.3	8.9	9.5	6.6	2.6	26	156	**487**	**500**	**1200**	**596**	74.5	118	33.2	56.1	53.1	59.4
Chromium	mg/L	0.05 **				<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L					<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		452	348	687	626	730	615	713	1020	1430	420	1110	2460	2370	4570	2570	826	972	733	733	700	880
Conductivity - field	µS/cm		476	353	709	700	668	687	666	1110	1300	453	1020	2230	2040	4520	2500	837	937	760	753	727	791
Copper	mg/L	1 *				0.0006		0.0012		0.0017		<0.0005		0.0009		0.0015		<0.0005		<0.0005		0.0007	
Dissolved Organic Carbon	mg/L	5 *	3.3	2.1	2.4	2.4	1.6	1.2	1.1	**5.3**	**6.0**	1.3	<1.0	1.7	<1.0	1.6	1.7	1.6	2.8	1.2	2.8	1.5	3.7
Hardness	mg/L	80-100 *	**103**	83.5	**410**	**335**	**353**	**359**	**387**	**616**	**844**	**209**	**532**	**573**	**623**	**919**	**586**	**311**	**278**	**378**	**415**	**359**	**422**
Ion Percentage	%		2.94	2.96	2.19	2.08	3.85	2.61	3.59	0.32	3.42	7.32	9.14	1.58	1.65	1.12	1.55	3.85	0.95	2.53	1.49	7.71	1.78
Iron	mg/L	0.3 *	0.049	0.012	0.027	0.060	0.019	0.019	0.019	0.016	**0.604**	0.174	**0.542**	**0.547**	0.24	0.010	**0.944**	0.260	0.241	<0.005	<0.005	0.040	0.229
Lead	mg/L	0.01 **				<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		10.6	12.1	14.7	26.3	26.7	31.1	32.2	15.0	19.4	13.6	26.7	36.1	38.4	24.80	22.90	19.9	23.9	17.9	18.8	16.8	18.7
Manganese	mg/L	0.05 *	0.0111	<0.0005	0.0011	0.0108	0.0015	0.0011	0.0011	0.0076	**0.4440**	0.0112	0.0177	0.0228	0.0121	0.0007	**0.0760**	0.0398	0.0213	0.0017	0.0014	0.0220	0.0116
Molybdenum	mg/L					0.0009		0.0016		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L					<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.05	0.29	<0.05	0.1	0.3	3.1	3.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	0.71	<0.05	<0.05	0.7	0.5	0.1	<0.05
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units		7.9	8.04	7.37	7.69	7.57	7.95	7.57	7.41	6.99	7.86	7.52	7.51	7.48	7.38	7.33	7.73	7.73	7.44	7.43	7.41	7.28
pH - field	units		7.95	7.91	6.97	7.12	7.12	7.34	7.08	6.99	6.49	7.49	7.04	7.09	7.01	7.04	6.90	7.43	7.47	7.18	7.10	7.24	6.96
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	<0.03					
Phosphorus	mg/L		0.03	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		4.2	1.6	2	4.3	4.2	2.9	3.0	6.9	12.0	1.7	2.7	3.7	3.5	1.7	2.5	4.1	7.1	1.6	1.7	0.7	1.4
Sodium	mg/L	200 *	60.3	44.5	8.1	20.1	21.2	9.5	7.7	5.8	10.1	21.5	49.3	**221**	197	**451**	**327**	41.5	90.7	14.2	14.9	14.3	24.7
Sulphate	mg/L	500 *	61.4	29.3	15.0	68.1	76.3	57.6	66.2	378	346	21.9	79.6	68.4	71.8	41.2	56.6	57.3	30.1	58.2	61.7	119	57.4
Temperature - field	°C		7.7	8.2	6.6	7.1	12.6	6.6	14.3	4.4	14.6	9.7	11.2	8.4	12.7	4.8	18.0	8.2	12.0	8.3	9.9	3.6	14.1
Total Dissolved Solids	mg/L	500 *	290	250	500	420	490	400	460	**700**	**990**	250	**600**	**1310**	**1400**	**2510**	**1470**	500	**520**	450	470	430	**510**
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.4	<0.3	<0.3	0.1	<0.3	0.2	<0.3	0.6	1.0	<0.3	<0.3	<0.3	<0.3
Zinc	mg/L	5 *				0.0028		0.0027		<0.0005		<0.0005		0.0015		0.002		<0.005		<0.005		<0.005	
Detected VOC Parameters																							
1,1-Dichloroethane	µg/L					<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
1,4-Dichlorobenzene	µg/L	1 *, 5 **				<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Benzene	µg/L	1 **				<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Chlorobenzene	µg/L	30 *, 80 **				<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
cis-1,2-Dichloroethylene	µg/L					<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Ethyl Benzene	µg/L	1.6 *, 140 **				<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
m/p-Xylenes	µg/L	20 *, 90 **				<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Toluene	µg/L	24 *, 60 **				<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Xylenes - total	µg/L	20 *, 90 **				<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	108-I		108-II		108-III		109-I		109-II		109-III		110-I		110-II		110-III		111-I	
			Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23
General/Inorganic Parameters																						
Alkalinity	mg/L	30-500 *	205	210	181	185	492	439	150	148	230	238	483	**538**	193	199	251	262	494	**528**	209	204
Aluminum	mg/L	0.1 *	0.053		0.085		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.2	0.1	<0.1	0.1	<0.1	0.2	0.2	0.1	<0.1	1.1	3.2	0.2	0.2	0.1	<0.1	0.1	<0.1	0.7	0.7
Anion sum	meq/L		4.81	4.95	4.68	4.83	11.4	10.8	3.44	3.41	6.6	6.59	18.7	17.3	5.44	5.59	8.97	8.97	18.1	20.3	4.82	4.88
Arsenic	mg/L	0.010 **	0.0018	0.0016	<0.0005	<0.0005	<0.0005	<0.0005	0.0040	0.0052	0.0007	0.0007	<0.0005	0.0006	0.0027	0.0032	0.0009	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.119		0.081		0.131		0.084		0.072		0.151		0.066		0.049		0.121		0.775	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		202	208	178	183	491	438	148	146	229	237	483	537	192	198	250	261	493	528	200	201
Boron	mg/L	5 **	0.0958		0.150		0.0192		0.0760		0.0350		0.173		0.0280		0.020		0.0140		0.440	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		25.9	24.6	36.8	37.4	190	206	20.1	23.8	86.4	92.7	290	258	59.3	59.7	117	123	245	252	11.3	27.3
Carbonate	mg/L		3	2	3	2	<1	<1	2	2	1	1	<1	<1	1	<1	<1	<1	<1	<1	9	3
Cation sum	meq/L		5.21	5.23	5.12	5.25	12.5	13.2	3.72	3.92	7.11	7.19	20.1	18.8	6.08	6.02	9.34	9.21	20.2	20.4	4.71	5.74
Chemical Oxygen Demand	mg/L		<10	20	<10	<10	<10	10	<10	<10	<10	<10	20	20	<10	<10	<10	<10	20	20	20	20
Chloride	mg/L	250 *	5.9	6.6	11.1	12.2	18.5	25.1	1.1	1.4	17.2	17.3	67.0	62.9	11.7	12.4	84.4	70.7	109	124	17.4	18.5
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0026		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		403	464	405	481	934	1110	304	329	602	635	1510	1560	491	518	837	853	1530	1620	411	481
Conductivity - field	µS/cm		449	422	459	442	1020	1010	309	303	617	583	1630	1450	515	490	863	803	1630	1630	453	439
Copper	mg/L	1 *	0.001		0.0011		<0.0005		<0.0005		0.0005		0.0016		<0.0005		<0.0005		0.0006		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	<1.0	<1.0	1.2	<1.0	2.5	1.5	1.2	<1.0	1.9	1.0	**6.4**	3.8	1.3	2.4	1.7	3.0	4.5	**6.2**	1.4	<1.0
Hardness	mg/L	80-100 *	**229**	**228**	**205**	**211**	**601**	**638**	**138**	**147**	**321**	**335**	**884**	**769**	**277**	**273**	**437**	**433**	**856**	**866**	51.3	90.9
Ion Percentage	%		4	2.71	4.45	4.13	4.44	9.83	3.88	6.97	3.7	4.36	3.68	4.09	5.48	3.69	1.99	1.28	5.32	0.29	1.12	8.11
Iron	mg/L	0.3 *	0.143	0.109	0.089	0.044	<0.005	<0.005	0.009	0.015	0.034	0.173	0.012	**2.13**	**0.440**	**0.393**	**0.451**	0.228	0.005	0.007	0.014	0.025
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		39.9	40.4	27.5	28.5	30.7	29.9	21.3	21.2	25.5	25.2	38.8	30.2	31.4	30.2	35.1	30.5	59.3	57.5	5.61	5.52
Manganese	mg/L	0.05 *	0.0085	0.0059	0.007	0.002	0.0102	0.0241	0.0043	0.0048	0.0101	0.0179	**0.811**	**0.974**	0.012	0.0136	0.0169	0.0219	<0.0005	<0.0005	0.0048	0.0079
Molybdenum	mg/L		0.0015		0.0034		<0.0005		0.0023		0.0125		<0.0005		0.0011		0.0007		<0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		0.009		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.05	<0.05	0.66	0.71	<0.05	<0.05	<0.05	<0.05	3.5	0.8	<0.05	<0.05	<0.05	<0.05	0.46	0.83	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units		8.18	8.08	8.19	7.94	7.24	7.12	8.22	8.11	7.71	7.68	6.98	7.00	7.82	7.73	7.49	7.39	7.16	6.96	8.66	8.24
pH - field	units		7.79	7.76	7.86	7.68	6.86	6.70	8.04	7.89	7.47	7.22	6.71	6.60	7.63	7.42	7.19	6.99	7.12	6.7	8.14	7.92
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																					
Phosphorus	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	0.02
Potassium	mg/L		2.1	2.1	2.2	2.2	1.2	1.4	1.3	1.4	3.2	2.4	3.7	4.9	1.6	1.7	2.2	2.1	2.4	2.8	3.6	3.6
Sodium	mg/L	200 *	12.1	12.9	21.2	21.8	8.6	8.8	20.5	21.1	13.3	9.1	50.2	70.1	10.1	10.5	11.5	10.6	67.1	67.2	81.4	86.8
Sulphate	mg/L	500 *	32.7	33.7	41.6	43.7	63.6	76.6	24.4	24.5	80.2	72.0	345	245	66.3	66.7	83.6	91.9	263	312	13.8	19.8
Temperature - field	°C		10.2	11.9	7.9	15.7	6.0	15.1	11.7	13.1	10.5	12.9	8.8	15.4	10.6	12.6	10.6	12.7	6.5	15	10.3	11.7
Total Dissolved Solids	mg/L	500 *	280	330	240	270	**620**	**630**	190	200	400	410	**1110**	**1000**	370	330	**590**	490	**1060**	**1190**	310	300
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	1.5	3.5	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0.7	0.6
Zinc	mg/L	5 *	0.0006		0.0012		<0.0005		<0.005		<0.005		<0.005		<0.005		<0.005		<0.005		0.001	
Detected VOC Parameters																						
1,1-Dichloroethane	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Benzene	µg/L	1 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Chlorobenzene	µg/L	30 *, 80 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
cis-1,2-Dichloroethylene	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
m/p-Xylenes	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		0.6		<0.5		<0.5		<0.5		<0.5		<0.5	
Toluene	µg/L	24 *, 60 **	<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5		<0.5	
Xylenes - total	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		0.8		<0.5		<0.5		<0.5		<0.5		<0.5	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.4
2023 Groundwater Chemical Results
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	111-II		111-III		112-I		112-II		112-III	
			Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23
General/Inorganic Parameters												
Alkalinity	mg/L	30-500 *	168	169	409	438	216	209	328	331	244	257
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		0.069	
Ammonia (as N)	mg/L		0.1	0.2	0.1	<0.1	0.2	0.2	0.1	0.1	0.1	<0.1
Anion sum	meq/L		4.02	4.10	10.6	11.9	5.60	5.48	10.8	11.0	8.61	8.79
Arsenic	mg/L	0.010 **	0.0017	0.0018	<0.0005	<0.0005	0.0042	0.0034	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.108		0.127		0.130		0.150		0.073	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		165	167	408	437	214	207	327	330	242	255
Boron	mg/L	5 **	0.0822		0.0325		0.0286		0.0518		0.0770	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		28.4	33.1	167	212	63.3	62.9	173	187	98	101
Carbonate	mg/L		2	2	1	<1	2	2	1	<1	2	2
Cation sum	meq/L		4.12	4.48	10.8	13.6	5.91	5.88	11.1	11.6	8.91	9.26
Chemical Oxygen Demand	mg/L		<10	<10	20	<10	<10	<10	20	20	20	20
Chloride	mg/L	250 *	5.4	6.0	41.8	58.1	15.3	15.9	43.4	45.4	56.6	55.6
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		352	399	922	1140	489	535	908	1040	758	857
Conductivity - field	µS/cm		384	365	991	1040	521	490	1000	965	820	784
Copper	mg/L	1 *	<0.0005		0.0006		<0.0005		0.0012		0.0014	
Dissolved Organic Carbon	mg/L	5 *	1.1	<1.0	1.7	1.4	2.2	1.7	**6.9**	**5.1**	**5.2**	3.2
Hardness	mg/L	80-100 *	**162**	**177**	**475**	**595**	**276**	**274**	**521**	**552**	**416**	**432**
Ion Percentage	%		1.21	4.41	0.90	6.80	2.69	3.51	1.35	2.91	1.76	2.62
Iron	mg/L	0.3 *	0.108	0.092	<0.005	<0.005	**0.500**	0.228	<0.005	0.018	0.051	0.005
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		22.0	22.8	14.2	16.0	28.6	28.5	21.6	20.7	41.5	43.6
Manganese	mg/L	0.05 *	0.0057	0.0061	0.0033	0.0326	0.0099	0.0059	0.0036	0.0066	0.0056	0.0030
Molybdenum	mg/L		0.0022		<0.0005		0.0009		<0.0005		0.0023	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.05	0.07	<0.05	0.09	4.1	4.4	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units		8.20	7.98	7.50	7.12	7.94	7.93	7.52	7.31	7.99	7.82
pH - field	units		7.79	7.64	6.93	6.70	7.54	7.58	7.02	6.96	7.42	7.39
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L											
Phosphorus	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		1.2	1.3	1.2	1.6	2.2	2.2	1.4	1.4	3.1	3.2
Sodium	mg/L	200 *	19.1	20.1	28.6	37.7	6.6	6.7	13.3	12.3	10.8	11.4
Sulphate	mg/L	500 *	29.8	31.7	73.6	84.7	47.4	47.3	140	144	110	108
Temperature - field	°C		10.2	11.7	8.6	12.7	10.2	13.2	10.8	12.9	8.2	17.0
Total Dissolved Solids	mg/L	500 *	240	260	**590**	**670**	320	320	**610**	**610**	**520**	470
Total Kjeldahl Nitrogen	mg/L		0.1	<0.3	0.1	<0.3	<0.3	<0.3	0.5	<0.3	<0.3	<0.3
Zinc	mg/L	5 *	<0.0005		<0.0005		<0.0005		0.0009		0.0018	
Detected VOC Parameters												
1,1-Dichloroethane	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5	
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5		<0.5		<0.5		<0.5		<0.5	
Benzene	µg/L	1 **	<0.5		<0.5		<0.5		<0.5		<0.5	
Chlorobenzene	µg/L	30 *, 80 **	<0.5		<0.5		<0.5		<0.5		<0.5	
cis-1,2-Dichloroethylene	µg/L		<0.5		<0.5		<0.5		<0.5		<0.5	
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5		<0.5		<0.5		<0.5		<0.5	
m/p-Xylenes	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		<0.5	
Toluene	µg/L	24 *, 60 **	<0.5		<0.5		<0.5		<0.5		<0.5	
Xylenes - total	µg/L	20 *, 90 **	<0.5		<0.5		<0.5		<0.5		<0.5	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius, meq/L - milliequivalents per litre, mV - millivolt
5) Blank indicates parameter was not analyzed
6) Bolded and shaded values exceed ODWQS.
7) Only VOC parameters with detections are shown

TABLE 5.5
2023 Leachate Indicator Parameter Comparison - Overburden
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Parameter:	Alkalinity	Ammonia	Boron	COD	Chloride	Iron	Manganese	Phosphorus	Potassium	Sodium	TKN
Leachate Range - SFA:*	**1590 - 4290**	**53 - 290**	**2.31 - 6.84**	**120 - 1070**	**179 - 1120**	**3.21 - 73.4**	**0.282 - 0.922**	**0.3 - 3.37**	**97.2 - 337**	**3 - 877**	**68 - 670**
Leachate Range - NFA:*	**716 - 2900**	**-**	**0.68 - 1.74**	**50 - 1510**	**9.7 - 1430**	**0.35 - 7.27**	**0.115 - 1.27**	**0.25 - 3.16**	**38 - 392**	**6 - 1130**	**20.8 - 467**
Reference Quality Range - 44-III:**	**170 - 260**	**0.03 - 1.1**	**<0.01 - 0.03**	**0.34 - 41.6**	**3.71 - 43.3**	**0.005 - 0.9**	**<0.001 - 0.334**	**<0.002 - 0.5**	**0.54 - 3.7**	**4.39 - 56**	**<0.1 - 1.92**
Reference Quality Range - 88-III:**	**184 - 257**	**<0.1 - 0.3**	**0.0221 - 0.62**	**<10 - 50**	**2.8 - 13.2**	**0.008 - 1.81**	**0.0011 - 0.0273**	**<0.02 - 0.05**	**1.77 - 3.0**	**2.57 - 12.6**	**<0.1 - 3.1**
Cell 1 - South											
5-VI	248 - 359	0.1 - 0.2	-	10	1.0 - 1.5	<0.005 - 0.551	<0.0005 - 0.253	<0.02 - 0.03	<0.5 - 1	2.4 - 2.6	<0.3
18B	438 - 554	0.4 - 0.6	0.076	20	90.4 - 98.8	0.486 - 1.66	0.175 - 0.340	0.01 - <0.02	1.6 - 2.9	35.2 - 56.1	0.5 - 0.9
19B	671 - 836	2.4 - 11	0.167	60 - 70	233 - 567	11.6 - 40.1	0.472 - 0.662	<0.02 - 0.02	7.8 - 12.2	144 - 236	4.1 - 12.5
20B	240 - 335	<0.1 - 0.1	0.009	10 - 20	6.6 - 7.5	0.013 - 0.27	0.0014 - 0.142	<0.01 - <0.02	<0.5	8.5 - 11.7	<2.0 - 2.2
52-II	336	0.1	-	70	650	0.019	0.282	0.01	2.6	68.0	<0.3
54-II	272	0.2	-	20	47.8	0.008	0.001	0.02	<0.5	16.9	0.8
62-II	285 - 447	<0.1 - 0.2	-	20	26.4 - 27.9	0.056 - 0.40	0.0372 - 0.0702	<0.02 - 0.02	<0.5 - 1.2	18.4 - 29.2	<0.3
64-II	223	0.1	-	<10	2.2	0.039	0.0123	<0.02	<0.5	2.2	<0.3
Cell 1 - North - East Side											
48	570 - 651	0.6 - 1.4	0.007	20	19.2 - 67.0	6.48 - 7.54	0.380 - 0.651	<0.02	0.5 - 1.6	14.7 - 66.8	0.8 - 1.4
46-II	273	0.2	-	30	60.8	0.184	0.0215	<0.01	2.7	13.2	<0.3
46-III	185	0.1	-	20	9.9	0.011	0.0009	0.02	<0.5	4.4	<0.3
50-II	308	0.2	-	<10	255	1.15	0.0277	<0.01	3.1	82.5	<0.3
50-III	193	0.1	-	20	62	0.007	0.0021	0.02	1.4	29.6	<0.3
61-III	270	0.1	-	10	10.5	<0.005	<0.0005	<0.01	<0.5	6.8	<0.3
63-II	216 - 220	0.2	0.020	20 - 60	9.5 - 9.6	0.306 - 0.310	0.011 - 0.0123	<0.01 - <0.02	1.5 - 2.2	7.3 - 8.8	<0.3
63-III	200 - 214	0.1 - 0.2	<0.005	<10 - 20	11.5 - 11.6	<0.05 - 0.066	<0.001 - 0.0043	<0.01 - <0.02	<0.5 - 0.6	3.1 - 3.5	<0.3 - <2.0
74-II	173	0.2	-	<10	21.0	0.019	0.0082	0.15	1.7	41.0	<0.3
74-III	249	0.2	-	<10	3.9	0.428	0.0766	<0.02	<0.5	3.8	<0.3
75-II	221 - 291	0.1	<0.005	<10 - 20	24.5 - 71.2	0.060 - 0.267	0.004 - 0.0163	0.01 - <0.02	<0.5 - 1.2	14.7 - 35.5	<0.3
81-II	786 - 816	0.2	0.043	20	20.6 - 23.4	0.383 - 4.05	0.065 - 0.067	<0.02	4.8 - 5.4	49.9 - 55.5	<0.3
81-III	735 - 765	0.6 - 3.4	0.005	40 - 50	5.0 - 5.4	8.13 - 34.2	0.475 - 1.05	0.03 - 0.06	0.9 - 2.2	4.9 - 6.2	1.2 - 4.3
Cell 1 - North - North Side											
33-II	381	0.1	-	20	43.8	0.032	0.0107	<0.02	1.4	54.2	0.4
33-III	391	0.1	-	20	34.4	<0.005	0.0056	<0.02	1.2	41.4	<0.3
66-II	1200	14.3	-	90	171	23.2	0.151	0.03	26.2	175	26.6
66-III	595 - 902	12.8 - 22.2	0.335	50 - 80	73.7 - 82.0	16.2 - 40.3	0.770 - 0.819	<0.02 - 0.08	13.4 - 20.7	58.0 - 118	17.0 - 24.1
77-I	254	0.1	-	<10	94.4	0.885	0.0244	0.02	1.6	17.0	<0.3
70-II / 113-II	279	0.1	-	<10	106	1.48	0.0209	<0.02	2.4	37.4	<0.3
70-III / 113-III	311	0.1	-	10	33.6	<0.005	0.0494	<0.02	1.4	19.4	2.2
Cell 1 - North - North and West Side											
40-II	257	0.1	-	20	5.5	0.017	0.0305	<0.02	1.6	8.5	<0.3
101-II	131	0.1	-	20	10.3	0.012	<0.0005	0.03	1.6	44.5	<0.3
101-III	410	0.1	-	<10	0.8	0.027	0.0011	<0.02	2.0	8.1	<0.3

NOTES: 1) Selected leachate indicator parameters are shown.
2) Units are in mg/L.
3) Blank indicates parameter not analyzed.
* - Leachate range from SFA Holding Tank (2006-2023) and Holding Tank NFA (2011-2023).
** - Reference Quality Range from fresh overburden wells 88-III (2006-2023) and 44-III (1989-2023).

TABLE 5.5
2023 Leachate Indicator Parameter Comparison - Overburden
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Parameter:	Alkalinity	Ammonia	Boron	COD	Chloride	Iron	Manganese	Phosphorus	Potassium	Sodium	TKN
Leachate Range - SFA:*	**1590 - 4290**	**53 - 290**	**2.31 - 6.84**	**120 - 1070**	**179 - 1120**	**3.21 - 73.4**	**0.282 - 0.922**	**0.3 - 3.37**	**97.2 - 337**	**3 - 877**	**68 - 670**
Leachate Range - NFA:*	**716 - 2900**	**-**	**0.68 - 1.74**	**50 - 1510**	**9.7 - 1430**	**0.35 - 7.27**	**0.115 - 1.27**	**0.25 - 3.16**	**38 - 392**	**6 - 1130**	**20.8 - 467**
Reference Quality Range - 44-III:**	**170 - 260**	**0.03 - 1.1**	**<0.01 - 0.03**	**0.34 - 41.6**	**3.71 - 43.3**	**0.005 - 0.9**	**<0.001 - 0.334**	**<0.002 - 0.5**	**0.54 - 3.7**	**4.39 - 56**	**<0.1 - 1.92**
Reference Quality Range - 88-III:**	**184 - 257**	**<0.1 - 0.3**	**0.0221 - 0.62**	**<10 - 50**	**2.8 - 13.2**	**0.008 - 1.81**	**0.0011 - 0.0273**	**<0.02 - 0.05**	**1.77 - 3.0**	**2.57 - 12.6**	**<0.1 - 3.1**
North Fill Area											
84-I	130 - 136	0.2 - 0.3	0.493	20	120 - 136	0.068 - 0.168	0.0047 - 0.0209	<0.02 - 0.04	2.2 - 3.2	98.3 - 99.8	<0.3 - 0.4
84-II	262	0.3	-	<10	9.7	1.1	0.0828	<0.02	1.8	6.1	<0.3
85-I	229 - 230	<0.1 - 0.1	0.012	<10 - 20	385 - 471	<0.005	0.0076 - 0.0123	<0.02	9.8 -10.0	115 - 135	<0.3
85-II	222 - 279	0.2 - 0.4	0.228	20	388 - 582	1.45 - 1.60	0.225 - 0.318	<0.02	6.6 - 8.4	125 - 128	<0.3 - 0.5
86-II	194 - 195	0.1	0.063	<10 - 10	15.6 - 15.7	0.071 - 0.078	0.0007 - 0.0012	<0.01 - <0.02	1.9 - 2.1	14.5 - 16.6	<0.3
86-III	291 - 325	0.1 - 0.2	0.157	<10 - 20	195 - 456	0.015 - 0.021	0.0072 - 0.0086	<0.02	2.8 - 3.3	103 - 173	<0.3
87-II	250 - 262	0.2	0.0291	<10	9.1 - 9.5	0.441 - 0.494	0.0164 - 0.0176	<0.02 - 0.03	1.7	7.0 - 7.1	<0.3 - 0.4
87-III	312 - 480	0.1	0.0073	10	11.1 - 17.6	0.022 - 0.836	0.0721 - 0.0091	<0.02	0.5 - 1.2	8.1 - 10.1	<0.3
88-II	241 - 257	0.2	0.182	<10	4.6 - 6.0	1.62 - 1.81	0.0264 - 0.0273	<0.02	3.0	10.3 - 12.6	0.2 - <0.3
89-II	102 - 103	0.1 - 0.2	0.105	<10	8.3	0.035 - 0.052	0.0028 - 0.0035	<0.02	<0.5 - 0.6	35.1 - 38.2	<0.3
89-III	300 - 320	<0.1 - 0.2	0.006	<10	8.8 - 9.2	<0.005	<0.0005	<0.02	0.5 - 0.9	3.7 - 4.1	<0.3
91-II	420 - 444	0.1 - 0.2	0.066	<10 - 20	36.1 - 53.4	0.159 - 0.320	0.0458 - 0.523	<0.02	1.3	19.2 - 25.3	<0.3
91-III	225	0.2	<0.005	<10	9.8	<0.005	<0.0005	<0.02	<0.5	3.2	<0.3
92-II	213 - 216	<0.1 - 0.2	0.810	<10	14.7 - 16.4	0.011 - 0.031	0.0009 - 0.0187	<0.02	2.7	18.4 - 18.5	<0.3
92-III	400 - 459	0.2 - 0.6	0.339	30 - 40	58.6 - 76.3	2.73 - 4.93	0.844 - 0.882	<0.02	20.0 - 25.9	58.0 - 58.1	1.0 - 3.6
93-I	196 - 199	0.2	0.0264	<10	9.7 - 9.9	0.365 - 0.757	0.0127 - 0.0128	<0.02	1.2 - 1.3	8.0 - 9.0	<0.3
93-II	291 - 413	<0.1 - 0.1	0.0046	<10 - 10	12.4 - 29.6	<0.005 - 0.019	<0.0005 - 0.002	<0.02	1.3 - 2.3	5.3 - 7.1	<0.3
94-I	195 - 196	0.2	0.0424	<10	10.7 - 12.2	0.350 - 0.517	0.0103 - 0.0105	<0.02	1.3 - 1.4	7.9 - 8.1	<0.3
94-II	327 - 330	0.1	0.0228	<10	22.7 - 23.7	<0.005 - 0.031	0.0006 - 0.0100	<0.02	1.2 - 1.4	9.7	<0.3
95-I	207 - 215	0.1 - 0.2	0.0120	10 - 30	17.1 - 20.5	0.247 - 0.257	0.0216 - 0.0229	<0.02	1.7 - 1.8	5.2 - 5.6	<0.3
95-II	239 - 270	0.2	0.0080	<10 - 10	40.9 - 75.8	0.046 - 0.508	0.134 - 0.196	<0.02	1.5 - 2.2	8.0 - 18.4	<0.3
104-II	292 - 298	<0.1	0.0122	<10 - 10	8.9 - 9.5	0.019	0.0011	<0.02	2.9 - 3.0	7.7 - 9.5	<0.3
104-III	240 - 477	0.1 - 0.2	0.0466	20	2.6 - 6.6	0.016 - 0.604	0.0076 - 0.444	<0.02 - 0.02	6.9 - 12.0	5.8 - 10.1	<0.3 - 0.4
106-II	253 - 280	0.1	0.0257	<10 - 10	487 - 500	0.240 - 0.547	0.0121 - 0.0228	<0.02	3.5 - 3.7	197 - 221	0.1 - <0.3
106-III	221 - 374	0.1	0.0140	20	596 - 1200	0.010 - 0.944	0.0007 - 0.0760	<0.02	1.7 - 2.5	327 - 451	0.2 - <0.3
107-II	292 - 302	<0.1 - 0.1	0.0160	<10	33.2 - 56.1	<0.005	0.0014 - 0.0017	<0.02	1.6 - 1.7	14.2 - 14.9	<0.3
107-III	268 - 329	<0.1 - 0.2	0.0090	<10 - 10	53.1 - 59.4	0.040 - 0.229	0.0116 - 0.0220	<0.02	0.7 - 1.4	14.3 - 24.7	<0.3
108-I	205 - 210	0.2	0.0958	<10 - 20	5.9 - 6.6	0.109 - 0.143	0.0059 - 0.0085	<0.02 - 0.02	2.1	12.1 - 12.9	<0.3
108-II	181 - 185	<0.1 - 0.1	0.150	<10	11.1 - 12.2	0.044 - 0.089	0.002 - 0.007	<0.02	2.2	21.2 - 21.8	<0.3
108-III	439 - 492	<0.1 - 0.1	0.0192	<10 - 10	18.5 - 25.1	<0.005	0.0102 - 0.0241	<0.02	1.2 - 1.4	8.6 - 8.8	<0.3
109-I	148 - 150	0.2	0.0760	<10	1.1 - 1.4	0.009 - 0.015	0.0043 - 0.0048	<0.02	1.3 - 1.4	20.5 - 21.1	<0.3
109-II	230 - 238	<0.1 - 0.1	0.0350	<10	17.2 - 17.3	0.034 - 0.173	0.0101 - 0.0179	<0.02	2.4 - 3.2	9.1 - 13.3	<0.3
109-III	483 - 538	1.1 - 3.2	0.173	20	62.9 - 67.0	0.012 - 2.13	0.811 - 0.974	<0.02	3.7 - 4.9	50.2 - 70.1	1.5 - 3.5
110-I	193 - 199	0.2	0.0280	<10	11.7 - 12.4	0.393 - 0.440	0.0120 - 0.0136	<0.02	1.6 - 1.7	10.1 - 10.5	<0.3
110-II	251 - 262	<0.1 - 0.1	0.0200	<10	70.7 - 84.4	0.228 - 0.451	0.0169 - 0.0219	<0.02	2.1 - 2.2	10.6 - 11.5	<0.3
110-III	494 - 528	<0.1 - 0.1	0.0140	20	109 - 124	0.005 - 0.007	<0.0005	<0.02	2.4 - 2.8	67.1 - 67.2	<0.3
111-I	204 - 209	0.7	0.440	20	17.4 - 18.5	0.014 - 0.025	0.0048 - 0.0079	0.02 - 0.04	3.6	81.4 - 86.8	0.6 - 0.7
111-II	168 - 169	0.1 - 0.2	0.0822	<10	5.4 - 6.0	0.092 - 0.108	0.0057 - 0.0061	<0.02	1.2 - 1.3	19.1 - 20.1	0.1 - <0.3
111-III	409 - 438	<0.1 - 0.1	0.0325	<10 - 20	41.8 - 58.1	<0.005	0.0033 - 0.0326	<0.02	1.2 - 1.6	28.6 - 37.7	0.1 - <0.3
112-I	209 - 216	0.2	0.0286	<10	15.3 - 15.9	0.228 - 0.500	0.0059 - 0.0099	<0.02	2.2	6.6 - 6.7	<0.3
112-II	328 - 331	0.1	0.0518	20	43.4 - 45.4	<0.005 - 0.018	0.0036 - 0.0066	<0.02	1.4	12.3 - 13.3	<0.3 - 0.5
112-III	244 - 257	<0.1 - 0.1	0.0770	20	55.6 - 56.6	0.005 - 0.051	0.0030 - 0.0056	<0.02	3.1 - 3.2	10.8 - 11.4	<0.3

NOTES: 1) Selected leachate indicator parameters are shown.
2) Units are in mg/L.
3) Blank indicates parameter not analyzed.
* - Leachate range from SFA Holding Tank (2006-2023) and Holding Tank NFA (2011-2023).
** - Reference Quality Range from fresh overburden wells 88-III (2006-2023) and 44-III (1989-2023).

TABLE 5.6
2023 Leachate Indicator Parameter Comparison - Fresh Bedrock
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Parameter:	Alkalinity	Ammonia	Boron	COD	Chloride	Iron	Manganese	Phosphorus	Potassium	Sodium	TKN
Leachate Range - SFA:*	**1590 - 4290**	**53 - 290**	**2.31 - 6.84**	**120 - 1070**	**179 - 1120**	**3.21 - 73.4**	**0.282 - 0.922**	**0.3 - 3.37**	**97.2 - 337**	**3 - 877**	**68 - 670**
Leachate Range - NFA:*	**716 - 2900**	**-**	**0.68 - 1.74**	**50 - 1510**	**9.7 - 1430**	**0.35 - 7.27**	**0.115 - 1.27**	**0.25 - 3.16**	**38 - 392**	**6 - 1130**	**20.8 - 467**
Reference Quality Range - 88-I:**	**178 - 237**	**<0.1 - 0.4**	**0.09 - 0.18**	**<10 - 50**	**0.7 - 4.7**	**<0.05 - 0.342**	**<0.001 - 0.021**	**<0.02 - 0.03**	**2.51 - 3.57**	**9.39 - 36.3**	**<0.1 - 2.8**
Reference Quality Range - 101-I:**	**80 - 229**	**0.05 - 1.3**	**-**	**4 - 134**	**1.6 - 130**	**0.01 - 0.51**	**0.001 - 0.017**	**<0.01 - 0.09**	**1.69 - 6.93**	**30.1 - 69.9**	**<0.1 - 2.8**
Cell 1 - South											
5-V	223 - 226	0.1 - 0.2	-	20 - 210	8.7 - 8.8	0.022 - 0.431	0.0007 - 0.0305	<0.02 - 0.03	1.9 - 2.4	9.7 - 12.4	<0.3 - <2.0
53-I	318	0.2	-	<10	0.7	0.148	0.0161	<0.02	1.2	4.1	<0.3
Cell 1 - North - East Side											
63-I	289 - 291	0.1 - 0.3	0.616	<10 - 20	63.4 - 65.3	0.012 - 0.150	<0.0005 - 0.021	0.03	3.6 - 4.2	181 - 238	<0.3
81-I	530 - 619	0.3 - 0.6	0.233	10 - 20	110 - 120	0.080 - 0.175	0.0129 - 0.0159	<0.02 - 0.02	6.2 - 6.8	37.9 - 41.4	<0.3 - 0.6
Cell 1 - North - North Side											
70-I / 113-I	163	1.0	-	20	10.3	0.012	0.0036	<0.02	4.9	42.5	<2.0
Cell 1 - North - North and West Side											
41-II	269	0.2	-	<10	4.3	0.307	0.0084	<0.02	1.8	5.6	<0.3
North Fill Area											
87-I	193 - 205	0.4	0.0586	<10 - 10	4.8 - 23.6	0.065 - 0.129	0.0055 - 0.0075	<0.02	1.9 - 2.0	10.9 - 15.2	<0.3
91-I	176 - 179	<0.1 - 0.2	0.023	<10	15.0 - 17.2	0.006 - 0.233	0.0020 - 0.0153	<0.02	1.6 - 1.7	9.1 - 9.4	<0.3
92-I	246 - 255	0.1 - 0.5	0.0642	<10 - 10	12.8 - 19.2	0.081 - 0.230	0.0027 - 0.161	<0.02 - 0.04	0.7 - 2.2	13.0 - 17.5	<0.3 - 0.5
104-I	286 - 290	<0.1 - 0.1	0.276	<10 - 10	12.9 - 13.3	0.019 - 0.060	0.0015 - 0.0108	<0.02	4.2 - 4.3	20.1 - 21.2	<0.3
106-I	170 - 242	0.1 - 0.2	0.0397	<10 - 50	26 - 156	0.174 - 0.542	0.0112 - 0.0177	<0.02	1.7 - 2.7	21.5 - 49.3	<0.3
107-I	288 - 292	0.6 - 1.0	0.336	<10	74.5 - 118	0.241 - 0.260	0.0213 - 0.0398	0.02	4.1 - 7.1	41.5 - 90.7	0.6 - 1.0

NOTES: 1) Selected leachate indicator parameters are shown.
2) Units are in mg/L.
3) Blank indicates parameter not analyzed.
* - Leachate range from SFA Holding Tank (2006-2023) and Holding Tank NFA (2011-2023).
** - Reference Quality Range from fresh bedrock wells 88-I (2006-2023) and 101-I (1999-2023).

TABLE 5.7
2023 Leachate Indicator Parameter Comparison - Brine
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Parameter:	Alkalinity	Ammonia	Boron	COD	Iron	Manganese	Phosphorus	Potassium	TKN
Leachate Range - SFA:*	**1590 - 4290**	**53 - 290**	**2.31 - 6.84**	**120 - 1070**	**3.21 - 73.4**	**0.282 - 0.922**	**0.3 - 3.37**	**97.2 - 337**	**68 - 670**
Reference Quality Range:**	**152 - 280**	**0.14 - 7.3**	**0.005 - 0.543**	**0.5 - 62.6**	**0.005 - 5.42**	**0.001 - 0.072**	**0.001 - 0.43**	**1.3 - 26.2**	**0.025 - 8.4**
Cell 1 - South									
5-IV	223	5.3	-	<250	3.05	0.0652	0.24	53.6	6.2
16A	244	0.2	-	20	<0.005	<0.0005	<0.01	1.2	<0.3
18A	258 - 433	0.9 - 3.9	0.259	20 - 40	0.16 - 5.29	0.0132 - 0.155	0.01 - <0.02	6 - 8	0.9 - 4.0
19A	562 - 574	2.0 - 3.1	0.200	80 - 180	8.87 - 21.6	0.142 - 0.167	<0.02 - 0.03	7.9 - 13.8	4.5 - 6.2
20A	317	1.2	-	20	2.32	0.0927	0.06	6.9	3.2
52-I	255	2.6	-	<250	1.28	0.0532	0.02	16.9	3.3
62-I	279	5.3	-	530	0.091	0.0279	<0.02	32.6	6.1
64-I	265	0.2	-	<10	0.007	0.0006	<0.01	6.6	<0.3
Cell 1 - North - East Side									
46-I	370	4.9	-	160	0.67	0.0240	0.17	20.0	5.9
50-I	220	0.2	-	20	0.031	0.0222	0.02	4.4	0.4
61-I	176	0.3	-	<10	<0.005	0.0024	0.26	3.2	<0.3
61-II	189	0.1	-	<10	<0.005	<0.0005	0.39	1.9	<0.3
75-I	487 - 498	0.5 - 0.7	1.56	20 - 30	0.070 - 0.163	0.003 - 0.007	0.03 - 0.08	8.1 - 8.6	0.9 - 2.1
Cell 1 - North - North Side									
66-I	592	1.0	-	50	7.38	0.0829	0.09	6.6	2.0
Cell 1 - North - North and West Side									
44-II	202	1.1	-	<10	0.476	0.0079	<0.01	3.3	0.8
North Fill Area									
86-I	245 - 253	1.4 - 1.5	0.249	<10 - 10	0.006 - 0.026	0.0018 - 0.0020	<0.01 - <0.02	7.1 - 8.2	2.2 - 3.1
89-I	304 - 305	1.0	0.800	30 - 40	0.090 - 0.113	0.0086 - 0.0098	0.04	7.2 - 7.5	1.1 - 1.3

NOTES: 1) Selected leachate indicator parameters are shown.
2) Units are in mg/L.
3) Blank indicates parameter not analyzed.
* - Leachate range from SFA Holding Tank (2006-2023).
** - Reference Quality Range from brine well 38-I (1989-2007).

TABLE 5.8
2023 Leachate Indicator Parameter Comparison - Concentrated Brine
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Parameter:	Alkalinity	Ammonia	Iron	Manganese	Phosphorus	TKN
Leachate Range - SFA:*	**1590 - 4290**	**53 - 290**	**3.21 - 73.4**	**0.282 - 0.922**	**0.3 - 3.37**	**68 - 670**
Reference Quality Range:**	**52.4 - 207**	**11.1 - 27.8**	**0.06 - 23.9**	**<0.01 - 0.54**	**<0.002 - 0.99**	**1.5 - 69**
Cell 1 - North - East Side						
76-I	209	20.2	2.77	0.166	0.08	20.3
Cell 1 - North - North and West Side						
41-I	216	8.9	3.47	0.0300	<0.2	8.9

NOTES: 1) Selected leachate indicator parameters are shown.
2) Units are in mg/L.
3) Blank indicates parameter not analyzed.
* - Leachate range from SFA Holding Tank (2006-2023).
** - Reference Quality Range from concentrated brine well 44-I (1989-2023).

TABLE 5.9
Ministry Guideline B-7 Criteria - Overburden
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	ODWQS	REFERENCE: 44-III AVERAGE	n	GUIDELINE B-7 CRITERIA	TRIGGER CRITERIA (80% of B-7)	South Fill Area 64-II Apr-23	48 Mar-23	48 Sep-23	46-II Mar-23	46-III Mar-23	61-III Mar-23	63-II Apr-23	63-II Sep-23	63-III Apr-23	63-III Sep-23	74-II Mar-23	74-III Mar-23	75-II Apr-23	75-II Sep-23
Health-Related ODWQS Parameters																			
Arsenic	0.010	0.0013	20	0.0056	0.0045	<0.0005	0.0016	0.0008	0.0012	<0.0005	<0.0005	0.0038	0.0040	<0.0005	<0.0005	0.0010	0.0007	<0.0005	<0.0005
Barium	1	0.187	5	0.390	0.312		0.113					0.104		0.032				0.028	
Boron	5	0.011	5	1.26	1.01		0.007					0.020		<0.005				<0.005	
Cadmium	0.005	0.0013	5	0.0022	0.0018		<0.0001					<0.0001		<0.0001				<0.0001	
Chromium	0.05	0.0040	5	0.015	0.012		<0.0005					<0.0005		<0.0005				<0.0005	
Lead	0.01	0.0012	5	0.003	0.003		<0.0005					<0.0005		<0.0005				<0.0005	
Nitrate	10.0	0.80	29	3.10	2.48	<0.05	<0.05	<0.05	<0.05	**5.5**	0.37	<0.05	<0.05	**29.1**	**30.3**	0.09	<0.05	<0.05	0.12
Nitrite	1.0	0.04	29	0.28	0.23	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Non-Health-Related ODWQS Parameters																			
Alkalinity	30-500	218	29	359	287	223	**570**	**651**	273	185	270	220	216	200	214	173	249	221	291
Aluminum	0.1	0.016	5	0.058	0.046		<0.025					<0.025		0.051				<0.025	
Chloride	250	11.6	29	131	105	2.2	19.2	67.0	60.8	9.9	10.5	9.5	9.6	11.5	11.6	21.0	3.9	24.5	71.2
Copper	1	0.003	5	0.501	0.401		<0.0005					<0.0005		0.0005				0.0005	
Dissolved Organic Carbon	5	1.1	19	3.0	2.4	1.9	**5.6**	**6.4**	1.7	**4.2**	**3.3**	<1.0	**3.2**	1.6	**3.4**	1.9	2.9	3.0	**3.8**
Iron	0.3	0.024	29	0.162	0.130	0.039	**6.48**	**7.54**	**0.184**	0.011	<0.005	**0.306**	**0.310**	0.066	<0.05	0.019	**0.428**	**0.267**	0.060
Manganese	0.05	0.004	20	0.027	0.022	0.0123	**0.651**	**0.380**	0.0215	0.0009	<0.0005	0.0123	0.011	0.0043	<0.001	0.0082	**0.0766**	0.0163	0.004
Sodium	200	9.1	29	105	83.6	2.2	14.7	66.8	13.2	4.4	6.8	8.8	7.3	3.1	3.5	41.0	3.8	14.7	35.5
Sulphate	500	48.5	29	274	219	8.9	31.1	7.0	32.3	11.7	3.4	36.8	35.6	20.0	19.5	42.5	2.8	7.7	18.1
Zinc	5	0.008	5	2.50	2.00		<0.005					<0.005		<0.005				<0.005	

PARAMETER	ODWQS	REFERENCE: 88-III AVERAGE	n	GUIDELINE B-7 CRITERIA	TRIGGER CRITERIA (80% of B-7)	North Fill Area 86-II Mar-23	86-II Sep-23	86-III Mar-23	86-III Sep-23	87-II Mar-23	87-II Sep-23	87-III Mar-23	87-III Sep-23	89-II Mar-23	89-II Sep-23	89-III Mar-23	89-III Sep-23	104-II Mar-23	104-II Sep-23	104-III Mar-23	104-III Sep-23
Health-Related ODWQS Parameters																					
Arsenic	0.01	0.0020	32	0.0060	0.0048	0.0022	0.0024	<0.0005	<0.0005	0.0006	0.0007	<0.0005	0.0015	0.0028	0.0031	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007
Barium	1	0.059	18	0.294	0.235	0.234		**0.662**		0.124		0.071		0.038		0.037		0.058		0.111	
Boron	5	0.105	18	1.33	1.06	0.063		0.157		0.0291		0.0073		0.105		0.006		0.0122		0.0466	
Cadmium	0.005	0.0001	18	0.0014	0.0011	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Chromium	0.05	0.0005	18	0.013	0.010	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Lead	0.01	0.0014	18	0.004	0.003	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nitrate	10.0	0.06	34	2.54	2.03	0.08	<0.05	<0.25	0.12	<0.05	<0.05	0.3	0.8	<0.05	<0.05	2.4	**5.3**	**3.1**	**3.0**	<0.05	<0.05
Nitrite	1.0	0.06	34	0.29	0.23	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Non-Health-Related ODWQS Parameters																					
Alkalinity	30-500	216	34	358	287	195	194	325	291	250	262	312	**480**	103	102	320	300	292	298	240	**477**
Aluminum	0.1	0.011	18	0.056	0.044	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		0.034		<0.025	
Chloride	250	7.7	34	129	103	15.6	15.7	**456**	**195**	9.5	9.1	17.6	11.1	8.3	8.3	9.2	8.8	8.9	9.5	6.6	2.6
Copper	1	0.002	18	0.501	0.401	0.0005		<0.0005		<0.0005		0.0013		<0.0005		<0.0005		0.0012		0.0017	
Dissolved Organic Carbon	5	1.2	34	3.1	2.5	1.5	<1.0	1.1	<1.0	**3.3**	1.2	2.8	2.1	2.0	1.1	2.4	1.4	1.2	1.1	**5.3**	**6.0**
Iron	0.3	0.132	34	0.216	0.173	0.071	0.078	0.021	0.015	**0.441**	**0.494**	0.022	**0.836**	0.035	0.052	<0.005	<0.005	0.019	0.019	0.016	**0.604**
Manganese	0.05	0.010	34	0.030	0.024	0.0012	0.0007	0.0072	0.0086	0.0164	0.0176	0.0091	**0.0721**	0.0028	0.0035	<0.0005	<0.0005	0.0011	0.0011	0.0076	**0.444**
Sodium	200	5.4	34	103	82.2	14.5	16.6	**173**	103	7.1	7.0	8.1	10.1	35.1	38.2	3.7	4.1	9.5	7.7	5.8	10.1
Sulphate	500	65.5	34	283	226	4.5	3.8	23.3	17.5	45.9	48.7	14.5	18.5	0.3	0.3	16.7	19.4	57.6	66.2	**378**	**346**
Zinc	5	0.003	18	2.50	2.00	<0.005		<0.005		<0.0005		0.001		<0.005		<0.005		0.0027		<0.0005	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standards (2006)
2) Reference average based on the geometric mean of historic concentrations for reference monitors.
n - Indicates number of sample results included in the calculation of the reference average.
3) Blank indicates parameter not analysed.
4) * - Indicates reference concentration exceeds ODWQS, therefore the reference concentration is used as the Guideline B-7 Criteria.
5) Bold values exceed Guideline B-7 Criteria.
6) Underlined values exceed the trigger criteria (80% of Guideline B-7 criteria).
6) All concentration values are in mg/L.

TABLE 5.10
Ministry Guideline B-7 Criteria - Bedrock

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FRESH BEDROCK	ODWQS	REFERENCE: 101-I		GUIDELINE B-7 CRITERIA	TRIGGER CRITERIA (80% of B-7)	South Fill Area		
						63-I		41-II
PARAMETER		AVERAGE	n			Apr-23	Sep-23	Mar-23
Health-Related ODWQS Parameters								
Arsenic	0.010	0.0019	24	0.0039	0.0031	<0.0005	<0.0005	<0.0005
Barium	1	0.052	9	0.289	0.231	0.091		
Boron	5	1.11	10	2.09	1.67	0.616		
Cadmium	0.005	0.0016	9	0.0024	0.0019	<0.0001		
Chromium	0.05	0.0050	9	0.016	0.013	<0.0005		
Lead	0.01	0.0006	9	0.0030	0.0024	<0.0005		
Nitrate	10.0	0.10	40	2.57	2.06	0.25	0.05	<0.05
Nitrite	1.0	0.04	39	0.28	0.22	<0.05	<0.05	<0.05
Non-Health-Related ODWQS Parameters								
Alkalinity	30-500	131	40	98	79	**289**	**291**	**269**
Aluminum	0.1	0.017	9	0.038	0.030	<0.025		
Chloride	250	5.1	40	66.3	53.1	65.3	63.4	4.3
Copper	1	0.003	9	0.25	0.20	0.0005		
Dissolved Organic Carbon	5	2.7	20	3.3	2.6	1.2	**3.8**	1.5
Iron	0.3	0.032	40	0.099	0.079	0.012	**0.150**	**0.307**
Manganese	0.05	0.005	24	0.017	0.013	<0.0005	**0.021**	0.0084
Sodium	200	56.3	39	92.2	73.8	**238**	**181**	5.6
Sulphate	500	59.9	40	170	136	24.2	23.1	39.7
Zinc	5	0.006	9	1.25	1.00	<0.005		

FRESH BEDROCK	ODWQS	REFERENCE: 88-I		GUIDELINE B-7 CRITERIA	TRIGGER CRITERIA (80% of B-7)	North Fill Area	
						87-I	
PARAMETER		AVERAGE	n			Mar-23	Sep-23
Health-Related ODWQS Parameters							
Arsenic	0.010	0.0013	31	0.0034	0.0028	<0.0005	<0.0005
Barium	1	0.131	17	0.348	0.278	0.166	
Boron	5	0.120	17	1.34	1.07	0.0586	
Cadmium	0.005	0.0002	17	0.0014	0.0011	<0.0001	
Chromium	0.05	0.0005	17	0.013	0.010	<0.0005	
Lead	0.01	0.0015	17	0.0036	0.0029	<0.0005	
Nitrate	10.0	0.13	33	2.60	2.08	<0.05	<0.05
Nitrite	1.0	0.05	33	0.29	0.23	<0.05	<0.05
Non-Health-Related ODWQS Parameters							
Alkalinity	30-500	209	33	157	126	**193**	**205**
Aluminum	0.1	0.015	17	0.037	0.029	<0.025	
Chloride	250	1.6	33	63.7	50.9	4.8	23.6
Copper	1	0.001	17	0.25	0.20	<0.0005	
Dissolved Organic Carbon	5	1.2	31	2.1	1.7	1.6	1.0
Iron	0.3	0.067	33	0.125	0.100	0.065	**0.129**
Manganese	0.05	0.005	33	0.017	0.013	0.0055	0.0075
Sodium	200	16.9	33	62.6	50.1	10.9	15.2
Sulphate	500	13.3	33	135	108	26.4	32.2
Zinc	5	0.004	17	1.25	1.00	<0.0005	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standards (2006)
2) Reference average based on the geometric mean of historic concentrations for reference monitors.
n - Indicates number of sample results included in the calculation of the reference average.
3) Blank indicates parameter not analysed.
4) * - Indicates reference concentration exceeds ODWQS, therefore the reference concentration is used as the Guideline B-7 Criteria.
5) Bold values exceed Guideline B-7 Criteria.
6) Underlined values exceed the trigger criteria (80% of Guideline B-7 criteria).

TABLE 5.10
Ministry Guideline B-7 Criteria - Bedrock
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BRINE BEDROCK	ODWQS	REFERENCE: 38-I		GUIDELINE B-7 CRITERIA	TRIGGER CRITERIA (80% of B-7)	South Fill Area					North Fill Area			
PARAMETER		AVERAGE	n			46-I	61-I	61-II	75-I		86-I		89-I	
						Mar-23	Mar-23	Mar-23	Apr-23	Sep-23	Mar-23	Sep-23	Mar-23	Sep-23
Health-Related ODWQS Parameters														
Arsenic	0.010	0.003	8	0.0063	0.0051	0.0060	<0.0005	0.0015	0.0009	0.0010	<0.0005	<0.0005	0.0017	0.0021
Barium	1	0.038	22	0.278	0.223				0.220		0.012		0.081	
Boron	5	0.180	21	1.38	1.11				**1.56**		0.249		0.800	
Cadmium	0.005	0.0009	22	0.0019	0.0015				<0.0001		<0.0001		<0.0001	
Chromium	0.05	0.003	22	0.0146	0.0117				<0.0005		<0.0005		<0.0005	
Lead	0.01	0.004	22	0.0051	0.0041				<0.0005		<0.0005		<0.0005	
Nitrate	10.0	0.056	50	2.54	2.03	<0.5	0.19	0.76	<0.05	0.07	<0.05	<0.05	<0.05	<0.05
Nitrite	1.0	0.009	50	0.26	0.21	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Non-Health-Related ODWQS Parameters														
Alkalinity	30-500	226	50	363	290	**370**	176	189	**487**	**498**	245	253	305	304
Aluminum	0.1	0.005	22	0.052	0.042				<0.025		<0.025		<0.025	
Copper	1	0.002	22	0.50	0.40				0.0027		<0.0005		<0.0005	
Dissolved Organic Carbon	5	1.8	3	3.4	2.7	1.2	1.4	1.9	**4.6**	2.3	1.3	<1.0	**6.5**	1.1
Manganese	0.05	0.014	22	0.0318	0.0254	0.0240	0.0024	<0.0005	0.007	0.003	0.0020	0.0018	0.0086	0.0098
Sulphate	500	33.4	50	267	213	<2.0	30.6	17.8	49.7	26.6	60.3	54.2	1.1	0.8
Zinc	5	0.008	23	2.50	2.00				<0.005		<0.005		<0.005	

CONCENTRATED BRINE	ODWQS	REFERENCE: 44-I		GUIDELINE B-7 CRITERIA	TRIGGER CRITERIA (80% of B-7)	South Fill Area	
PARAMETER		AVERAGE	n			76-I	41-I
						Apr-23	Mar-23
Health-Related ODWQS Parameters							
Arsenic	0.010	0.003	17	0.0065	0.0052	<0.005	<0.005
Nitrate	10.0	0.087	44	2.57	2.05	<5.0	<0.5
Nitrite	1.0	0.016	48	0.26	0.21	<5.0	<0.5
Non-Health-Related ODWQS Parameters							
Alkalinity	30-500	145	47	322	258	209	216
Dissolved Organic Carbon	5	0.6	17	2.8	2.3	1.5	<1.0
Manganese	0.05	0.102	25	0.102*	0.102*	**0.166**	0.0300
Sulphate	500	6.7	47	253	203	<20	<0.2

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standards (2006)
2) Reference average based on the geometric mean of historic concentrations for reference monitors.
n - Indicates number of sample results included in the calculation of the reference average.
3) Blank indicates parameter not analysed.
4) * - Indicates reference concentration exceeds ODWQS, therefore the reference concentration is used as the Guideline B-7 Criteria.
5) Bold values exceed Guideline B-7 Criteria.
6) Underlined values exceed the trigger criteria (80% of Guideline B-7 criteria).

TABLE 6.1
2023 Surface Water Chemical Results
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PARAMETER	UNITS	PWQO[1]	SW1				SW2				SW3				SW17				SW18	
			Feb-23	Apr-23	Jun-23	Dec-23	Feb-23	Apr-23	Jun-23	Dec-23	Feb-23	Apr-23	Jun-23	Dec-23	Feb-23	Apr-23	Jun-23	Dec-23	Feb-23	Apr-23
Alkalinity	mg/L	<75% background	157	238	247	284	156	248	230	288	158	247	296	291	145	243	251	280	158	247
Ammonia: total	mg/L		<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	0.1	<0.1	0.2	0.2
Ammonia: un-ionized	mg/L	0.02	<0.0003	0.0006	0.0007	<0.0002	<0.0004	<0.0005	0.0006	<0.0003	0.0003	0.0008	0.0008	<0.0004	0.0003	0.0012	0.0005	<0.0002	0.0008	0.0014
Arsenic	mg/L	0.005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	0.0006	0.0006	<0.0005	<0.0005	<0.0005
Barium	mg/L		0.037	0.047	0.060	0.056	0.036	0.049	0.049	0.056	0.037	0.046	0.061	0.055	0.038	0.057	0.060	0.083	0.037	0.049
Biochemical Oxygen Demand	mg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.01	0.02	0.04	0.01	0.01	0.02	0.04	0.01	0.01	0.02	0.04	0.02	0.02	0.03	0.04	0.03	0.01	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		20	30	40	<10	20	40	50	<10	20	30	40	20	20	40	40	<10	20	30
Chloride	mg/L		52.1	48.0	104	95.6	45.2	49.7	93.4	97.8	45.1	46.8	112	88.1	63.8	87.7	120	247	46.8	50.7
Chromium	mg/L	0.010	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		509	547	808	903	484	580	749	903	496	596	857	887	529	667	839	1450	496	569
Conductivity - field	µS/cm		532	630	845	918	522	626	796	913	523	634	910	903	555	752	892	1460	535	642
Copper	mg/L	0.005 **	0.0017	0.0013	0.0012	<0.0005	0.0012	0.0015	0.0027	<0.0005	0.0013	0.0012	0.001	<0.0005	0.0011	0.0007	0.0006	<0.0005	0.0014	0.0012
Dissolved Oxygen - field	mg/L	4-7 (temp dependent)	8.57	7.50	6.36	13.2	10.8	6.89	**4.00**	12.1	8.42	12.7	5.74	15.6	7.84	9.10	**4.02**	14.0	11.8	11.2
Iron	mg/L	0.3	0.082	0.057	**1.12**	0.056	0.059	0.128	**0.620**	0.055	0.046	0.043	**0.380**	0.116	0.153	0.138	**0.650**	0.095	0.059	0.065
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<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	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		2.69	<0.05	<0.05	0.21	2.9	<0.05	<0.05	0.18	2.79	0.24	0.54	0.22	2.04	<0.05	<0.05	0.43	2.82	0.1
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.72	7.72	7.71	7.59	7.82	7.78	7.60	7.66	7.79	8.01	7.78	7.83	7.71	7.78	7.64	7.62	7.78	7.91
pH - field	units	6.5-8.5	7.5	7.7	7.4	7.5	7.7	7.6	7.3	7.6	7.5	7.8	7.5	7.8	7.6	7.7	7.3	7.5	7.7	7.7
Phenols: total	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.02	0.02	**0.14**	0.03	0.02	**0.04**	**0.11**	0.03	<0.02	0.02	**0.10**	**0.05**	0.03	0.03	**0.10**	**0.04**	<0.02	0.02
Sulphate	mg/L		30.1	18.7	24.4	47.0	28.4	18.5	23.6	47.5	27.9	19.1	13.0	46.6	31.8	20.8	22.7	63	28.8	19.7
Temperature - field	°C		0.8	5.3	15	0.6	0.6	5.9	15.8	1.1	0.0	5.4	14.2	0.1	0.6	5.7	15.6	1.0	0.5	6.3
Total Dissolved Solids	mg/L		270	460	540	640	280	400	480	620	330	390	550	580	370	480	580	950	300	400
Total Kjeldahl Nitrogen	mg/L		0.6	0.5	0.8	0.4	0.5	0.6	0.8	0.4	0.4	0.5	0.8	0.4	0.6	0.7	0.9	0.4	0.6	0.7
Total Suspended Solids	mg/L		<2.0	<2.0	30	8	<2.0	7.2	11.3	<2	<2.0	6	4.7	3	<2.0	3.2	6	6	<2.0	2.8
Zinc	mg/L	0.020	0.0035	<0.005	0.017	<0.005	0.0023	<0.005	<0.005	<0.005	0.0017	<0.005	<0.005	<0.005	0.0042	<0.005	<0.005	0.008	0.003	<0.005

PARAMETER	UNITS	PWQO[1]	SW19		SW20				SW21				SW23				SW24			
			Feb-23	Apr-23	Feb-23	Apr-23	Jun-23	Dec-23	Feb-23	Apr-23	Jun-23	Dec-23	Feb-23	Apr-23	Jun-23	Dec-23	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L	<75% background	169	239	170	236	268	301	145	243	232	262	146	240	250	273	201	259	270	322
Ammonia: total	mg/L		<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	<0.1	0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	<0.0002	<0.0002	<0.0003	0.0002	0.0004	<0.0003	0.0001	0.0001	0.0005	<0.0002	0.0004	0.0015	0.0004	<0.0002	<0.0002	0.0008	0.0007	<0.0001
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	<0.0005	0.0006	0.0006	<0.0005	<0.0005	0.0006	0.0006	<0.0005	<0.0005	<0.0005	0.0009	0.0008
Barium	mg/L		0.034	0.043	0.034	0.042	0.040	0.048	0.037	0.058	0.056	0.085	0.038	0.062	0.060	0.085	0.050	0.038	0.055	0.076
Biochemical Oxygen Demand	mg/L		2.7	3.7	<2.0	<2.0	<2.0	<2.0	3.2	<2.0	2.0	<2.0	<2.0	<2.0	2.2	<2.0	2.6	<2.0	4.4	<2.0
Boron	mg/L	0.200	0.003	0.009	0.00	0.01	0.02	0.01	0.02	0.03	0.04	0.02	0.02	0.03	0.04	0.02	0.02	0.01	0.03	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		10	40	10	30	50	<10	30	50	40	<10	20	40	40	10	40	90	60	40
Chloride	mg/L		26.6	22.0	27.7	21.0	10.6	40.7	61.4	74.6	98.1	202	64.0	77.3	106	240	7.7	5.4	4.3	8.0
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		459	491	464	479	599	743	524	681	734	1300	525	691	791	1400	491	498	507	736
Conductivity - field	µS/cm		496	538	493	532	610	731	553	808	775	1320	557	755	832	1410	515	516	542	759
Copper	mg/L	0.005 **	0.001	0.0017	0.0024	0.0016	0.0034	<0.0005	0.0011	0.0007	0.0005	<0.0005	0.0024	0.0007	0.0005	<0.0005	0.0013	0.0006	0.001	<0.0005
Dissolved Oxygen - field	mg/L	4-7 (temp dependent)	12.7	7.06	9.88	**3.62**	**2.51**	12.5	**5.96**	8.32	5.24	16.3	6.98	**4.62**	**3.22**	12.2	6.88	5.21	5.49	11.3
Iron	mg/L	0.3	0.018	0.237	0.047	0.033	**0.420**	0.028	0.129	0.156	**0.340**	0.090	0.134	0.161	**0.490**	0.147	0.083	0.031	**0.521**	0.251
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<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	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		3.79	<0.05	3.92	<0.05	0.17	0.14	2.08	<0.05	<0.05	0.91	2.03	<0.05	<0.05	0.61	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.90	7.68	7.81	7.66	7.47	7.65	7.60	7.71	7.64	7.65	7.62	7.62	7.59	7.51	7.65	7.73	7.76	7.34
pH - field	units	6.5-8.5	7.5	7.3	7.6	7.2	7.2	7.6	7.1	6.6	7.2	7.4	7.7	8.1	7.2	7.4	7.5	7.8	7.4	7.3
Phenols: total	µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	<0.02	**0.04**	<0.02	<0.01	**0.10**	0.02	0.02	**0.04**	**0.08**	**0.04**	0.03	**0.04**	**0.09**	**0.04**	**0.04**	0.02	**0.21**	**0.07**
Sulphate	mg/L		24.5	19	25.1	18.0	47.0	39.6	32.8	21.8	22.6	58.6	32.5	20.7	20.6	60.6	62.2	27.8	18.8	73.5
Temperature - field	°C		0.9	4.3	0.8	4.1	14.1	0.5	1.7	5.4	15.6	1	0.7	5.2	15.1	1.4	0.7	6.3	14.5	1.2
Total Dissolved Solids	mg/L		340	370	330	370	440	470	350	580	500	790	330	500	530	870	240	360	350	520
Total Kjeldahl Nitrogen	mg/L		0.8	0.4	0.7	0.5	1.3	0.4	0.8	0.7	0.8	0.4	0.6	0.7	0.9	0.4	0.5	0.3	0.9	0.7
Total Suspended Solids	mg/L		8.4	17.6	<2.0	3.2	11.3	4	<2.0	2.8	4.8	5	3.6	3.6	7.6	<2	5.2	6.4	22.7	3
Zinc	mg/L	0.020	0.0012	<0.005	0.0023	<0.005	<0.005	<0.005	0.0063	<0.005	<0.005	<0.005	0.0044	<0.005	0.005	<0.005	0.0041	<0.005	0.007	<0.005

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) Bold and shaded values exceed the PWQO.
4) * - Cadmium PWQO value based on hardness >100 mg/L.
5) ** - Copper PWQO value based on hardness >20 mg/L.
6) *** - Lead PWQO value based on hardness >80 mg/L.

TABLE 7.1
Perimeter Landfill Gas Probe Monitoring
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

	GP1-96				GP2-19				GP3-19			
	Mar-23	Jul-23	Sep-23	Nov-23	Mar-23	Jul-23	Sep-23	Nov-23	Mar-23	Jul-23	Sep-23	Nov-23
Combustible Gas (v/v)	0.3	0.3	0.2	0.1	0.3	0.3	0.1	0.1	0.3	0.3	0.3	0.1
Carbon Dioxide (v/v)	0.0	1.1	1.0	0.8	0.3	1.1	0.0	0.2	1.2	0.2	0.1	0.0
Oxygen (v/v)	22.7	20.3	18.9	19.1	21.0	21.0	20.5	20.2	20.7	22.3	21.0	20.9
Water Elevation (mbgs)	1.9	1.8	1.8	1.7	3.5	3.6	3.5	3.3	4.2	4.2	4.3	4.2

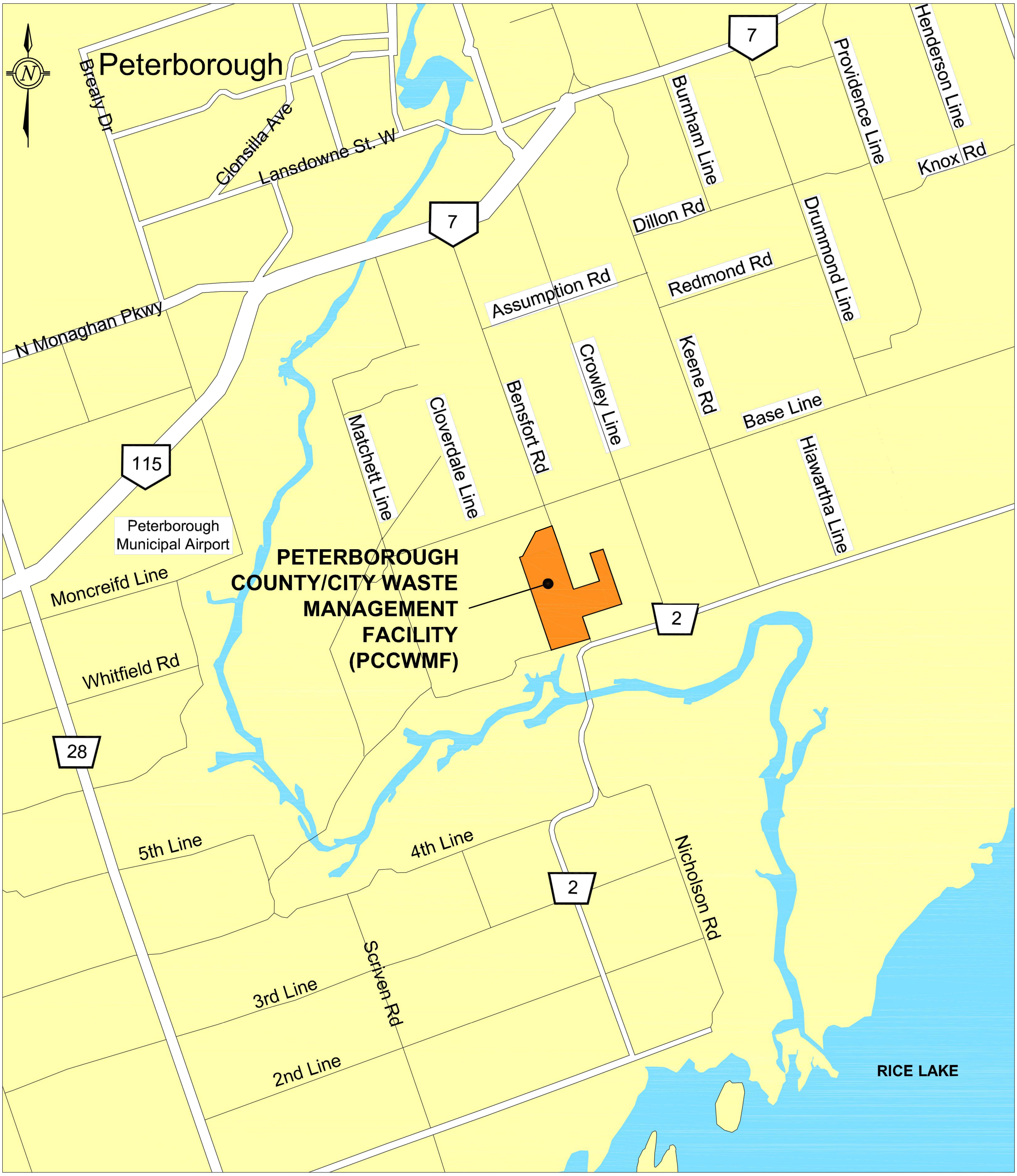
	GP4-96				GP5-96				GP6-96			
	Mar-23	Jul-23	Sep-23	Nov-23	Mar-23	Jul-23	Sep-23	Nov-23	Mar-23	Jan-00	Sep-23	Nov-23
Combustible Gas (v/v)	0.3	0.3	0.1	0.2	0.3	0.3	0.2	0.2	0.0	0.3	0.2	0.3
Carbon Dioxide (v/v)	1.6	0.3	0.3	0.3	0.5	2.1	1.6	1.0	0.0	0.4	0.2	0.4
Oxygen (v/v)	22.5	21.2	21.2	20.8	21.1	23.5	22.0	21.7	20.9	21.6	21.2	20.9
Water Elevation (mbgs)	1.9	2.0	1.9	1.7	5.0	5.1	5.0	4.8	2.2	1.8	1.8	1.8

	GP7-13				GP8-13				GP9-13			
	Mar-23	Jul-23	Sep-23	Nov-23	Mar-23	Jul-23	Sep-23	Nov-23	Mar-23	Jul-23	Sep-23	Nov-23
Combustible Gas (v/v)	0.3	0.3	0.1	0.1	0.3	0.3	0.2	0.2	0.0	0.3	0.3	0.2
Carbon Dioxide (v/v)	0.9	0.5	0.6	0.4	0.6	1.5	1.3	1.4	0.6	0.7	0.5	0.9
Oxygen (v/v)	21.2	23.3	21.9	21.7	22.6	21.0	19.6	19.5	22.3	22.3	21.3	20.9
Water Elevation (mbgs)	2.3	2.1	2.0	1.9	2.1	2.4	2.3	2.2	2.6	2.1	2.1	2.0

	GP10-16			
	Mar-23	Jul-23	Sep-23	Nov-23
Combustible Gas (v/v)	0.2	0.3	0.1	0.1
Carbon Dioxide (v/v)	2.7	2.8	2.4	1.9
Oxygen (v/v)	20.2	7.0	19.1	19.3
Water Elevation (mbgs)	3.2	3.2	3.2	3.0

NOTES: 1) mbgs = metres below ground surface
2) v/v = percent by volume

FIGURES



D/M/Y	DESCRIPTION	BY	APPROVED
15/05/24	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE 1.1

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: NOT TO SCALE

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

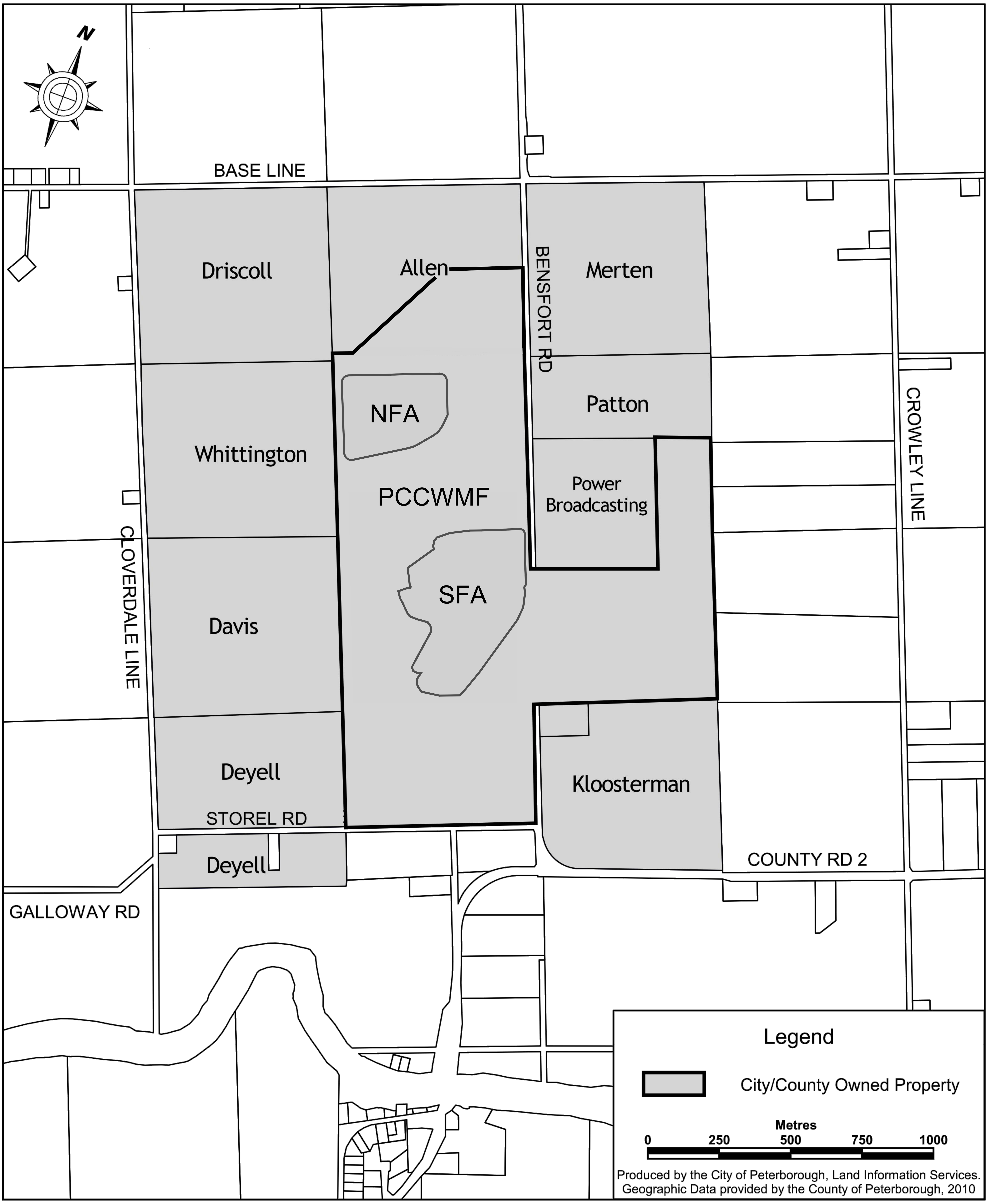
SITE LOCATION

2023 ANNUAL MONITORING REPORT
PETERBOROUGH COUNTY/CITY
WASTE MANAGEMENT FACILITY

Peterborough County
peterborough

WSP
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM

Plotted: May 10, 2024 – 2:08pm File: C:\Users\Jaclyn.Craig\WSP 0365\111-53296 Peterborough Landfill (all LF Engineering phases) – Project Folders\04. Technical\0 – Monit. and Rprt\AMR\2023\3-Figures\1 + 2 – Figure 1.1 and Figure 1.2.dwg



D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE 1.2

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: SEE SCALE BAR

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

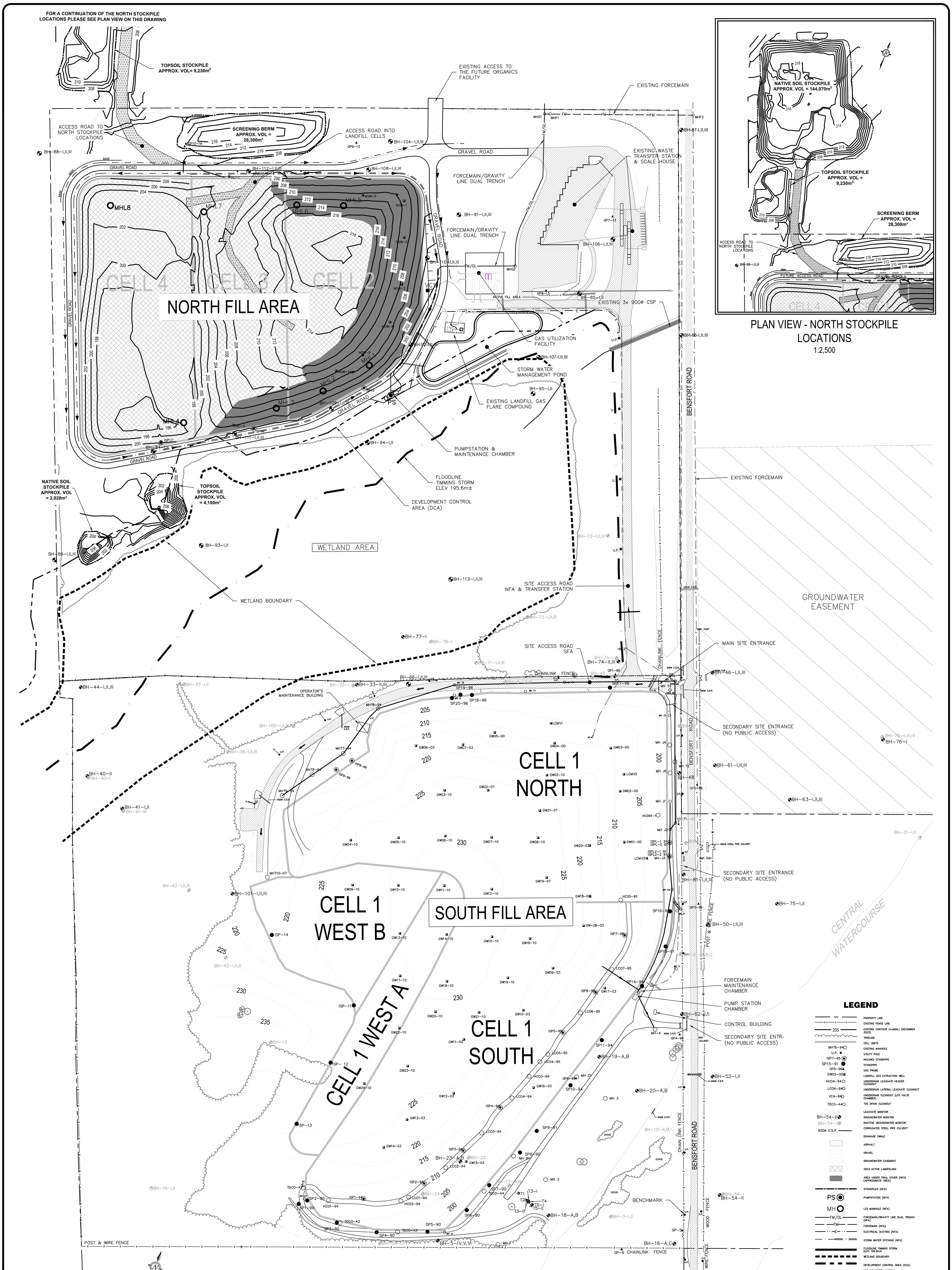
PROJECT NO. CA0008825.1917

CITY/COUNTY OF PETERBOROUGH PROPERTY OWNERSHIP

2023 ANNUAL MONITORING REPORT PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY

Peterborough County
peterborough

4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM



D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	J V C	J J O

REVISION / ISSUE

FIGURE 2.1

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: 1:1750

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

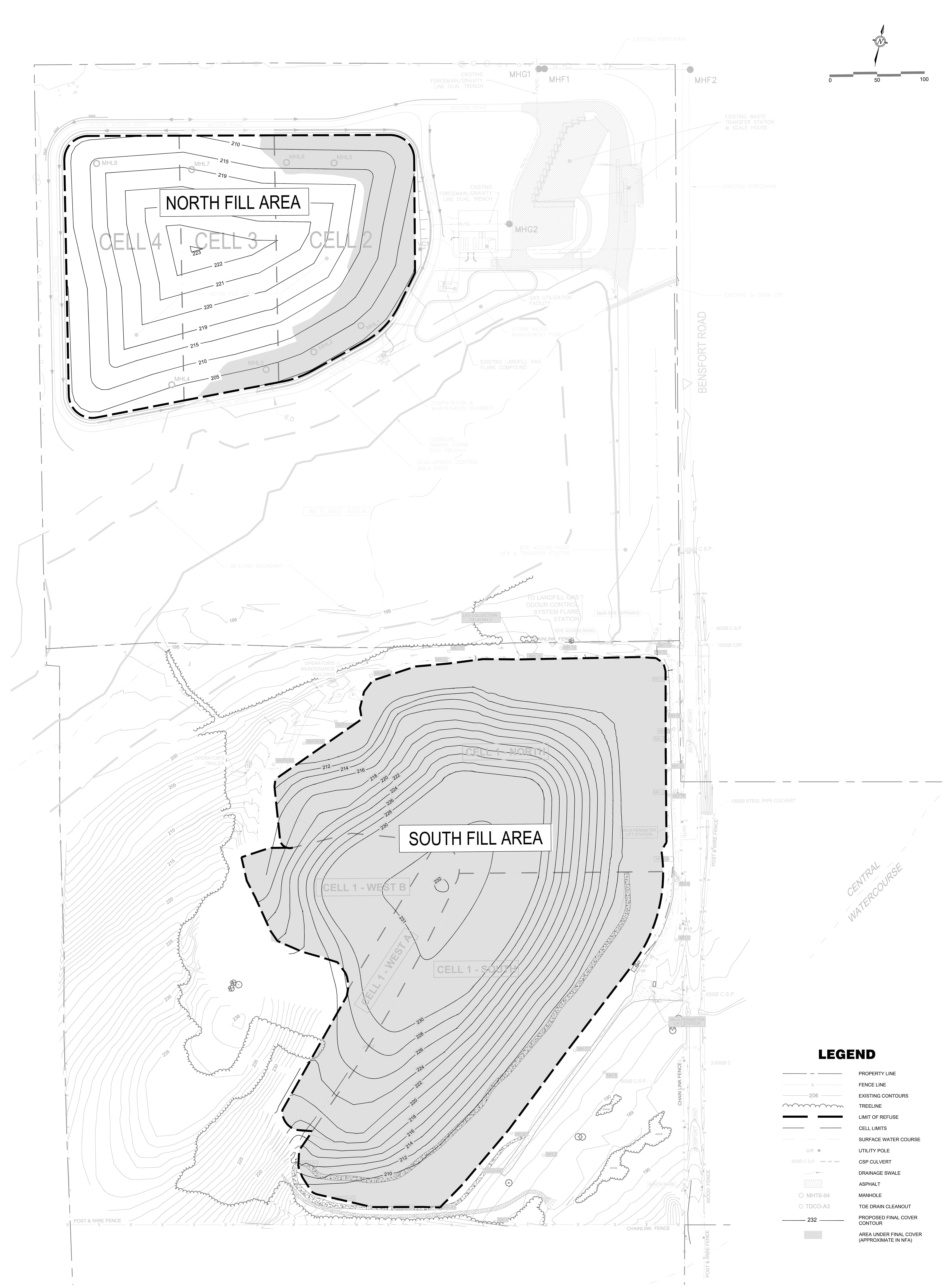
PROJECT NO. CA0008825.1917

EXISTING CONDITIONS SFA & NFA (2023)

2023 ANNUAL MONITORING REPORT PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY

Peterborough County peterborough

wsp
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM



D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE 2.2

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: SEE SCALE BAR

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

SFA & NFA APPROVED FINAL CONTOURS (2023)

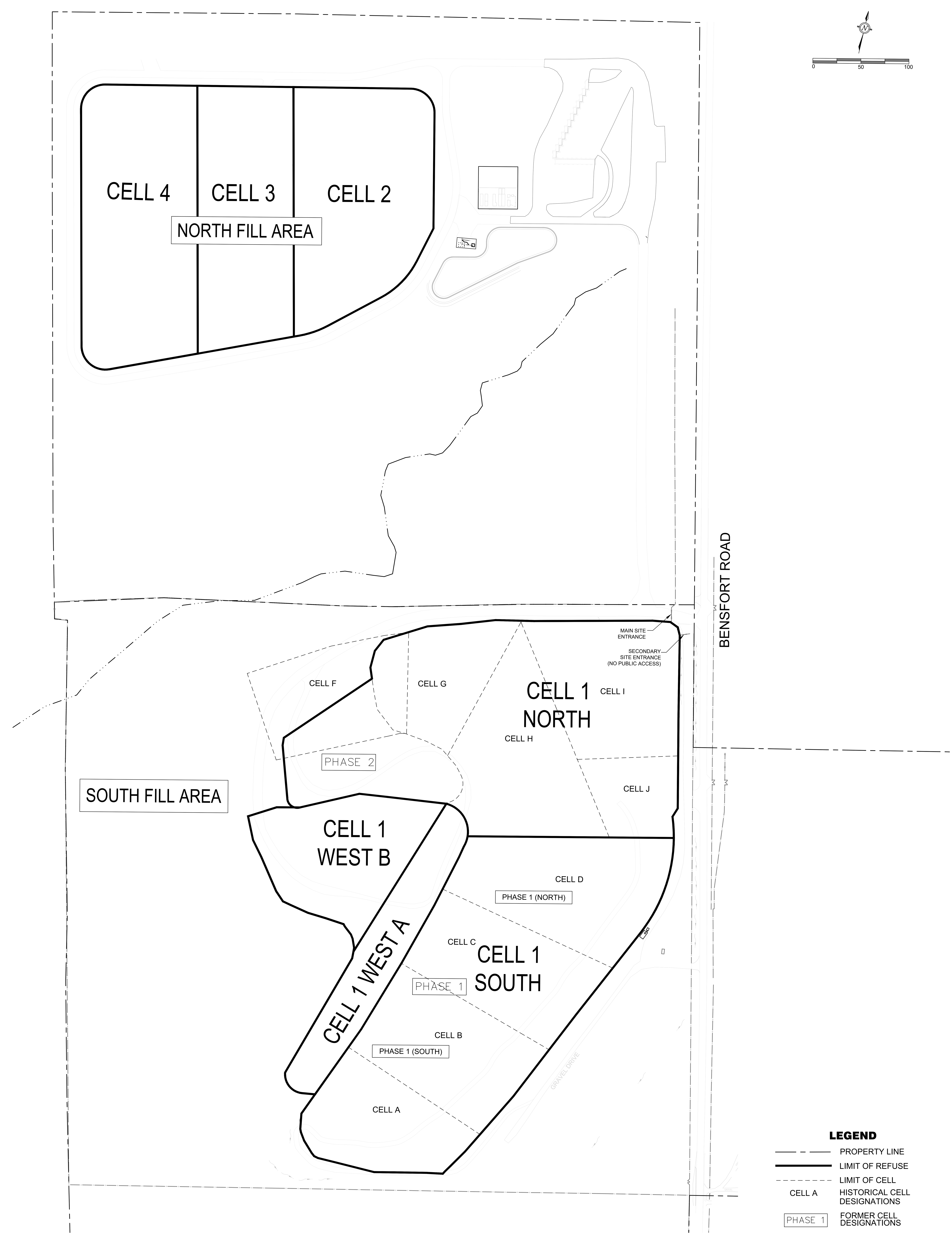
2023 ANNUAL MONITORING REPORT PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY

DISCLAIMER:

Peterborough County peterborough

4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM

Plotted: May 10, 2024 – 2:12pm File: C:\Users\Jaclyn.Craig\WSP O365\111-53296 Peterborough Landfill (all LF Engineering phases) - Project Folders\04. Technical\0 - Monit. and Rprt\AMR\2023\3-Figures\4 -Fig2.2.dwg



LEGEND

— - —	PROPERTY LINE
———	LIMIT OF REFUSE
- - - -	LIMIT OF CELL
CELL A	HISTORICAL CELL DESIGNATIONS
PHASE 1	FORMER CELL DESIGNATIONS

D/M/Y	DESCRIPTION	BY	APPROVED
15/05/24	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE 2.3

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: SEE SCALE BAR

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

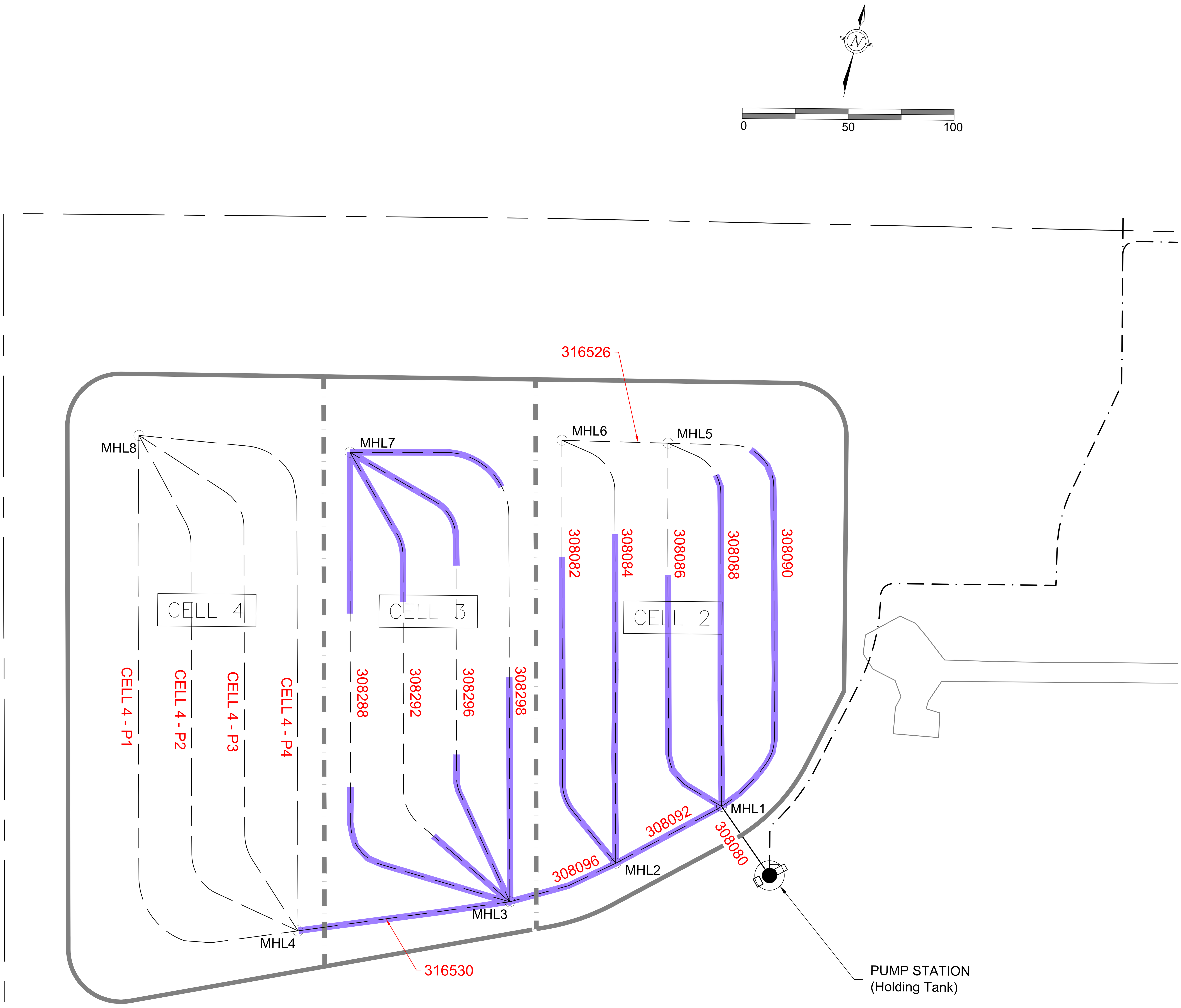
CURRENT AND HISTORICAL CELL DESIGNATIONS

2023 ANNUAL MONITORING REPORT PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY

Peterborough County
peterborough

wsp
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM

Plotted: May 10, 2024 – 2:12pm File: C:\Users\Jaclyn.Craig\WSP 0365\111-53296 Peterborough Landfill (all LF Engineering phases) – Project Folders\04. Technical\0 – Monit. and Rprt\AMR\2023\3-Figures\5-Fig2.3.dwg



LEGEND

- PROPERTY LINE
- LIMIT OF REFUSE
- LIMIT OF CELL
- NON-PERF. PIPE
- PERFORATED PIPE
- MHL-3 LEACHATE COLLECTION SYSTEM MANHOLE
- LEACHATE FORCEMAIN
- FLUSHING LOCATION

D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE 4.1

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: SEE SCALE BAR

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

NORTH FILL AREA LEACHATE COLLECTION SYSTEM FLUSHING

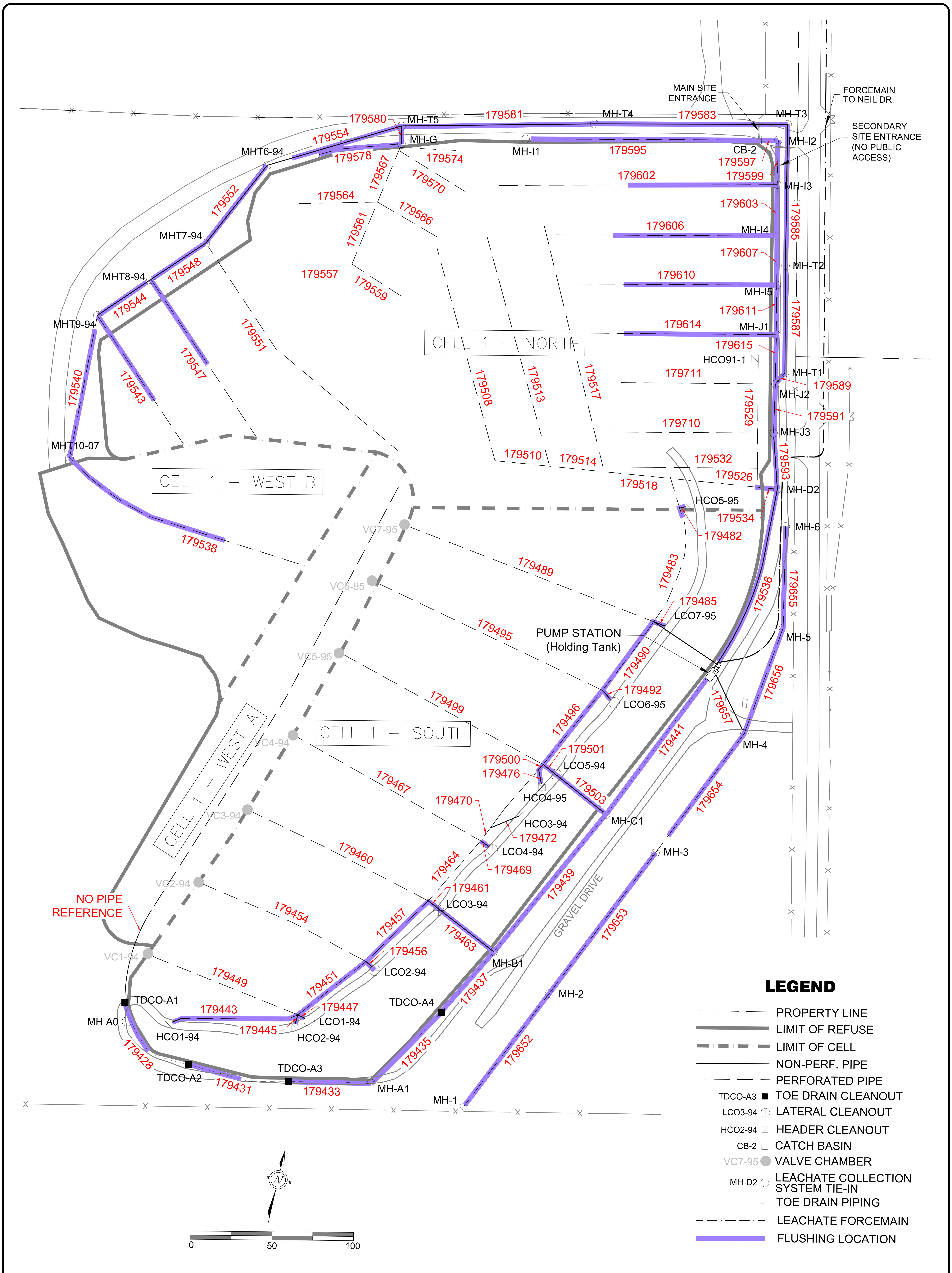
2023 ANNUAL MONITORING REPORT PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY

Peterborough County

peterborough

wsp
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM

Plotted: May 10, 2024 - 2:14pm File: C:\Users\Jaclyn.Craig\WSP O365\111-53296 Peterborough Landfill (all LF Engineering phases) - Project Folders\04. Technical\0 - Monit. and Rprt\AMR\2023\3-Figures\6-Fig4.1-4.2.dwg



D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE
4.2

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: SEE SCALE BAR

COUNTY OF PETERBOROUGH /
CITY OF PETERBOROUGH

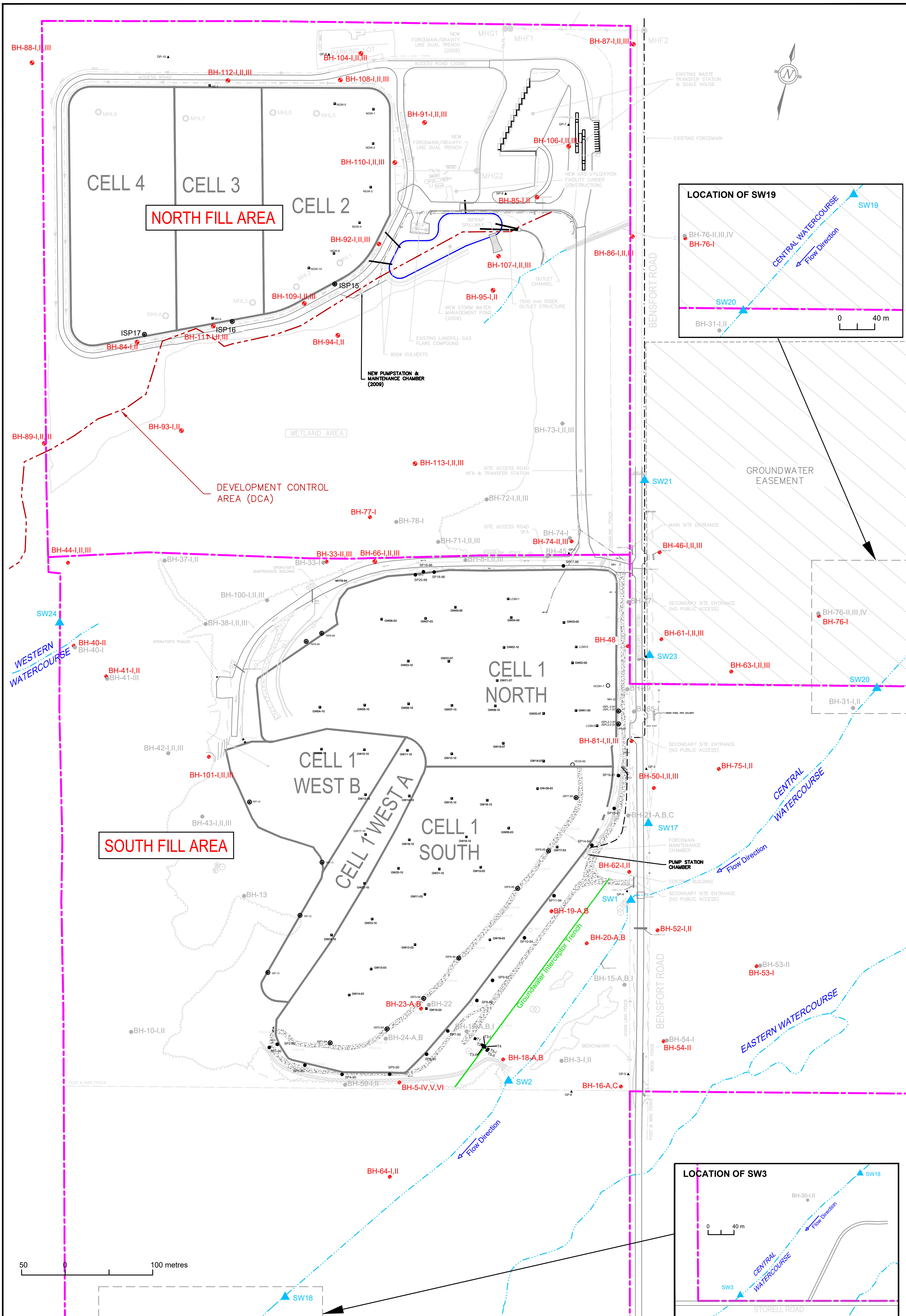
PROJECT NO. CA0008825.1917

SOUTH FILL AREA
LEACHATE COLLECTION SYSTEM FLUSHING

2023 ANNUAL MONITORING REPORT
PETERBOROUGH COUNTY/CITY
WASTE MANAGEMENT FACILITY

Peterborough County
peterborough

4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM



LEGEND

- PROPERTY BOUNDARY
- FENCE LINE
- GROUNDWATER EASEMENT
- BH-95-II GROUNDWATER MONITOR LOCATION AND DESIGNATION
- BH-3-I,II INACTIVE MONITORING LOCATION
- SW18 SURFACE WATER MONITOR LOCATION AND DESIGNATION
- SP9-91 STANDPIPE
- IPS4-94 INCLINED STANDPIPE
- T1 INTERCEPTOR TRENCH MONITORING WELL
- GP-10 GAS PROBE
- GW21-10 LANDFILL GAS EXTRACTION WELL

SCALE: 1:4000

REF. NO.: CA0008825.1917-5.1

DATE: MAY2024

PROJECT: CA0008825.1917

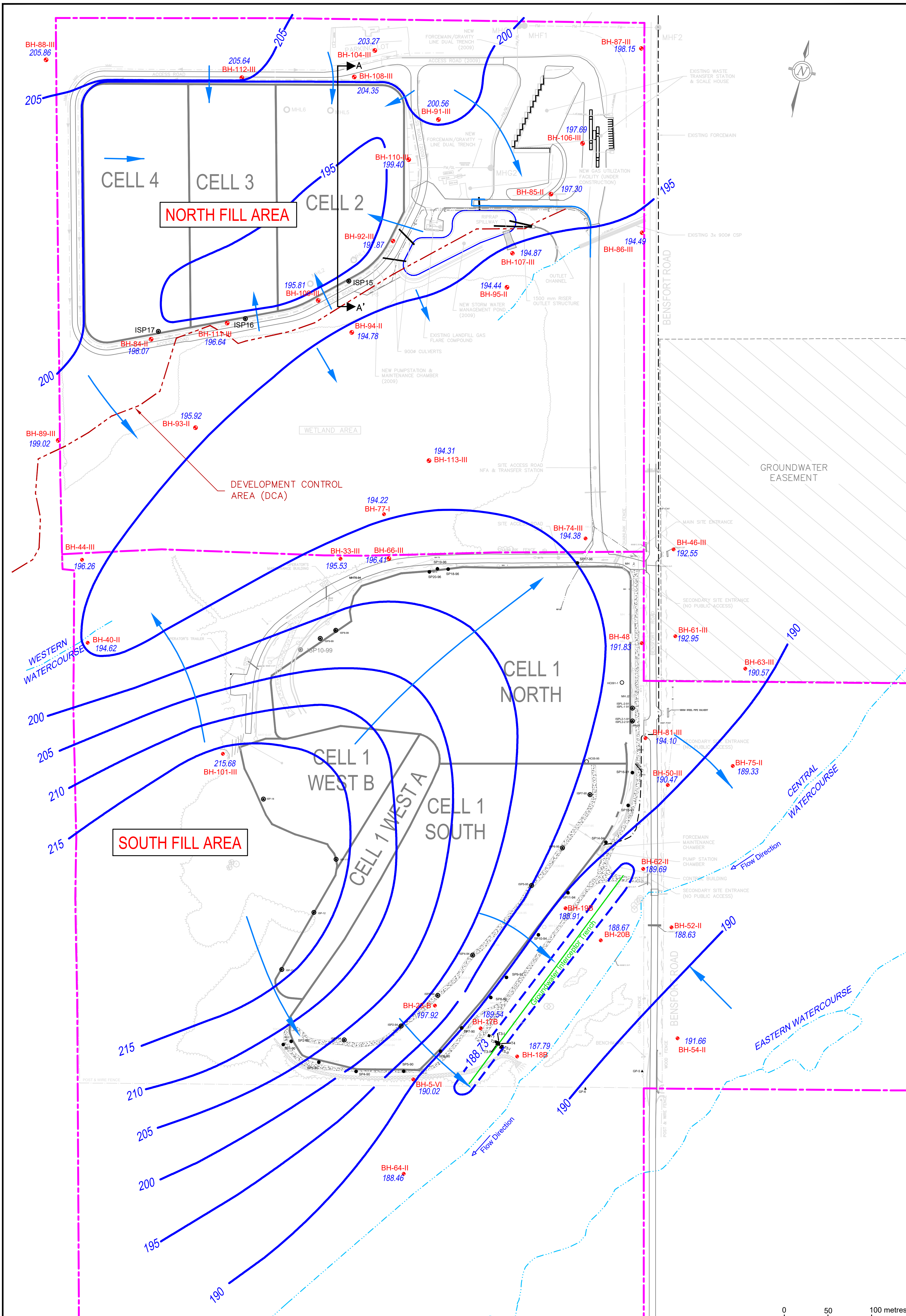
wsp

2023 MONITORING LOCATIONS

2023 ANNUAL MONITORING REPORT
PETERBOROUGH COUNTY / CITY WASTE MANAGEMENT FACILITY
For The County and the City of Peterborough

FIGURE

5.1



LEGEND

- PROPERTY BOUNDARY
- FENCE LINE
- GROUNDWATER EASEMENT
- 190 GROUNDWATER ELEVATION CONTOUR
- 187.8 GROUNDWATER ELEVATION IN mASL DATED SEPTEMBER 2023
- GROUNDWATER FLOW DIRECTION
- BH-95-II GROUNDWATER MONITOR LOCATION AND DESIGNATION
- SP9-91 STANDPIPE
- IPS4-94 INCLINED STANDPIPE
- T1 INTERCEPTOR TRENCH MONITORING WELL
- ISP10-99 DECOMMISSIONED INCLINE STANDPIPE
- (205.0) EXCLUDED FROM INTERPRETATION

SCALE: 1:4000

REF. NO.: CA0008825.1917-5.2

DATE: MAY 2024

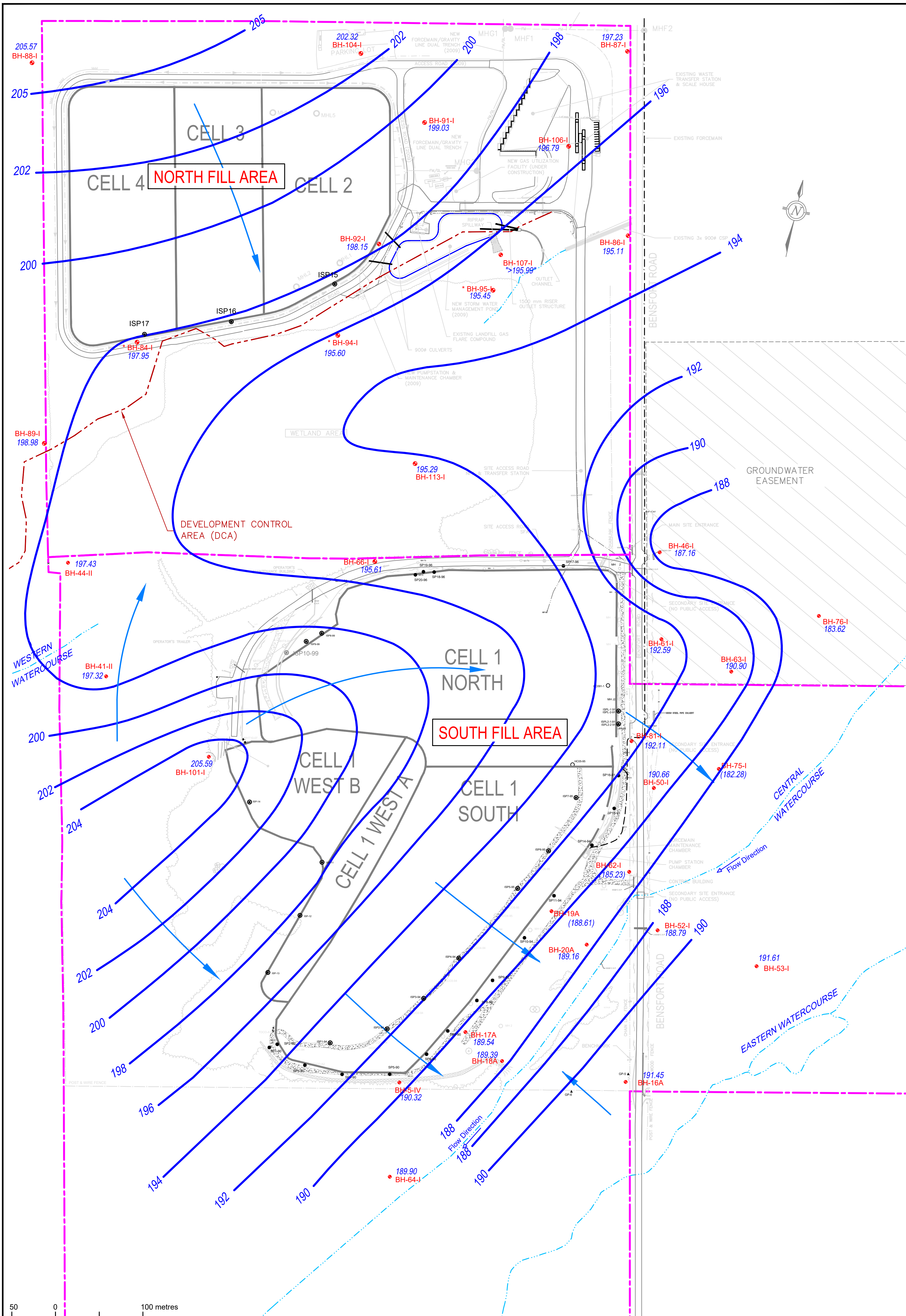
PROJECT: CA0008825.1917

SHALLOW GROUNDWATER FLOW REGIME - FALL 2023

2023 ANNUAL MONITORING REPORT
PETERBOROUGH COUNTY / CITY WASTE MANAGEMENT FACILITY
For The County and the City of Peterborough

FIGURE

5.2



LEGEND

	PROPERTY BOUNDARY
	FENCE LINE
	GROUNDWATER EASEMENT
190	GROUNDWATER ELEVATION CONTOUR
187.8	GROUNDWATER ELEVATION IN mASL DATED SEPTEMBER 2023
	GROUNDWATER FLOW DIRECTION
BH-95-II	GROUNDWATER MONITOR LOCATION AND DESIGNATION
* BH-84-I	WELLS INSTALLED AT THE OVERBURDEN / BEDROCK CONTACT
SP9-91	STANDPIPE
IPS4-94	INCLINED STANDPIPE
ISP10-99	DECOMMISSIONED INCLINE STANDPIPE
(205.0)	EXCLUDED FROM INTERPRETATION

SCALE: 1:4000

REF. NO.: CA0008825.1917. 5.3

DATE: MAY2024

PROJECT: CA0008825.1917

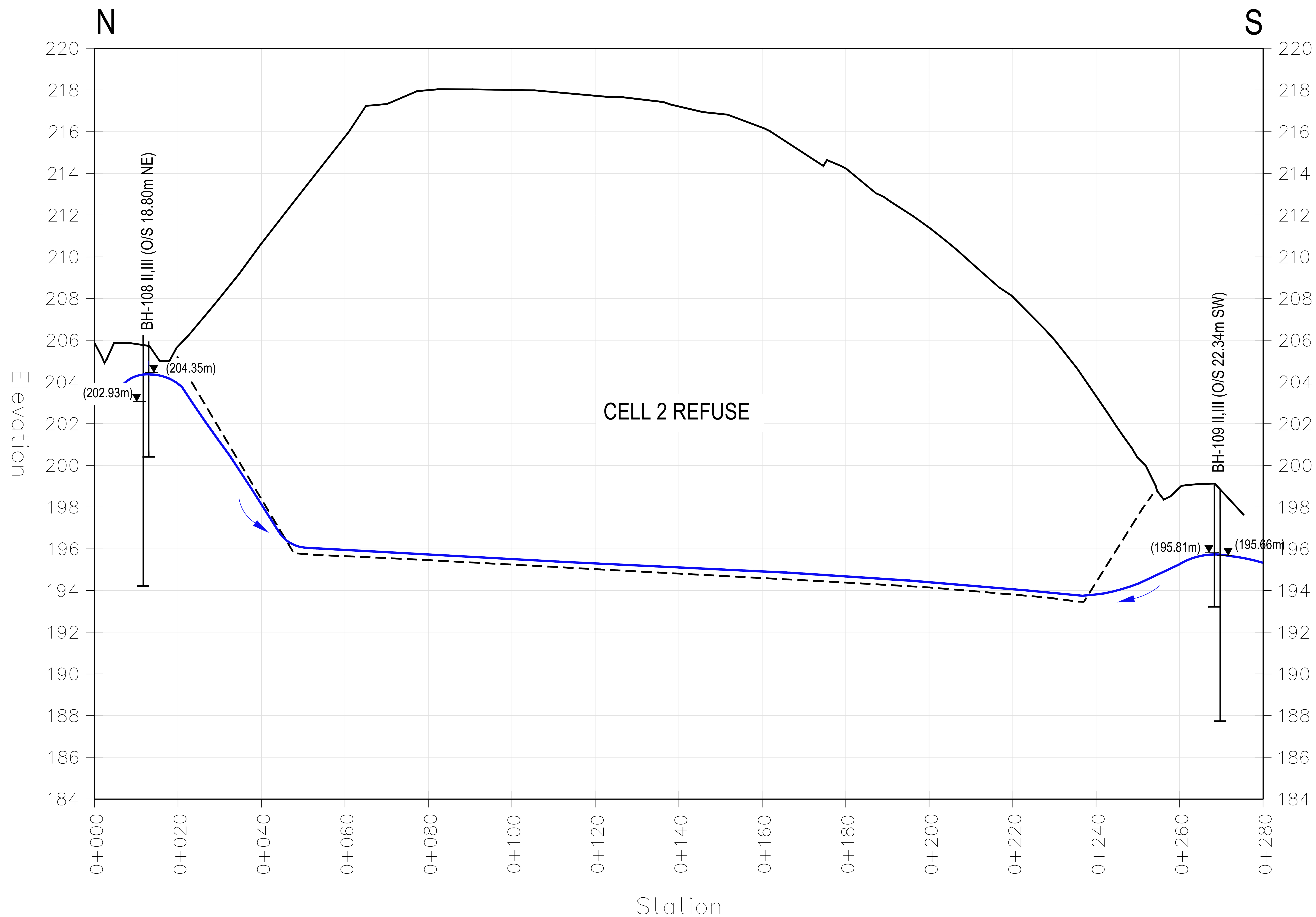
wsp

SHALLOW BEDROCK POTENTIOMETRIC SURFACE - FALL 2023

2023 ANNUAL MONITORING REPORT
PETERBOROUGH COUNTY / CITY WASTE MANAGEMENT FACILITY
For The County and the City of Peterborough

FIGURE

5.3



LEGEND

(203.8m)	SHALLOW GROUNDWATER ELEVATIONS (MASL) (SEPTEMBER 2023)
	BOTTOM OF DRAINAGE LAYER TOP OF CORRUGATED BASE
	EXISTING GROUND ELEVATION (DECEMBER 2023)
	GROUNDWATER CONTOUR

D/M/Y	DESCRIPTION	BY	APPROVED
15/05/24	2023 ANNUAL MONITORING REPORT	JVC	JJO
	REVISION / ISSUE		

wsp
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON, ONTARIO CANADA L8N 3Z1
TEL: 905-529-4414 | FAX 905-521-2699 | WWW.WSPGROUP.COM

Peterborough County
peterborough

CELL 2 CROSS-SECTION A-A'

2023 ANNUAL MONITORING REPORT
PETERBOROUGH COUNTY/CITY
WASTE MANAGEMENT FACILITY

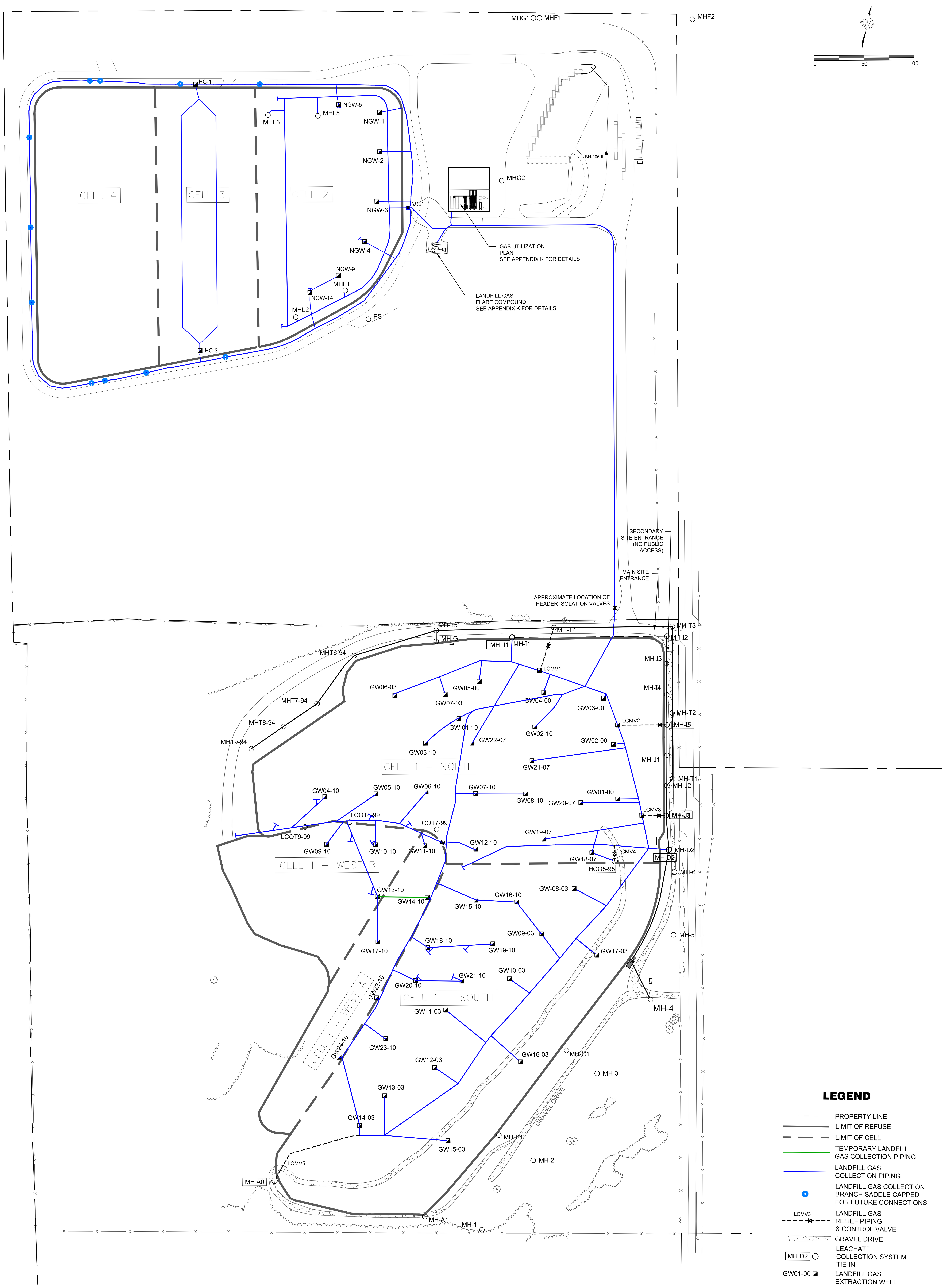
DWN BY: JVC
CHK BY: JJO
DATE: MAY 2024
SCALE: NOT TO SCALE

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

FIGURE
5.4

Plotted: May 10, 2024 – 2:17pm File: C:\Users\Joclyn.Craig\WSP O365\111-53296 Peterborough Landfill (all LF Engineering phases) – Project Folders\04. Technical\0 – Monit. and Rpt\AMR\2023\3–Figures\9–Fig5.4.dwg



D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE 7.1

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: SEE SCALE BAR

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

LANDFILL GAS COLLECTION SYSTEM LAYOUT

2023 ANNUAL MONITORING REPORT
PETERBOROUGH COUNTY/CITY
WASTE MANAGEMENT FACILITY

Peterborough County
peterborough

wsp
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM

APPENDIX

A

ENVIRONMENTAL COMPLIANCE APPROVAL

APPENDIX A - I)

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL – A341508 ISSUED: SEPTEMBER 7, 2018

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

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A341508
Issue Date: September 7, 2018

The Corporation of the City of Peterborough
500 George St N
Peterborough, Ontario
K9H 3R9

Site Location: 1260 Bensfort Road
Lot 15, Concession 14
Peterborough City, County of Peterborough

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

a 27.5 hectare Waste Fill Area (9.5 hectares North Fill Area and 18 hectares South Fill Area) within a total Site area of 158 hectares, which includes a 15 hectare groundwater easement zone, as follows

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

"Acceptable waste" and ***"Acceptable public drop-off waste"*** means municipal, commercial and institutional solid non-hazardous waste generated within the County of Peterborough;

"agent of the City of Peterborough" means a person or company who is hired by the City of Peterborough to fulfil the requirement of *Competent Supervisor* or *Competent Supervisors* referred to in Conditions 37(l), 124, 125 and 168 of this *Approval.* Such person or company would provide independent reports directly to the City of Peterborough and would not be employed or closely associated with any company that the City of Peterborough has contracted to operate the *Site;*

"Buffer Area" means that part of the *Site* that is not waste fill area and includes those lands and easements comprising 84.63 hectares as shown on Tab L of item 9 in Schedule "A";

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

"characteristic waste" means a hazardous waste that is corrosive waste, ignitable waste, leachate toxic waste or reactive waste;

"Competent Person" **or** ***"Competent People"*** means a person or people who has/have the following features:

A. *training and knowledge of the following:*
i. relevant waste management legislation, regulations and guidelines;
ii. major environmental concerns pertaining to the waste to be handled;
iii. contents of the *Owner's* Operations and Maintenance Manual required by Condition 37 and 38 of this *Approval;*
iv. the terms, conditions and operating requirements of the *Approval;*
v. contents of the Owner's Environmental Emergency Plan that is outlined in Conditions 167, 168 and 169 of this *Approval;*
vi. record keeping procedures;
vii. occupational health and safety concerns pertaining to the wastes to be processed;
viii. specific written procedures for the control of nuisance conditions; and
ix. specific written procedures for refusal of unacceptable waste loads; and

B. *through their knowledge, training and experience can carry out any necessary duties in the following, through instruction and practice:*
i. use and operation of any equipment to be used at the *Site;*
ii. operation and management of the Waste Disposal *Site,* in accordance with the specific job requirements of each individual operator, including concern for environmental protection and health and safety standards for the operator of the Waste Disposal *Site,* identification of unacceptable wastes, procedures for refusing the processing of unacceptable wastes, proper handling of waste, proper procedures for the storage of waste and proper maintenance of the *Site;* and
iii. process monitoring procedures; and

C. *training requirements:*
i. has been provided the necessary training by the *Owner* to become a *Competent Person* before starting at the *Site* as an operator; and
ii. is provided refresher training on the components of a *Competent Person* at least annually;

"Competent Supervisor" and ***"Competent Supervisors"*** means a person or people who:
i) is/are an employee(s) of the City of Peterborough or in the alternative, is an agent of the City of Peterborough;
ii) has/have fulfilled the Section A part of the definition of a *Competent Person;*
iii) is/are qualified because of their knowledge, training and experience to assure that direction given by the City of Peterborough to any contractor that the City has hired for the *Site* and the organization of work and its performance by that contractor is sufficient to assure that the terms and Conditions of this *Approval* and associated legislation and regulations are followed; and
iv) is not an employee of the contractor that is referred to in part iii) of this definition and also operates at arms length from such a contractor;

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

"***District Manager*** " refers to the District Manager in the Ministry of the Environment's Peterborough District Office;

"***District Office*** " refers to the Ministry of the Environment Peterborough District Office;

"EAA" refers to the Ontario Environmental Assessment Act as amended from time to time;

"EAAB" refers to the Environmental Assessment and Approvals Branch of the Ministry of the Environment;

"**Environmental Emergency Plan**" is the plan that is required by Conditions 167, 168 and 169 of this *Approval;*

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

"handbook" means the December 2009 Ministry of the Environment publication that has the title, "Land Disposal Restrictions (LDR) Handbook";

"Land Disposal Restrictions" means the requirements of Sections 74 through 85 of Regulation 347, which prohibit the disposal of hazardous wastes that are listed wastes or characteristic waste until they have been treated to meet the land disposal treatment requirements;

"Land Disposal Treatment Requirements" means the requirements identified in Schedule 1, Part A and Part B of Schedule 2 and Schedule 3 of Regulation 347 for listed wastes and in Schedule 5 of Regulation 347 for characteristic wastes. Land disposal treatment requirements are specified as either concentration-based numerical levels or as specified methods of treatment. Regulated constituents must be treated to meet the treatment requirements prior to land disposal;

"Listed Waste" means a waste included in Schedule 1, Schedule 2 Part A, Schedule 2 Part B or Schedule 3 of *Ontario Regulation 347;*

"MECP" or *"**Ministry**"* refers to the Ontario Ministry of the Environment, Conservation and Parks;

"***Operator*** " has the same meaning as "operator" as defined in s.25 of the *EPA* ;

"Operations and Maintenance Manual" means the Manual that is required by Conditions 37 and 38 of the *Approval;*

"***Owner" and "City"*** means the City of Peterborough and the County of Peterborough and/or its successors and assignees;

"OWRA" refers to the Ontario Water Resources Act;

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

"Peterborough" means The Corporation of the City of Peterborough;

"Peterborough Landfill Public Liaison Committee" or PLPLC" means a committee comprised of representatives of the City of Peterborough and area residents established in accordance with Condition 22 of this *Approval;*

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

"North Fill Area" and ***"NFA"*** means the 9.5 hectares landfill *Site* that is located in the North part of the *Site;*

"Reasonable Use Guideline" means the Ministry Guideline B-7 entitled "Incorporation of the Reasonable Use Concept into MECP Groundwater Management Activities, dated April 1994, as amended;

"Regional Director" refers to the Director of the Ministry of the Environment's Eastern Region;

"*Regulation 232* " or "*Reg. 232" or "O. Reg. 232/98"* 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 from time to time;

"Site" and ***"waste disposal site"*** means the 27.5 hectare Waste Fill Area (9.5 hectares North Fill Area and 18 hectares South Fill Area) being more particularly described as PART OF LOTS 14 and 15, CONCESSION 14, OTONABEE, TOWNSHIP OF OTONABEE-SOUTH MONAGHAN), located within a total site area of 158 hectares which includes a 15 hectare groundwater easement zone, in which waste may be deposited pursuant to this *Approval* in accordance with the plans and specifications described on Schedule "A"; and

The 158 hectares are more particularly described as PART LOT 13, 14 and 15, CONCESSION 14 and PART OF LOTS 14 and 15, CONCESSION 13, OTONABEE, TOWNSHIP OF OTONABEE-SOUTH MONAGHAN;

"South Fill Area" and ***"SFA"*** means the 18 hectares landfill site that is located in the South part of the *Site;* and

"waste" has the same meaning as in the EPA and regulations made thereunder.

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

TERMS AND CONDITIONS

GENERAL

Compliance

1. The *Owner* shall ensure that any person authorized to carry out work on or operate any aspect of the *Site* is notified of the *Approval* and the conditions herein and shall take all reasonable measures to ensure the 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 for in this *Approval* , the *Site* shall be designed, developed, constructed, operated and maintained in accordance with all documents listed in Schedule "A" to this *Approval.*

4. Waste disposal operations are approved for the South Fill Area and the North Fill Area, of the City of Peterborough Landfill Site, as generally described in the three volume supporting documentation reports listed as Items 36 to 38, of Schedule "A", submitted pursuant to the *Environmental Assessment Act* approval listed as Item 30, of Schedule "A". Only *acceptable waste* from within the City of Peterborough and the municipalities within the County of Peterborough may be disposed of at this *Site* .

5. As further compliance with the *Environmental Assessment Act* approval listed as Item 30, of Schedule "A", in particular Condition 5. A) of that approval, as it relates to the North Fill Area, the City/County shall continue to demonstrate the suitability of the *in situ* overburden materials to meet the design specifications, i.e. permeability, for the proposed recompacted base and side slopes.

6. Should it not be possible to achieve this design permeability referred to in Condition 5 of this *Approval,* recommendations shall be provided to the Director for an alternate design of the recompacted base and side slopes which will achieve an equivalent or better performance with respect to minimizing the flow of groundwater into the landfill.

Other Legal Obligations

7. The issuance of, and compliance with, this *Approval* does not:

   a. relieve any person of any obligation to comply with any provision of the *EPA* or any other 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 request

that any further information related to compliance with this *Approval* be provided to the *Ministry;*

unless a provision of this *Approval* specifically refers to the other requirement or authority and clearly states that the other requirement or authority is to be replaced or limited by this *Approval.*

Adverse Effect

8. The *Owner* or *Operator* remain 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 or impairment of air and/or water quality.

Furnish Information

9. 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 in a timely manner.

10. 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 subordinate legal instrument, in relation to the information, shall not be construed as:

- an approval, waiver, or justification by the *Ministry* of any act or omission of any person that contravenes any condition of this *Approval* or any statute, regulation or other subordinate legal requirement; or
- acceptance by the *Ministry* of the information's completeness or accuracy.

11. 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.

Interpretation

12. This *Approval* revokes and replaces the previous Approval and all subsequent amendments.

13. Where there is a conflict between a provision of any document, including the application, referred to in this *Approval* , and the conditions of this *Approval,* the conditions in this *Approval* shall take precedence.

14. Where there is a conflict between the application and a provision in any documents 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 in writing**.**

15. Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

16. 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.

Certificate of Restriction

17. (a) The Owner shall ensure a Certificate of Requirement is registered in the appropriate Land Registry Office on title to the Property and a registered copy is submitted to the Director the;

(b) Pursuant to Section 197 of the Environmental Protection Act, neither the Owner nor any person having an interest in the Property shall deal with the Property in any way without first giving a copy of this *Approval* to each person acquiring an interest in the Property as a result of the dealing.

No Transfer or Encumbrance

18. 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 is satisfied with the arrangements made to ensure that all conditions of this *Approval* will be carried out and that sufficient financial assurance is deposited with the *Ministry* to ensure that these conditions will be carried out.

Change of Owner

19. 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:

- the ownership of the *Site*;
- the Operator of the *Site*;
- the address of the *Owner* or *Operator*;
- 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; and
- the name of the corporation where the *Owner* or *Operator* is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act,* R. S. O. 1990, c. C.39, shall be included in the notification.

20. In the event of any change in the ownership of the Site, other than a change to a successor municipality, the *Owner* shall notify in writing the succeeding owner of the existence of this *Approval*, and a copy of such notice shall be forward to the *Director* and *District Manager*.

Inspections

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

- 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;
- to have access to, inspect, and copy any records required to be kept by the conditions of this *Approval*;
- to inspect the *Site,* related equipment and appurtenances;
- to inspect the practices, procedures, or operations required by the conditions of this *Approval*; and
- to sample and monitor for the purposes of assessing compliance with the terms and conditions of this *Approval* or the *EPA*, the *OWRA* or the *PA*.

Peterborough Landfill Public Liaison Committee, (PLPLC),

22. The Owner shall continue and maintain the *Peterborough Landfill Public Liaison Committe**e**, (PLPLC).* The *PLPLC* shall serve as a focal point for dissemination, review and exchange of information and monitoring results relevant to the operation of the undertaking. In addition, the purpose of the *PLPLC* shall be to provide community review of the development, operation (current and proposed) and ongoing monitoring, closure and post-closure care related to the landfill site.

23. The general mandate of the *PLPLC* shall include:

a. Work cooperatively towards proper on-*Site* operations and the avoidance of off-site impacts from the *Site;*
b. Review operations and provide regular input to the Owner with respect to all matters pertaining to landfill site operation, including issues pertaining to ongoing operations, fences that may be needed for litter, monitoring, the need for contingency plans/environmental emergency plan or remedial measures, response to community complaints, the need for changes to the *Approval,* post-closure monitoring and maintenance, and development of the proposed end use for the landfill site;
c. Review operational and monitoring reports;
d. Consider and make recommendations to the Owner regarding outside consulting advice in respect of the landfill *Site;*
e. Facilitate ongoing dialogue between the Owner, the District Office and the community, including residents and businesses in the immediate vicinity of the landfill *Site;*
f. Provide reports regularly to the community on the activities of the *PLPLC,* the landfill operations and landfill related issues and seek public input on these activities and issues;
g. Monitor the Owner's complaint response program and make recommendations to the Owner with respect to this program; and
h. Provide recommendations to the Owner with respect to unresolved complaints.

24. The *PLPLC* shall not exercise any supervisory, regulatory, approval, legal or other decision making role with respect to the operations (current and proposed) at the *Site.*

25. a) The Owner shall provide for the administrative costs of operating the *PLPLC,* including the cost of meeting places and clerical services up to a maximum annual cost of $5000; and

b) The *District Manager* may suggest to the City that a higher amount than $5000 of the cost be paid for by the City.

26. The *PLPLC* shall operate under a Terms of Reference of the committee. Suggestions to revise the *PLPLC* Terms of Reference may be made at any meeting that a quorum is present. No changes to the Terms of Reference can be made until the committee members mutually agree to changes.

27. A copy of the Terms of Reference shall be provided to the District Manager within thirty (30) days of issue of this *Approval.* Any changes to the Terms of Reference shall be provided to the District Manager for information purposes.

28. The community members shall be appointed by the *PLPLC* by the *Owner.* The community member positions are intended to be available to individuals that are not members of groups already represented on the *PLPLC* and have an interest in the operation of the landfill. The *PLPLC* shall encourage individuals who reside in close proximity to the landfill to participate. A community member is defined as a taxpayer and/or resident of the City of Peterborough.

29. The *PLPLC* shall determine the appropriate meeting frequency and review it on an annual basis.

30. Minutes and agendas of meetings shall be printed and distributed as per the mailing list on a timely basis.

31. The *PLPLC* shall have reasonable access to the *Site* and its landfill related facilities for the purpose of carrying out its objective and mandate and the Owner's consultants' reports relating to *Site* operations shall be provided to the *PLPLC.*

32. The Owner shall provide the *PLPLC* with access to the Owner's consultants as required and consultants reports in accordance with protocols agreed to between the Owner and the *PLPLC.*

33. Unless disclosure would be contrary to the Freedom of Information and Protection of Privacy Act, the *PLPLC* is to be provided all formal submissions and correspondence related to the *Site* operations by the Owner at the same time as these items are submitted to the Ministry, or any other body.

34. The Owner shall allow access to the landfill *Site* during normal operating hours, to enable any individual member of the *PLPLC* and member of the public recommended by local representatives on the *PLPLC,* to observe operations. An individual member of the *PLPLC* must contact the operator to arrange for a *Site* pass, be accompanied by an operators representative at all times and follow all safety procedures.

35. All recommendations made to the Owner with respect to ongoing landfill operations, monitoring

and the implementation of contingency measures shall be discussed at joint meetings between representatives of the Owner and the *PLPLC*. The purpose of these meetings will be to arrive at an agreement between the Owner and *PLPLC* with respect to implementation of the recommendations.

36. The Owner shall disclose all monitoring results to the *PLPLC* and deliver to the *PLPLC* all documents and information (except as may be privileged) relevant to the operation of the landfill.

Landfill Operator's Manual

37. Within 180 days of issuance of this *Approval,* the Owner shall submit to the District Manager a landfill operator's Operations and Maintenance Manual that is consistent with this *Approval* and that identifies the duties to be conducted by staff in key operational areas on a day to day basis. The operator's manual shall include:
    a. Health and safety;
    b. Best Management Plans for dust, litter and odour;
    c. Operation and maintenance of the *Site;*
    d. Waste acceptance;
    e. Waste disposal area and development;
    f. Nuisance management;
    g. Leachate management;
    h. Landfill gas management;
    i. Surface water/Storm water management;
    j. Inspections and monitoring;
    k. Complaints;
    l. a detailed job description of the duties of a *Competent Supervisor;* and
    m. Reporting and record keeping.

38. The Operations and Maintenance Manual shall be:
- retained at the *Site;*
- kept up to date through periodic revisions; and
- be available for inspection by *Ministry* staff.

Signage

39. A sign shall be installed and maintained at the main entrance/exit to the *Site* on which is legibly displayed the following information:
- the name of the *Site* and *Owner* ;
- the number of the *Approval;*
- the name of the *Operator;*
- the normal hours of operation;
- the allowable and prohibited waste types;
- a warning against unauthorized access;
- the telephone number to which complaints may be directed;
- a twenty-four (24) hour emergency telephone number (if different from above); and

- a warning against dumping outside the *Site* .

40. The Owner shall install and maintain signs to direct vehicles to the working face and recycling areas.

41. The Owner shall provide signs at recycling depot informing users what materials are acceptable and directing users to appropriate storage area.

Closure Plan

South Fill Area

42.1 At least 2 years prior to closure, the Owner shall submit to the Director for approval, with copies to the District Manager, and the *PLPLC* , a detailed *Site* closure plan pertaining to the termination of landfilling operations at the South Fill Area (SFA), post-closure inspection, maintenance and monitoring, and end use. The plan shall include the following:

a. a plan showing *Site* appearance after closure;
b. a description of the proposed end use of the *Site* ;
c. a description of the procedures for closure of the *Site,* including:
  i.) advance notification of the public of the landfill closure;
  ii) completion, inspection and maintenance of the final cover and landscaping;
  iii) *Site* security;
  iv) removal of unnecessary landfill-related structures, buildings and facilities; and
  v) final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
d. a schedule indicating the time-period for implementing sub-conditions i) to v) above.
e. 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;
f. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
g. an updated estimate of the contaminating life span of the SFA, based on the results of the monitoring programs to date.

42. 2 **North Fill Area**

At least 2 years prior to closure of the North Fill Area (NFA) or when 90% of the NFA allowed capacity is reached, whichever comes first, the Owner shall submit to the Director for approval, with copies to the District Manager, and the *PLPLC* , 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:

a. a plan showing the appearance of the NFA and the entire *Site* after closure;
b. a description of the proposed end use of the NFA and the entire *Site* ;
c. a description of the procedures for closure of the *Site,* including:

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

d. a schedule indicating the time-period for implementing sub-conditions i) to vi) above.
e. 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;
f. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
g. an updated estimate of the contaminating life span of the NFA and the entire *Site* , based on the results of the monitoring programs to date.

43. The SFA and/or the NFA and when applicable, the *Site* as a whole shall be closed in accordance with the closure plan(s) as approved by the *Director.*

End Use

44. The Owner shall consult with affected stakeholders on the proposed end uses prior to the submission of its closure report required under Condition 42.1 and 42.2. The proposed end use activities should be consistent with the types of activities consulted upon during the Environmental Assessment for the *Site.*

Closure of the *Site*

45. Upon closure of the South Fill Area, and/or the North Fill area, the following features will be inspected, recorded on a quarterly basis and maintained as required on a seasonal basis :

- evidence of settlement;
- possible leachate seeps and springs;
- cover soil integrity;
- vegetative cover;
- surface water drainage works;
- erosion and sediment in surface water drainage system; and
- groundwater monitoring wells.

46. A vegetative cover consisting of vegetation that is suited to local conditions and that is capable with minimal care of providing vigorous, plentiful cover no later than its 3rd growing season shall be established over all completed areas to control erosion and maximize evapotranspiration. The Owner shall complete planting as soon as possible but no later than 6 months after reaching final contours.

47. If weather conditions do not allow timely placement of final and vegetative cover, silt curtains shall be employed to minimize silt loadings to surface water bodies.

Landscape Plan

48. The Owner shall ensure a completed landscape plan for the *Site* is submitted to the District Manager with copies to the *PLPLC* .

OPERATION

Proper Operation

49. The *Site* shall be properly operated and maintained at all times. All waste shall be managed and disposed of in accordance with the *EPA* , *Regulation 347* , *Regulation 232,* and the requirements of this *Approval.* At no time shall the discharge of a contaminant that causes or is likely to cause an adverse effect be permitted.

50. The Owner shall ensure that the MECP's Guideline B-7, *Reasonable Use Guideline,* is applied at the *Site* boundaries.

Waste Inspection

51. All loads of waste coming to the *Site* shall be properly inspected by a *Competent Person* prior to disposal at the *Site.* Waste vehicles shall be diverted to appropriate areas for waste disposal.

Waste Deposit

52. The Owner shall deposit waste in a manner that minimizes exposure area at the landfill working face and waste shall be compacted before cover is applied.

Vermin, Dust, Litter, Odour, Noise, Traffic

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

Scavenging

54. The Owner shall ensure that there is no scavenging as defined in Reg. 347 at the *Site.*

Dust, Litter and Odour Control

55. The Owner shall control fugitive dust emissions from on-*Site* sources including but not limited to on-*Site* roads, stockpiled cover material and, closed landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the *Site.*

56. The Owner shall take all practical steps to prevent escape of litter from the *Site.* All loose, wind blown litter shall be collected and disposed of at the landfill working face.

57. The Owner shall respond to complaints of litter from the *Site* with one (1) week of the complaint's receipt.

58. Upon being notified of the approximate location of litter that has blown from the *Site* or from waste haulage vehicles that have used the *Site* or were en route to the *Site,* the Owner shall attempt to clean-up such litter as soon as is reasonably practicable.

59. The Owner shall ensure a Best Management Practices for the control of dust, odour and litter from the *Site* is submitted to the District Manager.

Noise

60. The Owner shall comply with noise criteria in MECP Guideline entitled "*Noise Guidelines for Landfill Sites"* dated October 1998 as amended from time to time and the *Site* shall comply with the limits set in Publication NPC205.

Burning Waste Prohibited

61. Burning of waste at the *Site* is prohibited.

Asbestos Waste

62. Any waste that is considered asbestos waste shall be handled in accordance with Section 17 of Reg. 347 as amended from time to time.

63. A suitable sized excavation for the asbestos waste shall be made by the Owner in a location away from the active landfilling face.

64. All asbestos waste shall be inspected to ensure that the asbestos waste is properly bagged or contained and free from puncture, tears or leaks.

65. The asbestos waste shall be placed in the excavation to avoid damage to the containers and to prevent dust and spillage.

66. Upon completion of the unloading and deposition of the asbestos in the excavation, at least 125 centimetres of cover or waste material shall be placed over the asbestos.

67. All asbestos waste shall be deposited to a level no higher that 1.25 metres below the general elevation of the disposal area to ensure that daily cover material removal in the future does not encounter the asbestos waste.

Backup Power

68. a) The Owner shall provide adequate backup power at the *Site* in order to ensure operation of the scale facility and operation of the landfill gas blower on-*Site* ; and

b) a portable generator would be considered sufficient for back-up power for the landfill gas blower.

69. A power supply connection at each leachate collection pumping station shall be installed by the Owner that will permit a portable generator to be connected during a power outage.

Surface Water

70. The Owner shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around active waste disposal areas to prevent extraneous surface water from coming in contact with the active working face.

71. The owner shall not discharge surface water to receiving water bodies without an approval under Section 53 of the OWRA.

72. If surface water ponding occurs in any surface water ditches having a drainage slope less than 0.5%, the Owner shall regrade the ditches.

Waste Type

73. a) Only *acceptable waste* may be received at the *Site* and public drop-off area;

b) The public drop-off area may receive only *Acceptable public drop-off waste;*

c) *Acceptable public drop-off waste* that is received at the *Site* shall be for disposal at the *Site* or transfer off-site for recycling or reuse;

d) *Acceptable public drop-off waste* may be stored at the public drop-off area for a maximum of ninety (90) days; and

e) With the exception of using a chipper to process wood waste into more manageable sizes, no waste processing shall occur at the public drop-off area.

Capacity

74. **South Fill Area**
The *Owner* shall only accept and deposit waste at the SFA as long as there is available capacity as defined by the final contours for the SFA approved by this *Approval* . This *Approval* permits disposal of waste at the *Site* to fill an air space of 2,918,000 cubic metres (including waste, daily and interim cover material) for the SFA.

75. **North Fill Area**

The *Owner* shall only accept and deposit waste at the NFA as long as there is available capacity as defined by the final contours for the NFA approved by this *Approval* . This *Approval* permits disposal of waste at the *Site* to fill an air space of 1,527,000 cubic metres (including waste, daily and interim cover material) for the North Fill Area.

Yearly Waste Limit

76. a) The Owner may receive at the *Site* up to a maximum of 85,000 tonnes per year of waste including contaminated soil for disposal at the *Site;* and

b) In the event of an emergency, the Owner may request to the District Manager that the amount allowed to be received in one particular year be increased by 20,000 tonnes and the District Manager has the authority to grant written approval to such a request.

Service Area

77. Only waste that is generated within the County of Peterborough may be accepted at the *Site.*

Cover Materials Allowed

78. The following materials, in the corresponding thickness, may be used as an alternative to soil as a daily and intermediate cover:

i) non-hazardous contaminated soil that meets the Land Disposal Requirements of Regulation 347 and the *handbook;* and

ii) Wood chips and compost overs consisting of processed chipped wood.

79. The Owner shall keep a record of the delivery of all contaminated soil to the *Site* . The record shall include the following information as a minimum:

i) The name and Approval number of the hauler;
ii) The name and address of the generator of the waste;
iii) The date and time of delivery; and
iv) The quantity of waste delivered.

80. The use of non-hazardous contaminated soil for daily/intermediate cover referenced in Condition 78 of this *Approval,* shall be subject to the Owner:

a) making sure that the Generator has provided a signed statement with the following information at a minimum to the Owner regarding the contaminated soil including:

i) the date;
ii) the name of the Generator;
iii) Generator Registration number, if the Generator has one;
iv) the source of the non-hazardous contaminated soil;
v) whether the non-hazardous contaminated soil was ever categorized as a listed or characteristic hazardous waste;
vi) any records required by Section 79 and 84 of Regulation 347;

vii) if the waste were a characteristic waste but has been treated, a copy of the Land Disposal Restrictions Form required by Regulation 347 or a notification stating that the waste was a characteristic waste and that the waste can be land disposed as per Sections 79 and 84 of Regulation 347; and
viii) analytical test results of the contaminated soil.

b) taking all reasonable precautions to ensure that the requirements of the *Land Disposal Restrictions* and the *Land Disposal Treatment Requirements* outlined in Regulation 347 are being followed at the *Site.*

81. The volume of contaminated soils stored at the *Site* shall not exceed the three months limitation of the annual daily/ interim cover material requirements as determined by the previous annual report. The Owner shall ensure at all times that the stockpiled contaminated soils shall produce no off-Site nuisance odours.

82. In the event of a reported incident of odour from the contaminated soil at the *Site* which causes a nuisance and poses a threat to the health and safety of person(s) and the environment, the Owner shall forthwith implement a contingency plan to immediately abate the nuisance odour and/or run-off that may originate from the stockpile.

83. The use of any other alternative materials as daily or intermediate cover material is subject to approval by the Director.

84. Use of contaminated soil as daily or intermediate cover materials shall be discontinued within two (2) working days of receipt of written notification from the District Manager, stating that the use of the alternative daily or intermediate cover materials at the *Site* has proven to be environmentally unsuitable.

Contaminated Soil as Daily or Intermediate Cover

85. Prior to receipt at the *Site* , each source of contaminated soils which are to be used as daily or intermediate cover shall be tested to determine if the soils meet the criteria in this *Approval* and Regulation 347. A copy of the test results shall be kept in the daily records for the *Site.*

86. If confirmatory testing of the contaminated soil used for daily or intermediate cover indicates it is hazardous or exceeds the allowed Land Disposal Restrictions, the Owner shall report any failed sample of the contaminated soil testing to the District Manager forthwith.

87. Any contaminated soil that is determined to be hazardous shall be considered a hazardous waste and shall be disposed in the appropriate manner.

88. Subject to Conditions 80 and 85 of this *Approval,* contaminated soil for use as daily cover shall be stockpiled in areas of the *Site* that have a leachate collection system installed below.

89. Subject to Conditions 80 and 85 of this *Approval,* contaminated soil may be used for

daily/intermediate cover but only on slopes where surface water drainage is into the waste fill and isolated from the storm water collection system.

90. Surface water run off from the contaminated soils stockpile which exceeds the Provincial Water Quality Objectives shall not be discharged through the surface water management system.

91. The Owner must ensure that measures are in place for the on-*Site* treatment and disposal of any contaminated run off from the contaminated soils stockpile.

Buffer Area

92. A minimum 30 metre buffer area shall be provided and maintained between the disposal areas and the landfill property boundaries.

Waste Limits

93. a) No waste, including daily cover, intermediate cover or final cover layer, may be landfilled outside the limits of the base contours and the final contours outlined in Items 36, 37, and 38 of Schedule "A"; and

b) Notwithstanding Condition 93 a) of this *Approval,* daily, intermediate and/or final cover materials may be temporarily stockpiled up to five (5) metres above the approved final contours for the *Site* for a maximum of time of six (6) months. Where cover material is temporarily stockpiled above final contour elevations, silt fencing, dust control and/or all other appropriate measures shall be taken to prevent dust and surface water impacts on/off *Site.*

Application of Cover Material

94. Cover material shall be applied as follows:

a) Daily Cover - At the end of each working day, the entire working face shall be covered

with a minimum thickness of 150 mm of soil cover or an approved alternative cover material;

b) Daily cover that is exposed shall be checked at least once every week to see if the 150 mm of soil cover or approved alternative cover material is being maintained;

c) Where the inspection required in Condition 94(b) reveals that the 150 mm cover has been compromised, soil cover or an approved alternative cover material shall be added to bring the thickness of the daily cover to a minimum of 150 mm;

d) Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved alternative cover material shall be placed; and

e) Final Cover - In areas where landfilling has been completed to final contours, a minimum 0.9 metre thick layer of final cover soil shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

95. Final cover, consisting of material of low permeability that has hydraulic conductivity to allow at least 0.15 metres of infiltration per year, shall be applied and compacted in maximum 15 cm thick lifts. The total compacted thickness of the final cover shall be at least 0.9 metre. A minimum of 0.15 metres of topsoil or other material approved by the Director shall cover the 0.9 metre of cover so that plant growth may be sustained.

96. Appropriate surface inspections of the final cover will be made annually by the Owner to ensure that erosional problems are identified and remediated forthwith.

97. Final cover and topsoil layer shall be progressively applied to the *Site* as the final waste contours are reached.

Hours of Operation

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

- 7 AM to 7 PM - Monday to Saturday (except statutory holidays).

99. On-*Site* equipment used for daily *Site* preparation and closing activities shall only be used during the following time periods:

- 6 AM to 8 PM - Monday to Saturday (except statutory holidays).

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

101. The Owner may provide limited hours of operation provided that the hours are posted at the landfill gate and that suitable notice is provided to the public of any change in operating hours.

102. Upon reasonable notice to the District Manager, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

***Site* Security**

103. During non-operating hours, the *Site* entrance and exit gates shall be locked and the *Site* shall be secured against access by unauthorized persons.

Fencing

104. The Owner shall make sure that the necessary fencing for security of the *Site* is installed.

Waste Inspection

105. The *Owner* shall conduct waste inspection to ensure that the waste is of a type approved for acceptance under this *Approval.*

Access Roads

106. On-*Site* roads shall be provided and maintained in a manner that vehicles hauling waste to and on the *Site* may travel readily and safely on any operating day. During winter months, when the *Site* is in operation, roads must be maintained to ensure safe access to the landfill working face. Access roads must be clear of mud, ice and debris which may create hazardous conditions.

Cleaning of Leachate Collection System

107. The leachate collection system piping for each stage of the development of the North Fill Area of the landfill shall be inspected annually for the first five years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary.

108. Leachate video system inspection shall be:
   i. biannual (every 2 years, in odd years e.g. 2013, 2015 etc.)
   ii. video inspection of the entire system or selected portions of the system shall be undertaken on an annual basis if obstructions or if significant changes in the ability to flush the system are encountered; and
   iii. annual video inspection of newly installed leachate pipes shall be undertaken for five years following installation.

109. The leachate collection system for the North Fill Area and the South Fill Area shall be cleaned at least once per year, having regards with a report entitled "Annual Monitoring Report, Design and Operations - 1997, Bensfort Road Landfill, Peterborough, Ontario", date May 1998, prepared by CRA. A video inspection performed of the NFA and SFA, where practicable, biannually, having regard to the 2003 to 2004 Annual Monitoring Reports, Design and Operations, South Fill Area, City of Peterborough, Waste Facility, Peterborough, Ontario. An opinion of a professional engineer as to the structural integrity and efficiency of the leachate collection system of the NFA and the SFA shall be included in the Annual Report required under Condition 184 of this *Approval.*

110. In areas where leachate collection pipe slopes are less than 0.5%, the leachate collection pipes shall be inspected semi-annually for the first three (3) years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary. After the three (3) year period, inspection and cleaning of the leachate collection pipes shall be in accordance with the previous condition.

Leachate Collection System:

111. No Waste shall be deposited in any cell in the North Fill Area of the *Site* until the leachate

collection system for that cell, as described in the documents listed in Item 37 in Schedule "A" has been installed.

112. Engineered components of the leachate collection system at the NFA, including those involving geotextile, granular blanket drainage layers, perforated pipes-french drains, and monitoring installations shall be inspected by a professional engineer prior to placement of waste, with appropriate maintenance and/or replacement of parts of the system occurring from time to time, as required and where feasible.

113. Leachate alarms shall be installed and maintained in the NFA and the SFA having regard to Section 6 of item 5 in Schedule "A".

114. The flow of leachate from the leachate collection systems shall be determined and the results integrated into the annual water balance.

115. The information referred to in Condition 114 of this *Approval* shall be used as part of an annual assessment of the performance of the under drain system and all interpretations and conclusions shall be included in the Annual Report.

116. Leachate that is to be removed from the leachate collection system shall be removed in a manner which prevents any overflow of leachate to any surface water course.

117. As-built drawings of the leachate control system for the North Fill area shall be submitted to the District Manager within 60 days of issue of this *Approval* or within sixty (60) days of the completion of the leachate control system for the North Fill area.

118. The leachate in the collection system shall be removed as required and in such a manner, to prevent any overflow of leachate to any surface watercourse.

119. Leachate samples shall be collected from the leachate collection system of the NFA and the SFA in order to characterize and monitor the leachate chemistry for a period of twenty-five (25) years subsequent to *Site* closure, at which time the monitoring program will be re-evaluated by the Owner to determine the need and/or type of monitoring to be continued. Recommendations from the Owner shall be submitted to the District Manager for acceptance. Leachate shall be sampled by the Owner at least two times per year (Spring and Fall) to monitor annual trends in leachate chemistry.

120. The flow of leachate from the leachate collection system shall be determined and the results integrated into an annual *Site* water balance. This information shall be used as part of an annual assessment of the performance of the leachate drain system and all interpretations and conclusions shall be included in the annual monitoring report.

Inspections

121. The owner shall inspect the *Site* monthly for the following items but not limited to these items:

- Erosion rills;

- General settlement areas or depressions;
- Shear and tension cracks;
- Condition of surface water drainage works;
- Erosion and sedimentation in surface water drainage system;
- Presence of any ponded water;
- Adequacy of cover material;
- Evidence of vegetative stress, distressed poplars or side slope plantings;
- Condition of groundwater monitoring wells and gas wells;
- Presence of insects, vermin, rodents and scavenging animals;
- The amount of litter at the *Site;*
- Condition of fence surrounding the *Site;* and,
- General *Site* appearance.

122. The owner shall inspect the *Site* weekly for presence of leachate seeps.

Competent People and Competent Supervisor

123. A training plan that is sufficient for people that operate any aspect of the *Site* to become a *Competent Person* shall be developed and implemented by the Operator. Only Competent People shall operate any aspect of the *Site* or carry out any activity required under this *Approval.* Workers at the *Site* shall provide proof of training to the Ministry upon request.

124. The Owner shall have a *Competent Supervisor* or *Competent Supervisors* for the *Site;*

125. (a) An up to date list of *Competent People* shall be kept at the *Site* and be readily available for inspection by a *Provincial Officer;*

(b) The District Manager shall be informed in writing within seven (7) days of any additions or changes to who is/are a *Competent Supervisor(s).*

MONITORING, RECORDING NOTIFICATION

Daily Inspections and Log Book

126. 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 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.

127. A record of the inspections shall kept in a daily log book or a dedicated electronic file that includes:

- the name and signature of person that conducted the inspection;
- the date and time of the inspection;
- the list of any deficiencies discovered;
- the recommendations for remedial action; and
- the date, time and description of actions taken.

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

Groundwater Monitors

129. The Owner shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage when not in use.

130. Any groundwater monitoring wells included in the monitoring program shall be assessed, repaired, replaced or decommissioned as required.

131. The Owner shall repair or replace any monitoring well which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

132. All monitoring wells that are no longer required as part of the groundwater monitoring program shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with Ontario Regulation 903.

133. A report on the decommissioning referred to in Condition 132 of this *Approval* shall be provided in the annual monitoring report for the period during which the well was decommissioned.

Monitoring Program

134. Monitoring programs shall be carried out for leachate, groundwater, private wells, surface water, landfill gas in accordance with the Environmental Monitoring Plan, as amended by the *District Manager* from time to time, outlined in Schedule "B" of this *Approval.*

135. a) The *Site* environmental monitoring programs shall be continually evaluated and enhanced as required by the ministry or as recommended in the Annual Report; and

b) The frequency of sampling and parameters for analysis may be adjusted by the District Manager as monitoring information becomes available.

136. No alterations to the groundwater or surface water monitoring programs shall be implemented prior to receiving written approval from the District Manager. The Owner shall provide a copy of any requests for modification to the monitoring program to the *PLPLC* at the same time or prior to the time that such request is made to the District Manager.

Contingency Plans and Trigger Mechanisms

Groundwater Quality

137. The trigger concentration for groundwater quality shall be 80% of the Guideline B-7 values for parameters that have an Ontario Drinking Water Standards value.

138. Groundwater chemical concentrations must be assessed with the trigger concentrations within twelve (12) weeks of sample collection.

139. The assessment process for groundwater quality is detailed in Item 36, 37 and 38 of Schedule "A".

140. If the District Manager determines that leachate collection is not successful and that the monitoring program indicates that contamination will potentially be migrating off-site, or, if leachate springs and/or outbreaks down gradient of manhole J1 occur, the Owner must install and operate the contingency program outlined in the appended documents as defined by Items 24, 29, 36, 37 and 38 of Schedule "A" of this *Approval* and as instructed by the District Manager. The District Manager may, at any time, instruct the Owner to implement the recommendations made in the monitoring report.

Surface Water Quality

141. The trigger mechanisms for surface water quality shall be one of the following:

- Where off-site surface water quality satisfies the Ministry's PWQO, the respective PWQO shall be used as a trigger concentration; and
- Where the background surface water quality naturally exceeds the PWQO, the background concentration should be considered in evaluating and updating the trigger concentration.

142. Surface water quality results will be assessed with the trigger concentrations within twelve (12) weeks of sample collection.

143. The assessment process for surface water quality and response to results above the trigger concentration are as detailed in Item 36, 37, and 38 of Schedule "A".

Landfill Gas

144. (a) Before the placement of any waste in the North Fill Area of the *Site,* the Owner shall ensure that the proposed landfill gas management system specified in Item 45 and 48 of Schedule "A" is installed and operational;

(b) Within sixty (60) days of the flare equipment operating to control landfill gas, an acoustic audit to measure the noise emissions from the flare equipment shall be conducted by the Owner. The Owner shall report the results of the acoustic audit to the Director within 120 days of the flare equipment becoming operational; and

(c) All buildings are to be free of any landfill gas accumulation. The Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

145. The landfill gas collection and flaring/utilization system, South Fill Area, shall be constructed and operated in accordance with the detailed design and development, as described in Item 45

and in Sections 3.0 to 3.4 in Item 48 of Schedule "A".

146. Detailed design and operations report for the North Fill Area and all subsequent phases of the landfill gas collection and flaring system, shall be submitted by the Owner/Operator, for the approval of the Director, with copies to the District Manager, prior to construction. Any design optimization or modification shall be clearly identified, along with an explanation of the reasons for the change.

147. The detailed design and operations report shall, at a minimum, include the following:

(a) full-scale design drawings and specifications, including profiles, *Site* plan showing the entire *Site* (waste fill areas and buffers), all engineered facilities associated with the headers, laterals and sub-laterals, and material descriptions and requirements for delivery, storage, installation and sampling;

(b) detailed quality assurance/quality control (QA/QC) program for construction of the landfill gas collection and flaring system;

(c) details of nuisance control programs and necessary precautions to avoid disturbance to the natural environment caused by the operation of the landfill gas collection and flaring;

(d) details on the monitoring, maintenance, repair and replacement of components of the landfill gas collection and flaring system, as necessary; and

(e) contingency plans for environmental controls.

148. The Owner/Operator shall develop and operate the landfill gas collection and flaring system, including all approved facilities, in accordance with the approved detailed design and operations report, and shall implement QA/QC activities and procedures, as approved by the Director.

149. The Owner/Operator shall ensure the *Site's* Operations and Maintenance Manual required by Condition 37 of this *Approval* is updated to reflect the development and operation of the landfill gas collection and flaring system expansion, with respect to details on inspection and maintenance schedules, documentation procedures, shut-down procedures, Ministry contact procedures, and flare operation and maintenance. A copy of the Manual shall be provided to the District Manager and a copy retained on-*Site* and made available to Ministry staff upon request.

150. Prior to implementation of any change in the landfill gas collection and flaring system operation, that may result in activities not specified in the Design Report, identified in Item 48, in Schedule "A", attached to this *Approval,* or in the *Approval,* and that may likely cause the discharge of contaminant to the natural environment, the Owner/Operator shall obtain approval from the Director.

151. The Owner/Operator shall maintain records of landfill gas flow. Such records shall be made available for inspection upon request by a Provincial Officer.

152. In the event of a discharge of a contaminant, including landfill gas, landfill gas condensate, leachate, etc., that causes or is likely to cause an adverse effect, the Owner/Operator shall immediately notify the District Manager and the Ministry's "Spills Action Centre", and advise of actions being taken to contain, control and ameliorate the situation.

153. For any situation when landfill gas is not being collected and incinerated and which cannot be rectified within 48 hours, the Owner/Operator shall notify the District Manager and advise of actions being taken to contain, control and ameliorate the situation.

154. The Owner/Operator shall ensure a written report describing a plan and implementation schedule for landfill gas and odour management in conjunction with *Site* development and progressive rehabilitation is submitted to the Ministry. The plan shall include, as a minimum:

(a) A description of any anticipated progress of final cover placement until *Site* closure, based on progressive rehabilitation of the *Site;* and

(b) A program to evaluate the effectiveness of the landfill gas collection system which shall identify areas of the *Site* which require upgrading, alteration, or additional collection and control facilities. The program shall include an assessment to be conducted at least once a year, of the *Site's* conformance with an operating code of practice which includes the development of system design parameters, details on the management of the system to satisfy the design parameters and a description of rationale for landfill gas flow adjustments to optimize system operation.

155. During construction and continued use of the landfill gas collection system, the Owner/Operator shall implement as a minimum, odour control plan. The effectiveness of the odour control plan shall be monitored and evaluated regularly, and updated or amended as necessary, based on operational experience and odour complaints received.

156. As a component of the Annual Monitoring and Operation Report for the *Site,* the Owner/Operator shall include a written report covering each year’s construction season. The report shall detail the construction activities, QA/QC program carried out for the construction, as-built drawings of the landfill gas collection and flaring system to date, including a description and reasons for any changes to the design of the landfill gas collection and flaring system.

157. Any gas extraction well that needs to be replaced due to damage or the well is deemed to be not functioning properly, or additional wells to upgrade the system, the Owner/Operator shall install or replace the gas extraction well within a reasonable time frame of identifying the need for replacement. Any such changes to the gas extraction system shall be documented in the Annual Monitoring and Operation Report.

158. The Owner/Operator shall implement the monitoring program for landfill gas to monitor the performance of the landfill gas collection and flaring system as approved by the Ministry, as well as any written recommendations of the District Manager through the review of the Annual Monitoring Reports.

159. Components of the active gas collection system shall be monitored on an as-needed basis, with a routine frequency of once per month for the full collection field. Any observed deficiencies/problems shall be repaired as soon as practicable and a summary of remedial actions carried out, shall be reported in the Annual Monitoring and Operation Report, listed in Condition 186 of this *Approval.*

160. The Owner/Operator shall ensure that any proposed changes to the monitoring program under this *Approval* shall be implemented subject to prior written concurrence of the District Manager. The requirement for prior written concurrence does not apply to those actions required to contain, control and ameliorate a situation under Conditions 152 and 153 of this *Approval.*

Subsurface Migration of Combustible Gas

161. Buildings and structures existing or to be built on-*Site* shall be situated, constructed and monitored in a manner which minimizes the potential for explosive hazards due to combustible gas. Appropriate methane detection and alarm equipment, shall be installed and maintained for all enclosed, unvented buildings and/or structures on-*Site* which at times are occupied by people.

Note: For the purposes of Condition 161, <u>vented building or structure</u> is a building or structure built with its floor sealed and elevated above ground and having adequate air space underneath the floor of the building or structure.

162. Subsurface migration of combustible methane gas shall meet the following limits, as required by Ontario Reg. 232/98:

(a) The concentration of methane gas must be less than 2.5 percent by volume at the limits of the property boundary;

(b) The concentration of methane gas must be less than 1.0 percent by volume (15% of the Lower Explosive Limit of methane) in any on-*Site* building or enclosed structure, and in the area immediately outside the foundation or basement floor of the building or structure that is located on-*Site* , if the building or structure is accessible by people or contains electrical equipment or a potential source of ignition;

(c) Sub-condition (b) does not apply to a leachate collection, storage or pumping station or a landfill gas collection and/or treatment facility for which specific Occupational Health and Safety measures and procedures relating to the risk of asphyxiation and the risk of explosion, must be followed; and

(d) The concentration of methane gas from the *Site* in any off-site building or enclosed structure, and in the area immediately outside the foundation or basement floor of the building or structure, if the building or structure is accessible by people or contains electrical equipment or a potential source of ignition, must be less than 0.05 percent by volume.

163. If a measured gas concentration at any specific compliance location, reaches the applicable limit identified in Sub-Conditions 162 (a) and (b) above, the Owner shall undertake additional monitoring, or if a notification is given that gas concentration has reached the limit specified in Sub-condition 162 (d), above, or if landfill gas concentrations exceed 10% of the Lower Explosion Level (LEL), the reading shall be re-measured to assess the source and pathway of methane to determine if the elevated concentrations are landfill related. If these readings confirm an exceedance of the applicable limit, the District Manager shall be notified immediately, and appropriate control measures shall be implemented as soon as possible thereafter.

164. If the elevated concentrations are landfill related, the Owner shall undertake contingency measures.

165. The owner shall maintain the flare that is installed at the *Site* for controlling landfill gas in proper working order.

General Contingency Measures

166. In the event a result of a monitoring test exceeds the trigger mechanisms detailed in Conditions 162 and 163 of this *Approval,* the Owner shall:

a. notify the District Manager, and the *PLPLC* of any trigger level exceedances within twenty four (24) hours of receipt of the results;
b. conduct an investigation into the cause of the adverse result and submit a report to the *District Manager* that includes an assessment of whether contingency measures need to be carried out;
c. if contingency measures are needed, submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures, and a schedule as to when these measures will be implemented, to the *Director* and notify *District Manager* ; and
d. implement the required contingency measures upon approval by the *Director.*

Environmental Emergency Plan

167. The Owner shall review the Environmental Emergency Plan on an annual basis as a minimum, and shall ensure that the names and telephone numbers of the persons to be contacted as required under Condition 168 are up-to-date, and that these numbers are prominently displayed and immediately available to all staff and emergency response personnel.

168. The Environmental Emergency Plan shall include, but not necessarily be limited to:

a) a requirement that an exceedance of any trigger concentration shall initiate contingency measures to ensure that groundwater and surface water discharging to the natural environment does not exceed surface water trigger concentrations outlined in Condition 141 of this *Approval;*

b) preparation for, prevention of, response to and recovery from an environmental emergency such as a spill or process upset, or emission of contaminants or odours;

c) a list of equipment and spill clean up materials available in case of an emergency;

d) contingency procedures to be followed in the event of equipment malfunction, a labour disruption, transportation disruption, inability of the Peterborough Water Pollution Control Plant to accept waste leachate or other business disruption to the operation;

e) a Fire and Explosion Safety Plan for the *Site* that has been developed by a *Professional Engineer* or other qualified person that is knowledgeable about fire and explosion issues at landfill sites;

f) management of unacceptable waste that may inadvertently end up at the *Site;*

g) *Site* emergency response team;

h) procedure for providing a written log or an electronic file to record the description of all spills or emission of a contaminant such as odour, the action taken for the clean-up or correction of the spill or emission of a contaminant, the time and date of the spill or emission of a contaminant, and for spills, the time that the *Ministry* and other persons were notified of the spill in fulfilment of the reporting requirements in the Act; and

i) notification protocol with names and telephone numbers of persons to be contacted, including persons responsible for the *Site,* the Ministry's District Office and Spills Action Centre, the local municipal fire department, the local municipal sewage treatment plant, the *Competent Supervisor* the local Medical Officer of Health, the Ministry of Labour, and the names and telephone numbers of waste management companies available for emergency response.

169. a) Any proposed changes to the Environmental Emergency Plan shall be submitted to the District Manager for his/her acceptance;

b) The equipment, materials, information and personnel requirements outlined in the Environmental Emergency Plan are required to be kept on *Site* and shall be immediately available on the *Site* at all times. The equipment shall be kept in a good state of repair and in a fully operational condition; and

c) The Owner shall promptly take all necessary steps to contain and clean up any spills or upsets at the *Site.* All spills and upsets shall be recorded in a written log or an electronic file format, as to the nature of the spill or upset, and action taken for clean-up, correction and prevention of future occurrences.

Complaints Procedure

170. 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, the time and date of the complaint, specific details of operations that were occurring, any changers from normal operations, types of waste loads (including source) and other on-*Site* activities;

b. The Owner, upon notification of the complaint, shall initiate appropriate steps to determine the validity of the complaint. If the complaint is determined to be valid, investigate all possible causes of the complaint, and proceed to take the necessary actions to eliminate the cause of the complaint. The Owner shall 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.

171. The Owner shall designate a person to receive any complaints and to respond with a written notice of action as soon as possible. The Owner shall post the *Site* complaints procedure at the *Site* entrance. All complaints and the Owner's actions taken to remedy the complaints shall be summarized in the Annual Report.

172. All complaints received by the Owner related to the environmental performance of the *Site,* including environmental performance related complaints that are determined by the *Owner* to be not valid, are to be reported within twenty-four (24) hours of receipt to the District Office. Complaints shall be reported to the *PLPLC* at the next *PLPLC* meeting.

Daily Records

173. Daily *Site* inspection records in the form of a written log or a dedicated electronic file shall include but not be limited to the following:

i) the type, geographic source, date and time of arrival, hauler, and quantity (tonnes) of all waste received at the *Site;*

ii) the area of the *Site* in which waste disposal operations are taking place;

iii) calculation of the total quantity (tonnes) of waste received at the *Site* during each operating day and each operating week;

iv) itemization of each load of contaminated soil delivered to the *Site* as is allowed by Condition 78 of this *Approval;*

v) results of any test done to determine the acceptability of waste at the *Site;*

vi) a reference for each load of solid non-hazardous industrial waste received, to the client and type of solid non-hazardous industrial waste;

vii) a record of any litter collection activities and the application of any dust suppressants;

viii) a record of the daily inspections;

ix) 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;

x) type and amount of daily, intermediate and final cover used;

xi) emergency situations and actions taken to resolve them; and

xii) any other pertinent information required by the District Manager.

174. The Owner shall maintain on record at the *Site* for each client disposing of solid non-hazardous waste at the *Site*, a description of each type of solid non-hazardous waste received from the client and documentation to demonstrate that the Owner has taken reasonable care to ensure that waste classified as either hazardous or liquid industrial waste under Reg. 347 as amended from time to time, is not disposed of at the *Site.*

Record Retention

175. Except as authorized in writing by the Director, all records required by this *Approval* shall be retained at the *Site* for a minimum of five (5) years from their date of creation.

176. The Owner shall retain all documentation listed in Schedule “A” for as long as this *Approval* is valid.

177. All monthly *Site* inspection records are to be kept at the *Site* until they are included in the Annual Report.

178. The Owner shall retain employee training records as long as the employee is working at the *Site.*

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

Emergency Situations

180. In the event of a fire or discharge of a contaminant to the environment, *site* staff shall contact the MECP Spills Action Centre (1-800-268-6060) and the District Office of the MECP forthwith.

181. The Owner shall submit to the District Manager a written report within 3 days of the spill or incident, outlining the nature of the incident, remedial measures taken and measures taken to prevent future occurrences at the *Site.*

182. The Owner shall ensure that adequate fire fighting and contingency spill clean up equipment is available and that emergency response personnel are familiar with its use and location.

Annual Report

183. 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,* and the *PLPLC*, by May 15th of each year, and shall cover the 12 month period preceding December 31st.

184. The Annual Report shall include the following:

i) an updated waste disposal site plan showing the areas of fill, buffer zones, present contours, monitoring locations and surface water control systems;

ii) a calculation of the remaining capacity of the *Site,* an estimate of the remaining *Site* life and a comparison of actual capacity used to approved *Site* capacity;
iii) the optimization of remaining *Site* capacity with respect to refining final contours, having regard to minimizing the potential for off-site impacts;
iv) approved changes to the operation;
v) procedures at the waste disposal site;
vi) a summary of any equipment changes at the site;
vii) an assessment of potential and actual impacts, if any, of the leachate on the Peterborough Water Pollution Control Plant;
viii) a summary of any occurrences or incidents where this *Approval* was not complied with, the reason for non-compliance and the measures to be implemented to ensure that future non-compliance does not occur;
ix) results in tabular format and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring and flaring, including an assessment of the need to amend the monitoring programs;
x) the interpretive analysis referred to in Condition 184 ix) shall include a discussion of groundwater parameters and compliance with the *Reasonable Use Policy* at the property boundary as well as recommendations for future action (contingency measures) that may be necessary should the monitoring program detect failure of the design;
xi) groundwater flow and contaminant migration analyses for the entire landfill *Site;*
xii) surface water quality with respect to Provincial Drinking Water Objectives;
xiii) 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/environmental emergency plan;
xiv) leachate characterization results and a discussion of the potential impacts on the Water Pollution Control Plant;
xv) total leachate volumes collected weekly, monthly and annually and the disposition of the collected leachate;
xvi) *Site* plans showing all surface and ground water monitoring locations and the existing contours of the *Site;*
xvii) areas of landfilling operation during the reporting period;
xviii) areas of intended operation during the next reporting period;
xix) areas of excavation during the reporting period;
xx) the progress of final cover, vegetative cover, and any intermediate cover application;
xxi) facilities installed during the reporting period;
xxii) *Site* preparations and facilities planned for installation during the next reporting period;
xxiii) 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;
xxiv) calculations of the amount of contaminated soil used as alternative cover at the *Site;*
xxv) the amount of contaminated soil stored at the *Site* at the end of the previous year;
xxvi) summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the *Site* ;
xxvii) summary of any complaints received and the responses made;

xxviii) a discussion of any operational problems encountered at the *Site* and corrective action taken;
xxix) a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
xxx) any other information with respect to the *Site* which the *District Manager* or *Regional Director* may require from time to time;
xxxi) a statement regarding compliance with all conditions of this *Approval* and other relevant Ministry requirements, guidelines and regulations;
xxxii) summary of inspections undertaken at the *Site;*
xxxiii) a summary of recycling efforts undertaken at the public drop-off area including the amount of recyclable received;
xxxiv) a summary of the requirements outlined in Condition 80 of this *Approval* regarding the use of contaminated soil for daily/intermediate landfill cover;
xxxv) any changes in operations, equipment or procedures employed at the *Site;* and
xxxvi) recommendations regarding any proposed changes in operations of the *Site.*

185. The implementation of any of the recommendations contained in an Annual Report that come within the scope of Section 27 of the Act, shall be by the approval of the Director.

186. The Owner shall retain on-*Site,* or in a suitable location within the Owner copies of the annual reports referred to in the preceding condition and any associated documentation of compliance monitoring activities and shall continue to do so for a period of at least two (2) years after the closure of the *Site.*

187. In accordance with Environmental Compliance Application dated June 6, 2013, Waste Fill Area known as the South Fill is hereby approved for closure in accordance with Item No 51, Schedule A.

188. a. The Owner shall implement the recommendations outlined in the memorandums from Shawn Kinney, Hydrogeologist, MECP, dated March 5, 2014 and B.W. Metcalfe, Surface Water Specialist, MECP, dated December 19, 2013.

b. The Owner shall implement the following changes to the monitoring program:

- Monitors GMW63-I, II, III and GMW75-I, II shall be added to the monitoring program.

- Samples from monitors GWM-48, GWM-19A, 19B, GMW63-I, II, III and GMW 75-I, II shall be analyzed for the same suite of parameters as in Group G1, Table 1.1 of the Approval.

DETAILED DESIGN FOR LANDFILL GAS COLLECTION SYSTEM FOR THE NORTH FILL AREA

189. Approval is hereby granted for the detailed design and construction of the landfill gas collection system in the North Fill Area of the Landfill Site all in accordance with the Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated September 30, 2016 and supporting documentation as listed below and forms part of Schedule "A", of the Provisional Certificate of Approval, No. A341508.

190. Within ninety (90) days of commissioning of each phase of the landfill gas collection and flaring system, the City shall submit to the *District Manager* a construction report detailing the construction activities and any design changes made to the Landfill Gas System during construction.

191. The updated landfill gas monitoring program, listed as Item 56 in Schedule "A" is hereby approved.

192. The Owner shall obtain an approval under section 9 of EPA and Section 27 of EPA for any future upgrade in the Landfill Gas Collection and Utilisation system.

REUSE CENTRE

193. The *Owner* may operate a "Reuse Centre" located on the public drop-off platform for the handling and temporary storage of reusable items in accordance with Items 54 and 55 of Schedule "A".

194. Only solid non-hazardous waste shall be stored at the "Reuse centre."

195. The following waste types are prohibited from being stored at the "Reuse centre":

i. Subject waste
ii. Asbestos waste
iii. Putrescible waste

196. The amount of waste stored at the "Reuse Centre" shall not exceed 30 cubic metres or 2 tonnes.

197. The *Owner* shall ensure that the "Reuse Centre" is only open during regular *Site* hours and that the facility is securely locked during other times.

198. The storage of waste outside of the "Reuse centre" is prohibited during non-operating hours.

199. Any solid, non-hazardous residual wastes arising from the operation of the "Reuse Centre" shall be disposed of at the *Site* as part of regular and normal operations.

SCHEDULE "A"

This Schedule "A" forms part of Approval No. A 341508

1) Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated July 28, 1993 and as amended November 17, 1993.

2) Report entitled "City of Peterborough Bensfort Road Landfill Site - Application for Interim Expansion, Volume 1" by Gartner Lee Limited and the City of Peterborough, dated March 1991.

3) Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 2" by Gartner Lee Limited dated March 1991.

4) Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 3" by Gartner Lee Limited, CJB Air Quality Management, S.S. Wilson and Associates and Gore & Storrie Ltd., dated March 1991.

5) Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 4" by Conestoga-Rovers & Associates dated March 1991.

6) Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 5" by Mark L. Dorfman, Planner Inc., City of Peterborough and Marshall, Macklin & Monaghan, dated March 1991.

7) Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Addendum 1" by Conestoga-Rovers & Associates, The City of Peterborough, Gartner Lee Limited, CJB Air Quality Management, S.S. Wilson and Associates, Gore & Storrie Limited, Marshall Macklin Monaghan and Mark L. Dorfman Planner Inc., dated December 1991.

8) Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Addendum 2" by Gartner Lee Limited, Conestoga-Rovers & Associates, CJB Air Quality Management and S. S. Wilson and Associates, dated September 1992.

9) Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Addendum 3" Tabs A-N by Gartner Lee Limited, Conestoga-Rovers & Associates, The City of Peterborough, CJB Air Quality Management, S. S. Wilson and Associates, Gore & Storrie Limited, Marshall Macklin Monaghan and Mark L. Dorfman Planner Inc., dated July 1993.

10) Report entitled "City of Peterborough Bensfort Road Landfill Site- 1992 Annual Monitoring Report" by Gartner Lee Limited dated March 1993.

11) Report entitled "City of Peterborough Bensfort Road Landfill Performance Monitoring Program" by Gartner Lee Ltd., dated October 1993.

12) Report entitled "Specifications for Tree Planting Bensfort Road Landfill Site" dated July 1992.

13) Draft Drawings 12-1, 12-2, 12-3, dated August 1993 and 12-4, 12-5 and 12-6 dated October 1993 by Conestoga- Rovers & Associates and any amendments to the Drawings which have been approved by the Director.

14) Report entitled “Annual Monitoring Report Design and Operations 1998, Bensfort Road Landfill Site Peterborough, Ontario,” prepared by Conestoga Rovers & Associates dated May, 1999.

15) Report entitled: “City of Peterborough, Bensfort Road Landfill Provisional Certificate of number A341508 Application for an Emergency Certificate, prepared by Gartner Lee Limited in association with Conestoga-Rovers and Associates Limited dated May,1999.

16) Letter from G. L Treadwell, Conestoga-Rovers & Associates to S. Essop, EAAB dated June 8, 1999. Providing Clarification on Site size and area.

17) Letter from P. Douglas Petrie, Willms & Shier, Solicitor for municipality, the Township of Otonabee-South Monaghen to A. Dominski and S. Essop Environmental Assessment and Approvals Branch dated June 9,1999, response to City of Peterborough Bensfort Road Landfill, Application for Emergency Approval MECP Certificate of Approval nos. A341508 (Site) and 8-4006-99-006(Air).

18) Letter from R. E. J. Leech Gartner Lee Limited to A. Dominski and S. Essop, EAAB dated June 17, 1999 response to the letter from P. Douglas Petrie Township of Otonabee - South Monaghan dated June 9, 1999.

19) Letter from T. A. McIelwain, Older Associates Ltd on behalf of D. Petrie, Willms & Shier, to S. Essop, EAAB, date June 21, 1999, response to petroleum hydrocarbon contaminated soils handling and storage protocol at the site.

20) Letter from E. Warburton, of the organization SHAME, to A. Dominski and S. Essop, EAAB, dated June 15, 1999 response and comments on the draft Emergency Application Certificate of Approval.

21) Letter from J. W. Hart, City Solicitor, City of Peterborough to S. Essop, EAAB, dated June 28, 1999 response and comments on Draft Emergency Certificate of Approval.

22) Letter from J. W. Hart, City Solicitor, City of Peterborough to SHAME and S. Essop, EAAB, dated June 28,1999 response on land compensation issue, odour problems, funding and site closure date.

23) Letter from P. Douglas Petrie, Willms & Shier, Solicitor for municipality, the Township of Otonabee-South Monaghen to A. Dominski and S. Essop, EAAB dated June 28,1999,

response and comments on draft Emergency Application Certificate of Approval.

24) Letter report from E. J. Leech, Gartner Lee Limited to A. Dominski, Environmental Assessment and Approvals Branch, dated July 26, 2999, providing revised plans for the Site.

25) Application for an Emergency Approval dated November 30, 2000 and supporting documentation titled "City of Peterborough, Bensfort Road Landfill, Provisional Certificate of Approval, No. A341508 - Application for an Emergency Certificate", prepared by Gartner Lee Ltd. and Conestpoga-Rovers and Associated Ltd., dated December 2000.

26) Letter to Mr. A Dominski, Environmental Assessment and Approvals Branch, Ministry of the Environment form Gartner Lee Ltd. Dated December 21, 2000, which provided environmental justification for expanding the service area of the Bensford Road Landfill site to include the waste from the Township of Havelock-Belmont-Methuen.

27) Application for an Emergency Approval dated June 8, 2001 and supporting documentation titled "City of Peterborough, Bensfort Road Landfill, Provisional Certificate of Approval, No. A341508 - Application for an Emergency Certificate", prepared by Gartner Lee Ltd. and Earth Tech (Canada) Inc., dated June, 2001.

28) Letter to Mr. Michael Williams, Environmental Assessment and Approvals Branch, Ministry of the Environment from City of Peterborough, City Solicitor, dated June 8, 2001, which provides justification for the application for an emergency approval and outlines the context of the application.

29) Letter to Mr. Michael Williams, Environmental Assessment and Approvals Branch, Ministry of the Environment from Gartner Lee Ltd., dated June 26, 2001 outlining the public consultation undertaken by the City of Peterborough regarding the emergency application.

30) Notice of Approval to Proceed with the Undertaking as required by the Environmental Assessment Act (EAA), O.C. 450/2002, dated January 23, 2002.

31) Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated March 28, 2002.

32) Documentation supporting an Application for a Provisional Certificate of Approval, submitted in accordance with Section 27 of the *Environmental Protection Act* : titled "Oton-1 Landfill Site, located in the Township of Otonabee-South Monaghan, County of Peterborough, dated March 2002, prepared by Earth Tech Canada Inc. for the County of Peterborough and the City of Peterborough.

33) Letter requesting an extension for the submission of the North Fill Area design details prepared by Earth Tech Canada Inc., submitted on behalf of the County and City of Peterborough, to the Ministry of the Environment, with attachments

34) The letter requesting an extension for the submission of the North Fill Area design and

operations report, prepared by McCarthy Tetrault, submitted on behalf of the County and City of Peterborough, to the Ministry of the Environment, dated September 17, 2003.

35) Letter dated January 29, 2004 to the ministry from Earth Tech Canada Ltd. submitting the following design documentation in compliance with Condition 5.1.

36) Volume 1 – South Fill Area, Design and Operations Report, dated January 2004, including:
-Hydrogeological Assessment

37) Volume 2 – North Fill Area Design and Operations Report, dated January 2004, including:
-Hydrogeological Assessment
-Surface Water Quality Study.

38) Volume 3 – Technical Assessments, South Fill Area and North Fill Area, dated January 2004, including:
-Air Quality Impact Assessment
-Leachate Environment Study
-Natural Environment Study
-Noise Impact Study Traffic Impact Study
-Visual Impact Study.

39) Letter dated February 28, 2008 from Frederick (Rick) A. Mosher, Conestoga-Rovers & Associates to Director, Environmental Assessment and Approvals Branch, Ministry of the Environment regarding request for an amendment to Condition 17.

40) Report entitled "Annual Monitoring Report, Design and Operations - 1997, Bensfort Road Landfill, Peterborough, Ontario", date May 1998, prepared by Conestoga-Rovers & Associates.

41) 2003 to 2004 Annual Monitoring Reports, Design and Operations, South Fill Area, Peterborough County/City Waste Facility, Peterborough, Ontario, prepared by Conestoga-Rovers & Associates.

42) Application for an Amendment to Provisional Certificate of Approval for a Waste Disposal Site, dated June 29, 2007 from The Corporation of the City of Peterborough.

43) Letter dated February 28, 2008 Frederick Mosher, Connestoga-Rovers & Associates requesting a revised leachate video inspection system inspection.

44) E-mail dated April 29, 2009 from Melanie Kawalec, The Corporation of the City of Peterborough, to Roman Lysiak, MECP regarding submission of additional information.

45) Report entitled "Landfill Gas Collection System Report, Peterborough County/City Waste Management Facility Peterborough, Ontario (PCCWMF)" dated June 30, 2009 prepared by UEM.

46) Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated November 8, 2010, signed by Melanie Kawalec, Manager, Waste Management Division, City of Peterborough.

47) Letter dated November 26, 2010, from Melanie Kawalec, Manager, Waste Management Division, City of Peterborough to the Director, Environmental Assessment and Approvals Branch, Ministry of the Environment, re: final detailed design for the landfill gas collection and flaring/utilization system in the South Fill Area of the Oton-1 Landfill Site.

48) Report entitled "Bensfort Road Landfill - Landfill Gas System Expansion", dated November 25, 2010 prepared by Dillon Consulting Ltd.

49) May 14, 2010, E-mail from Joe Ovcjak to K., Keeling, City of Peterborough with attached 2009 Monitoring Program.

50) September 1, 2011 e-mail from Wayne Jackson, Director, City of Peterborough, to Jim Chisholm of the Ministry of the Environment with the following attachments: 2010 Monitorimng Program, Groundwater and Leachate Monitoring Programs for the Site, Peterborough county/City Waste Management Facility; 2005 Annual Monitoring Report; and 2006 NFA Sampling Program

51) Report titled *South Fill Area Closure Plan, Peterborough Landfill, dated May 2013, prepared by Urban and Environmental Management Inc.*

52) Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated September 30, 2016, and supporting documentation prepared by WSP.

53) Response letter dated June 16, 2017 received from WSP regarding the clarification of design basis.

54) Application for Approval of a "Reuse Centre" dated June 3, 2016 and supporting documentation prepared by the Corporation of the City of Peterborough.

55) Email dated August 29, 2017 from Virginia Swinson, City of Peterborough to Nick Zambito, MECP regarding additional "Reuse centre" construction and operation details.

56) Environmental Compliance Application dated September 13, 2017 signed by Don Briand, City of Peterborough and the supporting documentation regarding landfill gas monitoring program.

SCHEDULE "B"
This Schedule "B" forms part of Approval No. A 341508

ENVIRONMENTAL MONITORING PROGRAM

A) **GROUNDWATER**

<u>Group</u>	<u>Monitoring Designation</u>	<u>Monitoring Events</u>	
Groundwater		*March/April*	*September/October*
G1	18A, 18B, 20B, 66-III, 81-I,81-II, 81-III	Water Levels	Water Levels
		Analysis List 1	Analysis List 1
		Analysis List 2	
		Analysis List 3	
G2	16A, 19B, 20A, 33-II, 33-III, 40-II, 41-I, 41-II, 44-1, 44-II, 44-III, 46-I,46-II, 46-III, 50-I, 50-II, 52-I, 52-II, 53-I, 54-II, 61-I, 61-II, 61-III, 62-I, 64-I, 64-II, 66-I, 66-II, 70-I, 70-II, 70-III, 74-II, 76-I, 77-I, 101-I, 101-II, 101-III	Water Levels	Water Levels
		Analysis List 1	
G3	5-V, 5-VI, 19A, 62-II, 48	Water Levels	Water Levels
		Analysis List 1	Analysis List 1
G4	5-IV, 16C, 50-III, 74-III	Water Levels	Water Levels
		Analysis List 1	Analysis List 3
G5	84-I, 84-II, 85-I, 85-II, 86-I, 86-II, 86-III, 87-I, 87-II, 87-III, 88-I, 88-II, 88-III, 89-I, 89-II, 89-III, 90-I, 90-II, 90-III, 91-I, 91-II, 91-III, 92-I, 92-II, 92-III, 93-I, 93-II, 94-I, 94-II, 95-I, 95-II, 104-I, 104-II, 104-III, 106-I, 106-II, 106-III, 107-I, 107-II, 107-III, 108-I, 108-II, 108-III, 109-I, 109-II, 109-III, 110-I, 110-II, 110-III	Water Levels	Water Levels
		Analysis List 1	Analysis List 1
		Analysis List 2	
		Analysis List 3	

B) PRIVATE WELLS

Group	Monitoring Designation	Monitoring Events	Comments
Private Wells		*March/April*	
P1	In Accordance with the Agreement Between the Corporation of the City of Peterborough and the Corporation of the Township of Otonabee. - January, 1993 as amended by previous annual reports.	Analysis List 4	As per agreement

C) SURFACE WATER

Group	Monitoring Designation	Monitoring Events					
Surface Water		*January/ February*	*March/April*	*May/ June*	*July/ August*	*September / October*	*November/December*
S1	SW1, SW2, SW3, SW17, SW18, SW19, SW20, SW21, SW23, SW24	Flow Rate	Flow Rate	Flow Rate	Flow Rate	Flow Rate	Flow Rate
							Anal

		Analysis List 1	Analysis List 1	Analysis List 1	Analysis List 1	Analysis List 1	ysis List 1
		Analysis List 6	Analysis List 6	Analysis List 6	Analysis List 6	Analysis List 6	Analysis List 6

D) LEACHATE

Group	Monitoring Designation	Monitoring Events					
Leachate		*January/ February*	*March/ April*	*May/ June*	*July/ August*	*September/ October*	*November/ December*
L1	Holding Tank		By-Law + COD			By-Law + COD	
						Analysis List 5a	
L2	MHT9-94[1]					Analysis List 5	
L3	23B (In-Waste Leachate Monitors)		Leachate Levels			Leachate Levels	
			Analysis List 1			Analysis List 2	
L4	ISP7-95, ISPL-1, ISPL-2, ISPL2-1, ISPL2-2, ISP8, ISP9, SP1-90, SP2-90, SP3-90, SP4-90, SP6-90, SP7-90, SP8-90, SP10-94, SP11-94, SP14-91, P15-91, SP16-91, SP18-91, SP19-91, SP20-91, ISP11, ISP12, ISP13, ISP14, ISP15	Leachate Levels	Leachate Levels	Leachate Levels	Leachate Levels	Leachate Levels	Leachate Levels
Inter-ceptor trench							
T1	MH-4					Analysis List 5	

[1] Location to be MHT6-94 following construction of Cell 1 West B

E) LANDFILL GAS

Group	Monitoring Designation	Monitoring Events					
Landfill Gas		*January/ February*	*March/ April*	*May/ June*	*July/ Au- gust*	*September/ October*	*November/December*
LFG-1	GP-2, GP-3, GP4, GP-5 and GP-6		Soil gas monitor- ing	Soil gas monitor- ing		Soil gas monitoring	Soil gas monitoring

Analysis List 1: Ca, Mg, Na, K, Cl, SO4, Alkalinity, NO3, NO2, NH3, TKN, pH, Conductivity, Fe, Mn, As, DOC, COD, Total Phenolics, Total P, P(dissolved), field pH and field conductivity, Anion Sum, Cation Sum, Bicarbonate, Carbonate, Hardness, Ion Balance, Orthophosphate (as P), field temperature, and Total Dissolved Solids (TDS).

Analysis List 2: Al, Ba, Be, B, Cd, Cr, Co, Cu, Pb, Mo, Ni, and Zn.

Analysis List 3: VOC Scan.

Analysis List 4: pH, conductivity, Alkalinity, Cl, SO4, Total P, Soluble P, TKN, NH3, NO2, NO3, K, Mg, Ca, Na, Fe, COD, DOC, Phenols, field pH and field conductivity.

Analysis List 5: cBOD5, BOD, TSS, TKN, NH4, Phenolics, Fe, Cl, Sr, Br, Alkalinity, K, Na, field pH and field conductivity.

Analysis List 5a: cBOD5, Sr, Br, Alkalinity, K, Na, field pH and field conductivity.

Analysis List 6: BOD5, TOC, TSS, TDS, Turbidity, Fe (field filtered), temperature, DO, field pH and field conductivity.

By-Law + COD: City of Peterborough By-Law 05-104 Schedule 'H', Table 1: "Sanitary and Combined Sewer Discharge Limits".

Soil Gas Monitoring: percent by volume (v/v) for methane; carbon dioxide; oxygen; and water level in the probe.

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

1. *The reason for inclusion of the definitions is to define the specific meaning of terms and simplify the wording of conditions in this Approval.*

2. *The reasons for Conditions 1 to 6 inclusive 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.*

3. *The reason for Conditions 7, 8, 12, 13, 14, 15, and 16 is to clarify the legal rights and responsibilities of the Owner under this Approval.*

4. *Conditions 9 and 10 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 Approval.*

5. *Condition 11 has been included in order to clarify what information may be subject to the Freedom of Information Act.*

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

7. *The reasons for Condition 18 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.*

8. *The reasons for Conditions 19 and 20 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.*

9. *The reason for Condition 21 is to ensure that appropriate Ministry staff have ready access to the Site for inspection of facilities, equipment, practices and operations required by the conditions in this Approval. This condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the EPA and OWRA.*

10. *The reason for Conditions 22 to 36 inclusive is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for site operation and environmental protection.*

11. *The reason for Conditions 37 and 38 is to ensure that a landfill operators manual is available with specific duties and responsibilities of employees provided in order to prevent an adverse impact on the environment.*

12. *The reason for Conditions 39 to 41 inclusive is to ensure that users of the Site are fully aware of important information and restrictions related to Site operations under this Approval.*

13. *The reasons for Conditions 42 and 43 are to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure the long-term protection of the natural environment.*

14. *Condition 44 has been inserted in order to ensure proper public consultation about the end use of the Site is undertaken and that the end use activities are consistent with those identified during the EA process.*

15. *Conditions 45 to 47 inclusive are included in order to ensure that certain activities are undertaken upon closure of the site in order to ensure that the closed site does not affect the natural environment.*

16. *The reason for Condition 48 is to ensure the timely submission by the Owner of a landscape plan for the site.*

17. *Condition 49 and 50 is needed to make certain that uses at the site are for waste disposal purposes only and not any other uses which may cause an adverse impact on the environment and human health.*

18. *Condition 51 is necessary in order to ensure that all waste loads are inspected and waste that is disposed of at the site is in accordance with the terms and conditions in this Approval.*

19. *The reasons for Conditions 52, 53, 55, 56, 57, 58, 59 and 122 to 125 inclusive 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.

20. *The reasons for Condition 54 are the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the landfill Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.*

21. *The reason for Condition 60 is to ensure that noise from or related to the operation of the landfill is kept to within Ministry limits and does not result in a hazard or nuisance to any person.*

22. *The reason for Condition 61 is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.*

23. *Conditions 62 to 67 inclusive have been included in order to ensure asbestos waste is handled and disposed of in accordance with Reg. 347 as amended from time to time. Proper handling and disposal of asbestos waste ensures that the asbestos waste does not cause an adverse impact on the environment and also does not affect human health.*

24. *The reason for Condition 68 and 69 is to ensure that backup power is available so that all facilities remain operational during a power disruption thus preventing any adverse impacts on the environment.*

25. *The reason for Condition 70 and 71 is to ensure that appropriate measures are taken in order to prevent surface water from contacting waste so as not to cause an adverse effect on the environment.*

26. *The reason Condition 72 has been included is in order to prevent ponding in on site ditches and any adverse impact on the environment and human health.*

27. *The reason for Conditions 73, 74, 75, 76 and 77, 92, and 93 inclusive is to specify the approved areas from which waste may be accepted at the Site, minimum buffer area, 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.*

28. *The reason for Condition 78 to 91 inclusive is to specify the approval requirements for use of alternative cover material at the Site.*

29. *The reason for Condition 94, 95, 96, and 97 is to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the site, and to ensure an acceptable site appearance is maintained. The proper closure of a landfill site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the site.*

30. *The reasons for Conditions 98 to 102 inclusive are to specify the normal hours of operation for*

the landfill Site and a mechanism for amendment of the hours of operation.

31. *The reason for Condition 103 is to provide security for the site.*

32. *The reason for Condition 104 is to create a means of capturing litter.*

33. *Condition 105 is needed in order to make certain that the waste received at the site is in accordance with the Approval and Reg. 347.*

34. *The reasons Condition 106 has been included are to ensure that access roads are clear and do not pose a safety hazard to the general public.*

35. *The reasons for Conditions 107 and 108 are to minimize the potential for clogging of leachate collection pipes and to ensure effective operation of the leachate collection system components for as long as they are required. Failure to clean out these components on a regular basis may result in a decrease in their service lives. Regular cleaning of the leachate collection pipes is especially important during stages of landfilling when the level of both organic and inorganic constituents in the leachate is high and, consequently, the potential for clogging due to encrustation is greatest. As the landfill reaches the more stable methane producing stage, pipe cleaning may be required less frequently.*

36. *Conditions 109 to 118 inclusive are to ensure that the leachate collection system is designed and built in accordance with Regulations and the ministry's requirements and to prevent off site migration of leachate which may cause an adverse effect on the environment.*

37. *Conditions 119 to 121 inclusive are needed to ensure leachate recirculation is undertaken in accordance with the ministry's requirements, there is proper monitoring and leachate recirculation does not pose an adverse impact on the environment.*

38. *The reason for Condition 126 to 128 is to ensure that the Site has proper inspections and records of the site.*

39. *The reason for Conditions 129 to 133 inclusive is to ensure that a properly working monitoring infrastructure is in place.*

40. *The reason for Conditions 134 to 136 inclusive is to demonstrate that the landfill site is performing as designed and the impacts on the natural environment are acceptable. Regular monitoring allows for the analysis of trends over time and ensures that there is an early warning of potential problems so that any necessary remedial/contingency action can be taken.*

41. *The reason for Conditions 137 to 143 inclusive is to ensure that the Owner follows a plan with an organized set of procedures for identifying and responding to unexpected but possible problems at the Site. A remedial action / contingency plan is necessary to ensure protection of the natural environment. A leachate contingency plan is a specific requirement of Reg. 232.*

42. *Conditions 144 to 160 have been inserted in order to ensure that concentrations of landfill gas*

do not pose a hazard to human health or the environment and to ensure that landfill gas controls are built and managed in accordance with the Ministry's requirements and regulations.

43. *The reasons for Conditions 161 to 166 inclusive are to ensure that landfill gas is properly managed and monitored.*

44. *The reason for Conditions 167 to 169 is so that the Owner has a robust plan for the preparation for, prevention of, response to and recovery from an environmental emergency.*

45. *The reason for Conditions 170 to 172 is so that the Owner has a robust procedure for responding to Complaints about the Site.*

46. *The reason for Conditions 173 to 179 inclusive 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.*

47. *The reasons for Conditions 180 to 182 inclusive are to ensure that the Ministry is informed of any spills or fires at the Site and to provide public health and safety and environmental protection.*

48. *The reasons for Conditions 183 to 186 inclusive 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.*

49. *The reason for the conditions 189 to 192 is to approve the detailed design of Landfill Gas collection system for North Fill Area.*

50. *The reason for Conditions 193 to 199 is to ensure that the "Reuse centre" is built, maintained and operated in a manner as to minimize the likelihood of an adverse effect or a hazard to the natural environment or any person.*

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A341508 issued on December 29, 1993

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 7th day of September, 2018

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

RL/
c: District Manager, MECP Peterborough
Joe Ovcjak, and Paul Mulholland, WSP Canada Inc., The Corporation of the City of Peterborough

APPENDIX A - II)

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL – A341508 ISSUED: JUNE 23, 2023

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

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A341508
Issue Date: June 23, 2023

The Corporation of the City of Peterborough
500 George St N
Peterborough, Ontario
K9H 3R9

The Corporation of the County of Peterborough
470 Water St
Peterborough, Ontario
K9H 3M3

Site Location: 1260 Bensfort Road and 1923 Base Line
Township of Otonabee-South Monaghan, County of Peterborough

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

the use and operation of a 40.95 hectare Waste Disposal Site (landfill/transfer/processing) within a total site area of 197.32 hectares, which includes the following:

- a 27.5 hectare landfill (9.5 hectares North Fill Area and 18 hectares South Fill Area);
- a 15 hectare groundwater easement zone;
- a public drop-off and reuse centre for the receipt, transfer, temporary storage and reuse of solid, non-hazardous waste; and
- a 13.45 ha composting facility, receiving and processing Organic Waste at a rate not exceeding 42,270 tonnes per year, consisting of the structures, processes and equipment described under Schedule "C".

Note: Use of the site for any other type of waste is not approved under this environmental compliance approval, and requires obtaining a separate approval amending this environmental compliance approval.

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

1. "Adverse Effect" is as defined in the EPA;

2. "Agent of the City of Peterborough" means a person or company who is hired by the City of Peterborough to fulfil the requirement of Competent Supervisor or Competent Supervisors required under this Approval. Such person or company would provide independent reports directly to the City of Peterborough and would not be employed or closely associated with any company that the City of Peterborough has contracted to operate the Site;

3. "Amendment Materials" means brush, Clean Wood (including wooden overs from the Composting process) and Clean Wood products (wood chips);

4. "Approval" means this Environmental Compliance Approval and any Schedules attached to it;

5. "Buffer Area" means that part of the Site that is not waste fill area and includes those lands and easements comprising 84.63 hectares as shown on Tab L of item 9 in Schedule "A";

6. "Change Log" means a section in the Design and Operations Report for the Composting Facility (Item #59 of Schedule "A") that contains a record for each change to the Design and Operations Report, including the date and description for each change that occurred;

7. "characteristic waste" is as defined in Reg 347;

8. "City of Peterborough" means The Corporation of the City of Peterborough;

9. "Clean Wood" means brush, clean virgin wood and clean virgin wood products, that does not contain painted wood or composite wood products, including laminated wood;

10. "Competent Supervisor" and "Competent Supervisors" means a person or people who:
    a. is/are an employee(s) of the City of Peterborough or in the alternative, is an agent of the City of Peterborough;
    b. is/are a Trained Personnel;
    c. is/are qualified because of their knowledge, training and experience to assure that direction given by the City of Peterborough to any contractor that the City of Peterborough has hired for the Site and the organization of work and its performance by that contractor is sufficient to assure that the terms and conditions of this Approval and associated legislation and regulations are followed; and
    d. is not an employee of the contractor that is referred to in paragraph c of this definition and also operates at arms length from such a contractor;

11. "Compost" has the same meaning as set out in the document "Ontario Compost Quality Standards" dated July 25, 2012, as amended.

12. "Composting" has the same meaning as set out in the document "Ontario Compost Quality Standards" dated July 25, 2012, as amended. Composting consists of thermophilic composting (active composting) and curing;

13. "Composting Facility" means the 13.45 ha waste disposal site (compost) located within a total

site area of 39.32 ha at 1923 Base Line, Southern Half of Lot 16, Concession 14, Otonabee, Township of Otonabee-South Monaghan;

14. "Compost Quality Standards" means the Ministry standards for compost as set out in the document entitled "Ontario Compost Quality Standards" dated July 25, 2012, as amended;

15. "Director" means a person appointed by the Minister pursuant to section 5 of the EPA for the purposes of Part II.1 of the EPA;

16. “District Manager” means the District Manager of the Peterborough District Office;

17. “District Office” means the Peterborough District Office of the Ministry;

18. “EAA”means the *Environmental Assessment Act* , R.S.O. 1990, c. E.18;

19. “EAAB” refers to the Environmental Assessment and Approvals Branch of the Ministry of the Environment;

20. "EASR" means the Environmental Activity and Sector Registry;

21. "EPA" means the *Environmental Protection Act,* R.S.O. 1990, c. E. 19;

22. "Finished Compost" means the Organic Waste that has been fully processed, as required, and is considered ready for sampling and testing for compliance with the Compost Quality Standards;

23. "Handbook" means the December 2009 Ministry publication that has the title, "Land Disposal Restrictions (LDR) Handbook";

24. "IC&I" means industrial, commercial and institutional;

25. "Immature Compost" means the Organic Waste which has been thermophilically Composted but not cured and screened, if screening is required;

26. "Land Disposal Restrictions" means the requirements of Sections 74 through 85 of Regulation 347, which prohibit the disposal of hazardous wastes that are listed wastes or characteristic waste until they have been treated to meet the land disposal treatment requirements;

27. "Land Disposal Treatment Requirements" means the requirements identified in Schedule 1, Part A and Part B of Schedule 2 and Schedule 3 of Regulation 347 for listed wastes and in Schedule 5 of Regulation 347 for characteristic wastes. Land disposal treatment requirements are specified as either concentration-based numerical levels or as specified methods of treatment. Regulated constituents must be treated to meet the treatment requirements prior to land disposal;

28. "Landfill" means the 27.5 ha waste disposal site (9.5 hectares North Fill Area and 18 hectares South Fill Area) (landfill/transfer) being more particularly described as Part of Lots 14 and 15, Concession 14, Otonabee, Township of Otonabee-South Monaghan, located within a total site area of 158 hectares, which includes a 15 hectare groundwater easement zone in accordance with the plans and specifications described in Schedule "A". The 158 hectares are more particularly described as Part Lot 13, 14 and 15, Concession 14 and Part of Lots 14 and 15, Concession 13, Otonabee, Township of Otonabee-South Monaghan;

29. "Leaf and Yard Waste" and "LYW" means waste consisting of natural Christmas trees and other plant materials but not tree limbs or other woody materials in excess of 7 centimetres in diameter and as defined in the Ontario Regulation 101/94, as amended, made under the EPA;

30. "Listed Waste" is as defined in Reg 347;

31. "Minister" means the Minister of the Ministry or such other member of the Executive Council as may be assigned the administration of the EPA and OWRA under the *Executive Council Act* , R.S.O. 1990, c. E.25;

32. "Ministry" means the ministry of the Minister and includes all, employees or other persons acting on its behalf;

33. "NMA" means the *Nutrient Management Act,* 2002, S.O. 2002, c. 4;

34. "North Fill Area" and "NFA" means the 9.5 hectares landfill Site that is located in the North part of the Site;

35. "Organic Waste" means solid non-hazardous waste derived from plants or animals, including wastes consisting of other compounds of carbon, all readily biodegradable, and as further described in Condition 8(2) of this Approval;

36. "Organic Waste Mix" means the mixture of the incoming SSO, Leaf and Yard Waste, and/or the Amendment Materials and/or additives approved in this Approval;

37. “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;

38. “Owner" means the Corporation of the City of Peterborough and the Corporation of the County of Peterborough, including any successors and assignees, and has the same meaning set out in section 25 of the EPA, as applicable;

39. “OWRA” means the *Ontario Water Resources Act,* R.S.O. 1990, c. O.40;

40. “PA” means the *Pesticides Act* , R.S.O. 1990, c. P-11;

41. "Peterborough Landfill and Compost Public Liaison Committee" or "PLC" means a committee

comprised of representatives of the City of Peterborough and area residents established in accordance with Condition 1(23) of this Approval;

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

43. "Public Drop-Off and Reuse Centre" means waste disposed site located within the Landfill that is used to receive, temporarily store and transfer solid, non-hazardous waste from residential, industrial, commercial and institutional sources for reuse or final disposal;

44. "Reasonable Use Guideline" means the Ministry guideline entitled "Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities, Guideline B-7", dated April 1994, as amended;

45. "Regulation 232" or "Reg. 232" or "O. Reg. 232/98" means Ontario Regulation 232/98: (Landfilling Sites), made under the EPA;

46. "Regulation 347" or "Reg. 347" means Revised Regulations of Ontario 1990, Regulation 347: (General - Waste Management), made under the EPA;

47. "Rejected Waste" means the load of incoming waste inadvertently received at the Site and deemed by the City of Peterborough to contain waste that does not meet the incoming Organic Waste quality criteria set out in this Approval or that cannot be Composted;

48. "Residual Waste" means waste resulting from the waste processing activities at the Site, and that cannot be Composted. Residual Waste is waste that is destined for final disposal;

49. "SDWA" means the *Safe Drinking Water Act,* 2002, S.O. 2002, c. 32;

50. “Site” means the waste disposal site approved under this Approval, including the Composting Facility, the Landfill, and the Public Drop-Off and Reuse Centre;

51. "South Fill Area" and "SFA" means the 18 hectares landfill site that is located in the South part of the Site;

52. "Spill" is as defined in the EPA;

53. "SSO" means the source separated Organic Waste which consists of the Organic Waste suitable for Composting, which has been separated at its source of origin by the generator of the waste;

54. "Stage 1" means the initial phase of the Composting Facility development as described in Schedule "C", with the maximum Organic Waste receipt rate described under Condition

8(4)(a);

55. "Stage 2" means the final phase of the Composting Facility development described in Schedule "C", with the maximum Organic Waste receipt rate described under Condition 8(4)(b);

56. "Standards Document" means the Ministry's document entitled "Ontario Compost Quality Standards" dated July 25, 2012, as amended;

57. "Trained Personnel" means an employee trained in accordance with the requirements of Condition 5 and is knowledgeable through instruction and/or practice and able to carry out any necessary duties; and

58. "waste" has the same meaning as in the EPA and regulations made thereunder.

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 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 for in this Approval, the Site shall be designed, developed, constructed, operated and maintained in accordance with the Design and Operations Reports (Items 36, 37 and 59 of Schedule "A") and all documents listed in Schedule "A" to this Approval.

(4) Unless exempted from an Environmental Compliance Approval requirement, any waste handling equipment that is not approved in this Approval but is to be operated at the Site must be a waste management system, also referred to by the Ministry as a mobile unit, approved by the Ministry for a temporary operation at any site.

(5) Notwithstanding the provisions of the Environmental Compliance Approval for the waste

management system or the mobile unit, the waste management system or the mobile unit shall not be operated at the Site in excess of sixty (60) days per year.

Other Legal Obligations

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

(a) relieve any person of any obligation to comply with any provision of the EPA or any other 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 request that any further information related to compliance with this Approval be provided to the Ministry.

(7) Despite an Owner 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 emission that caused the Adverse Effect or impairment of water quality.

Adverse Effect

(8) 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.

Furnish Information

(9) Any information requested by the Ministry, concerning the operation of the Site and its operation under this Approval, including but not limited to any records required to be kept by this Approval shall, upon request, be provided to the Ministry in a timely manner and in a format specified by the Ministry**.** Records shall be retained for two (2) years except as otherwise authorized in writing by the Director.

(10) 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 subordinate legal instrument, 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 condition of this Approval or any statute, regulation or other subordinate legal requirement; or
(b) acceptance by the Ministry of the information's completeness or accuracy.

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

Interpretation

(12) 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.

(13) 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.

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

(15) 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.

Certificate of Requirement

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

(17) (a) If not already completed, within ninety (90) 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 which shows the approximate area of the Site where waste has been and 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) If not already completed, within thirty (30) 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.

Registration on Title Requirement - Contaminant Attenuation Zone

(18) If not completed previously, the Owner shall, within a year from the date of issuance of this Approval, submit to the Director documents confirming that a CAZ has been established, in either fee simple or by way of a groundwater easement.

(a) If rights are obtained in fee simple, the Owner shall provide:

(i) documentation evidencing ownership of the CAZ obtained in compliance with O.Reg. 232/98, as amended;

(ii) a completed Certificate of Requirement and supporting documents containing a registerable description of the CAZ; and

(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 of the CAZ.

(b) Within thirty (30) calendar days of receiving a Certificate of Requirement signed or 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 a written verification that the Certificate of Requirement has been registered on title.

(c) If rights are obtained by way of a groundwater easement, the Owner shall:

(i) provide a copy of the easement agreement;

(ii) provide a plan of survey signed and sealed by an Ontario Land Surveyor for the CAZ;

(ii) submit proof of registration on title of the groundwater easement to the Director;

(d) The Owner shall not amend or remove or consent to the removal of the easement or CAZ from title without the prior written consent of the Director.

Change of Owner

(19) The Owner shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any change in:

(a) the ownership of the Site;

(b) the Operator of the Site;

(c) the address of the Owner or Operator;

(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; and

(e) the name of the corporation where the Owner or Operator is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act,* R. S. O. 1990, c. C.39, shall be included in the notification.

(20) 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.

(21) In the event of any change in Ownership of the Site, other than change to a successor Owner, 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.

Inspections

(22) 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;
- (e) to conduct interviews with staff, contractors, agents and assignees of the Owner; and
- (f) 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.

Public Liaison Committee

(23) The Owner shall establish and and maintain the Landfill and Composting Facility Public Liaison Committee (PLC). The PLC shall serve as a focal point for dissemination, review and exchange of information and monitoring results relevant to the operation of the undertaking. In addition, the purpose of the PLC shall be to provide community review of the development, operation (current and proposed) and ongoing monitoring, closure and post-closure care related to this Site.

(24) The general mandate of the PLC shall include:
- a. Work cooperatively towards proper on-Site operations and the avoidance of off-site impacts from the Site;
- b. Review operations and provide regular input to the Owner with respect to all matters pertaining to the landfill and compost Site operations, including issues pertaining to ongoing operations, fences that may be needed for litter, off-site odours that may be causing nuisances/complaints, monitoring, the need for contingency plans/environmental emergency plan or remedial measures, response to community complaints, the need for changes to the Approval,post-closure monitoring and maintenance, and development of the proposed end use for the landfill site;
- c. Review operational and monitoring reports;
- d. Consider and make recommendations to the Owner regarding outside consulting advice in respect of the Site (including both landfilling and composting operations);

e. Facilitate ongoing dialogue between the Owner, the District Office and the community, including residents and businesses in the immediate vicinity of the Site;
f. Provide reports regularly to the community on the activities of the PLC, the landfill and compost operations, and landfill and compost related issues and seek public input on these activities and issues;
g. Monitor the Owner's complaint response program and make recommendations to the Owner with respect to this program; and
h. Provide recommendations to the Owner with respect to unresolved complaints.

(25) The PLC shall not exercise any supervisory, regulatory, approval, legal or other decision making role with respect to the operations (current and proposed) at the Site.

(26) (a) The Owner shall provide for the administrative costs of operating the PLC, including the cost of meeting places and clerical services up to a maximum annual cost of $5000; and
(b) The District Manager may suggest to the Owner that a higher amount than $5000 of the cost be paid for by the Owner.

(27) The PLC shall operate under a Terms of Reference of the committee. Suggestions to revise the PLC Terms of Reference may be made at any meeting that a quorum is present. No changes to the Terms of Reference can be made until the committee members mutually agree to changes.

(28) A copy of the revised Terms of Reference shall be provided to the District Manager within thirty (30) days of issuance of this Approval. Any changes to the Terms of Reference shall be provided to the District Manager for information purposes.

(29) The community members shall be appointed by the PLC. The community member positions are intended to be available to individuals that are not members of groups already represented on the PLC and have an interest in the operation of the Site. The PLC shall encourage individuals who reside in close proximity to the Site to participate. A community member is defined as a taxpayer and/or resident of the City or County of Peterborough.

(30) The PLC shall determine the appropriate meeting frequency and review it on an annual basis.

(31) Minutes and agendas of meetings shall be printed and distributed as per the mailing list on a timely basis.

(32) The PLC shall have reasonable access to the Site and its landfill and compost related facilities for the purpose of carrying out its objective and mandate and the Owner's consultants' reports relating to Site operations shall be provided to the PLC.

(33) The Owner shall provide the PLC with access to the Owner's consultants as required and consultants reports in accordance with protocols agreed to between the Owner and the PLC.

(34) Unless disclosure would be contrary to the Freedom of Information and Protection of Privacy

Act, the PLC is to be provided all formal submissions and correspondence related to the Site operations by the Owner at the same time as these items are submitted to the Ministry, or any other body.

(35) The Owner shall allow access to the Site during normal operating hours, to enable any individual member of the PLC and member of the public recommended by local representatives on the PLC, to observe operations (including both landfill and composting operations). An individual member of the PLC must contact the operator to arrange for a Site pass, be accompanied by an operators representative at all times and follow all safety procedures.

(36) All recommendations made to the Owner with respect to ongoing landfill and compost operations, monitoring and the implementation of contingency measures shall be discussed at joint meetings between representatives of the Owner and the PLC. The purpose of these meetings will be to arrive at an agreement between the Owner and PLC with respect to implementation of the recommendations.

(37) The Owner shall disclose all monitoring results to the PLC and deliver to the PLC all documents and information (except as may be privileged) relevant to the operation of the Site.

2. GENERAL SITE OPERATIONS

Operation

(1) The Site shall be operated and maintained at all time 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.

(2) The three (3) separate Design and Operations Reports (Items 36, 37 and 59 of Schedule "A") shall be retained at the Site, kept up to date through periodic revisions, and be available for inspection by Ministry staff.

(3) Except for a change to the Change Log, changes to any of the Design and Operations Reports shall be submitted to the Director for approval.

Hours of Operation

(4) (a) Waste shall only be accepted at the Site for landfilling and transfer from 7:00 AM to 7:00 PM - Monday to Saturday (except statutory holidays).

(b) On-Site equipment used for daily landfill and transfer station preparation and closing activities shall only be used from 6:00 AM to 8:00 PM - Monday to Saturday (except statutory holidays).

(c) Waste shall only be accepted at the Site for composting from 7:00 AM to 7:00 PM -

Monday to Friday (except statutory holidays).

(d) On-Site equipment used for daily composting activities shall only be used from 7:00 AM to 7:00 PM - Monday to Saturday (except statutory holidays).

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

(6) The Owner may provide limited hours of operation provided that the hours are posted at the landfill gate and that suitable notice is provided to the public of any change in operating hours.

(7) Upon reasonable notice to the District Manager, contingency actions may take place outside normal hours of operation. Emergency response may occur at any time as required.

Site Access and Security

(8) No waste shall be received, landfilled or removed from the Site unless Trained Personnel are present to supervise the operations during operating hours. The Site shall be closed when Trained Personnel are not present to supervise operations at the Site.

(9) The Owner shall ensure that Trained Personnel is/are on duty at all times when the Site is open to carry out any activity required under this Approval.

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

(11) The Owner shall ensure that:
- (a) access to the Site is restricted by fencing; and
- (b) fencing and lockable gate are kept in good repair.

Signage

(12) A sign shall be installed and maintained at the main entrance(s)/exit(s) to the Site on which is legibly displayed the following information:
- (a) the name of the Site and Owner;
- (b) the number of the Approval;
- (c) the name of the Operator;
- (d) the waste receipt hours;
- (e) the allowable and prohibited waste types for the Composting Facility, the Landfill and the Public Drop-Off and Reuse Centre, respectively;
- (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.

(13) The Owner shall install and maintain signs to direct vehicles to the Composting Facility, the Landfill's working face, and the Public Drop-Off and Reuse Centre.

(14) The Owner shall provide signs at the recycling depot informing users what materials are acceptable and directing users to the appropriate storage area(s).

Incoming Waste Inspection

(15) (a) Prior to being accepted, the Owner shall ensure all incoming loads are inspected by Trained Personnel to ensure only wastes approved under this Approval are received at this Site, and that incoming Organic Waste loads for the Composting Facility contain only incidental amounts of other waste materials;

(b) If any incoming waste load is known to, or is discovered to, contain unapproved waste, that load shall not be accepted at the Site; and

(c) If any unacceptable waste is discovered on-site, that waste shall be re-directed to the designated Rejected Waste storage area.

(16) Loads of incoming waste (excluding waste received at the Public Drop-Off and Reuse Centre) and outgoing Residual Waste and Rejected Waste shall only be transported to and from the Site by haulers approved by the Ministry or registered on the EASR, as required.

Rejected and Residual Waste Handling

(17) The Owner shall ensure that the Rejected Waste and the Residual Waste are:
(a) temporarily stored in designated storage area(s);
(b) stored in a way that ensures that no adverse effects result from such storage;
(c) segregated from all other waste;
(d) stored in a way that ensures that no adverse effects result from the temporary storage; and
(e) handled and removed from the Site in accordance with Reg. 347 and the EPA, or sent to the Landfill for final disposal, as applicable.

(18) The Rejected Waste shall be removed from the Site or sent to the Landfill for final disposal, as applicable, within four (4) business days of its receipt.

(19) The Residual Waste shall be temporarily stored in a covered bin-which shall be removed from Site or sent to the Landfill for final disposal, as applicable, when full or once per week, whichever comes first.

(20) The Rejected Waste and the Residual Waste transported from the Site shall be in appropriately covered vehicles that will not allow fugitive dust or odour emissions to be emitted into the natural environment during the said transport.

Landscape Plan

(21) The Owner shall ensure a completed landscape plan for the Site is submitted to the District Manager with copies to the PLC.

Vermin, Dust, Litter, Odour, Noise, Traffic, Screening

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

(23) If at any time problems such as odours, dust, litter, noise, vectors, vermin, rodents or other nuisances are found at the Site, the Owner shall take appropriate, immediate remedial action to eliminate the problem, including suspension of all waste management activities and removal of waste from the Site, if necessary.

(24) The Owner shall control fugitive dust emissions from on-Site sources including but not limited to on-Site roads, waste storage/processing/handling areas, the active working face, and the closed landfill area prior to seeding especially during times of dry weather conditions. If necessary, major sources of dust shall be treated with clean water and/or dust suppression materials to minimize the overall dust emissions from the Site.

(25) The Owner shall:
- (a) take all necessary steps to prevent the escape of litter from the Site;
- (b) pick up litter at the Site on a daily basis, or more frequently if necessary;
- (c) if necessary, erect litter fences around the areas causing a litter problem; and
- (d) weekly, or more frequently as necessary, pick up off-Site litter (e.g., along access roads) which can reasonably be determined to have originated from the Site.

(26) Upon being notified of the approximate location of litter that has blown from the Site or from waste haulage vehicles that have used the Site or were en route to the Site, the Owner shall clean-up such litter as soon as is reasonably practicable.

(27) The Owner shall comply with noise criteria in Ministry guidance document titled “Noise Guidelines for Landfill Sites" dated October 1998 as amended from time to time.

(28) On-Site roads shall be provided and maintained in a manner that vehicles hauling waste to and on the Site may travel readily and safely on any operating day. During winter months, when the Site is in operation, roads must be maintained to ensure safe access to the landfill working face. Access roads must be clear of mud, ice and debris which may create hazardous conditions.

(29) The City of Peterborough shall ensure that all waste and Compost handling activities, including turning of the processing windrows and waste screening are only undertaken during favourable wind conditions.

(30) The City of Peterborough shall implement appropriate housekeeping procedures, including

regular cleaning of the Organic Waste handling equipment to minimize emissions of odour from the Organic Waste handling areas.

(31) The City of Peterborough shall maintain a negative air pressure atmosphere within the Receiving Building of the Composting Facility, as required by the Air Approval.

(32) The City of Peterborough shall ensure that, at all times when the SSO is in the Receiving Building, the air from the Receiving Building is exhausted through an appropriate air pollution control equipment approved by the Ministry in the Air Approval.

(33) The City of Peterborough shall ensure that the window(s) and doors of the Receiving Building are kept closed at all times except to permit the entry or exit of persons, waste and/or processing/maintenance/waste transport equipment.

(34) In the event that the outdoor Leaf and Yard Waste storage pile becomes odourous, the Leaf and Yard Waste shall be immediately diverted to the Landfill, the Receiving Building, or a composting system.

(35) If at any time the Organic Waste or the waste undergoing composting creates a negative impact, including but not limited to attraction to vermin and vectors, and the remedial measures cannot successfully mitigate the impacts within seven (7) days, the City of Peterborough shall forthwith remove the waste causing the negative impact for disposal at an approved waste disposal site.

(36) The Owner shall ensure that all vehicles transporting waste from the Site are not leaking or dripping waste or wastewater when leaving the Site.

(37) Should the City of Peterborough become aware that a vehicle delivering Organic Waste to the Site has leaked wastewater on the municipal roadways, the City of Peterborough shall immediately report the violation to the owner of the vehicle(s) and to the District Manager.

(38) The Owner shall ensure that vehicles leaving the Site do not drag mud or waste onto the public roadways.

(39) The Owner shall ensure that:
  (a) the wheels of all vehicles departing from the Site are inspected and cleaned, as required, prior to the vehicles' departure from the Site; and
  (b) any truck washing at the Compost Facility is conducted indoors within the confines of the Receiving Buildings with all washwater collected in the floor drains.

(40) The Owner shall ensure that there is no queuing or parking of vehicles that are waiting to enter the Site on any roadway that is not a distinct part of the Site.

(41) The Owner shall ensure that vehicles transporting waste and Compost from the Site are appropriately covered as they depart the Site, so that fugitive dust or odour emissions are minimized during the transport to their next destination.

(42) The City of Peterborough shall install a litter fence around the designated screening area within the Composting Facility.

(43) The City of Peterborough shall install and maintain planted perimeter berms along the west, north and east sides of the Composting Facility with the necessary height needed to block the line of sight from the adjacent residential homes to the Composting Facility (including the waste piles stored at the Composting Facility).

Wastewater Management

(44) The Owner shall take all appropriate measures to minimize surface water from coming in contact with waste. Temporary berms and ditches shall be constructed around the Landfill's active waste disposal areas to prevent extraneous surface water from coming in contact with the landfill's active working face.

(45) If surface water ponding occurs in any surface water ditches having a drainage slope less than 0.5%, the Owner shall regrade the ditches.

(46) The City of Peterborough shall ensure that all run-off from the Composting areas is directed to the perimeter swale system for discharge into the sanitary sewer, and is cleaned up to prevent accumulation of run-off (i.e., standing water) in the Composting area.

(47) The Owner shall ensure that all run-off and/or leachate from any waste management activity carried out at the Site is not discharged into the municipal drains, or any other natural drain or watercourse unless approved by the Ministry.

Composting Facility Environmental Impact Study Requirements

(48) The City of Peterborough shall install and maintain metal and mirrored flashers, reflective tape and streamers, and netting and overhead lines at the Composting Facility to deter birds and wildlife on an as-needed basis.

(49) The City of Peterborough shall maintain a 30 m buffer around the wetland and watercourse boundaries, as shown in Figure 4 of the Environmental Impact Study (Item #57 of Schedule "A").

(50) The City of Peterborough shall maintain a sediment fence around the Composting Facility during construction between May 15 and September 30 to prevent impacts to turtle nesting/egg hatching season.

(51) The City of Peterborough shall submit pictures and coordinates of any turtles or species at risk encountered during construction of the Composting Facility to the District Manager within two (2) days of the encounterment.

(52) Following the completion of construction of the Composting Facility, the City of Peterborough shall install and maintain permanent turtle exclusionary fencing along the chain link fencing on the north and west sides of the Composting Facility. The permanent fencing shall include chicken wire with 1/4" spacing, installed 20 cm deep and 60 cm above grade.

(53) The City of Peterborough shall use ensure that any Composting Facility construction activities which may cause adverse impacts to birds or their habitats (e.g. vegetation clearing) are conducted outside of the breeding bird season of April 15 to August 31. If this time period is unavoidable, additional Species at Risk (SAR) avifauna surveys and nest sweeps must be conducted by a qualified biologist retained by the City of Peterborough, prior to any clearing of vegetation on-site. If, during a nest sweep, any breeding birds and/or nests are encountered, all construction activities shall be ceased and a buffer should be placed around the nest until after August 31, or as soon as the birds have permanently left the nest. The size of the buffer will be dependent on the species and shall be developed in consultation with the District Manager and the retained qualified biologist.

(54) No development shall take place in Field 2 of Figure 2 of the Environmental Impact Study (Item #57 of Schedule "A").

Prohibitions

(55) Burning of waste at the Site is prohibited.

(56) The Owner shall ensure that there is no scavenging as defined in Reg. 347 at the Site.

3. ENVIRONMENTAL EMERGENCY

Emergency Response and Contingency Plan

(1) A minimum of three (3) months prior to the first receipt of the Organic Waste at the Site for composting, the Owner shall submit to the District Manager an updated Emergency Response and Contingency Plan. The Emergency Response and Contingency Plan shall be updated in consultation with the District Manager and the local Fire Department and as a minimum it shall include the following information:

a. emergency response procedures to be undertaken in the event of a spill, process upset, power failure, fire or any other emergency situation, including specific clean up methods for wastes expected to be generated from the emergency situation;
b. a Fire and Explosion Safety Plan for the Site that has been developed by a Professional Engineer or other qualified person that is knowledgeable about fire and explosion issues at landfill sites;
c. a list of equipment and clean up materials available for dealing with the emergency situations and their locations on the Site plan;

d. notification protocol with names and telephone numbers of persons to be contacted, including persons responsible for the Site, the Ministry's District Office and Spills Action Centre, the local Fire Department, the local Municipality, the local municipal sewage treatment plant, the local Medical Officer of Health, and the Ministry of Labour, and the names and telephone numbers of waste management companies available for emergency response;
e. contingency procedures to be followed in the event of a labour disruption, transportation disruption, inability of receiving sites to accept waste/leachate or other business disruption to the operation;
f. contingency procedures to be followed in the event of an operational upset such as, but not limited to, equipment malfunction, anaerobic composting conditions resulting in odours, or excessive stormwater flows;
g. contingency procedures to be followed in the event that the Site has reached maximum approved capacities or is unable to except additional waste for other reasons;
h. a requirement that an exceedance of any trigger concentration shall initiate contingency measures to ensure that groundwater and surface water discharging to the natural environment does not exceed surface water trigger concentrations outlined in this Approval;
i. list of alternate facilities to which waste and/or composting material can be re-directed if required;
j. procedures and actions to be taken should unacceptable waste inadvertently end up at the Site, including incoming Organic Waste that does not meet the quality criteria set out in this Approval for composting;
k. procedures and actions to be taken should the Composted Organic Waste fail to meet the required Compost Quality Standards;
l. procedures and actions to be taken should the Composting Recipe Criteria set out in this Approval not be met;
m. odour abatement plan with procedures and actions to be taken should the occurrence of complaints require the Owner to implement additional odour control measures necessary to alleviate impacts from odours emitted from the waste management activities at the Site, including the proposed design and operations for the odour control measures;
n. dust abatement plan to propose the design and operation of the contingency measure to alleviate impacts from dust originating from the waste management and vehicular activities at the Site;
o. trigger mechanism for implementation of the abatement plans required by m. and n. above; and
p. procedures and actions to be taken should the occurrence of the complaints require the Owner to suspend the waste processing activities at the Site.

(2) The Owner shall implement the provisions of the Emergency Response and Contingency Plan immediately upon receiving written concurrence from the District Manager.

(3) An up-to-date version of the Emergency Response and Contingency Plan shall be kept at the Site

at all times, in a central location available to all staff, and a copy shall be submitted to the District Manager, the local Municipality and the Fire Department, if requested.

(4) The Emergency Response and Contingency Plan shall be reviewed on an annual basis and updated, if necessary. The revised version of the Emergency Response and Contingency Plan shall be submitted to the District Manager and the Fire Department for comments and concurrence.

Emergency Response and Reporting

(5) The Owner shall immediately take all necessary measures, as outlined in the Emergency Response and Contingency Plan, to handle the emergency situations occurring at the Site.

(6) The Owner shall ensure that the equipment and materials outlined in the Emergency Response and Contingency Plan are immediately available at the Site at all times and are in a good state of repair and fully operational.

(7) The Owner shall ensure that all Site personnel are fully trained in the use of the equipment and materials outlined in the Emergency Response and Contingency Plan, and in the procedures to be employed in the event of an emergency.

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

(9) Should a Spill occur at the Site, in addition to fulfilling the requirements from the EPA, the Owner shall submit to the District Manager a written report within three (3) calendar days outlining the nature of the Spill, remedial measure taken and the measures taken to prevent future occurrences at the Site.

(10) All Spills shall be reported to the residents of the Township of Otonabee-South Monaghan and the County of Peterborough within three (3) days of the spill, outlining the nature of the Spill and remedial measure(s) taken.

4. COMPLAINT RESPONSE PROCEDURE

(1) A designated representative for the Owner shall be available to receive environmental complaints twenty-four (24) hours per day, seven (7) days per week. The telephone number for the designated representative for the Owner shall be clearly posted at the entrance to the Facility.

(2) If at any time, the Owner receives an environmental complaint from the public regarding the operation of the Equipment approved by this Approval, the Owner shall take the following steps:
   a. The Owner shall record each complaint in a computerized tracking system. The information recorded shall include the following:
      i. the name, address and the telephone number (or contact information) of the complainant,

        if known;
    ii. the date and time of the complaint;
    iii. details of the complaint, including the description and duration of the incident.
  b. After the complaint has been received by the Owner and recorded in the tracking system, the Owner shall, immediately notify, either the District Manager by phone during office hours or the Ministry's Spills Action Centre at 1-800-268-6060 after office hours. The Owner shall immediately initiate investigation of the complaint. The investigation shall include, as a minimum, the following:
    i. determination of the activities undertaken at the Facility at the time of the complaint;
    ii. general meteorological conditions including, but not limited to the ambient temperature, approximate wind speed and its direction, sunny versus cloudy, inversion versus clear and windy, etc. at the time of the complaint;
    iii. location of the person who submitted the complaint, if known, at the time of the incident; and
    iv. determination if the complaint is attributed to activities being undertaken at the Facility and if so, determination of all the possible cause(s) of the complaint;
  c. The Owner shall determine the remedial action(s) to address the cause(s) of the complaint and implement the remedial action(s) to eliminate the cause(s) of the complaint, as soon as practicably possible, and to prevent a similar occurrence in the future.
  d. The Owner shall forward a formal reply to the complainant, if known and to the District Manager within one (1) week after the receipt of the complaint. The response shall include the results of the investigation of the complaint, the action(s) taken or planned to be taken to address the cause(s) of the complaint, and if follow-up response would be provided.
  e. All of the information collected and actions taken must be recorded in the tracking system.

(3) If the District Manager deems the remedial measures taken as per Condition 4(2)(c) to be unsuitable, insufficient or ineffective, the District Manager may direct the Owner, in writing, pursuant to the remedial order section (s.17) or the preventative measures order section (s.18) of the EPA to take further measures to address the noted failure, upset or malfunction, including but not limited to the following:
  a. reduction in the receipt of the waste;
  b. cessation of the receipt of the waste;
  c. removal and off-site disposal of waste; and
  d. repairs or modifications to the equipment or processes at the Facility.

(4) All complaints shall be reported to the PLC at the next PLC meeting.

5. OPERATIONS MANUAL and PERSONNEL TRAINING

Operations Manual

(1) A minimum of one (1) month prior to the first receipt of the Organic Waste at the Site for composting, the Owner shall update and implement the Operations Manual for the Site for use by the Site personnel. As a minimum, the updated Operations Manual shall contain the following:

a. outline of the responsibilities of the Site personnel;
b. a detailed job description of the duties of a Competent Supervisor;
c. personnel training protocols;
d. health and safety requirements;
e. a site plan showing the waste disposal site boundary, the Landfilling area, the Public Drop-off and Reuse Centre, Organic Waste and Amendment Materials storage/processing areas, Composting pads, Finished Compost storage areas, and surface water/storm water management areas, including dimensions and construction details;
f. Site Operating Procedures including, but not limited to, leachate management, landfill gas management, surface water/stormwater management, and waste receiving, screening, refusal, unloading, handling, storage, processing, disposal, development, sorting, and shipping procedures;
g. sampling, testing, monitoring and recording procedures as required by this Approval;
h. required data recording and reporting procedures;
i. emergency response procedures including an outline of the responsibilities of Site personnel including roles and responsibilities during emergency situations, exit locations and evacuation routing, and locations of relevant equipment available for handling of the emergency situations;
j. the contingency plans for the Site;
k. the odour monitoring;
l. equipment and Site inspection and maintenance procedures;
m. nuisance impact control & housekeeping procedures, as required by this Approval; and
n. the procedures for handling and recording complaints as described in this Approval.

(2) A copy of this Operations Manual shall be kept at the Owner's office, must be accessible to Site personnel at all times and must be updated, as required.

Personnel Training

(3) Within thirty (30) days from the date of this Approval, all Site personnel shall be trained with respect to the following:
a. relevant waste management legislation, regulations and guidelines, including but not limited to the EPA and Regulation 347;
b. environmental, occupational health and safety concerns pertaining to the waste to be handled;
c. emergency first-aid information;
d. terms and conditions of this Approval, relevant to the specific job requirements of each individual operator in accordance with the Operations Manual required by Condition 5(1);
e. operation and management of the Site, or area(s) within the Site, as per the specific job requirements of each individual operator in accordance with the Operations Manual required by Condition 5(1); and

f. the procedures to be employed in the event of an emergency, as outlined in th ethe Emergency Response and Contingency Plan required by this Approval.

(4) Despite Condition 5(3) above, Site personnel do not have to be trained on any items related to the Composting Facility (including any operation and management requirements) until thirty (30) days prior to the first receipt of Organic Waste at the Composting Facility.

(5) The Owner shall ensure that all employees at the Site are trained in the requirements of this Approval relevant to the employee's position:

a. upon commencing employment at the Site in a particular position;
b. whenever items listed in Condition 5(3) are changed; and
c. during the planned three (3)-year refresher training.

(6) The Owner shall have a Competent Supervisor or Competent Supervisors for the Site.

(7) (a) An up to date list of Competent People shall be kept at the Site and be readily available for inspection by a Provincial Officer.

(b) The District Manager shall be informed in writing within seven (7) days of any additions or changes to who is/are a Competent Supervisor(s).

6. LANDFILL

Waste Type and Service Area

(1) (a) The Landfill shall only accept solid non-hazardous waste generated from residential, IC&I sources located within the City of Peterborough and the County of Peterborough.

(b) Waste disposal operations are approved for the South Fill Area and the North Fill Area, of the Landfill, as generally described in the three volume supporting documentation reports listed as Items 36 to 38, of Schedule "A", submitted pursuant to the Environmental Assessment Act approval listed as Item 30, of Schedule "A".

Receipt Rate

(2) The Owner may receive at the Site a maximum of 85,000 tonnes per year of waste, including non-hazardous contaminated soil for landfilling at the Site.

(3) In the event of an emergency, the Owner may request to the District Manager that the amount allowed to be received in one particular year be increased by 20,000 tonnes and the District Manager has the authority to grant written approval to such a request.

Capacity

(4) The Owner shall only accept and deposit waste at the NFA as long as there is available capacity as defined by the final contours for the NFA approved by this Approval. This Approval permits disposal of waste at the Site to fill an air space of 1,527,000 cubic metres (including waste, daily and interim cover material) for the North Fill Area.

Buffer Area

(5) A minimum 30 metre buffer area shall be provided and maintained between the disposal areas and the landfill property boundaries.

Waste Limits

(6) (a) No waste, including daily cover, intermediate cover or final cover layer, may be landfilled outside the limits of the base contours and the final contours outlined in Items 36, 37, and 38 of Schedule "A"; and

(b) Notwithstanding Condition 6(6)(a) of this Approval, daily, intermediate and/or final cover materials may be temporarily stockpiled up to five (5) metres above the approved final contours for the Site for a maximum of time of six (6) months. Where cover material is temporarily stockpiled above final contour elevations, silt fencing, dust control and/or all other appropriate measures shall be taken to prevent dust and surface water impacts on/off Site.

Waste Operations

(7) (a) The Owner shall deposit waste in a manner that minimizes exposure area at the landfill working face and waste shall be compacted before cover is applied.

(b) As further compliance with the EAA approval listed as Item 30, of Schedule "A", in particular Condition 5. A) of that approval, as it relates to the North Fill Area, the Owner shall continue to demonstrate the suitability of the in situ overburden materials to meet the design specifications, i.e. permeability, for the proposed recompacted base and side slopes.

(c) Should it not be possible to achieve this design permeability referred to in Condition 6(7)(b) of this Approval, recommendations shall be provided to the Director for an alternate design of the recompacted base and side slopes which will achieve an equivalent or better performance with respect to minimizing the flow of groundwater into the landfill.

Asbestos Waste

(8) Any waste that is considered asbestos waste shall be handled in accordance with Section 17 of Reg. 347 as amended from time to time.

(9) A suitable sized excavation for the asbestos waste shall be made by the Owner in a location away from the active landfilling face.

(10) All asbestos waste shall be inspected to ensure that the asbestos waste is properly bagged or contained and free from puncture, tears or leaks.

(11) The asbestos waste shall be placed in the excavation to avoid damage to the containers and to prevent dust and spillage.

(12) Upon completion of the unloading and deposition of the asbestos in the excavation, at least 125 centimetres of cover or waste material shall be placed over the asbestos.

(13) All asbestos waste shall be deposited to a level no higher that 1.25 metres below the general elevation of the disposal area to ensure that daily cover material removal in the future does not encounter the asbestos waste.

Application of Cover Material

(14) Cover material shall be applied as follows:
- (a) Daily Cover - At the end of each working day, the entire working face shall be covered with a minimum thickness of 150 mm of soil cover or an approved alternative cover material;
- (b) Daily cover that is exposed shall be checked at least once every week to see if the 150 mm of soil cover or approved alternative cover material is being maintained;
- (c) Where the inspection required in Condition 6(14)(b) reveals that the 150 mm cover has been compromised, soil cover or an approved alternative cover material shall be added to bring the thickness of the daily cover to a minimum of 150 mm;
- (d) Intermediate Cover - In areas where landfilling has been temporarily discontinued for six (6) months or more, a minimum thickness of 300 mm of soil cover or an approved alternative cover material shall be placed; and
- (e) Final Cover - In areas where landfilling has been completed to final contours, a minimum 0.9 metre thick layer of final cover soil shall be placed. Fill areas shall be progressively completed and rehabilitated as landfill development reaches final contours.

(15) Final cover, consisting of material of low permeability that has hydraulic conductivity to allow at least 0.15 metres of infiltration per year, shall be applied and compacted in maximum 15 cm thick lifts. The total compacted thickness of the final cover shall be at least 0.9 metre. A minimum of 0.15 metres of topsoil or other material approved by the Director shall cover the 0.9 metre of cover so that plant growth may be sustained.

(16) A vegetative cover consisting of vegetation that is suited to local conditions and that is capable with minimal care of providing vigorous, plentiful cover no later than its 3rd growing season shall be established over all completed areas to control erosion and maximize evapotranspiration. The Owner shall complete planting as soon as possible but no later than 6 months after reaching final contours.

(17) If weather conditions do not allow timely placement of final and vegetative cover, silt curtains shall be employed to minimize silt loadings to surface water bodies.

(18) Appropriate surface inspections of the final cover will be made annually by the Owner to ensure that erosional problems are identified and remediated forthwith.

(19) Final cover and topsoil layer shall be progressively applied to the Site as the final waste contours are reached.

Cover Materials Allowed

(20) The following materials, in the corresponding thickness, may be used as an alternative to soil as a daily and intermediate cover:
- (a) non-hazardous contaminated soil that meets the Land Disposal Requirements of Regulation 347 and the Handbook; and
- (b) Finished Compost, wood chips, and compost overs consisting of processed chipped wood.

(21) The Owner shall keep a record of the delivery of all contaminated soil to the Site. The record shall include the following information as a minimum:
- (a) The name and Approval number of the hauler;
- (b) The name and address of the generator of the waste;
- (c) The date and time of delivery; and
- (d) The quantity of waste delivered.

(22) The use of non-hazardous contaminated soil for daily/intermediate cover referenced in this Approval, shall be subject to the Owner:
- (a) making sure that the Generator has provided a signed statement with the following information at a minimum to the Owner regarding the contaminated soil including:
  - (i) the date;
  - (ii) the name of the Generator;
  - (iii) Generator Registration number, if the Generator has one;
  - (iv) the source of the non-hazardous contaminated soil;
  - (v) whether the non-hazardous contaminated soil was ever categorized as a listed or characteristic hazardous waste;
  - (vi) any records required by Section 79 and 84 of Regulation 347;
  - (vii) if the waste were a characteristic waste but has been treated, a copy of the Land Disposal Restrictions Form required by Regulation 347 or a notification stating that the waste was a characteristic waste and that the waste can be land disposed as per Sections 79 and 84 of Regulation 347; and
  - (viii) analytical test results of the contaminated soil.
- (b) taking all reasonable precautions to ensure that the requirements of the Land Disposal Restrictions and the Land Disposal Treatment Requirements outlined in Regulation 347 are being followed at the Site.

(23) The volume of contaminated soils stored at the Site shall not exceed the three months limitation of the annual daily/ interim cover material requirements as determined by the previous annual report. The Owner shall ensure at all times that the stockpiled contaminated soils shall produce no off-Site nuisance odours.

(24) In the event of a reported incident of odour from the contaminated soil at the Site which causes a nuisance and poses a threat to the health and safety of person(s) and the environment, the Owner shall forthwith implement a contingency plan to immediately abate the nuisance odour and/or run-off that may originate from the stockpile.

(25) The use of any other alternative materials as daily or intermediate cover material is subject to approval by the Director.

(26) Use of contaminated soil as daily or intermediate cover materials shall be discontinued within two (2) working days of receipt of written notification from the District Manager, stating that the use of the alternative daily or intermediate cover materials at the Site has proven to be environmentally unsuitable.

Contaminated Soil as Daily or Intermediate Cover

(27) Prior to receipt at the Site, each source of contaminated soils which are to be used as daily or intermediate cover shall be tested to determine if the soils meet the criteria in this Approval and Regulation 347. A copy of the test results shall be kept in the daily records for the Site.

(28) If confirmatory testing of the contaminated soil used for daily or intermediate cover indicates it is hazardous or exceeds the allowed Land Disposal Restrictions, the Owner shall report any failed sample of the contaminated soil testing to the District Manager forthwith.

(29) Any contaminated soil that is determined to be hazardous shall be considered a hazardous waste and shall be disposed in the appropriate manner.

(30) Subject to Conditions 6(22) and (27) of this Approval, contaminated soil for use as daily cover shall be stockpiled in areas of the Site that have a leachate collection system installed below.

(31) Subject to Conditions 6(22) and (27) of this Approval, contaminated soil may be used for daily/intermediate cover but only on slopes where surface water drainage is into the waste fill and isolated from the storm water collection system.

(32) Surface water run off from the contaminated soils stockpile which exceeds the Provincial Water Quality Objectives shall not be discharged through the surface water management system.

(33) The Owner must ensure that measures are in place for the on-Site treatment and disposal of any contaminated run off from the contaminated soils stockpile.

Leachate Collection System

(34) No Waste shall be deposited in any cell in the North Fill Area of the Site until the leachate collection system for that cell, as described in the documents listed in Item 37 in Schedule "A" has been installed.

(35) Engineered components of the leachate collection system at the NFA, including those involving geotextile, granular blanket drainage layers, perforated pipes-french drains, and monitoring installations shall be inspected by a professional engineer prior to placement of waste, with appropriate maintenance and/or replacement of parts of the system occurring from time to time, as required and where feasible.

(36) Leachate alarms shall be installed and maintained in the NFA and the SFA having regard to Section 6 of item 5 in Schedule "A".

(37) The flow of leachate from the leachate collection systems shall be determined and the results integrated into the annual Site water balance. This information shall be used as part of an annual assessment of the performance of the leachate collection system and all interpretations and conclusions shall be included in the Annual Report report.

(38) Leachate that is to be removed from the leachate collection system shall be removed in a manner which prevents any overflow of leachate to any surface water course.

(39) As-built drawings of the leachate control system for the North Fill area shall be submitted to the District Manager within sixty (60) days of issuance of this Approval or within sixty (60) days of the completion of the leachate control system for the North Fill area.

(40) Leachate samples shall be collected from the leachate collection system of the NFA and the SFA in order to characterize and monitor the leachate chemistry for a period of twenty-five (25) years subsequent to Site closure, at which time the monitoring program will be re-evaluated by the Owner to determine the need and/or type of monitoring to be continued. Recommendations from the Owner shall be submitted to the District Manager for acceptance. Leachate shall be sampled by the Owner at least two times per year (Spring and Fall) to monitor annual trends in leachate chemistry.

Cleaning of Leachate Collection System

(41) The leachate collection system piping for each stage of the development of the North Fill Area of the landfill shall be inspected annually for the first five years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary.

(42) Leachate video system inspection shall be:
 (a) biannual (every 2 years)
 (b) video inspection of the entire system or selected portions of the system shall be

undertaken on an annual basis if obstructions or if significant changes in the ability to flush the system are encountered; and

(c) annual video inspection of newly installed leachate pipes shall be undertaken for five years following installation.

(43) The leachate collection system for the North Fill Area and the South Fill Area shall be cleaned at least once per year, having regards with a report entitled "Annual Monitoring Report, Design and Operations - 1997, Bensfort Road Landfill, Peterborough, Ontario", date May 1998, prepared by CRA. A video inspection performed of the NFA and SFA, where practicable, biannually, having regard to the 2003 to 2004 Annual Monitoring Reports, Design and Operations, South Fill Area, City of Peterborough, Waste Facility, Peterborough, Ontario. An opinion of a professional engineer as to the structural integrity and efficiency of the leachate collection system of the NFA and the SFA shall be included in the Annual Report required under this Approval.

(44) In areas where leachate collection pipe slopes are less than 0.5%, the leachate collection pipes shall be inspected semi-annually for the first three (3) years after waste placement and then as often as future inspections indicate to be necessary. Additionally, leachate collection pipes must be cleaned whenever an inspection indicates that cleaning is necessary. After the three (3) year period, inspection and cleaning of the leachate collection pipes shall be in accordance with the previous condition.

Landfill Gas

(45) (a) Before the placement of any waste in the North Fill Area of the Site, the Owner shall ensure that the proposed landfill gas management system specified in Item 45 and 48 of Schedule "A" is installed and operational;

(b) Within sixty (60) days of the flare equipment operating to control landfill gas, an acoustic audit to measure the noise emissions from the flare equipment shall be conducted by the Owner. The Owner shall report the results of the acoustic audit to the Director within 120 days of the flare equipment becoming operational; and

(c) All buildings are to be free of any landfill gas accumulation. The Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in buildings if necessary.

(46) The landfill gas collection and flaring/utilization system, South Fill Area, shall be constructed and operated in accordance with the detailed design and development, as described in Item 45 and in Sections 3.0 to 3.4 in Item 48 of Schedule "A".

(47) Approval is hereby granted for the detailed design and construction of the landfill gas collection system in the North Fill Area of the Landfill Site all in accordance with the Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated September 30, 2016 and supporting documentation as listed below and forms part of Schedule "A", of the Provisional Certificate of Approval, No. A341508.

(48) Within ninety (90) days of commissioning of each phase of the landfill gas collection and flaring system, the Owner shall submit to the District Manager a construction report detailing the construction activities and any design changes made to the Landfill Gas System during construction.

(49) The Owner shall obtain an approval under section 9 of EPA and Section 27 of EPA for any future upgrade in the Landfill Gas Collection and Utilisation system.

(50) The Owner shall maintain the flare that is installed at the Site for controlling landfill gas in proper working order.

(51) The Owner/Operator shall develop and operate the landfill gas collection and flaring system, including all approved facilities, in accordance with the approved detailed design and operations report, and shall implement QA/QC activities and procedures, as approved by the Director.

(52) The Owner/Operator shall ensure the Site's Operations and Maintenance Manual required by Condition 5(1) of this Approval is updated to reflect the development and operation of the landfill gas collection and flaring system expansion, with respect to details on inspection and maintenance schedules, documentation procedures, shut-down procedures, Ministry contact procedures, and flare operation and maintenance. A copy of the Manual shall be provided to the District Manager and a copy retained on-Site and made available to Ministry staff upon request.

(53) Prior to implementation of any change in the landfill gas collection and flaring system operation, that may result in activities not specified in the Design Report, identified in Item 48, in Schedule "A", attached to this Approval, or in the Approval, and that may likely cause the discharge of contaminant to the natural environment, the Owner/Operator shall obtain approval from the Director.

(54) The Owner/Operator shall maintain records of landfill gas flow. Such records shall be made available for inspection upon request by a Provincial Officer.

(55) In the event of a discharge of a contaminant, including landfill gas, landfill gas condensate, leachate, etc., that causes or is likely to cause an adverse effect, the Owner/Operator shall immediately notify the District Manager and the Ministry's "Spills Action Centre", and advise of actions being taken to contain, control and ameliorate the situation.

(56) For any situation when landfill gas is not being collected and incinerated and which cannot be rectified within 48 hours, the Owner/Operator shall notify the District Manager and advise of actions being taken to contain, control and ameliorate the situation.

(57) The Owner/Operator shall ensure a written report describing a plan and implementation schedule for landfill gas and odour management in conjunction with Site development and progressive rehabilitation is submitted to the Ministry. The plan shall include, as a minimum:
(a) A description of any anticipated progress of final cover placement until Site closure,

based on progressive rehabilitation of the Site; and

(b) A program to evaluate the effectiveness of the landfill gas collection system which shall identify areas of the Site which require upgrading, alteration, or additional collection and control facilities. The program shall include an assessment to be conducted at least once a year, of the Site's conformance with an operating code of practice which includes the development of system design parameters, details on the management of the system to satisfy the design parameters and a description of rationale for landfill gas flow adjustments to optimize system operation.

(58) During construction and continued use of the landfill gas collection system, the Owner/Operator shall implement as a minimum, odour control plan. The effectiveness of the odour control plan shall be monitored and evaluated regularly, and updated or amended as necessary, based on operational experience and odour complaints received.

(59) As a component of the Annual Monitoring and Operation Report for the Site, the Owner/Operator shall include a written report covering each year's construction season. The report shall detail the construction activities, QA/QC program carried out for the construction, as-built drawings of the landfill gas collection and flaring system to date, including a description and reasons for any changes to the design of the landfill gas collection and flaring system.

(60) Any gas extraction well that needs to be replaced due to damage or the well is deemed to be not functioning properly, or additional wells to upgrade the system, the Owner/Operator shall install or replace the gas extraction well within a reasonable time frame of identifying the need for replacement. Any such changes to the gas extraction system shall be documented in the Annual Monitoring and Operation Report.

(61) The Owner/Operator shall implement the monitoring program for landfill gas to monitor the performance of the landfill gas collection and flaring system as approved by the Ministry, as well as any written recommendations of the District Manager through the review of the Annual Monitoring Reports.

(62) Components of the active gas collection system shall be monitored on an as-needed basis, with a routine frequency of once per month for the full collection field. Any observed deficiencies/problems shall be repaired as soon as practicable and a summary of remedial actions carried out, shall be reported in the Annual Report required under this Approval.

Backup Power

(63) (a) The Owner shall provide adequate backup power at the Site in order to ensure operation of the scale facility and operation of the landfill gas blower on-Site; and

(b) A portable generator would be considered sufficient for back-up power for the landfill gas blower.

(64) A power supply connection at each leachate collection pumping station shall be installed by the

Owner that will permit a portable generator to be connected during a power outage.

Closure Plans

(65) In accordance with Environmental Compliance Application dated June 6, 2013, Waste Fill Area known as the South Fill Area is hereby approved for closure in accordance with Item No 51, Schedule "A".

(66) At least 2 years prior to closure of the North Fill Area or when 90% of the NFA allowed capacity is reached, whichever comes first, the Owner shall submit to the Director for approval, with copies to the District Manager, and the PLC, a detailed North Fill Area Landfill 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:

a. a plan showing the appearance of the NFA and the entire Site after closure;
b. a description of the proposed end use of the NFA and the entire Site;
c. a description of the procedures for closure of the Landfill, including:
    i. advance notification of the public of the landfill closure;
    ii. posting of a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
    iii. completion, inspection and maintenance of the final cover and landscaping;
    iv. Site security;
    v. removal of unnecessary landfill-related structures, buildings and facilities; and
    vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
d. a schedule indicating the time-period for implementing Sub-conditions i. to vi. above.
e. descriptions of the procedures for post-closure care of the Landfill, 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;
f. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
g. an updated estimate of the contaminating life span of the NFA and the entire Site, based on the results of the monitoring programs to date.

(67) The SFA and/or the NFA and when applicable, the Site as a whole shall be closed in accordance with the closure plan(s) as approved by the Director.

(68) The Owner shall consult with affected stakeholders on the proposed end uses prior to the submission of its closure report required under Condition 6(66). The proposed end use activities should be consistent with the types of activities consulted upon during the Environmental Assessment for the Site.

Post-Closure Care

(69) Upon closure of the South Fill Area, and/or the North Fill area, the following features will be inspected, recorded on a quarterly basis and maintained as required on a seasonal basis :
(a) evidence of settlement;
(b) possible leachate seeps and springs;
(c) cover soil integrity;
(d) vegetative cover;
(e) surface water drainage works;
(f) erosion and sediment in surface water drainage system; and
(g) groundwater monitoring wells.

7. PUBLIC DROP-OFF AND REUSE CENTRE

Waste Type and Service Area

(1) The Public Drop-Off and Reuse Centre shall only accept solid non-hazardous waste generated from residential, IC&I sources located within the County of Peterborough.

(2) Waste that is received at the Public Drop-Off and Reuse Centre shall be for final disposal at the Site, for Composting at the Site, or transfer off-site for recycling or reuse.

Storage and Processing

(3) Waste may be stored at the Public Drop-Off and Reuse Centre for a maximum of ninety (90) days.

(4) Despite Condition 7(3), all putrescible waste shall be transferred to the Composting Facility within twenty-four (24) hours of receipt.

(5) With the exception of using a chipper to process wood waste into more manageable sizes, no waste processing shall occur at the Public Drop-Off and Reuse Centre.

(6) Waste shall be placed in the appropriate bins before the end of each operating day. No overnight storage of waste outdoors is permitted.

(7) 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.

(8) All storage containers/bins used to store waste shall be maintained in good condition to prevent leakage. The Owner shall immediately remove from service any leaking container. Containers/bins used to store clean scrap metal may be equipped with drainage holes to permit

the drainage of rainwater.

Reuse Centre

(9) The Owner may operate a "Reuse Centre" located on the public drop-off platform for the handling and temporary storage of reusable items in accordance with Items 54 and 55 of Schedule "A".

(10) The following waste types are prohibited from being received and stored at the "Reuse Centre":
- (a) Subject waste;
- (b) Asbestos waste; and
- (c) Putrescible waste.

(11) The amount of waste stored at the "Reuse Centre" shall not exceed 30 cubic metres or 2 tonnes.

(12) The storage of waste outside of the "Reuse Centre" is prohibited during non-operating hours.

8. COMPOSTING FACILITY

Waste Type and Service Area

(1) Only waste that is generated within the geographical boundaries of the City of Peterborough and the County of Peterborough may be accepted at the Site for composting.

(2) This Site is approved to accept municipal solid, non-hazardous waste destined for Composting at the Site. The Organic Waste approved for receipt at the Composting Facility:
- a. is limited to:
  - i. Leaf and Yard Waste from residential, industrial, commercial and institutional sources;
  - ii. Amendment Materials from residential, industrial, commercial and institutional sources; and
  - iii. SSO from residential, industrial, commercial and institutional sources;
- b. shall exclude diapers, incontinence products, and sanitary products, except in incidental amounts; and,
- c. shall exclude any Organic Waste stored in non-compostable bags and collection bags that promote anaerobic conditions.

(3) The City of Peterborough shall ensure that only wastes approved under this Approval are received at this Composting Facility by limiting the receipt of waste at the Composting Facility to the municipal curbside yard waste collection vehicles, the Public Drop-Off and Reuse Centre, and the Owner's Parks and Recreations Department and/or Public Works Department employees only.

Waste Receipt Rates and Storage Limits:

(4) Subject to Condition 8(11), the Composting Facility is approved to receive Organic Waste in quantities that are not to exceed:
  (a) for Stage 1:
    (i) 270 tonnes per day;
    (ii) 471 tonnes per week; and
    (iii) 30,020 tonnes per year, subject to the following limitations:
      (1) a maximum of 24,500 tonnes per year of SSO, Leaf and Yard Waste and Amendment Material for composting in the GORE Composting System; and
      (2) a maximum of 5,520 tonnes of Leaf and Yard Waste and Amendment Material per year for composting in the outdoor windrow Leaf and Yard Waste composting system;
  (b) for Stage 2:
    (i) 320 tonnes per day;
    (ii) 920 tonnes per week; and
    (iii) 42,270 tonnes per year, subject to the following limitations:
      (1) a maximum of 36,750 tonnes per year of SSO, Leaf and Yard Waste and Amendment Material for composting in the GORE Composting System; and
      (2) a maximum of 5,520 tonnes of Leaf and Yard Waste and Amendment Material per year for composting in the outdoor windrow Leaf and Yard Waste composting system.

(5) At the Composting Facility, the City of Peterborough is approved to temporarily store a maximum of approximately 14,100 tonnes of waste in Stage 1 and a maximum approximately 17,000 tonnes of waste in Stage 2 (including the presence of all waste at the Composting Facility such as in-process waste), subject to the following:
  (a) Within the Receiving Building:
    (i) a maximum of 30 cubic metres of Rejected Waste and/or Residual Waste within a roll-off bin; and
    (ii) a maximum of approximately 460 cubic metres of Organic Waste to be located on the 15 m x 29 m tipping floor, the 28.5 m x 10 m shredding/mixing area and the 22.4 m x 19.3 m storage area (note: for reference purposes only, this is equivalent to approximately 300 tonnes);
  (b) Within the GORE Composting System:
    (i) Under Stage 1, a maximum of eight (8) bunkers, with each bunker containing a maximum of approximately 1,030 cubic metres (8 m wide x 50 m long x 3.7 m tall piles) of Organic Waste Mix and/or Immature Compost, for a total of up-to approximately 8,240 cubic metres of Organic Waste Mix and/or Immature Compost (note: for reference purposes only, this is equivalent to approximately 5,750 tonnes); and
    (ii) Under Stage 2, a maximum of twelve (12) bunkers, with each bunker containing a maximum of approximately 1,030 cubic metres (8 m wide x 50 m long x 3.7 m tall piles) of Organic Waste Mix and/or Immature Compost, for a total of up-to approximately 12,360 cubic metres of Organic Waste Mix and/or Immature

Compost (note: for reference purposes only, this is equivalent to approximately 8,600 tonnes);

(c) a maximum of approximately 3,750 cubic metres (20 m x 50 m x 5 m wide pile) of Amendment Materials and Leaf and Yard Waste within the designated outdoor excess Leaf and Yard Waste storage area (note: for reference purposes only, this is equivalent to approximately 1000 tonnes);

(d) Within the outdoor windrow Leaf and Yard Waste composting system for the active composting and curing of Leaf and Yard Waste, a maximum of ten (10) static windrows, with each windrow containing a maximum of approximately 370 cubic metres (4.5 m wide x 50 m long x 2.2 m tall piles) of Organic Waste Mix and/or Immature Compost, for a total of up-to approximately 3,700 cubic metres of Organic Waste Mix and/or Immature Compost (note: for reference purposes only, this is equivalent to approximately 2,400 tonnes);

(e) Within the outdoor aerobic windrow curing system for the curing of Immature Compost from the GORE Composting System, a maximum of fifteen (15) static windrows, with each windrow containing a maximum of approximately 370 cubic metres (4.5 m wide x 50 m long x 2.2 m tall piles) of Immature Compost and/or Finished Compost, for a total of up-to approximately 5,500 cubic metres of Immature Compost and/or Finished Compost (note: for reference purposes only, this is equivalent to approximately 3,000 tonnes);

(f) a maximum of approximately 1,030 cubic metres of Immature Compost and/or Finished Compost within the designated outdoor screening area; and

(g) a maximum of two (2) Finished Compost and/or Compost stockpiles within the designated outdoor Finished Compost storage area, each containing a maximum of approximately 1,640 cubic metres (25 m in diameter x 10 m high), for a total of up-to approximately 3,280 cubic metres of Finished Compost and/or Compost (note: for reference purposes only, this is equivalent to approximately 1,680 tonnes).

(6) No waste shall be stored at any part of the Composting Facility other than those identified in Condition 8(5) at any time.

(7) In the event that Organic Waste cannot be processed at the Composting Facility and the Composting Facility is at its approved waste storage capacity, the City of Peterborough shall cease accepting additional Organic Waste. Receipt of additional waste may be resumed once such receipt complies with the waste storage limits approved in this Approval.

(8) Despite Conditions 2(17), (18) and (19), the Residual Waste and Rejected Waste generated within the Receiving Building shall be:

(a) stored within the designated roll-off bin within the confines of the Receiving Building at all times;

(b) segregated from all other waste; and

(b) removed from the Receiving Building within forty eight (48) hours from the time of it's receipt for final disposal in the the Landfill or disposal at an approved waste disposal site in accordance with Reg. 347 and the EPA.

(9) The City of Peterborough shall ensure that all waste storage is undertaken in a manner that does not cause an Adverse Effect or a hazard to the environment or any person.

(10) No storage of incoming Organic Waste in its transportation vehicle is approved under this Approval.

Development, Expiry of Approval and As-Built Drawings

(11) (a) Prior to receiving the waste quantity set out in Condition 8(4)(a) for Stage 1, the City of Peterborough shall construct and install all of the Composting Facility's processes, working areas and supporting units described under Stage 1 in Schedule "C".

(b) Stage 1 of the Composting Facility shall be constructed and the approved processes, working areas and supporting units shall be installed and must commence operation, as set out in Condition 8(11)(a), within five (5) years of issuance of this Approval, after which time the Approval for Stage 1 ceases to apply if the Composting Facility has not been constructed and installed in accordance with Condition 8(11)(a). In the event that the construction, installation and/or operation of any portion of Stage 1 of the Composting Facility is anticipated to be delayed beyond the time period stipulated, the City of Peterborough shall submit to the Director an application to amend the Approval to extend this time period, at least six (6) months prior to the end of the period. The amendment application shall include the reason(s) for the delay and whether there is any design change(s).

(c) Prior to receiving the waste quantity and types set out in Condition 8(4)(c) for Stage 2, the City of Peterborough shall construct and install all of the Composting Facility's processes, working areas and supporting units described under Stage 2 in Schedule "C".

(d) Stage 2 of the Composting Facility shall be constructed and the approved processes, working areas and supporting units shall be installed and must commence operation, as set out in Condition 8(11)(c), within ten (10) years of issuance of this Approval, after which time the Approval for Stage 2 ceases to apply if the Composting Facility has not been constructed and installed in accordance with Condition 8(11)(c). In the event that the construction, installation and/or operation of any portion of Stage 2 of the Composting Facility is anticipated to be delayed beyond the time period stipulated, the City of Peterborough shall submit to the Director an application to amend the Approval to extend this time period, at least six (6) months prior to the end of the period. The amendment application shall include the reason(s) for the delay and whether there is any design change(s).

(e) Within thirty (30) calendar days of commencement of construction of each stage, the City of Peterborough shall prepare and submit to the District Manager a schedule for the completion of construction and commissioning operation of the respective Composting Facility stage. The City of Peterborough shall notify the District Manager within thirty (30) days of the commissioning operation of each stage of the Composting Facility.

Upon completion of construction of each stage of the Composting Facility, the City of Peterborough shall prepare and submit a statement to the District Manager, certified by a Professional Engineer, that the Composting Facility has been constructed in accordance with this Approval.

(f) Upon the construction of each stage, the City of Peterborough shall update the Change Log in the Design and Operations Report to record the completion of construction and declare that the design conforms with Schedule "C". All supporting information including technical memorandum, engineering plans and specifications, as applicable and appropriate to support the declarations that the design conforms with Schedule "C" shall remain on-site for future inspections.

(12) Within ninety (90) days from the construction of Stages 1 and 2 of the Composting Facility, a set of as-built drawings or updated as-built drawings, as appropriate, certified by a Professional Engineer and showing the Composting Facility as constructed shall be prepared and kept at the Site.

Organic Waste Handling:

(13) The following waste management activities are approved at the Composting Facility in this Approval:

a. receipt, temporary storage and transfer of Organic Waste; and
b. processing of the Organic Waste, including the following Organic Waste management activities:
    i. mixing of the Organic Waste within the Receiving Building to generate the Organic Waste Mix;
    ii. shredding of the Organic Waste Mix destined for the Composting process within the Receiving Building;
    iii. grinding of Leaf and Yard Waste and Amendment Materials at the outdoor excess Leaf and Yard Waste storage area;
    iv. thermophilic Composting of the Organic Waste Mix that contains SSO within the GORE Composting System only;
    v. curing of the Immature Compost from the GORE Composting System within the outdoor aerobic windrow curing system;
    vi. thermophilic Composting and curing of the Organic Waste Mix that does not contain SSO within the outdoor windrow Leaf and Yard Waste composting system;
    vii. screening of the Immature Compost and Finished Compost, as required; and
    viii. shredding/grinding of wooden overs destined for re-use in the Composting process, as required.

(14) The City of Peterborough shall ensure that the Organic Waste management at the Composting Facility is carried out in accordance with the following requirements:

a. a waste tracking system shall be established and implemented for all waste received, in-process, processed, temporarily stored and transferred from the Composting Facility;

b. all incoming SSO shall be received, unloaded and temporarily stored within the confines of the Receiving Building, at all times;
c. all incoming Amendment Materials and Leaf and Yard Waste shall be received, unloaded and temporarily stored within the confines of the Receiving Building or on the designated excess Leaf and Yard Waste outdoor storage pad, at all times;
d. the City of Peterborough shall ensure that all incoming SSO, Leaf and Yard Waste and Amendment Materials are shredded and mixed into the Organic Waste Mix within the confines of the Receiving Building, at all times;
e. the SSO received in the Receiving Building shall be mixed into the Organic Waste Mix and transferred into the GORE Composting System within twenty-four (24) hours of receipt;
f. the Leaf and Yard Waste and Amendment Materials received in the Receiving Building shall be mixed into the Organic Waste Mix and transferred into a composting system within five (5) days of receipt;
g. Leaf & Yard Waste stored outdoors shall be transferred into a composting system within one (1) month of receipt or more frequently as needed to prevent odour impacts;
h. if needed, the outdoor Leaf and Yard Waste storage stockpile shall be turned at a rate frequent enough to reduce the likelihood of anaerobic conditions and odours arising within the stockpiles;
i. all storage, processing, Composting and other waste management activities shall take place in designated areas outdoors as set out in the supporting documentation listed in the attached Schedule "A";
j. during the fifteen-day pasteurization phase of the active Composting process within the outdoor windrow Leaf and Yard Waste composting system, the windrows shall be turned a minimum of five (5) times;
k. during the remainder of the active Composting process within the outdoor windrow Leaf and Yard Waste composting system, the windrows shall be turned at a frequency necessary to ensure compliance with the process operating criteria set out in this Approval;
l. during the curing phase, the Immature Compost shall be turned at least once per month, or more frequently if required, to maintain aerobic conditions;
m. in circumstances where it is not feasible to turn windrows as required in this Approval (e.g., during the extreme weather conditions or cold causing frozen material) and the turning frequency is decreased, the minimum Composting durations shall account for the time periods during which the biological activity becomes dormant or turning is not feasible;
n. only clean water shall be used to moisten the waste undergoing active Composting and curing, and any areas needed for dust control purposes;
o. wastewater collected at the Site may be used to moisten the waste prior to the start of the pasteurization phase of Composting, only if the use of the wastewater does not result in odorous discharges to the natural environment;
p. for each category of Compost produced at the Site, the progress of Composting through all of its stages shall be tracked; and

q. all windrows producing different categories of Compost, waste or NASM shall be kept separated.

(15) All activities approved under Condition 8(13) shall only be carried out by appropriately Trained Personnel.

(16) The City of Peterborough shall ensure that adequate lighting for the Composting waste inspection areas is provided to ensure proper waste inspection/screening.

(17) Unless otherwise specified in this Approval, the approved Composting activities shall be carried out as set out in the documents in the attached Schedule "A".

Cross-Contamination Prevention:

(18) The City of Peterborough shall ensure that the incoming Organic Waste and the equipment used in handling of the incoming Organic Waste are kept separate and do not come in contact with the Immature Compost / the Finished Compost and Compost except where the Immature Compost / the Finished Compost and Compost are being fed back into the Composting process.

(19) The City of Peterborough may use equipment utilized in processing of incoming Organic Waste to process the Immature Compost / the Finished Compost and Compost provided that the equipment has been cleaned and disinfected to prevent the Immature Compost / the Finished Compost and Compost from being contaminated by the incoming Organic Waste.

(20) If the same equipment is used in production of different categories of Compost, the City of Peterborough shall ensure that the equipment is cleaned before use in a different process.

General Requirements for Sampling and Analysis

(21) The City of Peterborough shall maintain a Quality Assurance/Quality Control (QA/QC) program for sampling and analysis of the Organic Waste, Immature Compost and the Finished Compost, as required by this Approval.

(22) All required analytical results shall be from a laboratory service provider accredited to the ISO/IEC:17025:2005 standard.

(23) The City of Peterborough shall contact their laboratory service provider for recommended sample preparation methods, sample containers, and other materials and instructions for sample collection and handling and shall prepare a written sampling protocol. This protocol shall be made available to the Ministry staff, upon request.

(24) The Organic Waste, Organic Waste Mix, Immature Compost, and Finished Compost

sampling/composite sample preparation and testing methods and procedures shall be as set out in Appendix 1 and Appendix 2 of the Standards Document.

(25) Retesting due to sample failure is as set out in the Standards Document.

Waste Screening and Quality Control of the Incoming Organic Waste

(26) Prior to being accepted, the City of Peterborough shall ensure all incoming Organic Waste loads are visually inspected by Trained Personnel to ensure only wastes approved under this Approval are received at this Site for Composting, and that incoming loads contain only incidental amounts of other waste materials.

(27) If any incoming waste load is known to, or is discovered to, contain unapproved waste, that load shall not be accepted at the Site.

(28) In the event that waste that is not approved under this Approval is inadvertently accepted at the Site, the City of Peterborough shall refuse receipt of the unapproved waste and return this Rejected Waste to the generator if it is safe to do so. If return of the Rejected Waste is not feasible, then the waste shall be re-directed to the designated Rejected Waste storage area.

(29) The Organic Waste or an additive necessary for Composting received at the Site for Composting shall not exceed the maximum concentrations for metals listed in Column 2, Table 3.2 of the Standards Document. Until such a time that the Standards Document dated July 25, 2012 is amended, the Organic Waste must not exceed the metal concentrations in Column 2, Table 3.2 of Schedule "D".

(30) The City of Peterborough shall ensure that all incoming Organic Waste accepted at this Site for Composting is characterized for metals in accordance with the requirements of this Approval.

(31) If the City of Peterborough relies on the published data for the well-studied/characterized Organic Waste feedstocks (e.g., Leaf and Yard Waste, wood, etc.), the latest published information shall be used to confirm that the Organic Waste feedstocks received at the Site and are destined to be processed into Compost at the Site comply with the feedstock standards from the Standards Document.

(32) If the published data is not available or used to confirm compliance of the Organic Waste with the feedstock standards from the Standards Document, the City of Peterborough shall:

a. establish the incoming Organic Waste feedstock sampling/testing protocol as set out in Appendix 1 and Appendix 2 of the Standards Document;
b. sample and analyze representative samples of the Organic Waste to be received at the Site prior to receipt at the Site for Composting;
c. sample the incoming Organic Waste on a monthly basis for a period of one (1) year

or until a consistent characteristic profile is obtained or for Organic Waste which are received less frequently than monthly, sample each incoming load for a period of one (1) year, or until a consistent characteristics profile is obtained; and

d. sample the incoming Organic Waste when the characteristics of the Organic Waste have changed.

(33) Notwithstanding the provisions of Condition 8(32) above, the City of Peterborough shall periodically sample the incoming Organic Waste for which consistent characteristics have been obtained to confirm that the Organic Waste has not changed.

(34) If at any time, the average concentration of any regulated metal in the Finished Compost is found to be greater than 80% of the concentration limit for the Category AA Compost set out in Condition 8(29), the City of Peterborough shall carry out testing of the incoming Organic Waste.

(35) Based on demonstrated compliance with the feedstock characterization requirements from Conditions 8(30) to (34), the City of Peterborough may designate the generator as a pre-approved source.

(36) At the weigh scale, the Trained Personnel shall ensure that all loads of the incoming Organic Waste being accepted at the Site are accompanied by documentation containing the results of the required waste characterization or showing the origin of the Organic Waste, if generated by a source considered to be well-studied and classified by the City of Peterborough as a pre-approved generator of the Organic Waste.

(37) The Organic Waste that has not been characterized in accordance with this Approval or that is not accompanied by the required documentation shall not be accepted at the Site and shall immediately be directed off-Site.

(38) The Trained Personnel shall visually inspect the incoming Organic Waste being unloaded in the unloading areas to ensure that only the approved waste types are processed at the Site.

Composting Recipe Criteria

(39) The City of Peterborough shall ensure that the Carbon to Nitrogen Ratio (C:N Ratio) of the Organic Waste Mix prior to its incorporation into the Composting process is maintained between 25:1 and 35:1 with the target of 30:1.

(40) The City of Peterborough shall ensure that the moisture content of the Organic Waste Mix prior to its incorporation into the Composting process is maintained between 40% and 60%.

(41) The City of Peterborough shall ensure that prior to its incorporation into the Composting process, the Organic Waste Mix has the appropriate porosity and the bulk density to

promote aerobic conditions within the windrows.

GORE Cover Operations

(42) (a) Unless otherwise required by this Approval or during loading and unloading, all Phase 1 and 2 GORE windrows shall remain covered with the GORE cover.

(b) Phase 3 GORE windrows shall have covers available for use at all times should the need for covering the windrows arise.

(c) if an malodorous situation is detected in the Phase III GORE windrows, the City of Peterborough shall manage or cover all material in the window(s) in accordance with the following:

(i) The material must be moved out of Phase III GORE windrows and reintroduced back into the composting process within 12 hours; and

(ii) If the material cannot be moved in accordance with Condition 8(42)(c)(i) above due to capacity limitations, the material must be immediately covered with GORE cover(s) until it is able to be moved.

(d) If a complaint involving odour is received by the Owner or the Ministry, the City of Peterborough shall carry out the activities required under Condition 8(42)(c) unless there is evidence that the odour is coming from another source.

(e) Removal of the GORE cover for any reason shall only be done during favourable weather conditions.

Compost Processing and Monitoring Requirements

(43) The City of Peterborough shall ensure that the moisture content of:

(a) the Organic Waste Mix undergoing active Composting is maintained on average between 40% and 60% per batch; and

(b) the Immature Compost undergoing curing is maintained on average between 40% and 60% per batch.

(44) The moisture of the waste shall be monitored and recorded:

(a) once the Organic Waste Mix has been generated for Composting (applies to both Composting systems);

(b) each time the waste is transferred within the GORE Composting System (e.g., Phase 1 to Phase 2, Phase 2 to Phase 3 and Phase 3 to curing);

(c) at the beginning of curing for the outdoor windrow Leaf and Yard Waste composting system; and

(d) at a minimum of once every two weeks during curing (applies to both Composting systems).

(45) For the purpose of verifying compliance with the:

(a) moisture requirement under Conditions 8(40) and (43)(a), the City of Peterborough shall monitor the moisture within the Organic Waste Mix using the following methods:
   (i) the procedure(s) set out in the BNQ Industry Standard, CAN/BNQ 0413-200/2005 *Organic soil conditioners - Composts;* or
   (ii) the squeeze test in accordance with the document entitled "Best Practices for Operating an Aerated Windrow Composting Facility", prepared by The Compost Council of Canada for Manitoba Conservation and Water Stewardship, dated 2016; and,
(b) the standard moisture requirement under Condition 8(43)(b), the City of Peterborough shall test the moisture level within the Immature Compost undergoing curing using the procedure(s) set out in the BNQ Industry Standard, CAN/BNQ 0413-200/2005 *Organic soil conditioners - Compost* .

(46) The City of Peterborough shall use best efforts to ensure that the oxygen content of the Organic Waste Mix and Immature Compost undergoing GORE Composting is maintained above 10%, with a target of 12-18%, at all times.

(47) The City of Peterborough shall initiate appropriate remedial measures to increase the oxygen content of the Organic Waste Mix or Immature Compost undergoing Composting:
(a) within one (1) hour of identifying the oxygen content excursions at or below 5% within the Organic Waste Mix; and
(b) within one (1) day of identifying the oxygen content excursions at or below 5% within the Immature Compost.

(48) (a) Temperature and oxygen shall be measured within the windrows within the GORE Composting System at the locations that will provide representative pasteurization temperature readings and oxygen readings as described in the supporting documentation in the attached Schedule "A".

(b) Temperature shall be measured within the windrows within the outdoor windrow Leaf and Yard Waste composting system and the windrows within the outdoor aerobic windrow curing area for the GORE Composting System:
   (i) at a depth of one (1) metre from the surface of the waste undergoing Composting; and
   (ii) every fifteen (15) metres along the length of the Composting windrow section or at six (6) representative locations, whichever method yields more locations.

(49) (a) The temperature and oxygen content of the waste within the GORE Composting System shall be monitored and recorded on a continuous basis.

(b) The temperature of the waste undergoing curing in the outdoor aerobic windrow curing area for the GORE Composting System shall be monitored and recorded weekly during the curing phase.

(c) The temperature of the waste within the outdoor windrow Leaf and Yard Waste composting system shall be monitored and recorded daily during the active Composting phase and weekly during the curing phase.

(50) Where continuous automated temperature monitoring is used, the compliance with the pasteurization requirement may be demonstrated on the basis of daily averages using all data points acquired over a twenty four (24) hour period.

(51) The City of Peterborough shall ensure that the temperature of the Immature Compost does not exceed 65 degrees Celsius and that within four (4) hours of identifying the temperature excursions above this level, appropriate remedial measures to lower the Composting temperature to the required level are initiated.

(52) The City of Peterborough shall ensure that the curing phase does not start until the Organic Waste Mix has completed the active Composting phase under Condition 8(54) and the temperature monitoring required by this Approval demonstrates reduced temperatures of equal to or less than 50°C.

(53) The oxygen and moisture monitoring frequencies may be modified by the Director in writing after two (2) years of successful monitoring results in accordance with this Approval.

Quality Control of the Finished Compost

(54) Compost shall comply with the pathogen reduction Compost Quality Standards set out in the Standards Document. Until such a time that the Standards Document dated July 25, 2012 is amended, the Organic Waste Mix is considered to be Immature Compost when it complies with the following pathogen reduction requirements:

a. using the windrow composting method, the Organic Waste Mix has been maintained at a minimum temperature of 55 degrees Celsius for at least fifteen (15) cumulative days. Also, during the high temperature period, the windrow has been turned at least five times; or
b. using the GORE Composting System, the Organic Waste Mix has been maintained at a minimum temperature of 55 degrees Celsius for at least three (3) consecutive days AND the Organic Waste Mix does not exceed the following pathogen concentrations:
    i. 1,000 colony forming units (CFU) E. coli or most probable number (MPN)/gram total solids (on a dry weight basis); and
    ii. 3 MPN Salmonella/4 grams total solids (on a dry weight basis, based on an analysis of the entire 4g sample).

(55) Compost shall comply with the maturity requirements set out in the Standards Document. Until such a time that the Standards Document dated July 25, 2012 is amended, Immature Compost is considered to be Finished Compost when it complies with the following maturity requirements:

a. the Immature Compost has been maintained at ≥ 40% moisture during curing; and

b. using the windrow composting method for Leaf and Yard Waste:
   i. the Immature Compost has been cured for a minimum period of six (6) months from the day the last portion of material went into the batch; or
   ii. the Immature Compost has been cured for a minimum period of twenty one (21) days from the day the last portion of material went into the batch, and the respiration rate is:
      1. less than, or equal to, 400 milligrams of oxygen per kilogram of volatile solids (on a dry weight basis) per hour; or
      2. less than, or equal to, 4 milligrams of carbon in the form of carbon dioxide per gram of organic matter (on a dry weight basis) per day; or

c. using the GORE Composting System, the Immature Compost has been cured for a minimum period of twenty one (21) days from the day the last portion of material went into the batch, and the respiration rate is:
   i. less than, or equal to, 400 milligrams of oxygen per kilogram of volatile solids (on a dry weight basis) per hour; or
   ii. less than, or equal to, 4 milligrams of carbon in the form of carbon dioxide per gram of organic matter (on a dry weight basis) per day.

(56) Compost shall comply with the metal, total foreign matter and sharp foreign matter content limits set out in the Standards Document for its intended end use criteria. Until such a time that the Standards Document dated July 25, 2012 is amended, Finished Compost is considered to be Compost when it complies with the following requirements:

a. Finished Compost must not contain regulated metals in a concentration that exceeds any of the limits set out in Table 3.1 of the Standards Document, as calculated on a dry weight basis, for the applicable end-use of the Organic Waste processed at the Site. Until such a time that the Standards Document dated July 25, 2012 is amended, Finished Compost must not exceed the metal concentrations in Table 3.1 of Schedule "D" for the applicable end-use of the Organic Waste processed at the Site.
b. Finished Compost shall comply with the total foreign matter content and sharp foreign matter content limits set out in Table 3.3, of the Standards Document, as calculated on a dry weight basis, for the applicable end-use of the Organic Waste processed at the Site. Until such a time that the Standards Document dated July 25, 2012 is amended, Finished Compost must not exceed the foreign matter content and sharp foreign matter concentrations in Table 3.3 of Schedule "D" for the applicable end-use of the Organic Waste processed at the Site.

(57) Prior to being transferred from the Site for its intended end use, the City of Peterborough shall:

a. conduct quality control testing of the Finished Compost in accordance with the requirements set out in the Standards Document and listed in Conditions 8(54) to (56) above; and
b. ensure that all Composting records for the Finished Compost demonstrate compliance with the temperature and residence time requirements for pathogen inactivation set out in the Standards Document and listed in Condition 8(54), above.

Compost End Use Requirements

(58) Finished Compost is considered to be Compost when it complies with Compost Quality Standards for the intended end use category.

(59) Finished Compost which does not exceed the maximum concentrations for metals as set out in Column 2 of Table 3.1 of the Standards Document and which complies with the foreign matter quality requirements, the maturity criteria, the pathogen reduction requirements and the pasteurization temperature and residency time requirements set out in the Standards Document may be transferred off Site:

a. for unrestricted use as Category AA Compost; or
b. for use as a non-agricultural source material in accordance with the NMA.

(60) Finished Compost which does not exceed the maximum concentrations for metals as set out in Column 3 of Table 3.1 of the Standards Document and which complies with the foreign matter quality requirements, the maturity criteria, the pathogen reduction requirements and the pasteurization temperature and residency time requirements set out in the Standards Document may be transferred off Site:

a. for unrestricted use as Category A Compost, provided that the labelling requirements as specified in the Standards Document are met; or
b. for use as a non-agricultural source material in accordance with the NMA.

(61) Finished Compost which does not exceed the maximum concentrations for metals as set out in Column 4 of Table 3.1 of the Standards Document and which complies with the foreign matter quality requirements, the maturity criteria, the pathogen reduction requirements and the pasteurization temperature and residency time requirements set out in the Standards Document may be transferred off Site:

a. for use as a non-agricultural source material in accordance with the NMA; or
b. for use at a waste disposal facility approved to receive this type of waste.

(62) Finished Compost which does not exceed the maximum concentrations for metals as set out in Table 3.1 of the Standards Document and which complies with the foreign matter quality requirements, the pathogen reduction requirements and the pasteurization temperature and residency time requirements but not with the maturity requirements set out in the Standards Document is considered to be an Immature Compost and a waste and shall:

a. be re-tested and/or shall continue to undergo curing at the Site; or
b. be disposed of as waste at a waste disposal site approved by the Ministry, or its equivalent if in jurisdictions outside of Ontario, to accept such waste.

(63) Finished Compost which does not exceed the maximum concentrations for metals as set out in Table 3.1 of the Standards Document and which complies with the foreign matter quality requirements, the maturity requirements but not with the pathogen reduction requirements and the pasteurization temperature and residency time requirements set out in the Standards Document is considered to be a waste and shall:

a. be returned to the Composting process for pasteurization as set out in this Approval; or
b. be disposed of as waste at a waste disposal site approved by the Ministry, or its equivalent if in jurisdictions outside of Ontario, to accept such waste.

(64) If Finished Compost exceeds the maximum concentrations for metals in Compost for its intended end use, as set out in Table 3.1 of the Standards Document, but meets the maximum concentrations for metals in feedstock listed in Table 3.2 of the Standards Document, it may be returned to the Composting process as waste for re-processing.

Best Management Plan

(65) The City of Peterborough shall ensure that a Best Management Practices Plan for the control of litter from the Site is prepared, maintained and implemented at the Site.

Closure Plan

(66) The City of Peterborough shall submit, for approval by the Director, a written Composting Facility Closure Plan at least four (4) months prior to the permanent closure of the Composting Facility. This plan must include, as a minimum, a description of the work that will be done to facilitate closure of the Composting Facility and a schedule for completion of that work.

(67) Within ten (10) days after closure of the Composting Facility, the City of Peterborough shall notify the Director, in writing, that the Composting Facility is closed and that the Closure Plan has been implemented.

9. MONITORING

Reasonable Use

(1) The Site shall be operated in such a way to ensure compliance with the Reasonable Use Guideline at monitoring points along the Site's property line.

Monitoring Program

(2) Monitoring programs shall be carried out for leachate, groundwater, private wells, surface water, landfill gas in accordance with the Environmental Monitoring Plan outlined in Schedule "B" of this Approval.

(3) The Site environmental monitoring programs shall be continually evaluated and enhanced as required by the ministry or as recommended in the Annual Report.

(4) The Owner shall implement the landfill monitoring recommendations outlined in the memorandums from Shawn Kinney, Hydrogeologist, Ministry, dated March 5, 2014 and B.W. Metcalfe, Surface Water Specialist, Ministry, dated December 19, 2013.

(5) Prior to construction of the Composting Facility, the City of Peterborough shall collect:
   (a) the static bedrock and overburden groundwater elevations at all wells listed in Table F of Schedule "B"; and
   (b) at least one round of water quality samples from all domestic and agricultural wells within a 500m radius of the site. Analysis for the contaminants of concern and all parameters included in the appendix D-5-5 Private Wells: Water Supply Assessment. Where access is not granted to collect a sample, written confirmation, including the dated letter circulated to the property owners, shall be forwarded to the Ministry.

(6) Prior to the initial commencement of operations at the Composting Facility, the City of Peterborough shall conduct predictive modelling of the potential leachate plume. The potential leachate plume modelling results shall be included in the Annual Report each year.

(7) (a) Prior to installing/finalizing the three (3) wells that are to-be-determined (TBD) under Table F of Schedule "B" and by no later than three (3) months following construction of the Composting Facility, the City of Peterborough shall submit Site Plan(s) identifying the three (3) proposed TBD monitoring locations to the District Manager for written concurrence.

   (b) The monitoring wells identified in Condition 9(7)(a) shall be installed within (3) months of receiving written concurrence from the District Manager.

Landfill Groundwater Contingency Plan and Trigger Mechanism

(8) The trigger concentration for groundwater quality shall be 80% of the Guideline B-7 values for all parameters that have an Ontario Drinking Water Standards value.

(9) Groundwater chemical concentrations must be assessed with the trigger concentrations within twelve (12) weeks of sample collection.

(10) The assessment process for the Landfill's groundwater quality is detailed in Item 36, 37 and 38 of Schedule "A".

(11) If the District Manager determines that the Landfill's leachate collection is not successful and that the monitoring program indicates that contamination will potentially be migrating off-site, or, if leachate springs and/or outbreaks down gradient of manhole J1 occur, the Owner must install and operate the contingency program outlined in the appended documents as defined by Items 24, 29, 36, 37 and 38 of Schedule "A" of this Approval and as instructed by the District Manager. The District Manager may, at any time, instruct the Owner to implement the recommendations made in the monitoring report.

Composting Facility Groundwater Contingency Plan and Trigger Mechanism

(12) The City of Peterborough shall update the Reasonable Use Criteria (RUC) limits set out in Table

8 of the Compost Facility's Hydrogeological Report (Item 57 of Schedule "A") every 5 years from the date of the ECA.

(13) The trigger concentrations for the groundwater trigger wells listed in Table F of Schedule "B" shall be 80% of the Guideline B-7 RUC limits under Condition 9(12) for all parameters that have an Ontario Drinking Water Standards value.

(14) If three (3) leachate indicator parameters exceed the trigger concentrations at the trigger wells described under Condition 9(13) during three (3) consecutive monitoring events, the City of Peterborough shall:
- (a) Immediately conduct an investigation into the source of the contamination to determine a list of corrective actions;
- (b) Submit the proposed findings and corrective actions to the District Manager within one (1) month of receiving the analytical results for the third consecutive monitoring event described under this condition; and
- (c) If leachate is confirmed to be the source:
  - (i) increase the groundwater sampling frequency indentified in Table F to quarterly; and
  - (ii) prepare and submit a Corrective Action Plan, that includes the proposed corrective actions to prevent exceedance of RUC limits at the Site property line, to the Director for approval within three (3) months of receiving written concurrence from the District Manager for the proposed corrective actions.

(15) If three (3) leachate indicator parameters exceed the RUC concentration limits under Condition 9(12) during three (3) consecutive monitoring events at the leachate well listed in Table F of Schedule "B", the City of Peterborough shall:
- (a) Immediately conduct an investigation into the potential leakages of the Composting Facility leachate collection system to determine a list of corrective actions;
- (b) Submit the proposed findings and corrective actions to the District Manager within three (3) months of receiving the analytical results for the third consecutive monitoring event described under this condition;
- (c) Increase the groundwater sampling frequency identified in Table F to quarterly; and
- (d) Submit the proposed corrective actions under Sub-condition (b) to the Director for approval within three (3) months of receiving written concurrence from the District Manager for the proposed corrective actions.

Surface Water Contingency Plan and Trigger Mechanism

(16) The trigger mechanisms for surface water quality shall be one of the following:
- (a) Where off-site surface water quality satisfies the Ministry’s PWQO, the respective PWQO shall be used as a trigger concentration; and
- (b) Where the background surface water quality naturally exceeds the PWQO, the background concentration should be considered in evaluating and updating the trigger concentration.

(17) Surface water quality results will be assessed with the trigger concentrations within twelve (12) weeks of sample collection.

(18) The assessment process for surface water quality and response to results above the trigger concentration are as detailed in Item 36, 37, 38 and 57 of Schedule "A".

Groundwater Monitors

(19) The Owner shall ensure all groundwater monitoring wells are properly capped, locked and protected from damage when not in use.

(20) Any groundwater monitoring wells included in the monitoring program shall be assessed, repaired, replaced or decommissioned as required.

(21) The Owner shall repair or replace any monitoring well which is destroyed or in any way made inoperable for sampling such that no more than one sampling event is missed.

(22) All monitoring wells that are no longer required as part of the groundwater monitoring program shall be decommissioned in accordance with good standard practice that will prevent contamination through the abandoned well and in accordance with Ontario Regulation 903.

(23) A report on the decommissioning referred to in Condition 9(22) of this Approval shall be provided in the Annual Report for the period during which the well was decommissioned.

Landfill Gas Monitoring and Subsurface Migration

(24) The updated landfill gas monitoring program, listed as Item 56 in Schedule "A" is hereby approved.

(25) The Owner shall ensure that all on-Site buildings/structures and all future buildings/structures have methane detection and alarm equipment installed and maintained, with active venting or an effective passive venting system to relieve any possible landfill gas accumulation if necessary.

(26) Subsurface migration of combustible methane gas shall meet the following limits, as required by Ontario Reg. 232/98:

(a) The concentration of methane gas must be less than 2.5 percent by volume at the limits of the property boundary;

(b) The concentration of methane gas must be less than 1.0 percent by volume (15% of the Lower Explosive Limit of methane) in any on-Site building or enclosed structure, and in the area immediately outside the foundation or basement floor of the building or structure that is located on-Site, if the building or structure is accessible by people or contains electrical equipment or a potential source of ignition;

(c) Sub-condition (b) does not apply to a leachate collection, storage or pumping station or a landfill gas collection and/or treatment facility for which specific Occupational Health and Safety measures and procedures relating to the risk of asphyxiation and the risk of explosion, must be followed; and

(d) The concentration of methane gas from the Site in any off-site building or enclosed structure, and in the area immediately outside the foundation or basement floor of the building or structure, if the building or structure is accessible by people or contains electrical equipment or a potential source of ignition, must be less than 0.05 percent by volume.

(27) If a measured gas concentration at any specific compliance location, reaches the applicable limit identified in Conditions 9(26)(a) and (b) above, the Owner shall undertake additional monitoring, or if a notification is given that gas concentration has reached the limit specified in Condition 9(26)(d), above, or if landfill gas concentrations exceed 10% of the Lower Explosion Level (LEL), the reading shall be re-measured to assess the source and pathway of methane to determine if the elevated concentrations are landfill related. If these readings confirm an exceedance of the applicable limit, the District Manager shall be notified immediately, and appropriate control measures shall be implemented as soon as possible thereafter.

(28) In the event a result of a monitoring test exceeds the trigger mechanisms detailed in Conditions 9(26) and (27) of this Approval, the Owner shall:
(a) notify the District Manager, and the PLC of any trigger level exceedances within twenty four (24) hours of receipt of the results;
(b) conduct an investigation into the cause of the adverse result and submit a report to the District Manager that includes an assessment of whether contingency measures need to be carried out;
(c) if contingency measures are needed, submit detailed plans, specifications and descriptions for the design, operation and maintenance of the contingency measures, and a schedule as to when these measures will be implemented, to the Director and notify District Manager; and
(d) implement the required contingency measures upon approval by the Director.

(29) If the elevated concentrations are landfill related, the Owner shall undertake contingency measures.

Changes to the Monitoring Plan

(30) Changes to the Environmental Monitoring Plan outlined in Schedule "B" of this Approval shall be submitted to the District Manager for review by the Ministry's Regional Technical Support Section prior to submission to the Director for approval.

(31) The Owner shall provide a copy of any requests for modification to the monitoring program to the PLC at the same time or prior to the time that such request is made to the District Manager.

(32) Changes to the Environmental Monitoring Plan outlined in Schedule "B" of this Approval for which the Owner has received written concurrence from the District Manager shall be submitted to the Director for approval prior to implementation.

(33) Upon completing one (1) year of monitoring in accordance with Table F of Schedule "B":

(a) the City of Peterborough may cease the monitoring of the BTEX parameters identified in Table F of Schedule "B";
(b) the City of Peterborough shall submit a report detailing the BTEX monitoring results to the District Manager for review by the Ministry's Regional Technical Support Section, including a discussion on whether further BTEX monitoring is required; and
(c) if the District Manager provides a written notice that further BTEX monitoring is required based on a review of the BTEX monitoring report, the City of Peterborough shall submit this notice to the Director for approval within thirty (30) days of the receipt of said notice.

10. INSPECTIONS AND RECORD KEEPING

Daily Inspections:

(1) Within thirty (30) days from the issuance of this Approval, the Owner shall prepare a comprehensive written inspection program which includes procedures for inspections of all aspects of the Site's operations including, but not limited to, the following:

a. waste loading/unloading/storage areas including the condition of the Receiving Building and its ventilation system and the air pollution control equipment;
b. condition of all major pieces of the Organic Waste processing equipment;
c. condition of all instruments including but not limited to the instruments for monitoring the Composting process parameters;
d. security fence and property line;
e. presence of excessive fugitive dust emissions from the operation of the Site;
f. presence of the on and off-Site litter;
g. presence of vector and vermin;
h. presence of off-Site odours; and
i. condition of all run-off drainage, collection and storage facilities.

(2) The inspections required in Condition 10(1) shall be undertaken daily by Trained Personnel in accordance with the inspection program to ensure that all equipment and facilities at the Site are maintained in good working order at all times and that no off Site impacts are occurring. Any deficiencies detected during these regular inspections must be remedied immediately, including temporarily ceasing operations at the Site if needed.

Monthly Inspections

(3) The Owner shall inspect the Site monthly for the following items as a minimum:

(a) Erosion rills;
(b) General settlement areas or depressions;
(c) Shear and tension cracks;
(d) Condition of surface water drainage works;
(e) Erosion and sedimentation in surface water drainage system;
(f) Presence of any ponded water;
(g) Adequacy of cover material;
(h) Evidence of vegetative stress;

(i) Condition of groundwater monitoring wells and gas wells;
(j) Presence of insects, vermin, rodents and scavenging animals;
(k) The amount of litter at the Site;
(l) Condition of fence surrounding the Site; and,
(m) General Site appearance.

(4) The Owner shall inspect the Site weekly for presence of leachate seeps.

Critical Spare Parts:

(5) The Owner shall prepare a list of critical spare parts and update this list annually or more frequently, if necessary, to ensure that this list is maintained up-to-date. The list shall be retained at the Site and be made available for inspection by a Provincial Officer, upon request.

(6) The Owner shall ensure that the critical spare parts are available at the Site at all times or be immediately available from an off-Site supplier.

Preventative Maintenance:

(7) The Owner shall develop and implement a preventative maintenance program for all on-Site equipment associated with the processing and managing of waste and control of odour, noise and dust emissions. The preventative maintenance program shall be maintained up-to-date, be retained at the Site and be available for inspection by a Provincial Officer, upon request.

Daily Activity Log:

(8) The Owner shall update and maintain a written or digital record of daily activities undertaken at the Site. All measurements shall be recorded in consistent metric units of measurement. The record shall include, as a minimum, the following information;

a. For the Landfill and Public Drop-off and Reuse Centre:
   i. the type, geographic source, date and time of arrival, hauler, and quantity (tonnes) of all waste received at the Landfill and Public Drop-off and Reuse Centre;
   ii. the area of the Landfill in which waste disposal operations are taking place;
   iii. calculation of the total quantity (tonnes) of waste received at the Landfill and Public Drop-off and Reuse Centre during each operating day and each operating week;
   iv. itemization of each load of contaminated soil delivered to the Landfill in accordance with this Approval;
   v. results of any test done to determine the acceptability of waste at the Landfill;
   vi. the client and type of solid non-hazardous industrial waste for each load of solid non-hazardous industrial waste received;
   vii. type and amount of daily, intermediate and final cover used;

b. For the Composting Facility:
   i. date, quantity, source and type of the Organic Waste, Amendment Materials, and

Compost received at the Composting Facility;

ii. analytical data from testing of the incoming Organic Waste or the published data and justification for using the published data;

iii. date, quantity, type, and quality (including the analytical data from any compliance testing) of Compost, by each category, transferred from the Site, including the destination of any Compost sold for non-residential purposes;

iv. date, quantity, type, quality (including the analytical data from any compliance testing) and the destination of Finished Compost that was transferred back to the Composting process to produce a different category of Compost;

v. date, quantity, type and the destination of the total Residual Waste transferred from the Site for final disposal;

vi. date, quantity, type and the destination of the Rejected Waste transferred off-Site, the reason for rejection and actions taken to prevent a recurrence in the future;

vii. waste processing activities undertaken at the Composting Facility, including shredding, grinding, screening, windrow construction, addition of moisture and windrow turning activities;

viii. monitoring and sampling activities;

ix. housecleaning activities;

x. temperature and/or oxygen excursions outside of the required levels;

xi. estimated running total of the Organic Waste temporarily stored prior to Composting, the Organic Waste Mix undergoing Composting, Immature Compost, the Finished Compost, the Residual Waste, the Rejected Waste and the Compost present at the Site;

c. For the General Site:

i. a record of any litter collection activities and the application of any dust suppressants;

ii. 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;

iii. emergency situations and actions taken to resolve them; and

iv. any other pertinent information required by the District Manager.

Emergency Situations

(9) The Owner shall establish and maintain a written or digital record of the emergency situations. The record shall include, as a minimum, the following:

a. the type of an emergency situation;

b. description of how the emergency situation was handled;

c. the type and amount of material spilled, if applicable;

d. a description of how the spilled material was cleaned up and waste stored, if generated; and

e. the location and time of final disposal, if applicable.

Inspections

(10) The Owner shall maintain a written or digital record of inspections as required by this Approval. The record shall include, as a minimum, the following:
   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.

Personnel Training

(11) The Owner shall maintain a written or digital record of training as required by this Approval. The record shall include, as a minimum, the following:
   a. date of training;
   b. name and signature of person who has been trained; and
   c. description of the training provided.

Sampling and Testing Records

(12) The Owner shall establish and maintain a written or digital record of all sampling and testing activities at the Site. This record shall include, as a minimum, the following information:
   a. waste sampled, sample collection locations and volume collected;
   b. day and time of collection;
   c. sample handling procedures;
   d. name of the person undertaking the sampling;
   e. parameters tested for and the results;
   f. name of the laboratory service provider facility conducting the testing, if applicable; and
   g. conclusions drawn with respect to the results of the monitoring and testing.

Monitoring Records

(13) The Owner shall establish and maintain a written or digital record of all monitoring activities at the Site as required by this Approval. This record shall include, as a minimum, the temperature, oxygen levels and moisture levels in the active Composting and curing windrows.

Complaints Response Records

(14) The Owner shall maintain a written or digital record of all complaints and the responses as required by this Approval.

Record Retention

(15) Except as authorized in writing by the Director, all records required by this Approval shall be retained at the Site for a minimum of five (5) years from their date of creation.

(16) All monthly Site inspection records are to be kept at the Site until they are included in the Annual Report.

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

Annual Report

(18) 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, and the PLC, by May 15th of each year, and shall cover the 12 month period preceding December 31st.

(19) The Annual Report shall include, as a minimum, the following:

a. For the Landfill and Public Drop-off and Reuse Centre:
   i. an updated Landfill site plan showing the areas of fill, buffer zones, present contours, monitoring locations and surface water control systems;
   ii. a calculation of the remaining capacity of the Landfill, an estimate of the remaining Landfill life and a comparison of actual capacity used to approved Landfill capacity;
   iii. the optimization of remaining Landfill capacity with respect to refining final contours, having regard to minimizing the potential for off-site impacts;
   iv. approved changes to the operation the Landfill;
   v. procedures at the Landfill;
   vi. areas of landfilling operation during the reporting period;
   vii. areas of intended operation during the next reporting period;
   viii. areas of excavation during the reporting period;
   ix. the progress of final cover, vegetative cover, and any intermediate cover application;
   x. calculations of the volume of waste, daily and intermediate cover, and final cover deposited or placed at the Landfill during the reporting period and a calculation of the total volume of Landfill capacity used during the reporting period;
   xi. calculations of the amount of contaminated soil used as alternative cover at the Landfill;
   xii. the amount of contaminated soil stored at the Landfill at the end of the previous year;
   xiii. summary of the weekly, maximum daily and total annual quantity (tonnes) of waste received at the Landfill;
   xiv. a summary of recycling efforts undertaken at the Public Drop-Off and Reuse Centre including the amount of recyclable received;
   xv. a summary of the requirements outlined in Condition 6(22) of this Approval regarding the use of contaminated soil for daily/intermediate landfill cover;

b. For the Composting Facility:
   i. annual amount of the Organic Waste received and processed at the Composting Facility, including the waste type, quantity and sources;
   ii. annual amount and quality of Compost transferred from the Site and its final destination;
   iii. a summary describing any Rejected Waste including quantity, waste type, reasons for

rejection and origin of the Rejected Waste;

iv. annual amount of the Residual Waste transferred from the Site for final disposal and its destination;
v. number of Composting and curing windrows and the status of processing at the end of the operating year;
vi. amount of unprocessed Organic Waste temporarily stored at the Composting Facility at the end of the operating year;
vii. amount of Compost temporarily stored at the Composting Facility at the end of the operating year;
viii. a summary of the Composting monitoring and sampling results required by this Approval;

c. For the General Site:
   i. results in tabular format and an interpretive analysis of the results of all leachate, groundwater, surface water and landfill gas monitoring and flaring, including an assessment of the need to amend the monitoring programs;
   ii. the interpretive analysis referred to in Sub-condition i. above shall include a discussion of groundwater parameters and compliance with the Reasonable Use Policy at the property boundary as well as recommendations for future action (contingency measures) that may be necessary should the monitoring program detect failure of the design;
   iii. groundwater flow and contaminant migration analyses for the Site;
   iv. surface water quality with respect to Provincial Drinking Water Objectives;
   v. Site plans showing all surface and ground water monitoring locations and the existing contours of the Site;
   vi. a report on the status of all monitoring wells and a statement as to compliance with Ontario Regulation 903;
   vii. 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/environmental emergency plan;
   viii. an assessment of potential and actual impacts, if any, of the leachate on the Peterborough Water Pollution Control Plant;
   ix. leachate characterization results and a discussion of the potential impacts on the Water Pollution Control Plant;
   x. total leachate volumes collected weekly, monthly and annually and the disposition of the collected leachate;
   xi. a summary of any equipment changes;
   xii. facilities installed during the reporting period;
   xiii. Site preparations and facilities planned for installation during the next reporting period;
   xiv. summary of any complaints received and the responses made;
   xv. any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site or identified during the facility inspections and any mitigative actions taken;
   xvi. any changes to the Emergency Response and Contingency Plan, the Operations Manual or the Closure Plan that have been approved by the Director or the District Manager since the last Annual Report;

xvii. a descriptive summary of any spills, incidents or other emergency situations which have occurred at this Site, any remedial measures taken, and the measures taken to prevent future occurrences;

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

xix. summary of inspections undertaken at the Site;

xx. any changes in operations, equipment or procedures employed at the Site;

xxi. any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs in this regard

xxii. an annual summary of any deficiencies, items of non-compliance or process aberrations that occurred at this Site and any remedial/mitigative action taken to correct them to ensure that future non-compliance does not occur; and

xxiii. a statement regarding compliance with all conditions of this Approval and other relevant Ministry requirements, guidelines and regulations.

(20) The implementation of any of the recommendations contained in an Annual Report that come within the scope of Section 27 of the Act, shall be by the approval of the Director.

SCHEDULE "A"

1. Application for a Certificate of Approval for a Waste Disposal Site (Landfill) dated July 28, 1993 and as amended November 17, 1993.

2. Report entitled "City of Peterborough Bensfort Road Landfill Site - Application for Interim Expansion, Volume 1" by Gartner Lee Limited and the City of Peterborough, dated March 1991.

3. Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 2" by Gartner Lee Limited dated March 1991.

4. Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 3" by Gartner Lee Limited, CJB Air Quality Management, S.S. Wilson and Associates and Gore & Storrie Ltd., dated March 1991.

5. Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 4" by Conestoga-Rovers & Associates dated March 1991.

6. Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Volume 5" by Mark L. Dorfman, Planner Inc., City of Peterborough and Marshall, Macklin & Monaghan, dated March 1991.

7. Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Addendum 1" by Conestoga-Rovers & Associates, The City of Peterborough, Gartner Lee Limited, CJB Air Quality Management, S.S. Wilson and Associates, Gore & Storrie Limited, Marshall Macklin Monaghan and Mark L. Dorfman Planner Inc., dated December 1991.

8. Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Addendum 2" by Gartner Lee Limited, Conestoga-Rovers & Associates, CJB Air Quality Management and S. S. Wilson and Associates, dated September 1992.

9. Report entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion, Addendum 3" Tabs A-N by Gartner Lee Limited, Conestoga-Rovers & Associates, The City of Peterborough, CJB Air Quality Management, S. S. Wilson and Associates, Gore & Storrie Limited, Marshall Macklin Monaghan and Mark L. Dorfman Planner Inc., dated July 1993.

10. Report entitled "City of Peterborough Bensfort Road Landfill Site- 1992 Annual Monitoring Report" by Gartner Lee Limited dated March 1993.

11. Report entitled "City of Peterborough Bensfort Road Landfill Performance Monitoring Program" by Gartner Lee Ltd., dated October 1993.

12. Report entitled "Specifications for Tree Planting Bensfort Road Landfill Site" dated July 1992.

13. Draft Drawings 12-1, 12-2, 12-3, dated August 1993 and 12-4, 12-5 and 12-6 dated October 1993 by Conestoga- Rovers & Associates and any amendments to the Drawings which have been approved by the Director.

14. Report entitled “Annual Monitoring Report Design and Operations 1998, Bensfort Road Landfill Site Peterborough, Ontario,” prepared by Conestoga Rovers & Associates dated May, 1999.

15. Report entitled: “City of Peterborough, Bensfort Road Landfill Provisional Certificate of number A341508 Application for an Emergency Certificate, prepared by Gartner Lee Limited in association with Conestoga-Rovers and Associates Limited dated May,1999.

16. Letter from G. L Treadwell, Conestoga-Rovers & Associates to S. Essop, EAAB dated June 8, 1999. Providing Clarification on Site size and area.

17. Letter from P. Douglas Petrie, Willms & Shier, Solicitor for municipality, the Township of Otonabee-South Monaghen to A. Dominski and S. Essop Environmental Assessment and Approvals Branch dated June 9,1999, response to City of Peterborough Bensfort Road Landfill, Application for Emergency Approval Ministry Certificate of Approval nos. A341508 (Site) and 8-4006-99-006(Air).

18. Letter from R. E. J. Leech Gartner Lee Limited to A. Dominski and S. Essop, EAAB dated June 17, 1999 response to the letter from P. Douglas Petrie Township of Otonabee - South Monaghan dated June 9, 1999.

19. Letter from T. A. McIelwain, Older Associates Ltd on behalf of D. Petrie, Willms & Shier, to S. Essop, EAAB, date June 21, 1999, response to petroleum hydrocarbon contaminated soils handling and storage protocol at the site.

20. Letter from E. Warburton, of the organization SHAME, to A. Dominski and S. Essop, EAAB, dated June 15, 1999 response and comments on the draft Emergency Application Certificate of Approval.

21. Letter from J. W. Hart, City Solicitor, City of Peterborough to S. Essop, EAAB, dated June 28, 1999 response and comments on Draft Emergency Certificate of Approval.

22. Letter from J. W. Hart, City Solicitor, City of Peterborough to SHAME and S. Essop, EAAB, dated June 28,1999 response on land compensation issue, odour problems, funding and site closure date.

23. Letter from P. Douglas Petrie, Willms & Shier, Solicitor for municipality, the Township of Otonabee-South Monaghen to A. Dominski and S. Essop, EAAB dated June 28,1999,

response and comments on draft Emergency Application Certificate of Approval.

24. Letter report from E. J. Leech, Gartner Lee Limited to A. Dominski, Environmental Assessment and Approvals Branch, dated July 26, 2999, providing revised plans for the Site.

25. Application for an Emergency Approval dated November 30, 2000 and supporting documentation titled "City of Peterborough, Bensfort Road Landfill, Provisional Certificate of Approval, No. A341508 - Application for an Emergency Certificate", prepared by Gartner Lee Ltd. and Conestpoga-Rovers and Associated Ltd., dated December 2000.

26. Letter to Mr. A Dominski, Environmental Assessment and Approvals Branch, Ministry of the Environment form Gartner Lee Ltd. Dated December 21, 2000, which provided environmental justification for expanding the service area of the Bensford Road Landfill site to include the waste from the Township of Havelock-Belmont-Methuen.

27. Application for an Emergency Approval dated June 8, 2001 and supporting documentation titled “City of Peterborough, Bensfort Road Landfill, Provisional Certificate of Approval, No. A341508 - Application for an Emergency Certificate”, prepared by Gartner Lee Ltd. and Earth Tech (Canada) Inc., dated June, 2001.

28. Letter to Mr. Michael Williams, Environmental Assessment and Approvals Branch, Ministry of the Environment from City of Peterborough, City Solicitor, dated June 8, 2001, which provides justification for the application for an emergency approval and outlines the context of the application.

29. Letter to Mr. Michael Williams, Environmental Assessment and Approvals Branch, Ministry of the Environment from Gartner Lee Ltd., dated June 26, 2001 outlining the public consultation undertaken by the City of Peterborough regarding the emergency application.

30. Notice of Approval to Proceed with the Undertaking as required by the Environmental Assessment Act (EAA), O.C. 450/2002, dated January 23, 2002.

31. Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated March 28, 2002.

32. Documentation supporting an Application for a Provisional Certificate of Approval, submitted in accordance with Section 27 of the *Environmental Protection Act* : titled "Oton-1 Landfill Site, located in the Township of Otonabee-South Monaghan, County of Peterborough, dated March 2002, prepared by Earth Tech Canada Inc. for the County of Peterborough and the City of Peterborough.

33. Letter requesting an extension for the submission of the North Fill Area design details

prepared by Earth Tech Canada Inc., submitted on behalf of the County and City of Peterborough, to the Ministry of the Environment, with attachments.

34. The letter requesting an extension for the submission of the North Fill Area design and operations report, prepared by McCarthy Tetrault, submitted on behalf of the County and City of Peterborough, to the Ministry of the Environment, dated September 17, 2003.

35. Letter dated January 29, 2004 to the ministry from Earth Tech Canada Ltd. submitting the following design documentation in compliance with condition 5.1.

36. Volume 1 – South Fill Area, Design and Operations Report, dated January 2004, including: -Hydrogeological Assessment

37. Volume 2 – North Fill Area Design and Operations Report, dated January 2004, including:
    - Hydrogeological Assessment
    - Surface Water Quality Study.

38. Volume 3 – Technical Assessments, South Fill Area and North Fill Area, dated January 2004, including:
    - Air Quality Impact Assessment
    - Leachate Environment Study
    - Natural Environment Study
    - Noise Impact Study Traffic Impact Study
    - Visual Impact Study.

39. Letter dated February 28, 2008 from Frederick (Rick) A. Mosher, Conestoga-Rovers & Associates to Director, Environmental Assessment and Approvals Branch, Ministry of the Environment regarding request for an amendment to condition 17.

40. Report entitled "Annual Monitoring Report, Design and Operations - 1997, Bensfort Road Landfill, Peterborough, Ontario", date May 1998, prepared by Conestoga-Rovers & Associates.

41. 2003 to 2004 Annual Monitoring Reports, Design and Operations, South Fill Area, Peterborough County/City Waste Facility, Peterborough, Ontario, prepared by Conestoga-Rovers & Associates.

42. Application for an Amendment to Provisional Certificate of Approval for a Waste Disposal Site, dated June 29, 2007 from The Corporation of the City of Peterborough.

43. Letter dated February 28, 2008 Frederick Mosher, Connestoga-Rovers & Associates requesting a revised leachate video inspection system inspection.

44. E-mail dated April 29, 2009 from Melanie Kawalec, The Corporation of the City of

Peterborough, to Roman Lysiak, Ministry regarding submission of additional information.

45. Report entitled "Landfill Gas Collection System Report, Peterborough County/City Waste Management Facility Peterborough, Ontario (PCCWMF)" dated June 30, 2009 prepared by UEM.

46. Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated November 8, 2010, signed by Melanie Kawalec, Manager, Waste Management Division, City of Peterborough.

47. Letter dated November 26, 2010, from Melanie Kawalec, Manager, Waste Management Division, City of Peterborough to the Director, Environmental Assessment and Approvals Branch, Ministry of the Environment, re: final detailed design for the landfill gas collection and flaring/utilization system in the South Fill Area of the Oton-1 Landfill Site.

48. Report entitled "Bensfort Road Landfill - Landfill Gas System Expansion", dated November 25, 2010 prepared by Dillon Consulting Ltd.

49. May 14, 2010, E-mail from Joe Ovcjak to K., Keeling, City of Peterborough with attached 2009 Monitoring Program.

50. September 1, 2011 e-mail from Wayne Jackson, Director, City of Peterborough, to Jim Chisholm of the Ministry of the Environment with the following attachments: 2010 Monitorimng Program, Groundwater and Leachate Monitoring Programs for the Site, Peterborough county/City Waste Management Facility; 2005 Annual Monitoring Report; and 2006 NFA Sampling Program.

51. Report titled South Fill Area Closure Plan, Peterborough Landfill, dated May 2013, prepared by Urban and Environmental Management Inc.

52. Application for a Provisional Certificate of Approval for a Waste Disposal Site, dated September 30, 2016, and supporting documentation prepared by WSP.

53. Response letter dated June 16, 2017 received from WSP regarding the clarification of design basis.

54. Application for Approval of a "Reuse Centre" dated June 3, 2016 and supporting documentation prepared by the Corporation of the City of Peterborough.

55. Email dated August 29, 2017 from Virginia Swinson, City of Peterborough to Nick Zambito, Ministry regarding additional "Reuse centre" construction and operation details.

56. Environmental Compliance Application dated September 13, 2017 signed by Don Briand, City of Peterborough and the supporting documentation regarding landfill gas monitoring

program.

57. Application for Environmental Compliance Approval submitted by James Istchenko, P.Eng., Manager of Environmental Services at the Corporation of the City of Peterborough dated September 8, 2022 and received on September 8, 2022 for the proposed Composting Facility, including all supporting attachments such as the Design and Operations Report, figures, Design Drawings, equipment specifications, process flow diagram, Odour Response and Control Plan, Environmental Impact Study and Hydrogeological Assessment Report.

58. Emails from Mike Lord, D.M. Wills Associates Limited, to Nick Zambito, Ministry, dated February 3, 2023, February 17, 2023, April 6, 2023, and May 9, 2023 regarding additional information requested during the review of the Composting Facility application.

59. Design and Operations Report for the Composting Facility dated June 2023 and prepared by D.M. Wills Associates Limited.

SCHEDULE "B"

ENVIRONMENTAL MONITORING PROGRAM

A) **GROUNDWATER (LANDFILL)**

Group	Monitoring Designation	Monitoring Events	
Ground water		*March/April*	*September/ October*
G1	18A, 18B, 19A, 19 B, 20B, 48 63-I, 63-II, 63-III, 75-I, 75-II, 66-III, 81-I,81-II, 81-III	Water Levels	Water Levels
		Analysis List 1	Analysis List 1
		Analysis List 2	
		Analysis List 3	
G2	16A, 20A, 33-II, 33-III, 40-II, 41-I, 41-II, 44-1, 44-II, 44-III, 46-I,46-II, 46-III, 50-I, 50-II, 52-I, 52-II, 53-I, 54-II, 61-I, 61-II, 61-III, 62-I, 64-I, 64-II, 66-I, 66-II, 70-I, 70-II, 70-III, 74-II, 76-I, 77-I, 101-I, 101-II, 101-III	Water Levels	Water Levels
		Analysis List 1	
G3	5-V, 5-VI, 62-II	Water Levels	Water Levels
		Analysis List 1	Analysis List 1
G4	5-IV, 16C, 50-III, 74-III	Water Levels	Water Levels
		Analysis List 1	Analysis List 3
G5	84-I, 84-II, 85-I, 85-II, 86-I, 86-II, 86-III, 87-I, 87-II, 87-III, 88-I, 88-II, 88-III, 89-I, 89-II, 89-III, 90-I, 90-II, 90-III, 91-I, 91-II, 91-III, 92-I, 92-II, 92-III, 93-I, 93-II, 94-I, 94-II, 95-I, 95-II, 104-I, 104-II, 104-III, 106-I, 106-II, 106-III, 107-I, 107-II, 107-III, 108-I, 108-II, 108-III, 109-I, 109-II, 109-III, 110-I, 110-II, 110-III	Water Levels	Water Levels
		Analysis List 1	Analysis List 1
		Analysis List 2	
		Analysis List 3	

B) PRIVATE WELLS

Group	Monitoring Designation	Monitoring Events	Comments
Private Wells		*March/April*	
P1	In Accordance with the Agreement Between the Corporation of the City of Peterborough and the Corporation of the Township of Otonabee. - January, 1993 as amended by previous annual reports.	Analysis List 4	As per agreement

C) **SURFACE WATER**

Group	Monitoring Designation	Monitoring Events					
Surface Water		*January/ February*	*March/ April*	*May/ June*	*July/ August*	*September/ October*	*November/ December*
S1	SW1, SW2, SW3, SW17, SW18, SW19, SW20, SW21, SW23, SW24	Flow Rate	Flow Rate	Flow Rate	Flow Rate	Flow Rate	Flow Rate
		Analysis List 1	Analysis List 1	Analysis List 1	Analysis List 1	Analysis List 1	Analysis List 1
		Analysis List 6	Analysis List 6	Analysis List 6	Analysis List 6	Analysis List 6	Analysis List 6

D) LEACHATE

Group	Monitoring Designation	Monitoring Events					
Leachate		*January/ February*	*March/ April*	*May/ June*	*July/ August*	*September/ October*	*November/ December*
L1	Holding Tank		By-Law + COD			By-Law + COD	
						Analysis List 5a	
L2	MHT9-94[1]					Analysis List 5	
L3	23B (In-Waste Leachate Monitors)		Leachate Levels			Leachate Levels	
	ISP7-95, ISPL-1, ISPL-2, ISPL2-1, ISPL2-2, ISP8, ISP9, SP1-90, SP2-90, SP3-90, SP4-90, SP6-90, SP7-90, SP8-90, SP10-94, SP11-94, SP14-91, P15-91, SP16-91, SP18-91, SP19-91, SP20-91, ISP11, ISP12, ISP13, ISP14, ISP15		Analysis List 1			Analysis List 2	
L4		Leachate Levels	Leachate Levels	Leachate Levels	Leachate Levels	Leachate Levels	Leachate Levels
Inter-ceptor trench							
T1	MH-4					Analysis List 5	

[1] Location to be MHT6-94 following construction of Cell 1 West B

E) LANDFILL GAS

Group	Monitoring Designation	Monitoring Events					
Landfill Gas		*January/ February*	*March/ April*	*May/ June*	*July/ August*	*September/ October*	*November/ December*
LFG-1	GP-2, GP-3, GP4, GP-5 and GP-6		Soil gas monitoring	Soil gas monitoring		Soil gas monitoring	Soil gas monitoring

F) COMPOSTING FACILITY

Location	Minimum Frequency	Parameters
Groundwater ● Background Wells: MW20-30, MW20-28A and (1) TBD bedrock well ● Downgradient Wells: MW20-01 and one (1) TBD bedrock well ● Trigger Wells: MW20-19 and MW20-22	Twice per year (Spring and Fall)	Laboratory: Alkalinity Ammonia Ammonium Barium Boron Calcium Chloride Copper Iron Lead Magnesium Nickel Nitrate pH Sodium Sulphate Total Dissolved Solids Zinc Dissolved Organic Carbon Chemical Oxygen Demand Total Suspended Solids Benzene, Toluene, Ethylbenzene, Xylene (BTEX) Field Parameters: pH, conductivity, temperature, water level
Leachate (1) TBD leachate well	Three times per year (Spring, Summer and Fall)	Laboratory: Alkalinity Ammonia Ammonium Barium Boron Calcium Chloride Copper Iron Lead Magnesium Nickel Nitrate pH

		Sodium Sulphate Total Dissolved Solids Zinc Dissolved Organic Carbon BOD_5 Chemical Oxygen Demand Total Suspended Solids Benzene, Toluene, Ethylbenzene, Xylene (BTEX) Field Parameters: pH, conductivity, temperature, water level
Leachate Collection System	Three times per year (Spring, Summer and Fall)	Laboratory: Alkalinity Ammonia Barium Boron Calcium Chloride Copper Iron Lead Magnesium Nickel Nitrate pH Sodium Sulphate Total Dissolved Solids Zinc Dissolved Organic Carbon BOD_5 Chemical Oxygen Demand Total Suspended Solids VOCs Field Parameters: pH, conductivity, temperature

Analysis List 1: Ca, Mg, Na, K, Cl, SO4, Alkalinity, NO3, NO2, NH3, TKN, pH, Conductivity, Fe, Mn, As, DOC, COD, Total Phenolics, Total P, P(dissolved), field pH and field conductivity, Anion Sum, Cation Sum, Bicarbonate, Carbonate, Hardness, Ion Balance, Orthophosphate (as P), field temperature, and Total Dissolved Solids (TDS).

Analysis List 2: Al, Ba, Be, B, Cd, Cr, Co, Cu, Pb, Mo, Ni, and Zn.

Analysis List 3: VOC Scan.

Analysis List 4: pH, conductivity, Alkalinity, Cl, SO4, Total P, Soluble P, TKN, NH3, NO2, NO3, K, Mg, Ca, Na, Fe, COD, DOC, Phenols, field pH and field conductivity.

Analysis List 5: cBOD5, BOD, TSS, TKN, NH4, Phenolics, Fe, Cl, Sr, Br, Alkalinity, K, Na, field pH and field conductivity.

Analysis List 5a: cBOD5, Sr, Br, Alkalinity, K, Na, field pH and field conductivity.

Analysis List 6: BOD5, TOC, TSS, TDS, Turbidity, Fe (field filtered), temperature, DO, field pH and field conductivity.

By-Law + COD: City of Peterborough By-Law 05-104 Schedule 'H', Table 1: "Sanitary and Combined Sewer Discharge Limits".

Soil Gas Monitoring: percent by volume (v/v) for methane; carbon dioxide; oxygen; and water level in the probe.

SCHEDULE "C"

Stages of Development for the Composting Facility

Stage 1:

- one (1) Composting Facility consisting of the following structures, processes and equipment located on an asphalt pad:
  - one (1) fully enclosed Receiving Building measuring approximately 30 m wide x 59 m long x 15 m high, to be used for receiving, shredding, and mixing of the Organic Waste, equipped with: three (3) fast acting roll-up doors, an impermeable concrete floor with a minimum 1% slope towards four (4) floor drains/sumps, and one (1) negative pressure ventilation system discharging the Receiving Building air through an outdoor biofilter;
  - a GORE™ Composting System for the composting of SSO, Leaf and Yard Waste and Amendment Material, consisting of the following phases:
    - Phase 1 (active phase) consisting of a maximum of four (4) GORE™ covered aerated static windrows, each windrow located within an approximately 50 m long x 1.2 m tall x 8.2 m wide concrete bunker on a concrete base, with each windrow aerated with two (2) in-floor aeration channels (also acting as leachate collection channels) and heated with an in-floor glycol-loop heating system during the winter months, separated by approximately 2 metres between bunkers;
    - Phase 2 (curing phase), for curing of the waste that completed Phase 1, consisting of a maximum of two (2) GORE™ covered aerated static windrows, each windrow located within an approximately 50 m long x 1.2 m tall x 8.2 m wide concrete bunker on a concrete base, with each windrow aerated with two (2) in-floor aeration channels (also acting as leachate collection channels), separated by approximately 2 metres between bunkers; and
    - Phase 3 (curing phase) for curing of the waste that completed Phase 2, consisting of a maximum of two (2) aerated static windrows, each windrow located within an approximately 50 m long x 1.2 m tall x 8.2 m wide concrete bunker on a concrete base, with each windrow aerated with two (2) in-floor aeration channels, separated by approximately 2 metres between bunkers;
  - a 100 m x 55 m outdoor aerobic windrow curing system, to be used for the curing of the waste that completed Phase 3, consisting of a maximum of fifteen (15) static windrows, separated by approximately 2 metres between windrows;
  - a 50 m x 20 m outdoor excess Leaf and Yard Waste storage area, to be used for the receipt, temporary storage and grinding of Leaf and Yard Waste prior to composting on-site;
  - a 80 m x 65 m outdoor windrow Leaf and Yard Waste composting system, to be used for the receipt and composting of excess Leaf and Yard Waste and Amendment Material only, consisting of a maximum of ten (10) static windrows, separated by approximately 2 metres between windrows;
  - a 50 m x 30 m outdoor screening area, to be used for the screening of Immature Compost and Finished Compost;
  - a 65 m x 30 m outdoor Finished Compost storage area, to be used for the temporary storage of

Finished Compost; and

- processing equipment used around the composting facility, including loaders, shredder, grinder, skid steers, trommel screens, stackers, tractor, mobile cover unwinding machine, stacker feeder, portable work lights, and a windrow turner.

Stage 2:

- All of the processes, working areas and supporting units listed under Stage 1 above;
- Within the GORE™ Composting System:
    - o two (2) additional Phase 1 (active phase) GORE™ covered aerated static windrows, each windrow located within an approximately 50 m long x 1.2 m tall x 8.2 m wide concrete bunker on a concrete base, with each windrow aerated with two (2) in-floor aeration channels (also acting as leachate collection channels) and heated with an in-floor glycol-loop heating system during the winter months, separated by approximately 2 metres between bunkers;
    - o one (1) additional Phase 2 (curing phase) GORE™ covered aerated static windrow, located within an approximately 50 m long x 1.2 m tall x 8.2 m wide concrete bunker on a concrete base, aerated with two (2) in-floor aeration channels (also acting as leachate collection channels), separated by approximately 2 metres between bunkers; and
    - o one (1) additional Phase 3 (curing phase) aerated static windrow, located within an approximately 50 m long x 1.2 m tall x 8.2 m wide concrete bunker on a concrete base, aerated with two (2) in-floor aeration channels (also acting as leachate collection channels), separated by approximately 2 metres between bunkers.

SCHEDULE "D"

Compost Quality Standards

Table 3.1 - Maximum Concentration of Metals in Compost:

Item	Column 1	Column 2	Column 3
	Metal	Category AA Compost	Category A Compost
		mg/kg dry weight	*mg/kg dry weight*
1.	Arsenic	13	13
2.	Cadmium	3	3
3.	Chromium	210	210
4.	Cobalt	34	34
5.	Copper	100	400
6.	Lead	150	150
7.	Mercury	0.8	0.8
8.	Molybdenum	5	5
9.	Nickel	62	62
10.	Selenium	2	2
11.	Zinc	500	700

Table 3.2 - Maximum Concentration of Metals in Feedstock:

Item	Column 1	Column 2
	Metal	Feed for Category AA Compost
		mg/kg dry weight
1.	Arsenic	75
2.	Cadmium	20
3.	Chromium	1060
4.	Cobalt	150
5.	Copper	760
6.	Lead	500
7.	Mercury	5
8.	Molybdenum	20
9.	Nickel	180
10.	Selenium	14
11.	Zinc	1850

Table 3.3 - Maximum Concentration of Foreign Matter and Sharps in Compost:

Parameter	Category AA Compost	Category A Compost
Foreign matter	Total foreign matter greater than 3 mm shall not exceed 1.0%, calculated on a dry weight basis, and plastic cannot exceed 0.5%; and Compost shall not contain any foreign matter greater than 25 mm per 500 ml.	Total foreign matter greater than 3 mm shall not exceed 1.0%, calculated on a dry weight basis, and plastic cannot exceed 0.5%; and Compost shall not contain any foreign matter greater than 25 mm per 500 ml.
Sharp foreign matter	Compost shall contain no material of a size or shape that can reasonably cause human or animal injury.	Compost shall contain no material of a size or shape that can reasonably cause human or animal injury.

Table A1 - Baseline Sampling Frequency of Compost (Metals, Pathogens, Maturity and Foreign Matter):

Compost Produced Annually (wet tonnes)	Baseline Number of Samples (per year)
<5000	4
5000-15000	6
15000-50000	12
>50000	+ 2 more samples for every additional 10,000 tonnes above the 12 Baseline samples.

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

1. The reason for inclusion of the definitions is to define the specific meaning of terms and simplify the wording of conditions in this Approval.

2. The reason for Conditions 1(1), 1(2), 1(4) to 1(15) is to clarify the legal rights and responsibilities of the Owner and Operator under this Approval.

3. The reasons for Conditions 1(3), 2(2), 2(3), 5(1), 5(2), 6(4), 6(6), and 8(11) to 8(17) to 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.

4. Conditions 1(16), 1(17) and 1(18) are included, pursuant to subsection 197(1) of the EPA, to provide that any persons having an interest in the Site are aware that the land has been approved and used for the purposes of waste disposal.

5. The reasons for Condition 1(19) 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.

6. The reasons for Condition 1(20) 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.

7. The reason for Condition 1(21) is to ensure that the successor is aware of its legal responsibilities.

8. The reason for Condition 1(22) 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.

9. The reason for Conditions 1(23) to 1(37) is to establish a forum for the exchange of information and public dialogue on activities carried out at the landfill Site. Open communication with the public and local authorities is important in helping to maintain high standards for Site operation and environmental protection.

10. The reasons for Conditions 2(1), 2(10), 2(11), 2(22) to 2(54), 6(7), 6(21) to 6(33), 6(69), 7(2) to 7(12), 8(7) to 8(10), and 8(65) are to ensure that the Site is operated and maintained in an environmentally acceptable manner and does not result in a hazard or nuisance to the natural environment or any person.

11. The reasons for Condition 2(4) to 2(7) are to specify the hours of operation for the Site and a mechanism for amendment of the hours of operation, as required.

12. The reasons for Condition 2(8) and 2(9) 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.

13. The reason for Conditions 2(12), 2(13), and 2(14) 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.

14. The reason for Conditions 2(15) to 2(20) is to ensure that only waste approved under this Approval are accepted at the Site and handled in an environmentally acceptable manner which does not result in a hazard or nuisance to the natural environment or any person.

15. The reason for Condition 2(21) is to ensure the timely submission by the Owner of a landscape plan for the Site.

16. The reason for Condition 2(55) is that open burning of municipal waste is unacceptable because of concerns with air emissions, smoke and other nuisance affects, and the potential fire hazard.

17. The reasons for Condition 2(56) are the protection of public health and safety and minimization of the potential for damage to environmental control, monitoring and other works at the Site. Scavenging is the uncontrolled removal of material from waste at a landfill site.

18. Conditions 3(1) to 3(7) are included to ensure that an Emergency Response and Contingency Plan is developed and maintained at the Site and that staff are properly trained in the operation of the equipment used at the Site and emergency response procedures, and 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.

19. Conditions 3(8) to 3(10) are included to ensure that emergency situations are reported to the Ministry, local municipality and residents to ensure public health and safety and environmental protection.

20. The reason for Condition 4 is to ensure that any complaints regarding operations at this Site are responded to in a timely, efficient and effective manner.

21. Conditions 5(3) to 5(7) are included to ensure that personnel employed at the Site are fully aware and properly trained on the requirements and restrictions related to Site operations under this Approval.

22. The reason for Conditions 6(1) to 6(3), 6(5), and 7(1) is to specify the approved areas from which waste may be accepted at the Site, minimum buffer area, and the types and amounts of waste that may be accepted at the Site, based on the Owner's application and supporting documentation.

23. Conditions 6(8) to 6(13) have been included in order to ensure asbestos waste is handled and disposed of in accordance with Reg. 347 as amended from time to time. Proper handling and disposal of asbestos waste ensures that the asbestos waste does not cause an adverse impact on the environment and also does not affect human health.

24. The reasons for Conditions 6(14) to 6(19) are to ensure that landfilling operations are conducted in an environmentally acceptable manner. Daily and intermediate cover is used to control potential nuisance effects, to facilitate vehicle access on the Site, and to ensure an acceptable Site appearance is maintained. The proper closure of a landfill Site requires the application of a final cover which is aesthetically pleasing, controls infiltration, and is suitable for the end use planned for the Site.

25. The reason for Condition 6(20) is to specify the approval requirements for use of alternative cover material at the Site.

26. The reasons for Conditions 6(34) to 6(40) are to ensure that the leachate collection system is designed and built in accordance with Regulations and the ministry's requirements and to prevent off Site migration of leachate which may cause an adverse effect on the environment.

27. The reasons for Conditions 6(41) to 6(44) are to minimize the potential for clogging of leachate collection pipes and to ensure effective operation of the leachate collection system components for as long as they are required. Failure to clean out these components on a regular basis may result in a decrease in their service lives. Regular cleaning of the leachate collection pipes is especially important during stages of landfilling when the level of both organic and inorganic constituents in the leachate is high and, consequently, the potential for clogging due to encrustation is greatest. As the landfill reaches the more stable methane producing stage, pipe cleaning may be required less frequently.

28. Conditions 6(45) to 6(60) have been inserted in order to ensure that concentrations of landfill gas do not pose a hazard to human health or the environment and to ensure that landfill gas controls are built and managed in accordance with the Ministry's requirements and regulations and the proposed design.

29. The reasons for Conditions 6(61) to 6(62) are to ensure that landfill gas is properly managed and monitored.

30. The reason for Conditions 6(63) and 6(64) is to ensure that backup power is available so that all facilities remain operational during a power disruption thus preventing any adverse impacts on the environment.

31. The reasons for Conditions 6(65) to 6(67) 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.

32. Condition 6(68) has been inserted in order to ensure proper public consultation about the end use of the Site is undertaken and that the end use activities are consistent with those identified during the EA process.

33. Conditions 8(1) to 8(4) are included to specify the approved Organic Waste receipt rate, the approved Organic Waste types and the service area from which the Organic Waste may be accepted at the Site based on the Owner's application and supporting documentation.

34. Conditions 8(5) and 8(6) are included to identify the maximum amounts of waste approved to be present at the Site at any one time within each storage location to prevent adverse impacts on the environment.

35. Conditions 8(18) to 8(20), and 8(42) are included to ensure that waste handling, processing and storage at the Site are undertaken in done in a way which does not result in an adverse environmental effect or a hazard to the environment or any person and are 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.

36. Conditions 8(21) to 8(38) are included to ensure that the Owner accepts and processes only the waste types that are approved in this Approval and that those wastes that are appropriate for Composting, and to ensure that the Owner regularly tests the incoming Organic Waste and the Finished Compost to verify compliance with the Compost Quality Standards and compatibility of Compost produced at the Site with its proposed final end use.

37. Conditions 8(39) to 8(41) are included to specify the Composting recipe criteria as per the consensus in the composting industry and the Ministry's requirements so that the operation for the Site does not result in an Adverse Effect or a hazard to the natural environment or any person.

38. Conditions 8(43) to 8(53) are included to specify the operating parameters and quality control required for a properly functioning Composting operation as per the consensus in the composting industry and the Ministry's requirements so that the operation for the Site does not result in an Adverse Effect or a hazard to the natural environment or any person.

39. Conditions 8(54) to 8(63) are included to identify the Compost Quality Standards that must be met before Finished Compost is considered suitable for its intended end use and to identify applicable regulatory compliance criteria for the wastes processed or generated at the Site to ensure that all outputs from waste management activities at the Site are properly managed, processed and disposed of in accordance with the Ministry's regulatory requirements and in a manner that protects the health and safety of the public and the

environment.

40. Conditions 8(66) to 8(67) are included to ensure that final closure of the Site is completed in accordance with Ministry’s standards.

41. The reasons for Conditions 9(1) to 9(23) and 9(30) to 9(33) are to ensure: the Owner installs the environmental monitoring wells and conducts environmental monitoring at the Site in accordance with the Ministry's recommendations; the long-term health and safety of the public and the environment; to demonstrate that the Site is performing as designed and the impacts on the natural environment are acceptable; to provide a mechanism to permit changes to the monitoring program; and 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 points. 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.

42. Reasons for Condition 9(24) to 9(29) are to ensure that off-Site migration of landfill gas is monitored and all buildings at the Site are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the Site; and and to ensure the Owner has a plan with an organized set of procedures for identifying and responding to potential issues relating to landfill gas migration at the Site's compliance point.

43. Conditions 10(1) to 10(7) are included to require the Site and equipment used for waste management and pollution control to be inspected and maintained thoroughly and on a regular basis to ensure that the operations at the Site are undertaken in a manner which does not result in an Adverse Effect or a hazard to the health and safety of the environment or any person.

44. Conditions 10(8) to 10(20) are included to ensure that detailed records of Site activities, inspections, monitoring and upsets are recorded and maintained for inspection and information purposes; 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; and 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. Annual reports are an important tool used in reviewing Site activities and for determining the effectiveness of Site design.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A341508 issued on September 7, 2018

In accordance with Section 139 of the *Environmental Protection Act,* you may by written notice served upon me and the Ontario Land 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 ("the Notice") 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:

Registrar* Ontario Land Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5 OLT.Registrar@ontario.ca	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 Ontario Land Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349 or 1 (866) 448-2248, or www.oltt.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 23rd day of June, 2023

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

NZ/
c: District Manager, MECP Peterborough
Michael Lord, D.M. Wills Associates Limited

APPENDIX A - III)

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL – 2231-8YCPHG ISSUED: SEPTEMBER 18, 2012

Content Copy Of Original

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER 2231-8YCPHG
Issue Date: September 28, 2012

The Corporation of the City of Peterborough
500 George Street North
Peterborough, Ontario
K9H 3R9

Site Location: Peterborough Waste Management System
1260 Bensfort Road
City of Peterborough, County of Peterborough

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

the stormwater management facilities and leachate management facilities to service the Peterborough Waste Management Facility (Bensfort Road Landfill Site) located on Part of Lots 14 and 15, Concession 13, Part of Lots 13, 14 and 15, Concession 14, County of Peterborough, comprising of 18 ha South Fill Area, 9.5 ha North Fill Area, and 15 ha groundwater easement zone within a total of landfill property area of 158 ha, consisting of the following:

PROPOSED SEWAGE WORKS:

modifications to the existing stormwater management facilities and leachate management facilities to service the Peterborough Waste Management Facility (Bensfort Road Landfill Site) located on Part of Lots 14 and 15, Concession 13, Part of Lots 13, 14 and 15, Concession 14, County of Peterborough, comprising of 18 ha South Fill Area, 9.5 ha North Fill Area, and 15 ha groundwater easement zone within a total of landfill property area of 158 ha, consisting of the following:

- the realignment and lowering of three (3) sections of the existing 150 mm diameter Leachate Forcemain located along the east side of Bensfort Road, as part of the County Road No. 39 (Bensfort Road) Reconstruction, in the City of Peterborough, at the following three (3) separate locations along the east side of Bensfort Road: a 335 m long section from approx. 1,464 m north of Assumption Road to approx. 1,129 m north of Assumption Road, a 270 m long section from approx. 118 m south of Base Line Road to approx. 388 m south of Base Line Road and a 110 m long section from approx. 954 m north of Storell Road to approx. 844 m north of Storell Road;
- the replacement of five (5) existing Forcemain Valve Chambers, as part of the County Road No. 39 (Bensfort Road) Reconstruction, in the City of Peterborough, at the following locations along the east side of Bensfort Road: Leachate Forcemain Chamber # 1 located approx. 857 m north of Storell Road, Leachate Forcemain Chamber # 2 located approx. 180 m south of Base Line Road, Leachate Forcemain Chamber # 4 located approx. 1,064 m north of Base Line Road, Leachate Forcemain Chamber # 5 located approx. 1,097 m south of Assumption Road and Leachate Forcemain Chamber # 6 located approx. 438 m south of Assumption Road;

all in accordance with the application dated January 12, 2012 and received January 16, 2012, including final plans and specifications prepared by the Peterborough County Public Works.

SEWAGE WORKS APPROVED ON SEPTEMBER 24, 2009:

establishment of stormwater management facilities and leachate management facilities to service the Peterborough Waste Management Facility (Bensfort Road Landfill Site) located on Part of Lots 14 and 15, Concession 13, Part of Lots 13, 14 and 15, Concession 14, County of Peterborough, comprising of 18 ha South Fill Area, 9.5 ha North Fill Area, and 15 ha groundwater easement zone within a total of landfill property area of 158 ha, consisting of the following:

establishment of leachate management facility to service the North Fill Area (**NFA**) of the Bensfort Road Landfill Site consisting of the following:

Leachate Collection System - NFA

- four (4) 200 mm diameter perforated HDPE leachate collection pipes with an approximate total length of 1,131 m serving Cell 4 of the North Fill Area, spaced at no more than 50 m within a 500 mm thick layer of 50 mm clear stone, enclosed between top and bottom geotextile layers, extending from 2,400 mm diameter manhole MHL8 and discharging by gravity to 2,400 mm diameter manhole MHL4;
- four (4) 200 mm diameter perforated HDPE leachate collection pipes with an approximate total length of 1,022 m serving Cell 3 of the North Fill Area, spaced at no more than 50 m within a 500 mm thick layer of 50 mm clear stone, enclosed between top and bottom geotextile layers, extending from 2,400 mm diameter manhole MHL7 and discharging by gravity to 3,000 mm diameter manhole MHL3;
- two (2) 200 mm diameter perforated HDPE leachate collection pipes with an approximate total length of 437 m serving Cell 2 of the North Fill Area, spaced at no more than 50 m within a 500 mm thick layer of 50 mm clear stone, enclosed between top and bottom geotextile layers, extending from 2,400 mm diameter manhole MHL6 and discharging by gravity to 2,400 mm diameter manhole MHL2;

three (3) 200 mm diameter perforated HDPE leachate collection pipes with an approximate total length of 600 m serving Cell 2 of the North Fill Area, spaced at no more than 50 m within a 500 mm thick layer of 50 mm clear stone, enclosed between a top and a bottom geotextile layers, extending from 2,400 mm diameter manhole MHL5 and discharging by gravity to 2,400 mm diameter manhole MHL1;

one (1) approximately 211 m long 200 mm diameter solid HDPE perimeter leachate collector pipe with a 0.5% horizontal slope, extending through four (4) 2.4 to 3.0 m diameter precast concrete manholes (MHL4, MHL3, MHL2, and MHL1), discharging collected leachate through 37 m long 300 mm diameter solid HDPE pipe to a leachate pumping station described below;

Leachate Pumping Station - NFA PS

- one (1) leachate pumping station (NFA PS) consisting of 11.5 m deep 3.0 m diameter precast concrete wet well equipped with two (2) submersible pumps (one duty and one standby), each rated at 15.1 L/sec at 63.9 m TDH, located at the south east corner of the North Fill Area, equipped with one (1) 100 kw standby diesel generator, discharging through a meter chamber consisting of 4.9 m long x 2.6 m wide precast concrete chamber, one (1) 575 m long 150 mm diameter HDPE forcemain, and an existing 150 mm diameter South Fill Area leachate forcemain located on the east side of Bensfort Road to a manhole at Neal Drive and Bensfort Road where it reaches Peterborough sanitary sewage collection system for treatment at Peterborough Water Pollution Control Plant (WPCP); and

- including all controls and associated appurtenances.

all in accordance with the Application for Approval of Municipal and Private Sewage Works submitted by The Corporation of the City of Peterborough dated July 2, 2009 and design specifications and drawings prepared by Urban & Environmental Management Inc., Consulting Engineers, Mississauga, Ontario.

SEWAGE WORKS APPROVED ON JULY 30, 2009:

establishment of stormwater management facilities to service the Bensfort Road Landfill Site (Peterborough Waste Management Facility) North Fill Area of an approximately 15.63 ha. drainage catchment for enhanced (80% SS removal) level of quality control and to provide quantity control of post development 2 to 100-year flows to predevelopment levels, consisting of the following:

Internal Peripheral Ditch/Grassed Swale:

- approximately 270 m long (Ditch D6-D7), 1:2.5 side sloped triangular existing ditch to intercept storm drainage from the laydown area at the east of the landfill site, discharging via one (1) existing 600 mm diameter culvert under the service road to the main cell of the existing wet pond:
- approximately 450 m long (Ditches D3-D4), 1:2.5 side sloped triangular ditch to intercept storm drainage from the western part of the landfill site to ditch D4-D5 as described below:
- approximately 745 m long (Ditches D1-D2 and D4-D5), 1 m bottom width 1:2.5 side sloped trapezoidal ditch to intercept storm drainage from the eastern part of the landfill site, via two (2) 900 mm diameter culverts under the service road to a wet pond as described below:

Wet pond (approximate service area 14.23 ha.):

- a wet pond with two (2) 900 mm diameter inlet pipes into a sediment forebay and an existing 600 mm diameter inlet pipe to directly discharge into the main cell consisting of 1870 m3 in permanent, 4070 m3 in extended detention and a total volume of 5,290 m3 at a depth of 2.34 m (100-yr HWL-bottom level), to store, attenuate and discharge stormwater into a tributary of an unnamed Creek of the Crystal Springs Wetland and Otonabee River via the following control outlet:
- a 1500 mm diameter aluminized CSP riser perforated outlet control structure anchored on the pond bottom, surrounded with 50 mm diameter clear stone jacket with a 150 mm and a 200 mm diameter riser inlets to a 300 mm diameter outlet pipe and valve chamber to discharge via a rip rap splash pad to a 3.8 m wide 300 mm deep grassed outlet channel into the Creek,
- a 600 mm deep by 7.4 m wide rip rap overflow channel located in the south embankment of the pond to discharge storm water into the Creek;

External Peripheral Ditch/Grassed Swale:

- approximately 525 m long (Ditch D15-16), 1:2.5 side sloped triangular ditch to intercept storm drainage from the external drainage west of the landfill site and discharge overland via a rip-rap dispersion channel into the creek within the wooded area,
- approximately 280 m long (Ditch D13-14), 1:2.5 side sloped triangular ditch to intercept storm drainage from the external drainage north of the site and discharge into Bensfort Road side ditches,
- approximately 290 m long (Ditch D10-10), 1:2.5 side sloped triangular ditch to intercept storm drainage from the external drainage north of the site and discharge into an existing ditch as described below:
- approximately 580 m long (Ditches D10-11 and D11-12), 1:2.5 side sloped existing triangular

ditches to intercept storm drainage from the external drainage east of the site and discharge into existing Bensfort Road side ditch,

- approximately 126 m long (Ditch D8-D9), 1:3 side sloped triangular existing ditch to intercept storm drainage from the existing transfer station, parking and service area to an oil and grit separator as described below:

Oil and Grit Separator (approximate service area 1.4 ha.) **:**

- one (1) manhole type oil/grit separator (Model Stormceptor STC-2000 or approved equivalent), located in the north-east corner of the site, rated at 30 L/s flow without by-passing, having a sediment storage capacity of 7.7 m3, oil storage capacity of 2890 L and a total volume of 11.0 m3, discharging via a 600 mm diameter existing storm sewer to the Creek via a 2.8 m wide 300 mm deep grassed swale;

all in accordance with the **Application for Approval of Municipal and Private Sewage Works, Stormwater Management Facility,** dated April 20, 2009, North Landfill Area Stormwater Management Pond Design Brief, prepared and submitted by Joe Ovcjak, P.Eng., Urban & Environmental Management Inc., Consulting Engineers.

SEWAGE WORKS APPROVED ON OR BEFORE DECEMBER 22, 1993 UNDER WASTE CofA# A341508:

establishment of leachate management facility to service the South Fill Area (**SFA**) of the Bensfort Road Landfill Site consisting of the following:

Leachate Pumping Station - SFA PS

- one (1) leachate pumping station (SFA PS) consisting of a 2.5 m deep x 3.0 m wide x 7.3 m long precast concrete holding tank and wet well equipped with two (2) submersible pumps (one duty and one standby), each rated at 5.8 L/sec and combined capacity of 9.0 L/sec, located at the east side of the South Fill Area, discharging through a flow meter, one (1) 6,200 m long 150 mm diameter HDPE forcemain located on the east side of Bensfort Road to a manhole at Neal Drive and Bensfort Road where it reaches Peterborough sanitary sewage collection system for treatment at Peterborough Water Pollution Control Plant (WPCP);

all in accordance with the Application for Approval of Municipal and Private Sewage Works submitted by The Township of Otonabee dated August 1992 and design specifications and drawings prepared by Conestoga Rovers & Associates .

SEWAGE WORKS APPROVED ON OR BEFORE JULY 2, 1996:

establishment of stormwater management facilities to service the Bensfort Road Landfill Site (Peterborough Waste Management Facility) South Fill Area of an approximately 18 ha. drainage to provide quantity control of stormwater run-off by attenuating flows from storm events up to 1:100 year return frequency to predevelopment levels, consisting of the following:

- construction and upgrading of drainage swales including temporary sediment traps, installation of culverts at internal road crossings and associated appurtenances;

all in accordance with the information submitted by the Conestoga-Rovers and Associates Limited, Consulting Engineers and the following list of documents containing the information relied upon in the issuance of this Approval of Approval No. 3-1516-91-966:

1. Application for the sewage works dated September 9, 1991, signed by the City of Peterborough

and Frederick Mosher, P. Eng., Conestoga-Rovers and Associates Limited.

2. Report entitled "Surface Water Study For the Continued Operation of the Bensfort Road Landfill Site" dated February 1991, prepared by Gartner Lee Limited.

3. Report entitled "Report on the Impact of Leachate Discharge from the Peterborough Landfill on the Peterborough WPCP City of Peterborough WPCP" revised dated February 1991, prepared by Gore & Storrie Limited.

4. Reports entitled "City of Peterborough Bensfort Road Landfill Site Application for Interim Expansion" Volumes 3 and 4 both dated March 1991, prepared by Conestoga-Rovers and Associates Limited.

5. Letter dated September 20, 1991, signed by Frederick Mosher, P. Eng., Conestoga-Rovers and Associates Limited addressed to Paul Nieweglowski, Ministry of Environment and Energy.

6. Letter dated April 14, 1992, signed by Frederick Mosher, P. Eng., Conestoga-Rovers and Associates Limited addressed to Ranee Mahalingham, P. Eng., Approvals Branch, Ministry of Environment and Energy.

7. Letter dated May 12, 1992, signed by Philip J. Bauer, B.A.Sc. Eng., Conestoga-Rovers and Associates Limited addressed to Ranee Mahalingham, P. Eng., Approvals Branch, Ministry of Environment and Energy.

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.

" *Director* " means any Ministry employee appointed by the Minister pursuant to section 5 of the Part II.1 of the Environmental Protection Act ;

" *District Manager* " means the District Manager of the Peterborough District Office of the *Ministry* ;

" *Ministry* " means the Ontario Ministry of the Environment;

" *Owner* " means The Corporation of the City of Peterborough and includes its successors and assignees;

"Previous Works" means those portions of the sewage works previously constructed and approved under an *Approval* ;

“Proposed Works ” means the sewage works described in the *Owner* 's application, this *Approval* and in the supporting documentation referred to herein, to the extent approved by this *Approval* ;

" *Works* " means the sewage works described in the *Owner* 's application, this *Approval* and in the supporting documentation referred to herein, to the extent approved by 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

PART I - GENERAL

1. GENERAL PROVISIONS

(1) Except as otherwise provided by these Conditions, the *Owner* shall design, build, install, operate and maintain the *Works* in accordance with the description given in this *Approval* , the application for approval of the *Works* and the submitted supporting documents and plans and specifications as listed in this *Approval* .

(2) Where there is a conflict between a provision of any submitted document referred to in this *Approval* and the Conditions of this *Approval* , the Conditions in this *Approval* shall take precedence, and where there is a conflict between the listed submitted documents, the document bearing the most recent date shall prevail.

(3) Where there is a conflict between the listed submitted documents, and the application, the application shall take precedence unless it is clear that the purpose of the document was to amend the application.

2. EXPIRY OF APPROVAL

(1) Construction, operation, maintenance and removal of such items are the responsibility of the *Owner* and shall be coordinated with appropriate authorities in a timely fashion and on a priority basis as set by the County and the City of Peterborough and / or the *Ministry* . The *Approval* issued by this *Approval* will cease to apply to those parts of the *Works* which have not been constructed within ten (10) years of the date of this *Approval.*

3. CHANGE OF OWNER

(1) The *Owner* shall notify the *District Manager* and the *Director* , in writing, of any of the following changes within thirty (30) days of the change occurring:

(a) change of *Owner* ;

(b) change of address of the *Owner* ;

(c) change of partners where the *Owner* 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.B17 shall be included in the notification to the *District Manager* ; and

(d) change of name of the corporation where the *Owner* is or at any time becomes a corporation, and a copy of the most current information filed under the Corporations Information Act , R.S.O. 1990, c. C39 shall be included in the notification to the *District Manager*

PART II - STORMWATER MANAGEMENT FACILITY

4. OPERATION AND MAINTENANCE

(1) The *Owner* shall ensure that the design minimum liquid retention volume in the wet pond is

maintained at all times .

(2) The *Owner* shall inspect the *Works* at least once a year and, if necessary, clean and maintain the *Works* to prevent the excessive build-up of sediments, and/or vegetation.

(3) The *Owner* shall maintain a logbook to record the results of these inspections and any cleaning and maintenance operations undertaken, and shall keep the logbook ready and updated for inspection by the *Ministry* . The logbook shall include the following:

(a) the name of the *Works* ; and

(b) the date and results of each inspection, maintenance and cleaning, including an estimate of the quantity of any materials removed.

5. RECORD KEEPING

(1) The *Owner* shall retain for a minimum of five (5) years from the date of their creation, all records and information related to or resulting from the operation and maintenance activities required by this *Approval.*

6. EFFLUENT MONITORING

The *Owner* shall establish and carry out, upon commencement of operation of the *Works* , the following effluent monitoring program:

(1) one (1) grab sample of the effluent from the outlet of the pond shall be collected within four (4) hour following commencement of a storm event with at least one (1) sample per season and with a minimum of three (3) samples during summer months of June, July and August and analyzed for the Total Suspended Solids, Turbidity, Un-ionized ammonia, Oxygen level (O_2), Temperature, pH and Oil and Grease; together with the following as per the schedule therein:

Table 1 - Effluent Monitoring for SWMF Pond for Landfill Sites (Note-4) Sampling Points: Pond Inlets (900 mm culverts from Landfill Site) and Pond Outlet		
Effluent Parameter	**Frequency**	**Sample Type**
General Chemistry Note 1	Semi-annually	Grab
Volatile Organic Compounds (VOC) Note 2	Semi-annually	Grab
Metals Scan Note 3	Semi-annually	Grab

Note 1: General Chemistry - hardness, alkalinity, chloride, nitrite, nitrate, sulfate, ammonia, colour, Total Kjeldahl Nitrogen (TKN), total phosphorus, Dissolved Organic Carbon (DOC), phenols, Biological Oxygen Demand (BOD_5), Chemical Oxygen Demand (COD).

Note 2: Volatile Organic Compounds (VOC) - benzene, bromodichloromethan, bromoform, bromomethane, carbon tetrachloride, chlorobenzene, chlorethane, chloroform, chloromethane, dibromochloromethane, 1,2-dichlorbenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, trans-1,2-dichloroethylene, dichloromethane, 1,2-dichloropropane, cis-1,3-dichloropropene, ethylbenzene, styrene, 1,1,2,2-tetrachloroethane, tetrachloroethylene, toluene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, trichlorofluoromethane, vinyl chloride, m+p-zylene, o-xylene.

Note 3: Metals Scan - boron, calcium, magnesium, sodium, potassium, aluminium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, vanadium, silver, zinc.

Note 4: Grab samples of stormwater from the two (2) Inlet pipes from the Landfill Site shall be collected, mixed and analyzed for the parameters and frequency as outlined in Table 1, along with grab sample from the pond outlet pipe for a storm event which results in a discharge from the works while maintaining a minimum of thirty (30) days between two consecutive sampling events.

(2) Unless otherwise stated, the protocol for sampling and analysis shall be in accordance with the principles specified in the Ministry's publication titled " Protocol for the Sampling and Analysis of Industrial and Municipal Waste Water" dated August 1994, (ISBN 0-7778-1880-9), as revised from time to time by more recently published edition.

(3) After the owner obtains a minimum of three (3) years of monitoring results, the monitoring frequency and monitoring parameters specified in subsection (1) Table 1 may be modified by the *District Manager* if written request is made by the Engineer on behalf of the *Owner* .

7. EFFLUENT OBJECTIVES

(1) The *Owner* shall use best efforts to design, construct and operate the *Works* with the objective that the concentrations of the materials named below as effluent parameters are not exceeded in the effluent from the *Works.*

Table 2 - Pond Effluent Objectives	
Effluent Parameter	**Concentration Objective** (milligrams per litre unless otherwise indicated)
pH	6.5 - 8.5
Turbidity	25 NTU
Un-ionized ammonia	0.02 mg/L
Oil and grease	15 mg/L
Boron	0.2 mg/L
Iron	0.3 mg/L

(2) The *Owner* shall use best efforts to ensure that the effluent from the *Works* is essentially free of floating and settleable solids and does not contain oil or any other substance in amounts sufficient to create a visible film or sheen or foam or discolouration on the receiving waters.

PART III - LEACHATE COLLECTION AND DISPOSAL SYSTEM

8. OPERATION AND MAINTENANCE

(1) The *Owner* shall exercise due diligence in ensuring that, at all times, the *Works* and the related equipment and appurtenances used to achieve compliance with this *Approval* are properly operated and maintained. Proper operation and maintenance shall include effective performance, adequate funding, adequate operator staffing and training.

(2) The *Owner* shall provide for the overall operation of the *Works* with an operator who holds a licence that is applicable to that type of facility and that is of the same class as or higher than the class of the facility in accordance with Ontario Regulation 129/04.

(3) Any diversion of sewage flow from any portion of the *Works* is prohibited, except:

(a) where it is unavoidable in preventing loss of life, danger to public health, personal injury or severe property damage; or

(b) where it is necessary for the purpose of essential maintenance of the *Works* to assure their efficient operation, and the *District Manager* has given a prior written approval for the bypass.

9. MONITORING AND RECORDING

The *Owner* shall carry out the following monitoring program:

(1) All samples and measurements taken for the purposes of this *Approval* are to be taken at a time and in a location characteristic of the quality and quantity of leachate over the time period being monitored.

(2) For the purposes of this condition, Quarterly means once every three months.

(3) A composite sample shall be collected at the following sampling point at a **quarterly frequency (May, August, and October)** and analyzed for each parameter listed and all results recorded:

Table 3 Leachate Monitoring Sampling Location: Neal Drive Manhole		
Parameters	**Parameters**	**Field Parameters**
Alkalinity, Total (as CaCO3)	Cobalt	pH
Total Ammonia Nitrogen	Copper	Conductivity
Bromide	Iron	Temperature
CBOD5	Lead	
Chloride	Manganese	
Iron	Mercury	
pH	Molybdenum	
Phenolics (Total)	Nickel	
Potassium	Selenium	
Sodium	Silver	
Total Kjeldahl Nitrogen (TKN)	Strontium	
Total Suspended Solids (TSS)	Tin	
Total Phosphorus	Titanium	
	Vanadium	
	Zinc	
	Zirconium	

(4) The methods and protocols for sampling, analysis and recording shall conform, in order of

precedence, to the methods and protocols specified in the following:

(a) the Ministry's Procedure F-10-1, “Procedures for Sampling and Analysis Requirements for Municipal and Private Sewage Treatment Works (Liquid Waste Streams Only), as amended from time to time by more recently published editions;

(b) the Ministry's publication "Protocol for the Sampling and Analysis of Industrial/Municipal Wastewater" (January 1999), ISBN 0-7778-1880-9, as amended from time to time by more recently published editions;

(c) the publication "Standard Methods for the Examination of Water and Wastewater" (21st edition), as amended from time to time by more recently published editions;

(5) The *Owner* shall install and maintain (a) flow measuring device(s), to measure the flow rate of leachate from the *Works* with an accuracy to within plus or minus 15 per cent (+/- 15%) of the actual flow rate for the entire design range of the flow measuring device in order to measure and record:

(i) the quantity of leachate being conveyed through Leachate Pumping Station NFA PS;

(ii) the quantity of leachate being conveyed through the Leachate Pumping Station SFA PS;

(6) The *Owner* shall retain for a minimum of three (3) years from the date of their creation, all records and information related to or resulting from the monitoring activities required by this *Approval* .

PART IV - GENERAL

10. REPORTING

(1) One week prior to the start up of the operation of the *Proposed Works* , the *Owner* shall notify the *District Manager* (in writing) of the pending start up date.

(2) The *Owner* shall report to the *District Manager* or designate, any exceedence of any parameter specified in Condition 7 orally, as soon as reasonably possible, and in writing within seven (7) days of the exceedence.

(3) In addition to the obligations under Part X of the Environmental Protection Act , the *Owner* shall, within 10 working days of the occurrence of any reportable spill as defined in Ontario Regulation 675/98, bypass or loss of any product, by-product, intermediate product, oil, solvent, waste material or any other polluting substance into the environment, submit a full written report of the occurrence to the *District Manager* describing the cause and discovery of the spill or loss, clean-up and recovery measures taken, preventative measures to be taken and schedule of implementation.

(4) The *Owner* shall, upon request, make all manuals, plans, records, data, procedures and supporting documentation available to *Ministry* staff.

(5) The *Owner* shall prepare and submit to the *District Manager* a performance report as part of the Annual Monitoring and Design and Operations Report for the Site by **May 15 th** each year, covering the preceding calendar year. The first such report shall cover the first annual period following the commencement of operation of the *Works* and subsequent reports shall be submitted to cover successive annual periods following thereafter. The reports shall contain, but shall not be limited to, the following information:

(a) a summary and interpretation of all stormwater monitoring data and a comparison to the effluent objectives outlined in Condition 7, including an overview of the success and adequacy of the *Works* ;

(b) a summary and interpretation of all leachate monitoring data and volume of leachate disposed off-site during the reporting period;

(c) a description of any operating problems encountered and corrective actions taken;

(d) a summary of all maintenance carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the *Works* ;

(e) a summary of any effluent quality assurance or control measures undertaken in the reporting period;

(f) a summary of the calibration and maintenance carried out on all effluent monitoring equipment; and

(g) a description of efforts made and results achieved in meeting the Effluent Objectives under Condition 7.

(h) a summary of any complaints received during the reporting period and any steps taken to address the complaints;

(i) any other information the *District Manager* requires from time to time.

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

1. Condition 1 is imposed to ensure that the *Works* are built and operated in the manner in which they were described for review and upon which approval was granted. This condition is also included to emphasize the precedence of Conditions in the *Approval* and the practice that the Approval is based on the most current document, if several conflicting documents are submitted for review.

2. Condition 2 is included to ensure that, when the *Works* are constructed, the *Works* will meet the standards that apply at the time of construction to ensure the ongoing protection of the environment.

3. Condition 3 is included to ensure that the Ministry records are kept accurate and current with respect to approved works and to ensure that subsequent owners of the works are made aware of the Approval and continue to operate the works in compliance with it.

4. Conditions 4 and 8 are included to require that the *Works* be properly operated and maintained such that the environment is protected .

5. Condition 5 is included to require that all records are retained for a sufficient time period to adequately evaluate the long-term operation and maintenance of the *Works* .

6. Conditions 6 and 9 are included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Approval,* so that the *Ministry* can work with the *Owner* in

resolving any problems in a timely manner.

7. Condition 7 is imposed to establish non-enforceable effluent quality objectives which the *Owner* is obligated to use best efforts to strive towards on an ongoing basis. These objectives are to be used as a mechanism to trigger corrective action proactively and voluntarily before environmental impairment occurs.

8. Condition 10 is included to provide a performance record for future references, to ensure that the *Ministry* is made aware of problems as they arise, and to provide a compliance record for all the terms and conditions outlined in this *Approval,* so that the *Ministry* can work with the *Owner* in resolving any problems in a timely manner.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). 6802-7VFRUK issued on September 24, 2009.

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

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

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

The Notice should also include:

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

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

This Notice must be served upon:

The Secretary* Environmental Review Tribunal 655 Bay Street, Suite 1500 Toronto, Ontario M5G 1E5	AND	The Director appointed for the purposes of Part II.1 of the Environmental Protection Act Ministry of the Environment 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) 212-6349, Fax: (416) 314-4506 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 28th day of September, 2012

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

KC/
c: District Manager, MOE Peterborough District Office
Pat Devlin, The Corporation of the City of Peterborough

APPENDIX

B

CITY'S BY-LAW
NUMBER 07-027

Amended by 09-108
Amended by 14-095
Amended by 15-132

THE CORPORATION OF THE CITY OF PETERBOROUGH

BY-LAW NUMBER 07-027
Amended by 09-108, 14-095, 15-132

BEING A BYLAW FOR THE PURPOSE OF REGULATING THE DISPOSAL OF WASTE, INCLUDING ESTABLISHING OF TIPPING FEES FOR THE PETERBOROUGH COUNTY-CITY WASTE MANAGEMENT FACILITY

WHEREAS Council of the City of Peterborough wishes to enact a By-law for the purposes of regulating the disposal of waste;

AND WHEREAS Section 391 of the *Municipal Act, 2001* provides that a municipality may pass by-laws imposing fees or charges;

AND WHEREAS solid waste tipping fees will be included in the By-law;

AND WHEREAS the City of Peterborough held a public meeting on December 11, 2006 at City Hall, 500 George Street North, Peterborough, in accordance with Regulation 244/02 under the *Municipal Act, 2001*;

NOW THEREFORE the Council of the City of Peterborough enacts as follows:

1. INTERPRETATION

In this By-law:

"City" means the City of Peterborough;

"Director" means the Director of Utility Services for the City of Peterborough and where applicable includes a person designated by the Director to perform a task or exercise a power in his or her place and stead;

"garbage" means dry waste other than recyclable materials, organic materials and hazardous waste;

"green waste" has the meaning set out in Schedule "A";

"hazardous waste" means hazardous waste as defined in R.R.O. 1990, Regulation 347, as amended from time to time, pursuant to the Environmental Protection Action, R.S.O 1990, cE19, which includes:

a) hazardous industrial waste;
b) acute hazardous waste chemical;
c) hazardous waste chemical;
d) severely toxic waste;
e) ignitable waste;
f) corrosive waste;
g) reactive waste;
h) radioactive waste, except radioisotope wastes disposed of in a landfilling site in accordance with the written instructions of the Atomic Energy Control Board or the Canadian Nuclear Safety Commission;
i) pathological waste;
j) leachate toxic waste;
k) PCB waste as defined in Regulation of 362 of Revised Regulations of Ontario, 1990;

"recyclable materials" means those materials set out in Schedule "A";

"waste" means anything for which the holder has no further use and which the holder has discarded and includes, but is not limited to garbage and recyclable material;

"waste management facility" means the Peterborough County/City Waste Management Facility, formerly known as Bensfort Landfill Site, located at 1260 Bensfort Road, Township of Otonabee, South Monaghan, County of Peterborough. For the purpose of this by-law, the waste management facility includes the landfill site and the Public Drop-off Depot.

2. GENERAL PROVISIONS AND PROHIBITIONS

2.1 No person shall, at the waste management facility:

(a) deposit waste outside the posted hours of operation;

(b) deposit waste or recyclable materials at any place other than the place respectively designated for the receipt of such waste;

(c) deposit hazardous waste;

(d) deposit any waste which originated from outside the County or City of Peterborough. If requested, the person shall provide proof of the origin of the waste prior to depositing the waste;

(e) refuse to remove, at the person's expense, any waste which has been deposited by the person which is not in compliance with this by-law;

(f) remove or scavenge any deposited waste without the prior written approval of the Director;

(g) deposit waste which has been transported to the facility except when such waste has been properly secured or covered in canvas, tarpaulins or nets, so fastened down around the edges as to prevent any of the contents from leaving the vehicle during transport.

2.2 Not withstanding Section 2.1 (b), any load which contains less than 10% by volume of recyclable materials may be deposited at the place designated for the receipt of garbage.

3. FEES

3.1 No person shall deposit waste at the waste management facility without paying the appropriate fee for that type of waste, as set out in Schedule "B".

3.2 If any cheque provided in payment of a fee payable under Subsection 3.1 is returned marked "Not Sufficient Funds", the amount of the fee shall remain unpaid, and together with the administrative charge for NSF cheques, determined in accordance with the City's Financial Policies shall be a debt to the City owing by that person recoverable by action or other means open to the City.

4. ENFORCEMENT PROCEDURES

4.1 In the event that a person deposits, or attempts to deposit waste, not in compliance with this by-law:

(a) The person may be refused access to the waste management facility;

(b) The person shall receive a written warning on the first such occasion;

(c) The person shall pay surcharges in the following amounts on any subsequent occasions:

(i) $100 on the first subsequent occasion;

(ii) $200 on the second subsequent occasion;

(iii) $300 on the third and any other subsequent occasions.

5. **SCHEDULES**

The following Schedules attached hereto form a part of this By-law:

Schedule "A" –Recyclable Materials; and
Schedule "B" – Waste Management Tipping Fees.

6. **PENALTY**

Any person who contravenes this by-law is guilty of an offence and, upon conviction, is liable to a fine or penalty provided for in the ***Provincial Offences Act***, as amended.

7. **EFFECTIVE DATE**

This By-law shall come into force and take effect on Thursday, March 1, 2007.

By-law read a first, second and third time this 26th day of February, 2007.

(Sgd.) D. Paul Ayotte, Mayor

(Sgd.) Nancy Wright-Laking, City Clerk

SCHEDULE "A"

TO BY-LAW 07 -027
RECYCLABLE MATERIALS

The following materials are banned from disposal at the waste management facility but are accepted for recycling at the facility's Public Drop-off Depot:

"blue box materials" means recyclable materials as collected in the City of Peterborough Blue Box Collection program, as amended from time to time, namely:

a) clear and coloured glass from food & beverage bottles and jars; aseptic containers;
b) metal cans and foil; including food & beverage cans, aluminum foil & trays;
c) empty metal paint and aerosol cans;
d) gable top drink cartons and tetra paks including milk and juice cartons and tetra pack containers for juice, milk, soup;
e) plastic soft drink and water containers made out of polyethylene terephthalate (PET or PETE #1);
f) plastic bottles and jugs made out of high density polyethylene (HDPE #2);
g) tubs and lids (#5);
h) polystyrene and styrofoam containers (#6) including clear trays and clamshells marked with the #6 only; plant pots up to 12 inches in size, cell-paks, carrying flats; foam meat trays, plates, cups, take-out containers and egg cartons only;
i) film plastic bags including bread, milk , fresh and frozen produce bags, bulk food, dry cleaning, toilet-tissue packaging, and cereal box liners;
j) boxboard, including cereal, crackers, detergent, toothpaste, shoe boxes;
k) corrugated cardboard consisting of triple-layer cardboard boxes. Waxed, stained, painted or contaminated cardboard must be discarded as garbage;
l) paper including envelopes, direct mail advertising, paper egg cartons, greeting cards and all remaining paper and paper products generated by households
m) newspapers & magazines, including inserts, catalogues, white envelopes, computer paper; writing papers, telephone directories, manuals & softcover books;

"clean wood waste" includes untreated lumber and wood products such as pallets and raw lumber, but does not include painted wood, paneling, pressboard or similar treated products;

"drywall" includes drywall scraps or drywall material, which may contain paint and screws, segregated from supporting building material;

"green waste" means leaves, grass clippings; trees, excluding stumps; garden roots and cuttings; hedge and shrub trimmings; brush cuttings; twigs and branches; natural Christmas trees; other plant material;

"scrap metal" includes metal auto parts, large appliances, bicycles, tools, etc; and

"tires" means tires without wheel rims.

SCHEDULE "B"

TO BY-LAW 07-027
WASTE MANAGEMENT TIPPING FEES

1. GARBAGE

		Rate
a)	**Load of 100 kg or less**	$5.00 flat rate
b)	**Load over 100 kg**	$90.00 per metric tonne

2. RECYCLABLE MATERIALS

All loads of recyclable materials must be segregated and cannot contain garbage.

		Rate
a)	**Load of 100 kg or less**	FREE
b)	**Load over 100 kg**	$45.00 per metric tonne
c)	**On-road tires** (tire diameter:124cm/49 inches or less)	
	- up to 5 tires in a load	$3 surcharge per tire
	- more than 5 tires in a load	$225 per metric tonne
d)	**Off-road tires** (tire diameter:127 cm/ 50" or more)	
	- up to 5 tires in a load	$40 surcharge per tire
	- more than 5 tires in a load	$225 per metric tonne
e)	Freon-containing appliances	$15 surcharge per appliance

3. UNCONTAMINATED GRANULAR MATERIAL AND NON-HAZARDOUS CONTAMINATED SOIL TIPPING FEE

		Rate
a)	Granular materials determined by the Director to be suitable as cover material at the waste management facility, and deposited in the area specified by the Director, for such use;	FREE
b)	Non-hazardous contaminated soil, tested for suitability by owner of the material and determined by the Director to be suitable as cover material at the waste management facility, and deposited in the area specified by the Director for such use.	$20.00 per metric tonne

THE CORPORATION OF THE CITY OF PETERBOROUGH

BY-LAW NUMBER 09-108

BEING A BY-LAW TO AMEND BY-LAW 07-027 FOR THE PURPOSE OF REGULATING THE DISPOSAL OF WASTE, INCLUDING ESTABLISHING OF TIPPING FEES FOR THE PETERBOROUGH COUNTY-CITY WASTE MANAGEMENT FACILITY

WHEREAS the Council of the City of Peterborough passed By-law 07-027 being a by-law for the purpose of regulating the Disposal of Waste, including establishing of Tipping Fees for the Peterborough County-City Waste Management Facility;

AND WHEREAS the Council of the City of Peterborough deems it expedient to amend Schedule "B" of By-law 07-027 to reflect changes in Tipping Fees;

THEREFORE the Council of the Corporation of the City of Peterborough enacts as follows:

1. That Section 1 of Schedule "B" of By-law 07-027 be amended by adding the following:

	Rate
"c) Asbestos	$200.00 per metric tonne"

2. That Section 2 of Schedule "B" of By-law 07-027 be amended by replacing items c) and d) with the following:

	Rate
"c) On-road tires	Free
d) Off-road tires	Free"

3. That Schedule "B" of By-law 07-027 be amended by adding the following Section.

"4. Electronic or Hazardous Waste

All loads of waste electronics and electrical equipment or municipal hazardous or special waste must be taken to the Household Hazardous Waste Drop-off Depot for recycling or proper disposal.

	Rate
a) Monitors	Free
b) Fluorescent Light Tubes	Free"

4. That this By-law shall come into effect on Tuesday, September 1, 2009.

By-law read a first, second and third time this 10th day of August, 2009.

(Sgd.) D. Paul Ayotte, Mayor

(Sgd.) Kevin Arjoon, Deputy Clerk

City of Peterborough

The Corporation of the City of Peterborough

By-Law Number 14-095

Being a By-law to amend By-law 07-027 Being a By-law for the purpose of regulating the Disposal of Waste, including establishing of Tipping Fees for the Peterborough County-City Waste Management Facility

Whereas the Council of the City of Peterborough passed By-law 07-027 being a by-law for the purpose of regulating the Disposal of Waste, including establishing of Tipping Fees for the Peterborough County-City Waste Management Facility;

And Whereas the Council of the City of Peterborough deems it necessary to amend Schedule "A" of By-law 07-027 to reflect changes in acceptable recyclable materials;

Now Therefore, The Corporation of the City of Peterborough by the Council thereof hereby enacts as follows:

1. That Schedule "A" of By-law 07-027 be amended by adding the following Recyclable Materials:

   "boxsprings" of all sized, must be clean

   "mattresses: of all sizes, including futons; must be clean

2. That this By-law shall come into effect on Tuesday, September 2, 2014.

By-law read a first, second and third time this 5th day of August, 2014.

(Sgd.) Daryl Bennett, Mayor

(Sgd.) Natalie Garnett, Deputy City Clerk

City of Peterborough

The Corporation of the City of Peterborough

By-Law Number 15-132

Being a By-law to amend By-law 07-027 Being a By-law for the purpose of regulating the Disposal of Waste, including establishing of Tipping Fees for the Peterborough County-City Waste Management Facility

Whereas the Council of the City of Peterborough passed By-law 07-027 being a by-law for the purpose of regulating the Disposal of Waste, including establishing of Tipping Fees for the Peterborough County-City Waste Management Facility;

And Whereas the Council of the City of Peterborough deems it necessary to amend Schedule "B" of By-law 07-027 to reflect changes in the tipping fee for Garbage, loads over 100 kg;

Now Therefore, The Corporation of the City of Peterborough by the Council thereof hereby enacts as follows:

1. That Schedule "B" of By-law 07-027 be amended by changing the tipping fee for 1.b) Garbage – Loads over 100 kg to $90.00 per metric tonne:

2. That this By-law shall come into force and effect on Tuesday, September 8, 2015.

By-law read a first, second and third time this 8th day of September, 2015.

(Sgd.) Daryl Bennett, Mayor

(Sgd.) John Kennedy, City Clerk

APPENDIX

C

LEACHATE COLLECTION SYSTEM, WATER BALANCE AND LEACHATE QUALITY

LEACHATE COLLECTION SYSTEM, WATER BALANCE AND LEACHATE QUALITY

TABLE OF CONTENTS

1.0 Leachate Management

One of the primary operations at the Peterborough County/City Waste Management Facility (PCCWMF) is the management and disposal of leachate. Leachate is the infiltration water collected after passing through the waste. A multi-component leachate collection and pumping system has been designed and constructed to collect and dispose of leachate generated at the PCCWMF. In addition to handling and disposing of collected leachate it is also important to monitor leachate levels and inspect areas of the Site under interim or final cover for evidence of leachate seepage as part of the overall landfill and surface water management strategy.

All cells referenced in this text are based on the historical site cell designations to assist in explaining the system development and operations. These historical cell designations can be found on Figure 2.3.

The leachate collection and pumping system is a combination of gravity drainage systems to pumping stations that discharge leachate via forcemains to the City's sanitary sewer system for subsequent treatment.

1.1 Leachate Collection System Overview

Leachate and potentially impacted surface water/groundwater are directed into the leachate collection system from a number of separate areas and conveyed to a common holding area/pumping station in either the North Fill Area (NFA) or South Fill Area (SFA). Figure C.1 provides a layout of the various leachate collection piping systems at the Site. From each pumping station, collected liquids are pumped through a forcemain to the City's Sanitary Sewer System via a sanitary sewer manhole located at Neal Drive and Bensfort Road. The leachate pumping system schematic for the SFA is shown on Figure C.2. Final treatment of the leachate takes place at the City's Wastewater Treatment Plant. Table C.1 presents historical leachate/groundwater volumes discharged to the forcemain.

The combination of leachate and potentially impacted surface water and groundwater is collected at the Site using differing systems and sub-systems that correspond to the following areas:

i) Cell 1 – South (above former Phase 1 Area and former Cells A to D);

ii) West Portion of Cell 1 – North (some new areas and areas above former Phase 2 Area);

iii) East Portion of Cell 1 – North (former Cells G, H, I &J);

iv) Cell 1 – West A;

v) Cell 1 – West B;

vi) Groundwater Interceptor Trench to the east of the fill area adjacent to Bensfort Road;

vii) Cell 2 in the NFA;

viii) Cell 3 in the NFA; and

ix) Cell 4 in the NFA.

1.2 Cell 1 – South

A toe drain is installed along the south and east perimeter of former Cells A to D, which collects leachate from the base of the former cells. The toe drain conveys collected leachate by gravity from the base of former Cells A to D and the collection system in Phase 1 and Cell 1 West A area to the SFA pumping station. The toe drain is accessed by manholes MH-A0, MH-A1, MH-B1, MH-C1 and MH-D2.

The leachate collection system on the upper portion of Cell 1 - South (Phase 1) is comprised of perforated underdrain piping installed in conjunction with a stone drainage blanket on the prepared base of the cell. The combination of the leachate collection system and cell base grading direct leachate to a perforated header installed along the inside base of the eastern perimeter berm. Leachate collected from Phase 1 is directed by gravity to the toe drain manholes that drain to the SFA pumping station.

1.3 West Portion of Cell 1 – North

The leachate collection system on the West Portion of Cell 1 – North (former Phase 2) is comprised of perforated underdrain laterals installed in conjunction with a stone drainage blanket on the prepared base of the cells. Leachate drains from the underdrain laterals to manholes MHT7-94, MHT8-94, and MHT9-94, which flow by gravity through the perimeter leachate header to MH-J3. MH-J3 acts as a lift station in which the leachate level is continuously monitored and pumped to the SFA pumping station when it reaches pre-set elevations.

1.4 East Portion of Cell 1 – North

The network of leachate collection piping for the east portion of Cell 1 – North, the area above former Cells G to J, is comprised of perforated underdrain laterals installed in conjunction with a stone drainage blanket on the prepared base of the cells. The leachate drains from the laterals to manholes MH-I2 to MH-J3 and then it drains by gravity through the perimeter leachate header to MH-J3.

Leachate collected in the toe drain at the base of former Cell G drains via MH-G, located centrally near the north perimeter of the SFA, into the perimeter header where it drains to MH-J3. This piping section also collects and transports leachate and surface water from the Phase 2 Area.

Leachate collected from former Cell H drains to MH-D2 and then through 250 mm solid piping to the SFA pumping station. There is a hydraulic connection between former Cells H and J that was documented during construction of the Cell J underdrain system. The majority of leachate from the former Cell H drains directly into the former Cell J leachate collection system.

1.5 Cell 1 – West (A & B)

The leachate collection system for Cell 1 West is comprised of a perforated underdrain pipe and a stone drainage blanket on the base of the cell.

Leachate in Cell 1 – West A is directed via the underdrain pipe to manhole TDCO-A1 where it drains to the toe drain and subsequently the SFA pumping station. An isolation valve is located at TDCO-A1.

Leachate in Cell 1 – West B is similarly directed by the underdrain pipe to manhole MHT10-07. An isolation valve is located at this manhole. Solid pipe connects MHT10-07 to MHT9-94, from where leachate drains through the outside perimeter header, to MH-J3.

1.6 Groundwater Interceptor Trench

The groundwater interceptor trench is located between the fill area and Bensfort Road. The groundwater interceptor constructed of perforated pipe in a stone trench captures groundwater migrating laterally in the underlying till beneath former Cells A to D and Phase 1. This system is intended to act as a hydraulic barrier to capture potentially contaminated groundwater flowing beneath the landfill, and prevent its discharging to the intermittent stream, which flows across the southeast corner of the PCCWMF. Groundwater is intercepted and drains north from MH-1 to MH-4, and south from MH-6 to MH-4. MH-4 acts as a lift station, pumping collected groundwater to the SFA pumping station.

1.7 Cell 2 – NFA

The leachate collection system for Cell 2 in the NFA is comprised of perforated underdrain pipes and a stone drainage blanket on the base of the cell.

The leachate collection system directs leachate to MHL2. A 200 mm diameter HDPE solid pipe directs leachate from MHL2 to the NFA pumping station which conveys collected leachate through a meter chamber and ultimately discharges into the City sanitary sewer.

1.8 Cell 3 – NFA

The construction of a leachate collection system for Cell 3 in the NFA was completed in December 2015. Similar to Cell 2, the leachate collection system is comprised of perforated underdrain pipes and a stone drainage blanket on the base of the cell.

The leachate collection system directs leachate to MHL3 located in the southeast corner of Cell 3. A 200 mm diameter HDPE solid pipe directs leachate from MHL3 to MHL2 in Cell 2, which drains to the NFA pumping station.

1.9 Cell 4 – NFA

The construction of a leachate collection system for Cell 4 in the NFA was completed in December 2022. Similar to Cells 2 and 3, the leachate collection system is comprised of perforated underdrain pipes and a stone drainage blanket on the base of the cell.

The leachate collection system directs leachate to MHL4 located in the southeast corner of Cell 4. A 200 mm diameter HDPE solid pipe directs leachate from MHL4 to MHL3 in Cell 3, which drains to Cell 2 and then the NFA pumping station.

2.0 Water Balance Analysis

Table C.1 presents historical leachate/groundwater volumes discharged to the forcemain. These data were compared to environmental data to examine the overall water balance at the Site. 91,727 m^3 of leachate was collected at the site in 2023.

The volume of leachate produced at the Site is dependent on the area of the refuse areas, the proportion of the net surplus that infiltrates into the waste, and amount of groundwater inflow.

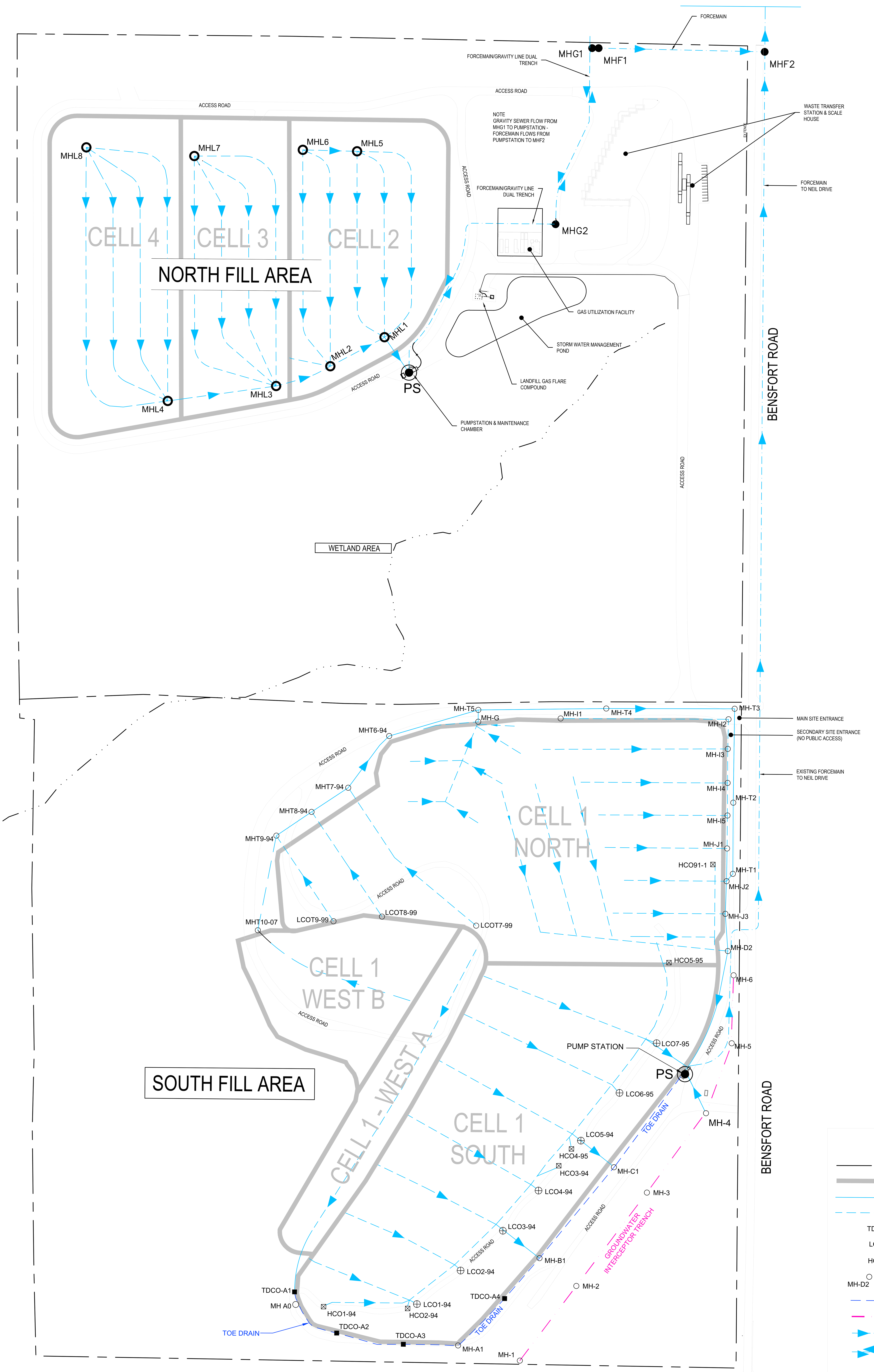
Table C.2 summarizes the interpreted volumes attributed to leachate production from precipitation and groundwater inflow, in 2023.

As shown in Table C.1, the total volume of leachate collected in 2023, 91,727 m^3, was 92.7% higher than the volume of 47,603 m^3 collected in 2022. The increase in the volume of leachate is attributed to Cell 4 becoming operational in late 2022, which increased the capture area for precipitation. The precipitation received in 2023 was 7.2% higher than the amount of precipitation received in 2022, for the Peterborough Airport climate station.

As shown in Table C.2, approximately 49% of the collected leachate within the SFA is attributed to precipitation infiltration through the landfill cap and refuse, with the remaining portion attributed to groundwater inflow at various locations surrounding the cell. It is interpreted that approximately 11,448 m^3 of groundwater inflow occurs within the NFA, based on the surrounding groundwater levels in 2023, which represents 23% of the total leachate collected from the NFA. The remaining 77% of leachate production in the NFA is attributed to precipitation infiltration through the refuse for Cells 2 and 3, and direct precipitation collection in Cell 4. Precipitation and infiltration represent a larger portion of the leachate production within the NFA, since the cells are still operational.

Figure C.3 provides a comparison between the monthly 2023 precipitation totals and the historical monthly averages obtained from the Peterborough Airport climate station from 1981-2010. The total precipitation received at the Peterborough Airport in 2023 was measured to be 817 mm, which was less than the historical climate normal of 855 mm.

Figure C.4 provides a comparison between the weekly precipitation and the volume of leachate discharged to the forcemain. As shown in the figure, leachate production within the NFA is noticeably influenced by precipitation events, which is not unexpected, since Cell 2 and 3 are partially under final cover and Cell 4 is has recently been constructed and is essentially a collection basin for precipitation until final contours are reached. As a result of the construction of Cell 4 in December 2022, volumes of leachate production are expected to increase in the NFA until waste elevation reach final contours and final cover placement begins.



LEGEND

	PROPERTY LINE
	LIMIT OF CELL
	NON-PERF. PIPE
	PERFORATED PIPE
TDCO-A3 ■	TOE DRAIN CLEANOUT
LCO3-94 ⊕	LATERAL CLEANOUT
HCO2-94 ⊠	HEADER CLEANOUT
MH-D2 ○ / MHL1	LEACHATE COLLECTION SYSTEM TIE-IN (SFA/NFA)
	TOE DRAIN PIPING
	INTERCEPTOR PIPING
	LEACHATE FORCEMAIN
	LEACHATE FORCEMAIN & GRAVITY SEWER DUAL TRENCH
MHG1 ●	GRAVITY SEWER MANHOLE (NFA)
● MHF1	FORCEMAIN SERVICE MANHOLE
PS ◉	PUMPSTATION

D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	JVC	JJO

REVISION / ISSUE

FIGURE C.1

DWN BY: JVC DATE: MAY 2024
CHK BY: JJO SCALE: SEE SCALE BAR

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

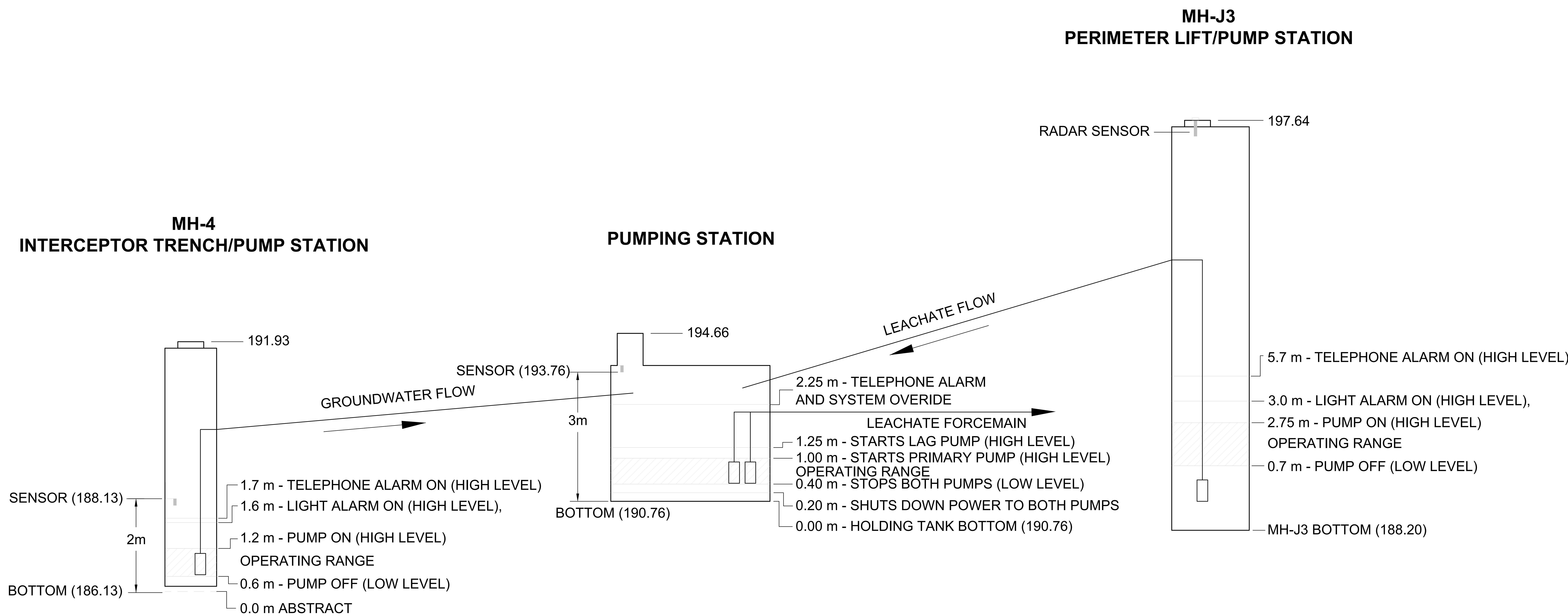
LEACHATE COLLECTION SYSTEM

2023 ANNUAL MONITORING REPORT PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY

Peterborough County peterborough

WSP
4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM

Plotted: May 10, 2024 – 2:24pm File: C:\Users\Jaclyn.Craig\WSP O365\111-53296 Peterborough Landfill (all LF Engineering phases) – Project Folders\04. Technical\0 – Monit. and Rprt\AMR\2023\3–Figures\11 – Figure C.1 – LCS.dwg



NOTES:
1. ONCE ALARM HAS BEEN ACTIVATED IT CAN ONLY BE DEACTIVATED BY RESETTING THE MILLTRONICS CONTROLLER.
2. MH4 AND PUMP STATION HAVE ULTRA SONIC LEVEL SENSORS. RADAR SENSOR INSTALLED IN MH-J3 IN JUNE 2007.
3. DRAWING BASED ON CRA 2007 ANNUAL MONITORING REPORT, FIGURE E.1.

D/M/Y	DESCRIPTION	BY	APPROVED
15/05/2024	2023 ANNUAL MONITORING REPORT	JVC	J J O

REVISION / ISSUE

4 HUGHSON STREET SOUTH, SUITE 300
HAMILTON (ONTARIO) CANADA L8N 3Z1
TEL.: 905-529-4414 | FAX:905-521-2699 | WWW.WSP.COM

AUTOMATED LEACHATE PUMPING SYSTEM DIAGRAM SFA

2023 ANNUAL MONITORING REPORT PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY

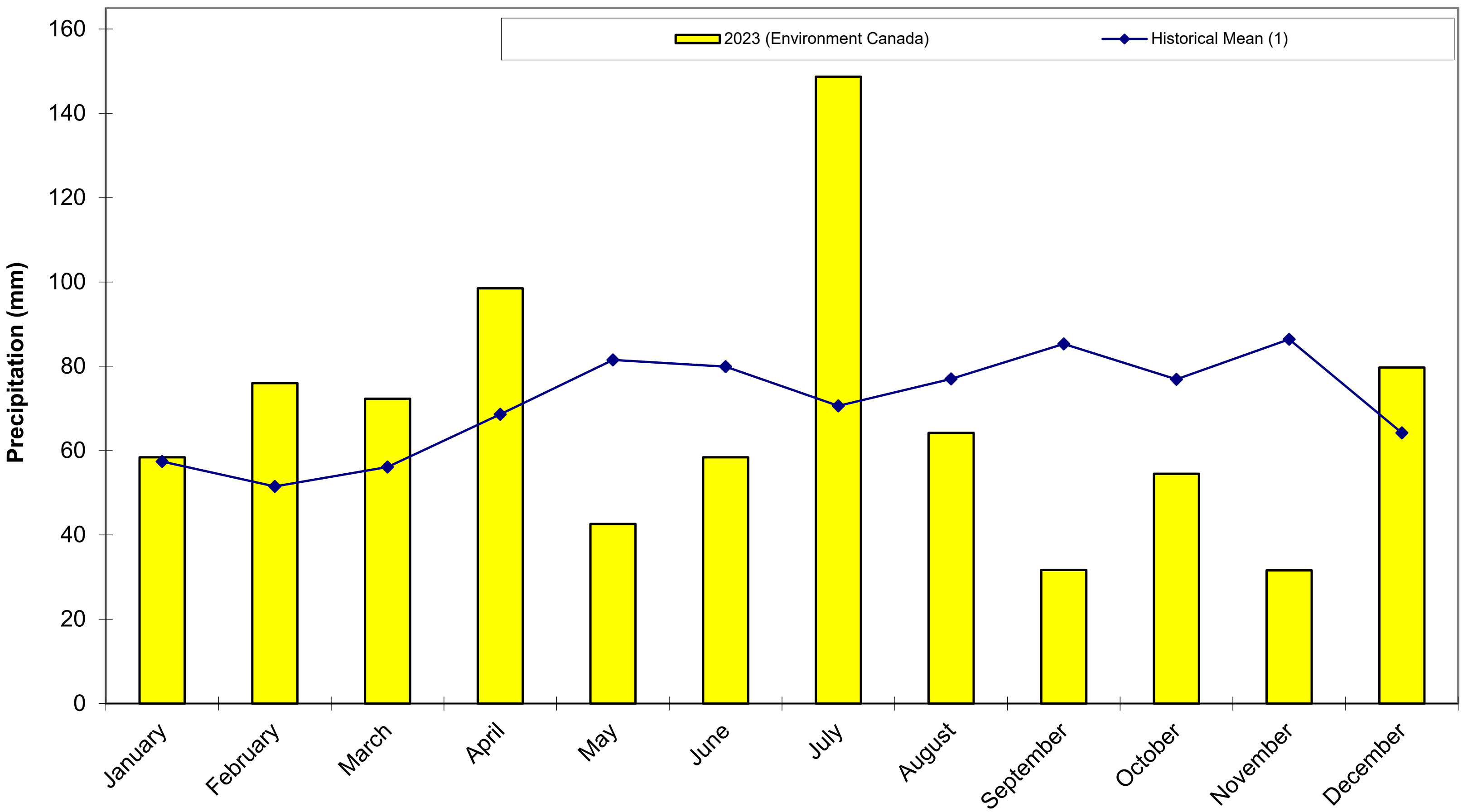
DWN BY: JVC
CHK BY: JJO
DATE: MAY 2024
SCALE: NOT TO SCALE

COUNTY OF PETERBOROUGH / CITY OF PETERBOROUGH

PROJECT NO. CA0008825.1917

FIGURE
C.2

Figure C.3
Precipitation Comparison – Peterborough Airport (2023) vs. Historical Mean
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility



Notes:
(1) Historical monthly averages are obtained from Environment Canada, Canadian Climate Normals from 1981-2010 Peterborough Airport Station Data.

FIGURE C.4
COMPARISON OF WEEKLY PRECIPITATION TO LEACHATE DISCHARGED TO FORCEMAIN

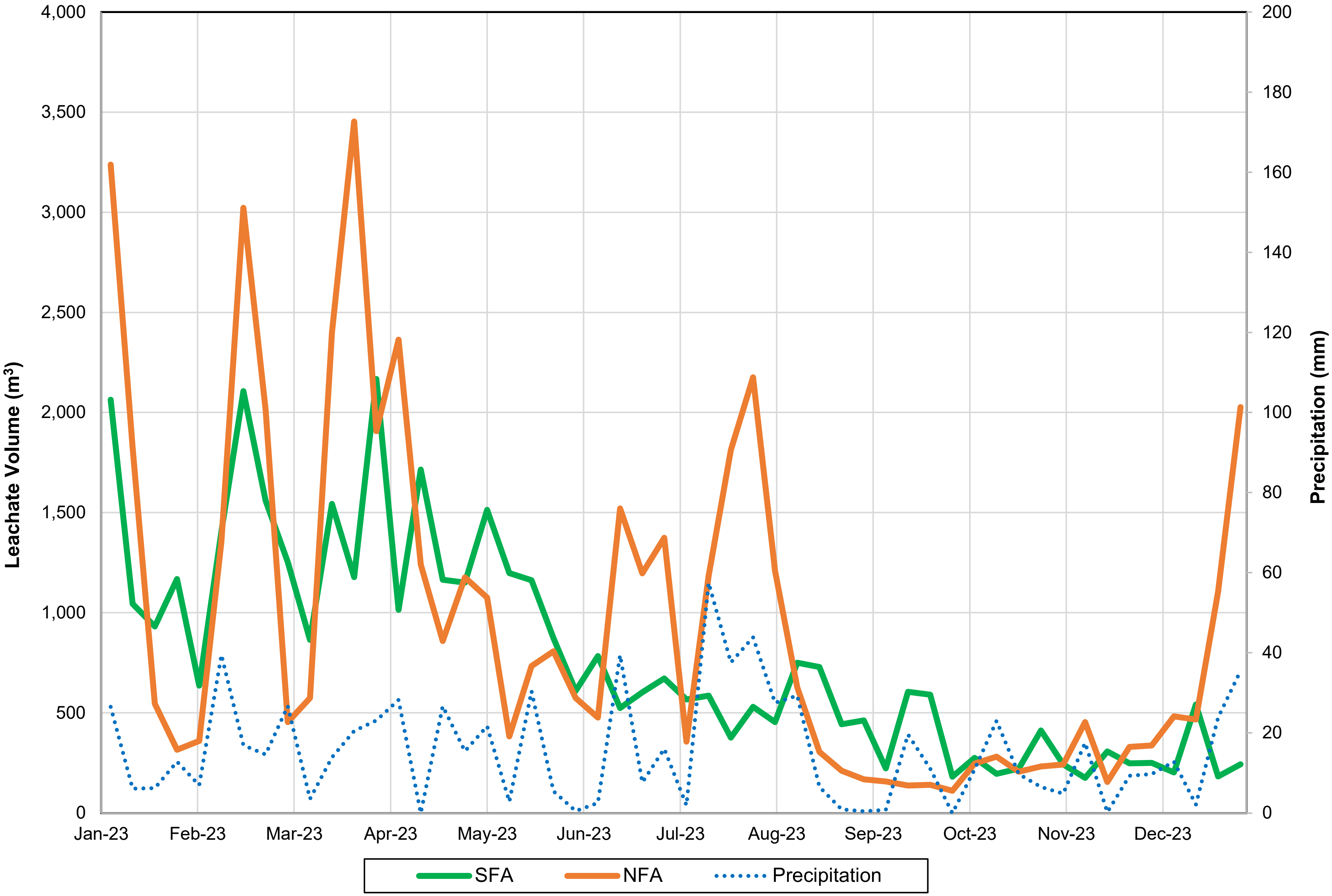


TABLE C.1
Historical Leachate/Groundwater Volumes
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

	Averaged Annual Trucking Records[1]	Metered Truck Records		Forcemain Records												
Month	**1987 to 1990 (m^3)**	**1991 (m^3)**	**1992 (m^3)**	**1993 (m^3)**	**1994 (m^3)**	**1995 (m^3)**	**1996 (m^3)**	**1997 (m^3)**	**1998 (m^3)**	**1999 (m^3)**	**2000 (m^3)**	**2001 (m^3)**	**2002 (m^3)**	**2003 (m^3)**	**2004 (m^3)**
January	2,233	6,236	4,397	9,601	2,337	8,923	9,283	7,879	6,336	4,365	4,159	6,501	4,094	1,924	5,724
February	2,158	6,502	3,257	4,246	3,813	6,083	10,583	6,233	5,058	6,054	4,004	4,209	3,199	1,481	3,476
March	3,872	9,362	7,114	9,622	5,800	10,949	9,412	8,476	12,921	6,910	5,116	6,955	10,648	3,374	8,585
April	3,795	10,253	7,094	8,231	6,353	5,423	14,116	11,477	6,586	4,821	6,569	12,412	11,533	10,859	4,443
May	3,430	5,445	4,768	5,901	5,708	8,312	8,088	8,098	3,938	3,304	7,841	4,974	8,432	6,616	9,120
June	2,659	3,573 [2]	3,502	6,162 [3]	6,279	7,045	9,349	5,976	4,782	3,398	10,930	4,969	6,405	5,596	5,775
July	2,024	2,924	2,551	4,084	5,310	4,702	7,946	4,385	3,667	2,941	6,880	3,948	5,339	1,967	6,481
August	1,643	1,789	3,499	2,900	3,420	4,154	3,781	4,511 [5]	3,788	2,477	4,362	2,372	5,238	3,702	6,185
September	1,798	1,469	4,463	2,174	4,135	9,062	6,447	4,066	4,133	3,215	5,800	951	2,688	3,220	7,489
October	3,766	1,693	3,944	3,018 [4]	1,777	7,748	6,708	3,629	2,164	4,691	3,590	7,379	2,851	5,660	3,701
November	4,900	1,682	8,332	3,018 [4]	3,820	11,483	4,583	4,383	2,145	9,257	3,240	3,465	4,974	3,087	3,849
December	4,135	3,273	6,330	5,303	7,330	8,866	7,789	4,777	5,703	6,760	4,602	11,111	5,057	10,281	7,617
Totals	**36,413**	**54,201**	**59,251**	**64,260**	**56,081**	**92,750**	**98,085**	**73,890**	**61,221**	**58,193**	**67,093**	**69,246**	**70,455**	**57,766**	**72,443**

	Forcemain Records														
Month	**2005 (m^3)**	**2006 (m^3)**	**2007 (m^3)**	**2008[7] (m^3)**	**2009 (m^3)**	**2010 (m^3)**	**2011 (m^3)**	**2012 (m^3)**	**2013 (m^3)**	**2014 (m^3)**	**2015 (m^3)**	**2016 (m^3)**	**2017 (m^3)**	**2018 (m^3)**	**2019 (m^3)**
January	11,174	15,846	6,316	13,120	4,713	5,217	5,509	11,387	9,959	5,537	4,418	9,595	11,314	6,673	4,267
February	5,391	10,819	4,465	10,530	6,900	3,803	6,315	7,641	5,252	2,352	3,252	10,849	8,584	9,565	3,531
March	4,603	8,815	6,831	13,215	12,757	8,064	13,505	10,130	8,449	8,089	6,035	12,459	12,628	5,778	4,966
April	11,658	7,755	8,659	12,787	10,422	5,485	7,697	9,113	12,462	18,568	11,017	12,187	13,722	13,584	10,671
May	5,818	8,063	5,881	9,384	8,552	2,966	8,623	5,675	6,760	9,153	4,605	7,065	12,004	5,943	14,262
June	3,387	4,672	2,605	7,851	6,320	4,292	10,615	5,410	6,274	5,150	8,720	4,329	8,795	3,572	8,061
July	1,908	4,445	4,257	6,295	3,927	2,720	7,679	4,734	4,317	3,853	4,851	3,016	12,832	2,410	3,614
August	2,375	1,814	2,750	6,564	3,629	2,607	12,983	3,147	4,301	4,448	4,034	2,610	7,204	3,410	2,836
September	1,605	3454 [6]	2,843	7,910	2,427	2,239	6,225	4,230	3,633	3,379	3,472	2,180	4,251	2,714	1,898
October	2,611	4249 [6]	2,784	4,907	4,188	1,901	10,075	5,550	4,894	6,706	3,326	1,859	4,368	2,003	2,780
November	10,607	7475 [6]	4,083	5,624	5,060	2,529	6,693	5,281	8,324	8,520	3,876	1,937	6,114	5,711	4,496
December	15,034	4555 [6]	7,221	6,340	11,033	8,909	12,063	8,058	3,697	5,349	6,722	2,728	3,397	6,827	6,184
Totals	**76,172**	**81,963**	**58,696**	**104,527**	**79,928**	**50,733**	**107,981**	**80,355**	**78,322**	**81,104**	**64,327**	**70,813**	**105,213**	**68,190**	**67,566**

	Forcemain Records			
Month	2020 (m^3)	2021 (m^3)	2022[(8)] (m^3)	2023 (m^3)
January	10,205	4,983	4,340	11,456
February	5,731	2,738	5,730	13,579
March	12,540	6,661	7,690	13,762
April	8,558	6,302	7,585	11,663
May	5,979	4,623	3,728	8,590
June	3,739	2,700	4,369	7,715
July	2,851	3,822	1,911	7,954
August	2,927	2,824	1,706	4,735
September	2,537	6,523	1,997	2,440
October	2,382	6,331	2,321	2,256
November	2,577	5,471	1,744	2,249
December	7,341	9,319	4,483	5,328
Totals	**67,366**	**62,297**	**47,603**	**91,727**

Notes:
(1) Averaged monthly trucking records through 4 year period as measured by the truckload.
(2) Leachate trucking flowmeter installed at loading station.
(3) Leachate forcemain installation and commissioning.
(4) Leachate volumes for October and November were prorated over a two month period.
(5) Installation of replacement flow meter.
(6) Flow estimated due to broken flow meter (September 14, 2006).
(7) Flowmeter malfunction in November 2008, flow estimated by using the average from October and December 2008.
(8) Flow estimated in April and September 2022 in the SFA due to SCADA system malfunction. Volumes were estimated based on 3 year average from 2019-2021.

FIGURE C.5
Historical Annual Leachate Volumes
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

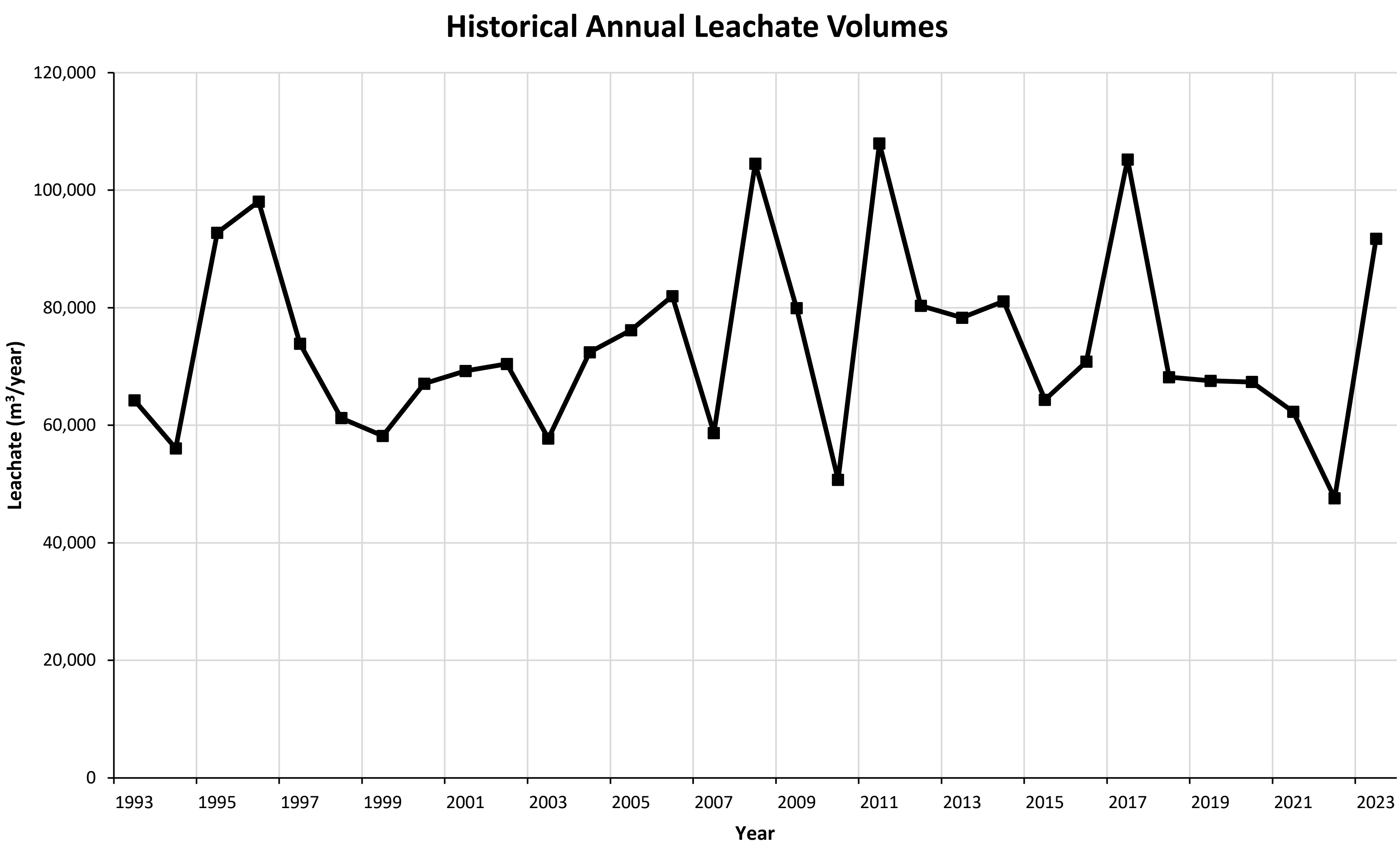


Table C.2
Leachate Production Summary - 2023
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Landfill Area ID	Area (m^2)	Leachate Produced From Infiltration (m^3)	Leachate Produced from Groundwater Inflow (m^3)	Total Leachate Production (m^3)
Cell 1 (SFA)	181,759	19,975	-	41,175
Uphill Edge of Landfill (1)	-	-	4,500	
Influx of Groundwater (2)	-	-	500	
Interceptor Trench (3)	-	-	1,200	
Interceptor Trench (4)	-	-	15,000	
Cell 2 (5)	32,000	39,104	4,349	50,552
Cell 3 (6)	28,000		2,682	
Cell 4 (7)	34,726		4,417	
Totals	**276,485**	**59,079**	**32,648**	**91,727**

NOTES
(1) Includes horizontal flow into Cell 1-South and part of Cell 1-North.
(2) Includes upflow into former Cell I and J.
(3) Includes groundwater flow into the trench from bedrock.
(4) Includes groundwater flow into trench shortcircuiting from overburden unit and surface water.
(5) Areas of Cell 2 were placed under final cover in late 2015.
(6) Cell 3 became operational in December 2015.
(7) Cell 4 became operational on December 22, 2022.

Table C.3
Leachate Chemical Results - Holding Tanks
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	BY-LAW [1]	SFA											
			Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Oct-20	Apr-21	Sep-21	Mar-22	Oct-22	Apr-23	Oct-23
Alkalinity	mg/L			2210		2110		1720		1720		1860		2060
Biochemical Oxygen Demand	mg/L	300	20.6	15.4	28.1	29.9	21.4	19.1	20.8	25.6	29.3	20.6	22.9	36.4
Bromide	mg/L			2.8		2.8		2.2		2.0		2.5		3.5
Carbonaceous Biochemical Oxygen Demand	mg/L			17.8		16.3		11.8		12.7		9.7		17.4
Chloride	mg/L	1500	314	635	230	581	336	495	247	348	290	557	179	557
Chemical Oxygen Demand	mg/L		280	300	190	440	310	270	230	270	240	320	200	400
Conductivity - field	µS/cm		4000	5820	3460	6040	4220	4430	3500	4100	3830	4940	3220	4570
Fluoride	mg/L	10	<1	<1	<0.1	<1	<1	<1	<0.1	<1	0.4	<1	<1	<1
pH	units	6.0-10.5	6.63	7.19	6.72	7.24	6.82	6.72	6.76	7.1	6.71	7.1	6.71	7.03
pH - field	units		6.43	7.06	6.65	6.99	6.72	6.75	6.76	6.25	6.56	6.83	6.5	6.8
Sodium	mg/L			544		485	6	5	5	3		416		492
Sulphate	mg/L	1500	46.7	17.3	33.3	18.5	13.6	35.2	28.9	24.5	16.1	19.1	20.7	19.6
Temperature - field	°C		9.9	12.8	9.2	13.7	10.1	11.6	9.2	14.0	8.3	14.1	9.6	13.6
Total Kjeldahl Nitrogen	mg/L	100	215	331	144	300	206	201	184	264	213	247	158	275
Total Suspended Solids	mg/L	350	40	25	30	36.7	30	31	33.3	29.3	46.7	32.0	50	56.7
Aluminum	mg/L	50	0.09	0.07	0.04	0.07	0.046	0.052	0.057	0.05	0.054	0.046	0.061	0.098
Antimony	mg/L	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Arsenic	mg/L	1	<0.005	0.008	<0.005	0.007	<0.005	<0.005	<0.005	0.009	<0.005	<0.005	<0.005	<0.005
Bismuth	mg/L	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	mg/L	0.7	<0.001	<0.001	<0.001	<0.001	0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	3	0.017	0.039	0.01	0.04	0.02	0.025	0.014	0.018	0.015	0.021	0.01	0.028
Cobalt	mg/L	5	0.007	0.013	0.005	0.013	0.007	0.007	0.006	0.007	0.006	0.009	0.004	0.011
Copper	mg/L	2	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide	mg/L	2	<0.01	0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Iron	mg/L	50	13.1	6.87	16	11.7	17.9	10.7	18.3	10.6	16.9	9.79	16.7	17.5
Lead	mg/L	1	0.0041	<0.01	<0.01	0.02	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	mg/L	5	0.647	0.425	0.75	0.499	0.696	0.452	0.677	0.6	0.662	0.396	0.614	0.406
Mercury	µg/L	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1
Molybdenum	mg/L	5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nickel	mg/L	3	0.024	0.047	0.016	0.051	0.027	0.033	0.023	0.025	0.024	0.038	0.015	0.047
Phosphorus	mg/L	10	0.86	1.67	0.86	1.65	1.46	0.9	1.05	0.98	0.99	0.85	1.15	2.43
Potassium	mg/L			159		160		106		97.2		137		165
Selenium	mg/L	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver	mg/L	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	mg/L			0.92		0.88		0.84		0.77		0.98		0.91
Tin	mg/L	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Titanium	mg/L	5	0.018	0.041	0.009	0.036	0.022	0.022	0.019	0.018	0.007	0.019	0.013	0.039
Vanadium	mg/L	5	0.003	0.007	0.002	0.006	0.003	0.004	0.003	0.004	<0.002	0.003	0.002	0.005
Zinc	mg/L	2	0.04	0.01	0.08	<0.01	0.02	0.02	0.02	<0.01	<0.01	0.06	0.01	0.01
Zirconium	mg/L	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Oil & Grease - anim/veg	mg/L	150	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Oil & grease - mineral	mg/L	15	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Oil and Grease - total	mg/L				<2	<2	<2	<2	<2	<2	4	<2	5	<2

Table C.3
Leachate Chemical Results - Holding Tanks
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	BY-LAW [1]	SFA											
			Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Oct-20	Apr-21	Sep-21	Mar-22	Oct-22	Apr-23	Oct-23
1,1,1,2-Tetrachlorethane	µg/L													
1,1,1-Trichloroethane	µg/L													
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<1	<0.5	0.8	1	0.5	<0.5	0.6	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L		0.6	<0.5	<0.5	<0.5	0.8	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethylene	µg/L													
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	80	5.7	5.9	6	4.8	7.2	7.5	5	4.1	6.7	4.2	5.1	5.7
Acetone	µg/L													
Benzene	µg/L	10	6.5	<0.5	5.8	<0.5	7.7	<0.5	0.7			<0.5	1.9	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L		15.3	0.9	11.2	<0.5			2.3	2	4.6	2	5.6	3.6
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L	40	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L	4000	<0.5	<0.5	<0.5	<0.5	<0.5						<0.5	<0.5
cis-1,3-Dichloropropylene	µg/L													
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	1000	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	160	7	<0.5	11.7	<0.5	5.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L		30.8	<0.5	43.8	<0.5	29.7	0.6	0.9	1	2.4	<0.5	6.9	0.7
Methyl Ethyl Ketone	µg/L													
Methyl Isobutyl Ketone	µg/L													
Methyl t-Butyl Ether	µg/L													
nonyl-Phenol ethoxylates	µg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
nonyl-Phenols	µg/L	1	1.9	1.5	2.1	1.7	<2	<3	2.8	<3	3	2	<4	2.7
o-Xylene	µg/L		7.1	1.1	10	<0.5	13.5	8.8	3	1.2	4.6	<0.5	3.9	0.5
Phenols - total	µg/L	1000	4	5	9	9	6	5	5	3	5	4	<2	<2
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	400	2.3	<0.5	5.2	<0.5	5.4	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5
trans-1,2-Dichloroethylene	µg/L	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	µg/L													
Trichloroethylene	µg/L	400	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	2	0.2	<0.2	0.5	<0.2	0.8	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	1400	37.9	1.1	53.8	<0.5	43.2	9.4	3.9	2.1	7	<0.5	10.9	1.2

NOTES: 1) By-law criteria is based on City of Peterborough By-law 15-075 to regulate discharge.
2) Blank indicates parameter not analysed.
3) SFA - South Fill Area Holding Tank
4) NFA - North Fill Area Holding Tank

Table C.3
Leachate Chemical Results - Holding Tanks
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	BY-LAW [1]	NFA											
			Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Oct-20	Apr-21	Sep-21	Mar-22	Oct-22	Apr-23	Oct-23
Alkalinity	mg/L			1590		2320		2450		2250		2900		716
Biochemical Oxygen Demand	mg/L	300	10	17.2	900	428	180	333	9.4	22.8	26.6	26.0	126	17.7
Bromide	mg/L			1.9		2.6		2.7		2.0		5.9		<2.0
Carbonaceous Biochemical Oxygen Demand	mg/L			8.1		415		304		11.1		19.1		9.4
Chloride	mg/L	1500	418	737	540	852	653	778	563	718	514	1430	399	316
Chemical Oxygen Demand	mg/L		150	1010	1510	1110	630	900	310	500	180	790	580	220
Conductivity - field	µS/cm		3770	5640	5580	7510	5680	7260	5400	6460	4760	10600	4260	2420
Fluoride	mg/L	10	<1	<1	5.8	<20	3.88	9.2	<0.1	<1	0.3	<1	<1	<1
pH	units	6.0-10.5	7.52	7.79	7.73	7.81	7.86	7.89	7.8	7.9	7.96	8.15	7.46	7.68
pH - field	units		7.48	7.57	7.64	7.49	7.75	7.99	7.72	7.68	7.74	7.86	7.19	7.49
Sodium	mg/L			698		882	171	46	6	9		1130		293
Sulphate	mg/L	1500	438	554	130	492	210	293	373	222	292	581	310	255
Temperature - field	°C		16	16.6	20.3	23.2	22.1	23.4	23	24.3	22.5	25.2	17.1	19.5
Total Kjeldahl Nitrogen	mg/L	100	89.2	182	62.1	259	196	262	187	377	191	467	160	93.5
Total Suspended Solids	mg/L	350	8	8.5	32	225	20	9	16.7	26.7	10	30	45	9.3
Aluminum	mg/L	50	0.06	0.13	0.4	3.01	0.333	0.257	0.116	0.319	0.102	0.211	0.225	0.17
Antimony	mg/L	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Arsenic	mg/L	1	0.006	0.01	0.016	0.035	0.014	0.024	0.02	0.047	0.017	0.038	0.013	0.013
Bismuth	mg/L	5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Cadmium	mg/L	0.7	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	3	0.019	0.044	0.066	0.134	0.061	0.071	0.06	0.095	0.054	0.181	0.07	0.04
Cobalt	mg/L	5	0.005	0.009	0.009	0.015	0.008	0.011	0.009	0.012	0.009	0.024	0.009	0.007
Copper	mg/L	2	0.005	<0.005	0.005	0.017	0.014	0.016	0.02	0.007	0.009	0.022	0.005	0.014
Cyanide	mg/L	2	<0.01	0.02	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01
Iron	mg/L	50	1.42	1.44	4.23	7.27	0.74	0.86	1.33	1.69	0.64	1.08	1.22	1.63
Lead	mg/L	1	0.0032	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Manganese	mg/L	5	0.207	0.319	1.08	1.27	0.258	0.179	0.254	0.368	0.24	0.198	0.453	0.214
Mercury	µg/L	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1
Molybdenum	mg/L	5	<0.005	<0.005	<0.005	0.01	0.008	0.012	0.012	<0.005	<0.005	0.015	<0.005	<0.005
Nickel	mg/L	3	0.04	0.073	0.041	0.102	0.054	0.073	0.057	0.065	0.05	0.139	0.05	0.036
Phosphorus	mg/L	10	0.35	1.16	2.26	2.59	1.14	1.52	1.29	2.19	1.23	3.16	1.66	0.82
Potassium	mg/L			196		249		265		212		392		101
Selenium	mg/L	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
Silver	mg/L	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Strontium	mg/L			1.66		1.64		1.23		1.15		1.41		0.99
Tin	mg/L	5	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Titanium	mg/L	5	0.016	0.04	0.045	0.206	0.047	0.042	0.035	0.068	0.029	0.115	0.043	0.043
Vanadium	mg/L	5	0.006	0.018	0.016	0.038	0.016	0.014	0.012	0.023	0.011	0.036	0.012	0.01
Zinc	mg/L	2	0.03	0.02	0.26	0.17	0.05	0.18	0.07	0.03	0.03	0.07	0.04	0.02
Zirconium	mg/L	5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.03	<0.01	<0.01
Oil & Grease - anim/veg	mg/L	150	<4	<4	7	<4	<4	5	<4	<4	<4	<4	<4	<4
Oil & grease - mineral	mg/L	15	<4	<4	6	<4	<4	<4	<4	<4	<4	<4	<4	<4
Oil and Grease - total	mg/L				13	5	<2	5	<2	<2	3	<2	6	<2

Table C.3
Leachate Chemical Results - Holding Tanks
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

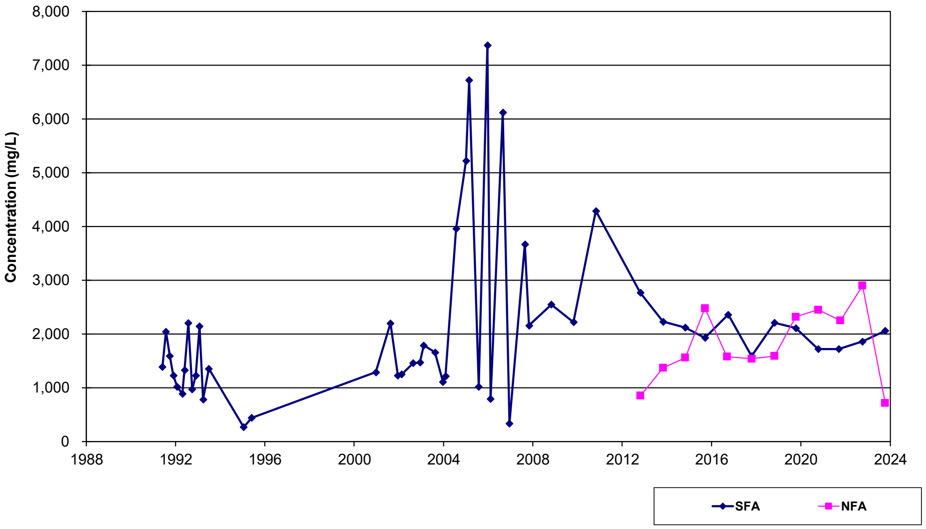
PARAMETER	UNITS	BY-LAW [1]	NFA											
			Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Oct-20	Apr-21	Sep-21	Mar-22	Oct-22	Apr-23	Oct-23
1,1,1,2-Tetrachlorethane	µg/L													
1,1,1-Trichloroethane	µg/L													
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L		<0.5	<0.5	0.8	<0.5	<0.5	0.7	0.6	<0.5	<0.5	<0.5	1.4	<0.5
1,2-Dichloroethylene	µg/L													
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	80	<0.5	<0.5	<0.5	<0.5	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	3	<0.5
Acetone	µg/L													
Benzene	µg/L	10	<0.5	<0.5	<0.5	<0.5	0.6	0.6	<0.5			<0.5	4	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L	40	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L	4000	<0.5	<0.5	<0.5	<0.5	<0.5						0.6	<0.5
cis-1,3-Dichloropropylene	µg/L													
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	1000	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5
Ethyl Benzene	µg/L	160	<0.5	<0.5	0.7	<0.5	1	0.9	<0.5	0.7	<0.5	<0.5	15.7	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L		<0.5	<0.5	1.4	0.7	2.7	2.1	<0.5	1.4	<0.5	0.7	37.6	<0.5
Methyl Ethyl Ketone	µg/L													
Methyl Isobutyl Ketone	µg/L													
Methyl t-Butyl Ether	µg/L													
nonyl-Phenol ethoxylates	µg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
nonyl-Phenols	µg/L	1	<1	<1	3	1.6	<2	<3	1.2	<3	1	2	<4	<1
o-Xylene	µg/L		<0.5	<0.5	0.7	<0.5	1.4	1.2	<0.5	0.7	<0.5	<0.5	16.9	<0.5
Phenols - total	µg/L	1000	1	3	130	74	171	46	6	9	9	9	91	<2
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.8	<0.5
Tetrachloroethylene	µg/L	16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	400	<0.5	<0.5	2.5	<0.5	1.6	2.3	<0.5	<0.5	<0.5	<0.5	22.7	<0.5
trans-1,2-Dichloroethylene	µg/L	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropylene	µg/L													
Trichloroethylene	µg/L	400	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2
Xylenes - total	µg/L	1400	<0.5	<0.5	2	1	4.1	3.3	0.8	2.1	<0.5	1	54.5	<0.5

NOTES:
1) By-law criteria is based on City of Peterborough By-law 15-075 to regulate discharge.
2) Blank indicates parameter not analysed.
3) SFA - South Fill Area Holding Tank
4) NFA - North Fill Area Holding Tank

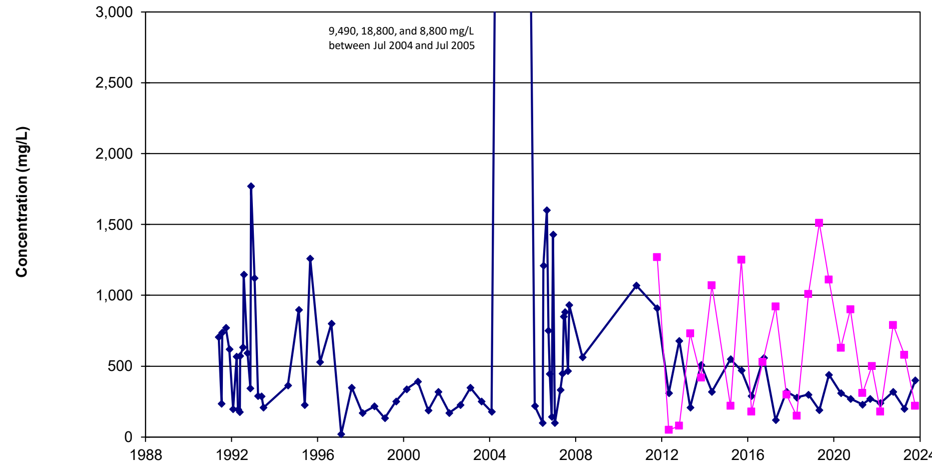
Figure C.6

Time Concentration Graphs - Holding Tanks

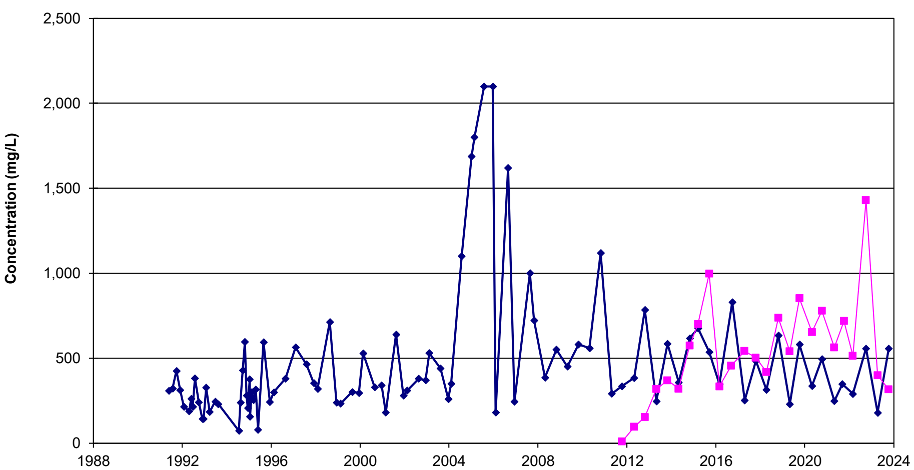
ALKALNITY



CHEMICAL OXYGEN DEMAND



CHLORIDE



IRON

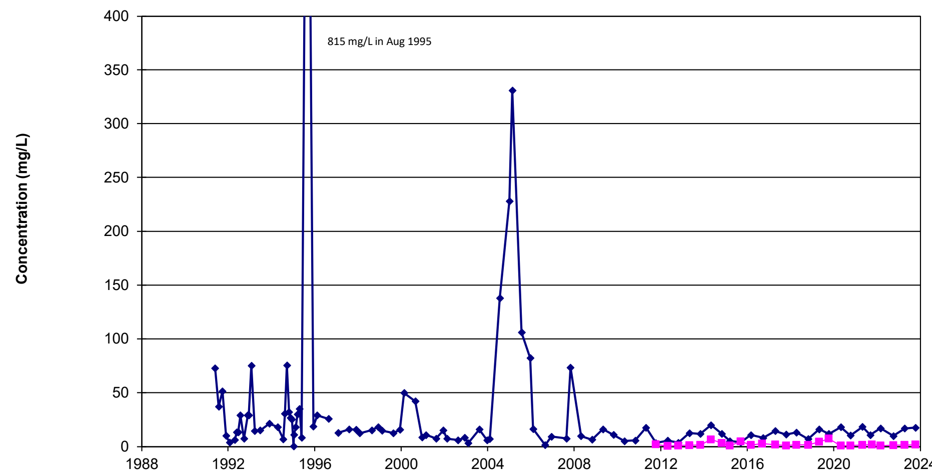
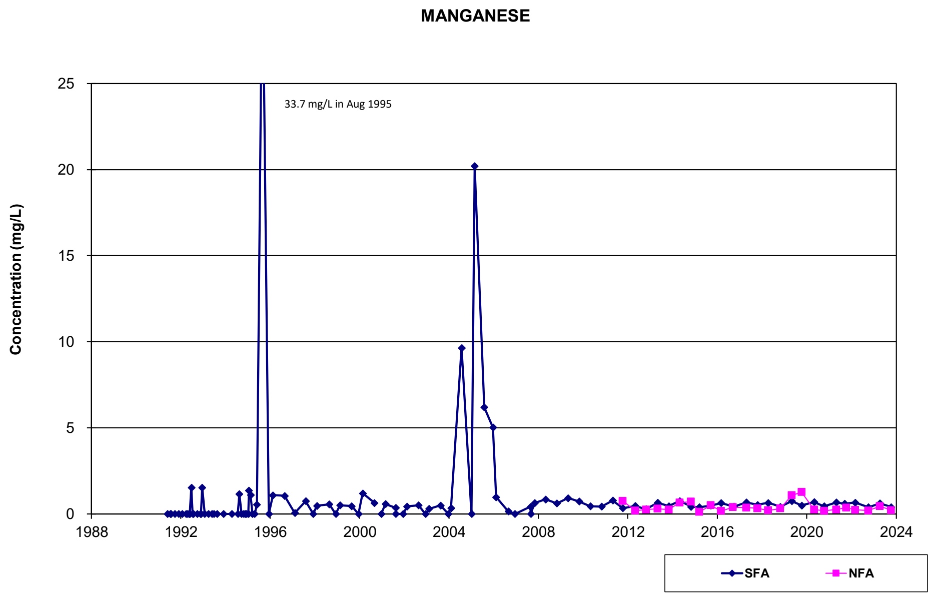
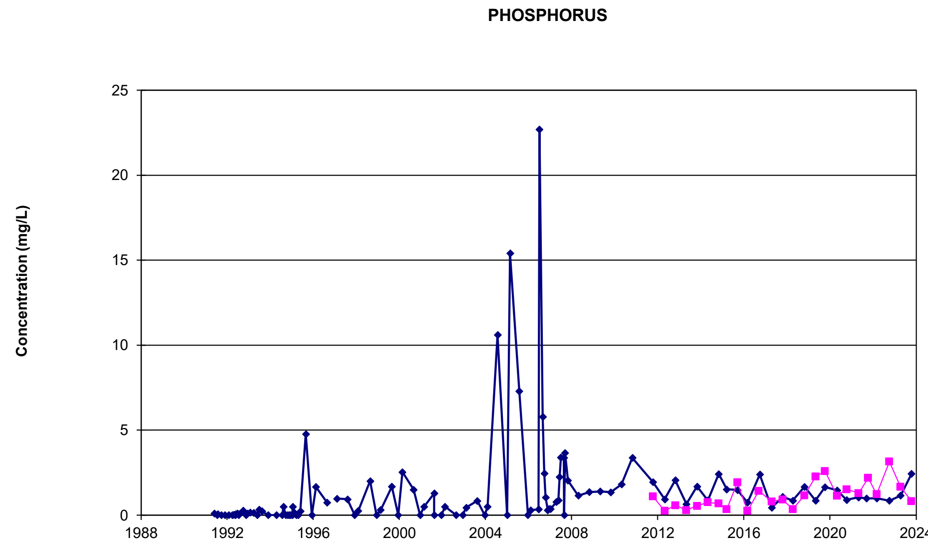
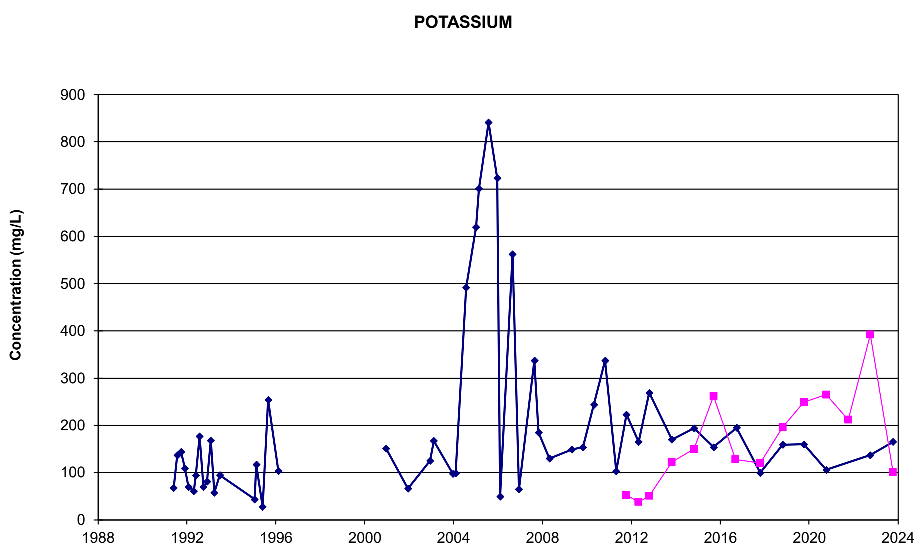


Figure C.7

Time Concentration Graphs - Holding Tanks







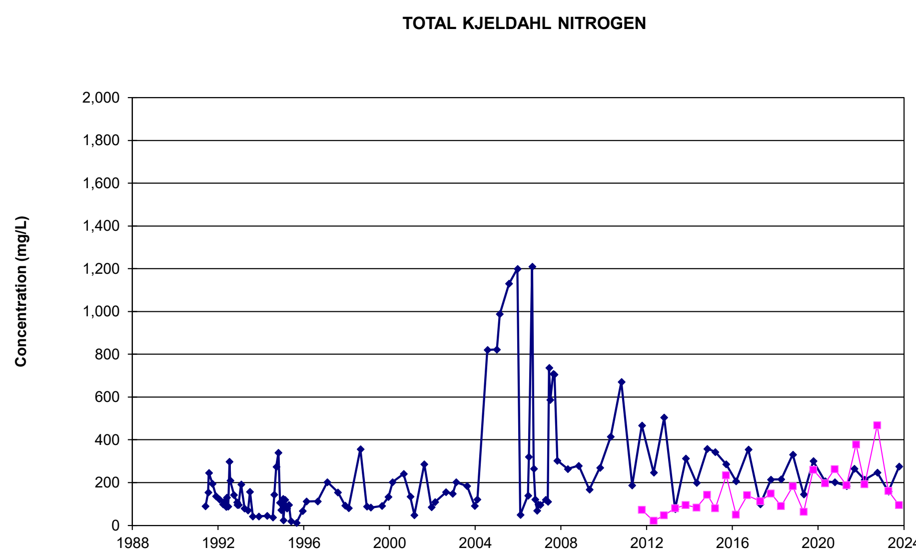


Table C.4
Leachate Chemical Results - Maintenance Hole T6-94
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	Oct-18	Oct-19	Oct-20	Sep-21	Oct-22	Oct-23
Alkalinity	mg/L	3600	3290	2970	2610	2920	2680
Ammonia	mg/L	602	493	414	368	414	402
Biochemical Oxygen Demand	mg/L	130	38.1	29.2	40.1	28	34.9
Bromide	mg/L	3.1	2.8	2.9	<2.0	3.3	3.3
Carbonaceous Biochemical Oxygen Demand	mg/L	30.4	25.5	19.1	19.2	21.7	19.9
Chloride	mg/L	866	710	576	505	169	560
Conductivity - field	µS/cm	8700	8320	6820	6160	7170	5410
Iron	mg/L	5.22	7.73	6.17	10.4	12.0	17.1
pH - field	units	7.28	7.01	6.98	6.71	7.02	7.73
Phenols - total	µg/L	8	10	6	7	6	2
Potassium	mg/L	275	256	209	187	220	220
Sodium	mg/L	812	751	513	448	529	529
Strontium	mg/L	1.27	1.19	1.11	1.16	1.20	1.12
Temperature - field	°C	11.4	13.8	11.3	12.8	13.2	13.6
Total Kjeldahl Nitrogen	mg/L	579	490	409	457	437	415
Total Suspended Solids	mg/L	14	13.3	<2.0	21	36	141

Table C.5
Leachate Chemical Results - Refuse Monitoring 23 B
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	Apr-18	Oct-18	Apr-19	Oct-19	May-20	Sep-20
Alkalinity	mg/L	446		809		1490	
Aluminum	mg/L		0.03		0.04		0.032
Ammonia	mg/L	18.2		74.3		60.3	
Anion sum	meq/L	11.4		18.8		35.8	
Arsenic	mg/L	0.007	<0.005	0.0009		0.0011	
Barium	mg/L		0.437		0.545		0.655
Beryllium	mg/L		<0.001		<0.001		<0.0005
Bicarbonate	mg/L	445		808		1490	
Boron	mg/L		1.48		1.52		1.58
Cadmium	mg/L		0.001		<0.001		<0.0001
Calcium	mg/L	104	170	161		180	
Carbonate	mg/L	<1		<1		1	
Cation sum	meq/L	11.1		21.6		32.4	
Chemical Oxygen Demand	mg/L	40		50		180	
Chloride	mg/L	58.9		95.3		244	
Chromium	mg/L		0.002		0.001		0.0059
Cobalt	mg/L		0.008		0.007		0.0081
Conductivity	µS/cm	1120		1900		4000	
Conductivity - field	µS/cm	1050	4720	1970	4830	3480	
Copper	mg/L		<0.005		0.016		<0.0005
Dissolved Organic Carbon	mg/L	12.8		24		92.4	
Dissolved Oxygen - field	mg/L	4.89	1.96	1.58	1.34	1.39	
Hardness	mg/L	352		574		869	
Ion Percentage	%	1.35		6.88		4.93	
Iron	mg/L	3.02	30.3	9.56		27.9	
Lead	mg/L		<0.01		0.01		<0.0005
Magnesium	mg/L	22.4		41.7		102	
Manganese	mg/L	0.072	0.352	0.254		0.28	
Molybdenum	mg/L		<0.005		<0.005		0.0007
Nickel	mg/L		0.03		0.035		0.026
Nitrate	mg/L	9		<0.5		<0.5	
Nitrite	mg/L	0.6		<0.5		<0.5	
Oxydation Reduction Potential	mV	42.6	-102.2	-46.2	-104.6	-46.8	
pH	units	7.14		6.94		6.67	
pH - field	units	7.01	6.6	6.64	6.72	6.96	
Phenols - total	µg/L	<1		3		4	
Phosphate	mg/L	0.02	0.45	<0.02		0.15	
Phosphorus	mg/L	0.04		0.06		0.11	
Potassium	mg/L	21.5		37.3		99.7	
Sodium	mg/L	50.5	224	86.7		185	
Sulphate	mg/L	21.4		21.6		3.5	
Temperature - field	°C	9.5	12.5	11.3	13.1	12.5	
Total Dissolved Solids	mg/L	580		880		1570	
Total Kjeldahl Nitrogen	mg/L	31.6		76.6		122	
Zinc	mg/L		<0.01		<0.01		0.0028

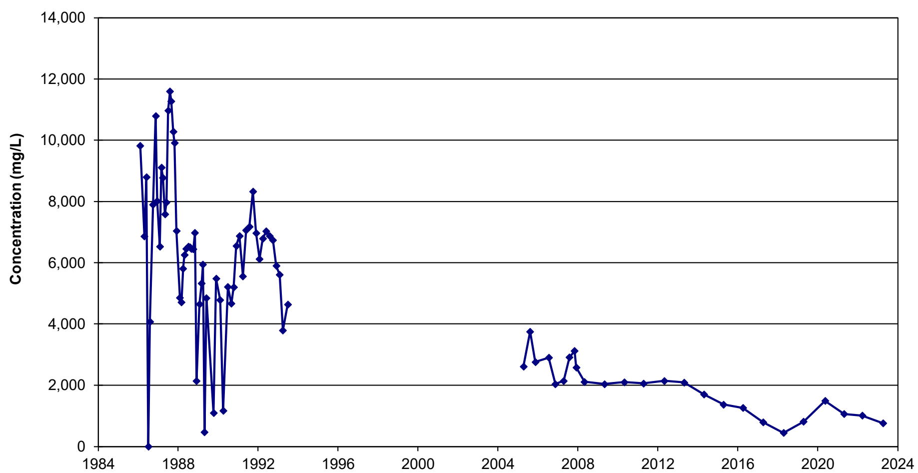
Table C.5
Leachate Chemical Results - Refuse Monitoring 23 B
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	Apr-21	Oct-21	Mar-22	Sep-22	Apr-23	Sep-23
Alkalinity	mg/L	1060		1010		756	
Aluminum	mg/L		<0.025		<0.025		<0.025
Ammonia	mg/L	78.1		84.3		42.1	
Anion sum	meq/L	24.7		23.4		16.8	
Arsenic	mg/L	0.0008		0.0006		<0.0005	
Barium	mg/L		0.414		0.587		0.51
Beryllium	mg/L		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L	1060		1010		756	
Boron	mg/L		1.05		1.39		1.22
Cadmium	mg/L		<0.0001		<0.0001		<0.0001
Calcium	mg/L	182		133		163	
Carbonate	mg/L	<1		<1		<1	
Cation sum	meq/L	25.6		22.7		18	
Chemical Oxygen Demand	mg/L	100		80		50	
Chloride	mg/L	136		130		62.6	
Chromium	mg/L		0.0031		0.0045		0.004
Cobalt	mg/L		0.0039		0.0069		0.0058
Conductivity	µS/cm	2450		2270		1480	
Conductivity - field	µS/cm	2520	2660	2160	4320	1620	3310
Copper	mg/L		0.0005		<0.0005		<0.0005
Dissolved Organic Carbon	mg/L	28.3		24.5		16.2	
Dissolved Oxygen - field	mg/L	2.45	2.27	1.13	2.44	0.85	2.77
Hardness	mg/L	706		543		567	
Ion Percentage	%	1.79		1.56		3.4	
Iron	mg/L	28.1	24.4	3.87		7.22	
Lead	mg/L		<0.0005		<0.0005		<0.0005
Magnesium	mg/L	61.2		51.3		38.9	
Manganese	mg/L	0.48		0.245		0.394	
Molybdenum	mg/L		<0.0005		<0.0005		0.0005
Nickel	mg/L		0.014		0.018		0.014
Nitrate	mg/L	<0.5		<0.5		0.17	
Nitrite	mg/L	<0.5		<0.5		<0.05	
Oxydation Reduction Potential	mV	-85.3	-62	-2.4	-108	15.5	-99.1
pH	units	6.78		6.84		6.64	
pH - field	units	6.47	6.56	6.56	6.60	6.45	6.51
Phenols - total	µg/L	7		2		2	
Phosphate	mg/L	0.25		0.03			
Phosphorus	mg/L	0.19		0.09		0.08	
Potassium	mg/L	56.9		53.4		34.6	
Sodium	mg/L	99.7		101		62.6	
Sulphate	mg/L	16.2		11		20.3	
Temperature - field	°C	12.2	13	11.8	13.4	13.1	13
Total Dissolved Solids	mg/L	1090		960		470	
Total Kjeldahl Nitrogen	mg/L	85				42.1	
Zinc	mg/L		0.0017		0.002	<0.03	<0.005

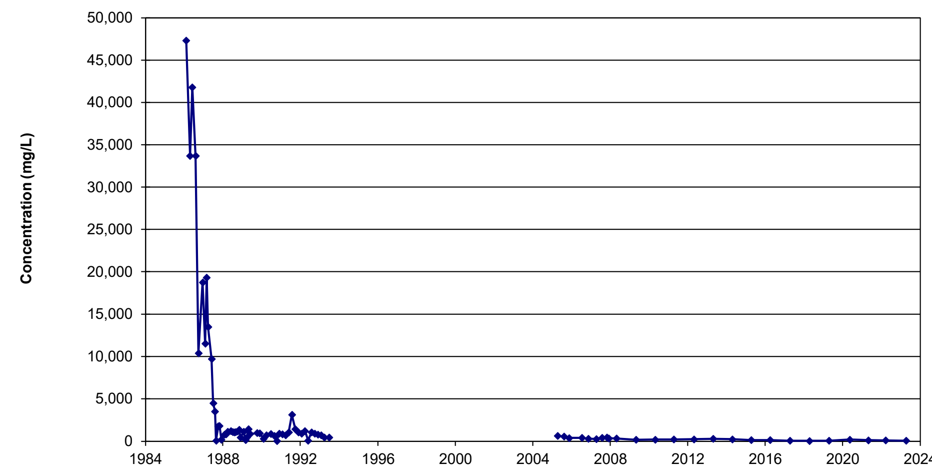
Figure C.8

Time Concentration Graphs - Refuse Monitor 23B

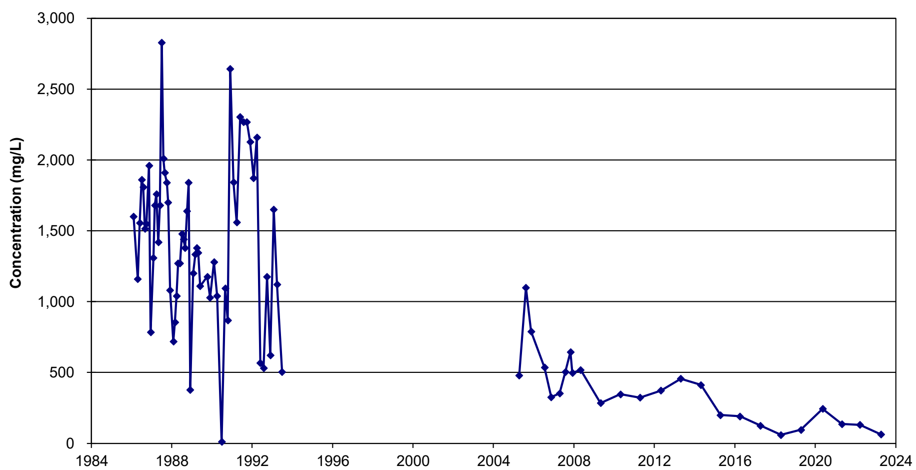
ALKALINITY



CHEMICAL OXYGEN DEMAND



CHLORIDE



IRON

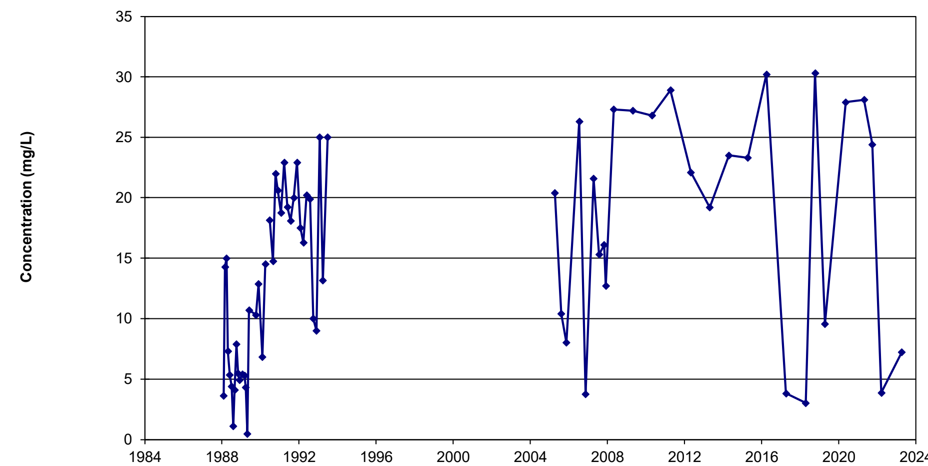
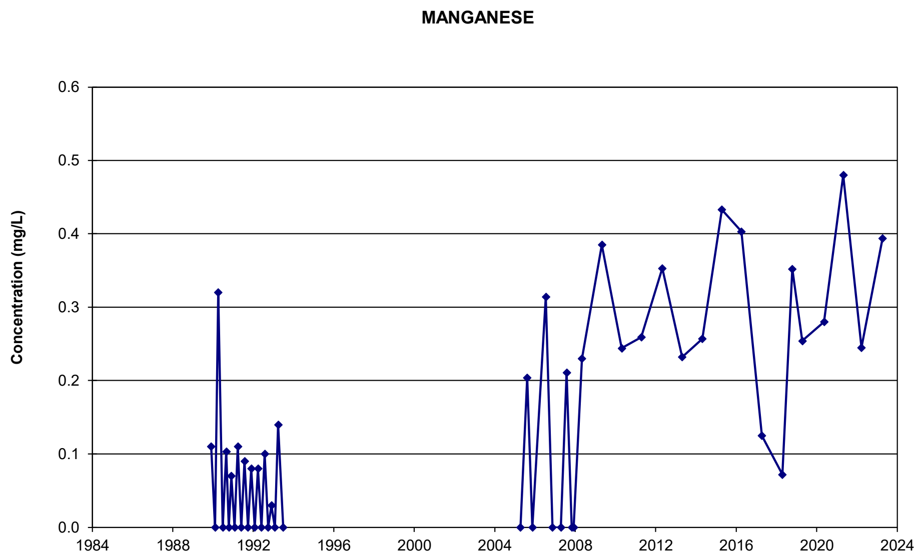
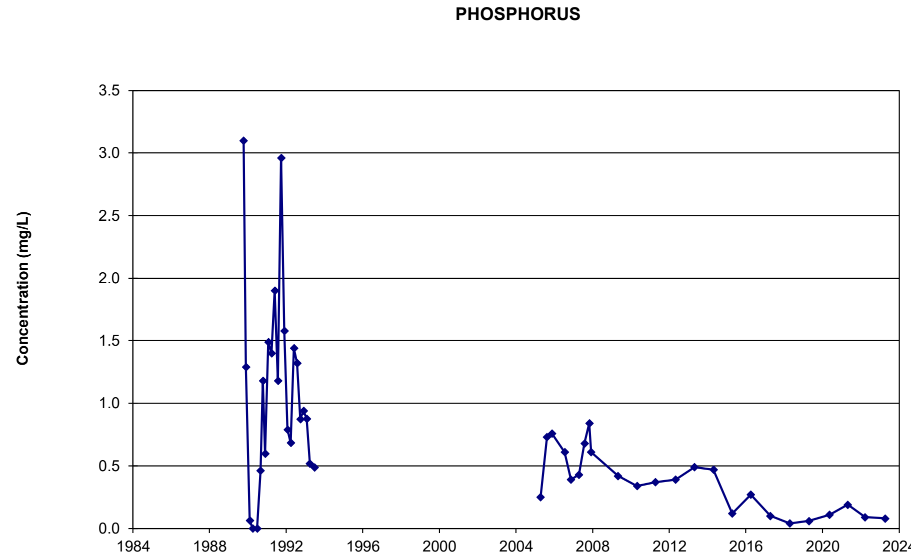
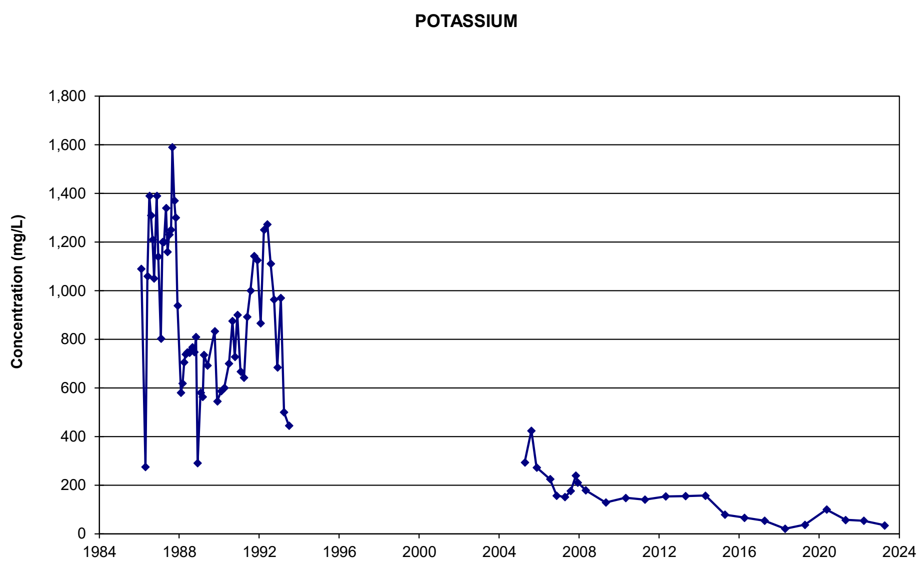


Figure C.9

Time Concentration Graphs - Refuse Monitor 23B







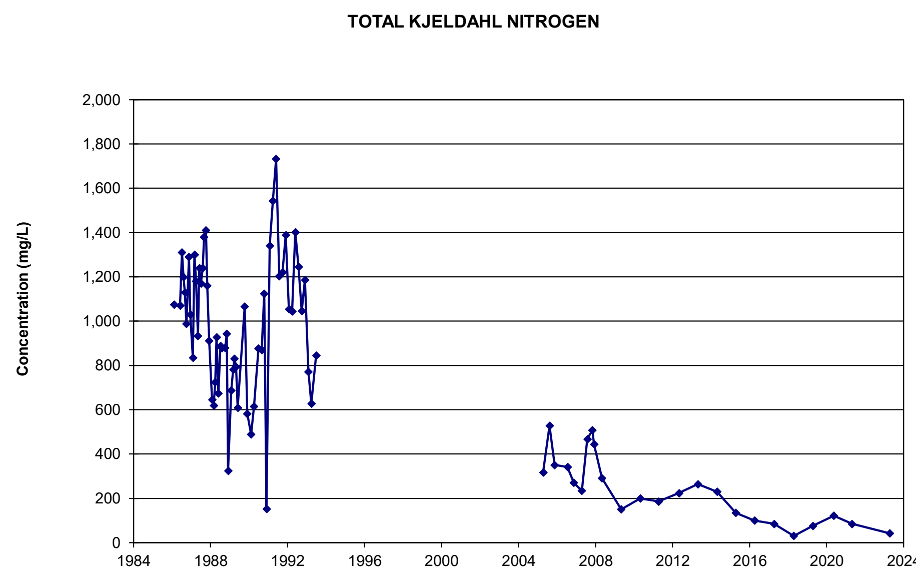
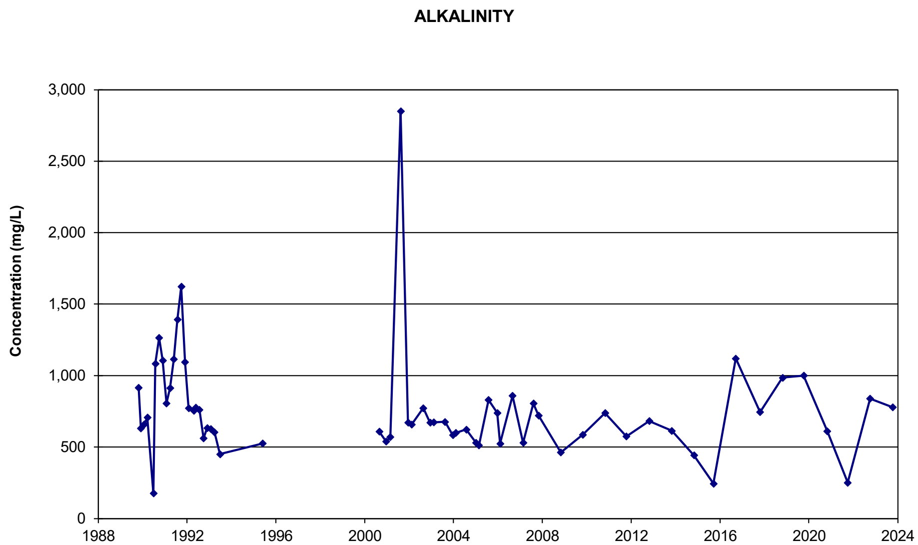


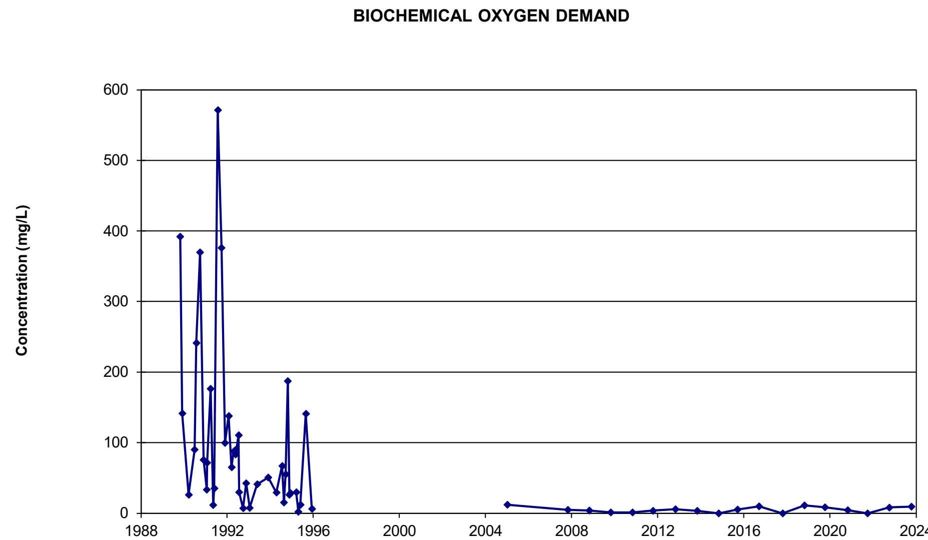
Table C.6
Leachate Chemical Results - Maintenance Hole 4
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

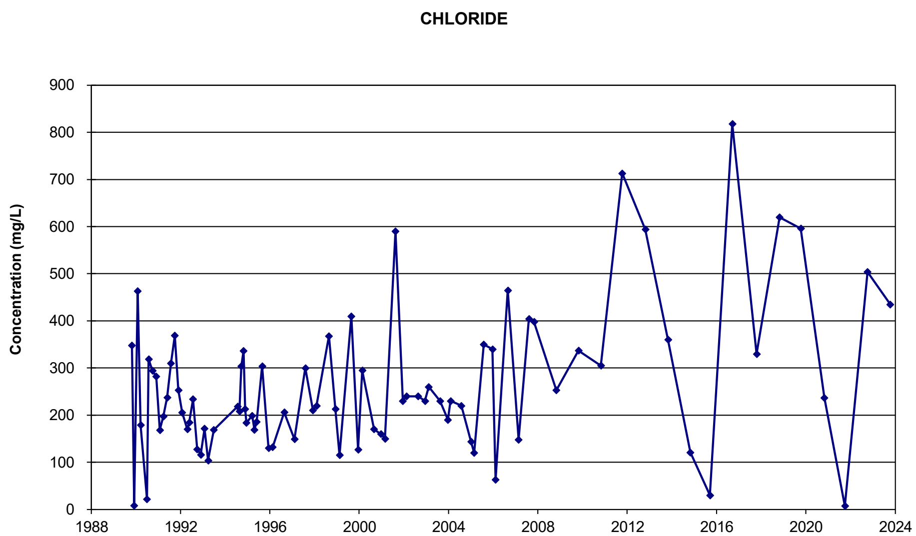
PARAMETER	UNITS	Oct-18	Oct-19	Oct-20	Sep-21	Oct-22	Oct-23
Alkalinity	mg/L	985	1000	611	251	838	778
Ammonia	mg/L	59.9	67.2	24	0.6	52.9	52.6
Biochemical Oxygen Demand	mg/L	11	8.4	4.2	<2.0	8.0	9.2
Bromide	mg/L	2.1	2	1	<2	2.2	<2.0
Carbonaceous Biochemical Oxygen Demand	mg/L	4.3	4	<2.0	<2.0	3.9	2.8
Chloride	mg/L	620	596	237	7.3	504	435
Conductivity - Field	µS/cm	3490	3840	1670	459	3120	2360
Iron	mg/L	15.8	22.8	0.3	0.08	3.82	1.06
pH - Field	units	6.54	6.61	7	7.34	6.69	6.59
Phenols - total	µg/L	4	9	<1	<1	6	2
Potassium	mg/L	58.3	51.6	22.2	3.8	48.1	50
Sodium	mg/L	352	370	130	10	316	283
Strontium	mg/L	0.81	0.8	0.39	0.17	0.66	0.56
Temperature - Field	°C	12	12.4	10.9	15.5	13.0	13.4
Total Kjeldahl Nitrogen	mg/L	76.4	71.6	30.6	26	63.5	66.3
Total Suspended Solids	mg/L	36	33.3	2.4	<2.0	16	8.7

Figure C.10

Time Concentration Graphs - Interceptor Trench: MH4







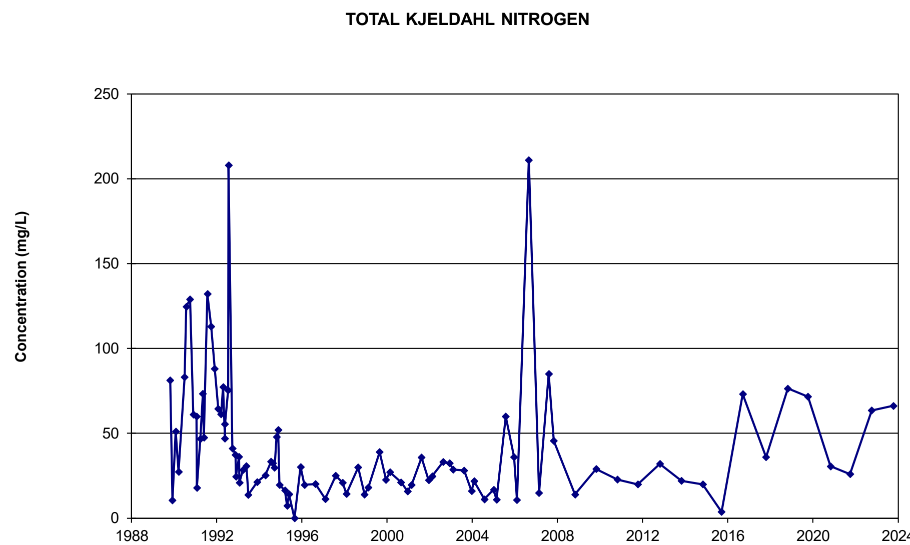
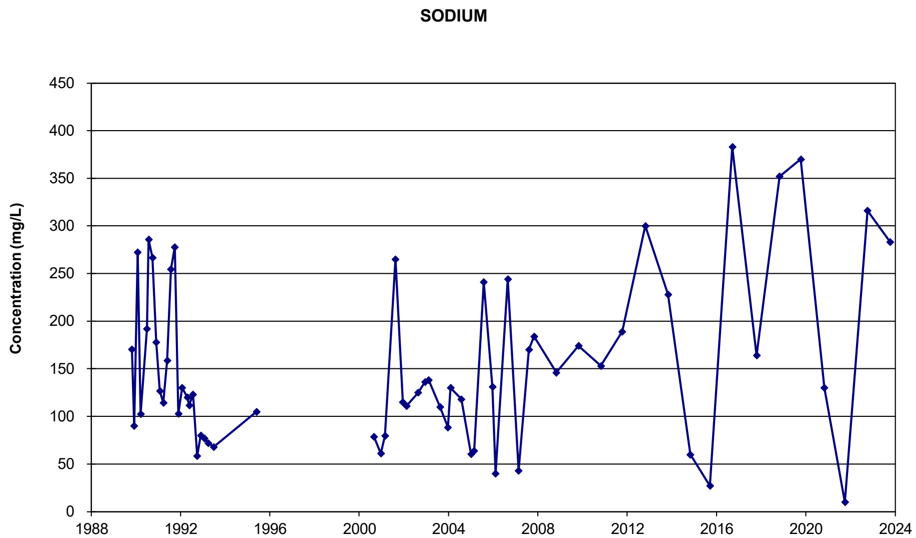
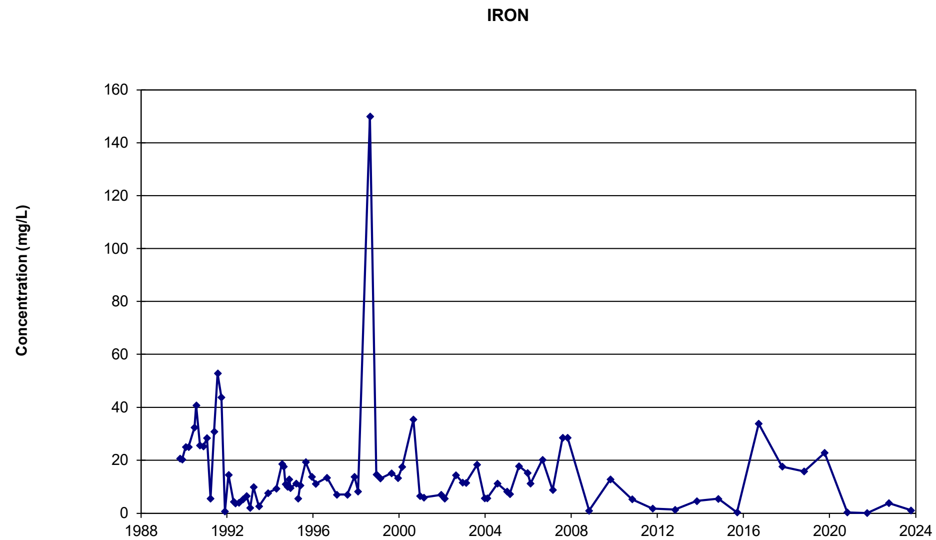
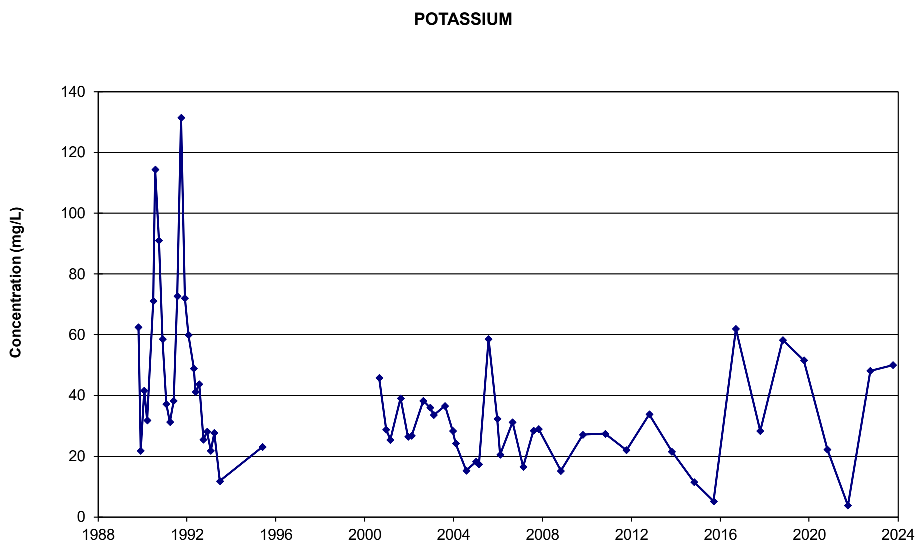


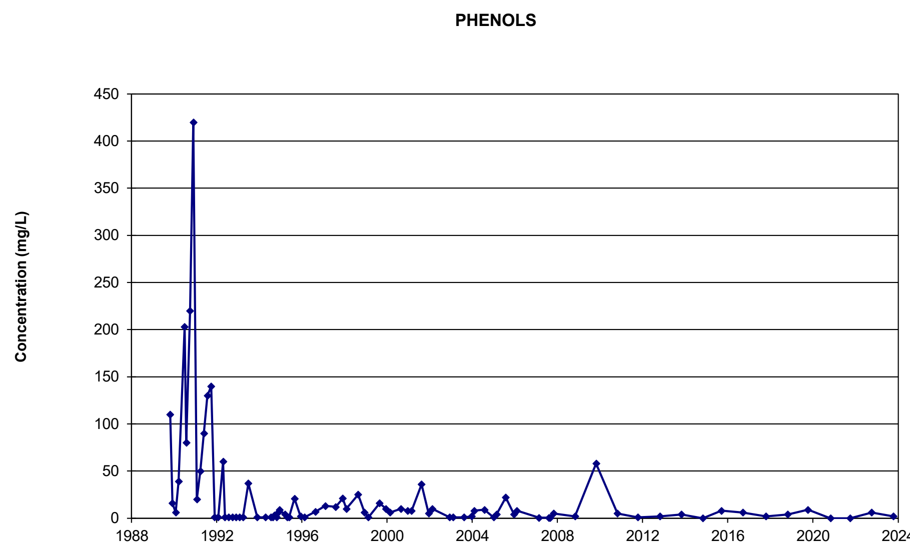
Figure C.11

Time Concentration Graphs - Interceptor Trench: MH4









APPENDIX

D

IMPACT OF LEACHATE ON WASTE WATER TREATMENT PLANT

IMPACT OF LEACHATE FROM PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY ON PETERBOROUGH WASTE WATER TREATMENT PLANT IN 2023

TABLE OF CONTENTS

1.0 Introduction

This Appendix was prepared to update the annual assessment of leachate quality from the South Fill Area (SFA) and North Fill Area (NFA) of the Peterborough County/City Waste Management Facility (PCCWMF), specifically with respect to its expected impact on the operation of the Peterborough Waste Water Treatment Plant (WWTP).

Leachate collected from the SFA and NFA flows to a respective pump station. From the pump stations, leachate is directed through 150 mm diameter forcemains to the City of Peterborough's (City) sanitary sewer at Neil Drive. Leachate and the raw wastewater collected in the municipal system subsequently drain by gravity to the WWTP.

The potential impact of the quantity and quality of leachate discharge from the landfill forcemain on the WWTP was assessed based on available data.

2.0 Data Reviewed

Totalizer readings from a flow meter on the leachate forcemain are recorded on a regular basis. Leachate quantities discharged to the City's sanitary sewer were based on records collected by City Staff.

The analytical data reviewed were based on leachate holding tank samples collected by the City's Environmental Sampling Crew. Collected samples were analyzed at the WWTP laboratory or sent to a third-party Canadian Association of Environmental Analytical Laboratories (CAEAL) accredited laboratory for analysis.

All samples collected were grab samples. Samples were collected in April and October 2023 for analysis and comparison to select parameters in the City of Peterborough Sewer Use By-Law No.15-075 (By-Law).

3.0 Leachate Quantity Assessment

The 2023 monthly recorded leachate flow rates from the holding tank are presented in Table D.1. Based on these recorded readings the following was observed:

- February had the highest average daily flow of leachate with 485 cubic metres per day (m^3/d).
- October had the lowest average daily flow rate of leachate with 73 cubic metres per day (m^3/d).
- The average daily leachate flow rate in 2023 was 253 m^3/d. This was a 272% increase from 2022.

The 2023 average daily influent sewage flow to the Peterborough WWTP, from all sources, was 45,236 m^3/d (compared to the average design capacity of 54,500 m^3/d). Construction of Cell 4 was completed in December 2022 and was connected to the leachate collection system onsite. Due to the landfill surface area expansion, the influx of total leachate generated in 2023 increased by 93%. During 2023, the average influent volume from the PCCWMF to the WWTP was 0.53% of the total influent flow volume, which is considered insignificant in terms of hydraulic load. February 2023 had the highest fraction of influent leachate at the WWTP with leachate providing 0.91% of the total WWTP influent hydraulic load.

4.0 Leachate Quality Assessment

4.1 By-Law Criteria

The City of Peterborough regulates discharges to the sanitary sewer system under City By-Law 15-075. Analytical results for the 2023 leachate samples are compared with By-Law limits in Table C.3 (in Appendix C). The concentrations of general chemistry, metal, and VOC parameters for the 2023 samples were all below the By-Law criteria with the exceptions of:

- Total Kjeldahl Nitrogen (TKN) in the SFA holding tank sampled both in April and October 2023.
- TKN in the NFA holding tank sampled April 2023.
- Nonyl-phenols in the SFA holding tank sampled in October 2023.

4.2 Leachate Loading on the WWTP

The loading of leachate contaminants on the WWTP was reviewed for key parameters based on two sampling events in 2023 and the recorded leachate flow to the sanitary sewer for the months of the sampling events. The overall loading on the WWTP from all sources was estimated from available monthly flow data and influent concentrations. Table D.2 provides the leachate contaminant loadings on the WWTP for these key parameters.

Review of both the leachate discharge and the WWTP influent for both sample collection dates indicates that:

- Total Suspended Solids (TSS) from landfill leachate contributed 0.11% in April 2023 and 0.02% in October 2023 of the TSS loading treated by the WWTP;
- Phosphorus from landfill leachate contributed 0.27% in April 2023 and 0.08% in October 2023 of the phosphorus loading treated by the WWTP;
- Chemical Oxygen Demand (COD) from landfill leachate contributed 0.80% in April 2023 and 0.15% in October 2023 of the overall COD loading treated by the WWTP.
- Biochemical Oxygen Demand (BOD_5) from landfill leachate contributed 0.31% in April 2023 and 0.03% in October 2023 of the BOD_5 loading treated by the WWTP; and
- TKN from landfill leachate contributed 3.8% in April 2023 and 1.0% in October 2023 of the TKN loading treated by the WWTP;

Based on the above, the loading from the landfill leachate to the WWTP generally represents a small portion of the total contaminant loading.

In general, the range of leachate flows and organic loadings discharged to the WWTP represent only a small fraction of the plant’s total capacity. Considering that the WWTP is reportedly operating in compliance with its approvals criteria, leachate does not create any WWTP compliance issues. In accordance with the Environmental Compliance Approval for the Site, the potential impact of leachate on the City’s WWTP should continue to be evaluated.

5.0 Summary and Recommendations

Landfill leachate from the Site that is discharged via the forcemain along Bensfort Road to the City of Peterborough sanitary sewer system:

- Is considered insignificant with respect to leachate hydraulic loading on the WWTP, as even during the peak leachate discharge periods the leachate flow accounts for less than 1 percent of the overall average sewage flow;
- All leachate samples were below the By-Law criteria with the exceptions of TKN in the SFA holding tank sampled both in April and October 2023, TKN in the NFA holding tank sampled April 2023, and nonyl-phenols in the SFA holding tank sampled in October 2023.
- BOD_5, TSS, phosphorus and COD loads on the WWTP from landfill leachate are low and represent only a small portion of the WWTP capacity; and
- TKN load on the WWTP appears to be in the range of 1.0% and 3.8%, which is still considered significantly low.

The potential impact of landfill leachate on the WWTP should continue to be evaluated on an annual basis.

TABLE D.1
2023 Leachate and Peterborough WWTP Flow Rates
2023 ANNUAL MONITORING REPORT
Peterborough County/City Waste Management Facility

Month	Monthly Leachate Volume to Sewer from PCCWMF	Average Daily Leachate Flow from PCCWMF	Total WWTP Influent Flow	% Leachate of WWTP Influent	Total Monthly Precipitation
	(m^3/month)	(m^3/d)	(m^3/d)	(%)	(mm)
January	11,456	370	49,185	0.75%	58.4
February	13,579	485	53,055	0.91%	76.0
March	13,762	444	56,826	0.78%	72.3
April	11,663	389	63,920	0.61%	98.5
May	8,590	277	49,532	0.56%	42.6
June	7,715	257	40,565	0.63%	58.4
July	7,954	257	41,452	0.62%	148.7
August	4,735	153	44,870	0.34%	64.2
September	2,440	81	36,063	0.23%	31.7
October	2,256	73	34,376	0.21%	54.5
November	2,249	75	34,447	0.22%	31.6
December	5,328	172	38,544	0.45%	79.7
Total Volume (m^3)	91,727				
Maximium	13,762	485	63,920	0.91%	148.7
Minimum	2,249	73	34,376	0.21%	31.6
Average	7,644	253	45,236	0.53%	68.1
Historical Range (1990-2023)		31-485			

Table D.2

Leachate Loading on WWTP 2023

2023 ANNUAL MONITORING REPORT

Peterborough County/City Waste Management Facility

		April-23							
		WWTP			Leachate			Loading as a Percentage of WWTP loading	Sewer Use Bylaw Criteria (mg/L)
ANALYTE	UNIT	Conc. (mg/L)	Flow (ML/d)	Loading (kg/d)	Conc. (mg/L)	Flow (ML/d)	Loading (kg/d)		
TSS	mg/L	254	63.920	16,236	47.4	0.389	18.4	0.11%	350
Phosphorous	mg/L	3.23	63.920	206	1.42	0.389	0.6	0.27%	10
COD	mg/L	303	63.920	19,368	398	0.389	155.0	0.80%	
BOD-5	mg/L	150	63.920	9,588	76.8	0.389	29.9	0.31%	300
TKN	mg/L	25.7	63.920	1,643	*159	0.389	61.9	3.8%	100

		October-23							
		WWTP			Leachate			Loading as a Percentage of WWTP loading	Sewer Use Bylaw Criteria (mg/L)
ANALYTE	UNIT	Conc. (mg/L)	Flow (ML/d)	Loading (kg/d)	Conc. (mg/L)	Flow (ML/d)	Loading (kg/d)		
TSS	mg/L	327	34.376	11,241	33.9	0.073	2.5	0.02%	350
Phosphorous	mg/L	4.49	34.376	154	1.66	0.073	0.1	0.08%	10
COD	mg/L	447	34.376	15,366	314	0.073	22.9	0.15%	
BOD-5	mg/L	222	34.376	7,631	27.4	0.073	2.0	0.03%	300
TKN	mg/L	37.8	34.376	1,299	*180	0.073	13.2	1.0%	100

Notes: 1. WWTP loads based on flow and concentrations measured on or near specified date.
2. Leachate load based on quality sampling results from specified date and monthly average leachate flow rate.
3. Leachate data taken from NFA and SFA samples. Samples proportioned 47.8% SFA and 52.2% NFA for April 2023 and 52.0% SFA and 48.0% NFA for October 2023, based on leachate quantities pumped in 2023.
4. * indicates exceedances from the Sewer Use Bylaw Criteria.

APPENDIX

E HYDROGEOLOGIC DETAILS

Table E.1
Groundwater Monitor Details
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

MONITOR	Borehole Diameter (mm)	Monitor Stick Up (m)	T.O.P. ELEVATION (mASL)	Ground Elevation (mASL)	Screen Bottom / Interval (mASL)	Filter Pack Interval (mASL)	Lower Seal Interval (mASL)	Surface Seal Interval (mASL)	Backfill Interval (mASL)	Monitor Type
3-I	185		190.98	190.98	183.88	183.88	188.91			bedrock piezometer
3-II	185	0.70	190.26	189.56	185.48	185.48	183.28			overburden standpipe
5-IV	185	0.70	196.30	195.60	181.78-182.54	181.78-183.58	183.58-195.6		181.58-181.78	deep bedrock piezometer
5-V			187.98		183.325					bedrock piezometer
5-VI			194.05		189.264					overburden standpipe
8-I	95	1.12	199.90	198.78	183.81	183.81	197.23			bedrock piezometer
8-II	185	1.09	199.87	198.78	191.85	191.85	190.4			overburden piezometer
8-III	185	0.65	199.53	198.88	192.84-197.41	192.84-197.78	197.78-198.88			overburden standpipe
10-I	185	0.25	231.23	230.98	213.28	213.28	230.43			overburden piezometer
10-II	185	0.27	231.22	230.95	219.25	219.25	218.82			overburden standpipe
13	185	0.21	238.96	238.75	225.95	225.95	236.68			perched sand standpipe
15A	185	0.44	189.78	189.34	184.86	184.86				overburden piezometer
15B	185	0.58	189.80	189.22	185.38	185.38				overburden standpipe
15-I	185	0.78	190.12	189.34	183.41-183.94	183.41-183.86	183.86-187.82			bedrock piezometer
16A	94	0.95	196.78	195.83	184.95	184.95				bedrock piezometer
16C	185	0.78	196.64	195.97	186.08-193.7	186.08-193.7	193.7-195.97			overburden standpipe
17A	94	0.77	193.31	192.54	183.88-184.34	183.88-184.94	184.94-186.34			bedrock piezometer
17B	185	0.76	193.33	192.57	186.63-190.17	186.63-190.77	190.77-191.37			overburden standpipe
17-I	185	0.75	193.17	192.42	179.1-179.86	179.1-180.47	180.47-192.42		178.8-179.1	deep bedrock piezometer
18A	94	0.58	189.86	189.28	183.82-184.08	183.82-184.68	184.68-186.28			bedrock piezometer
18B	185	0.61	189.86	189.25	186.25-188.65	186.25-188.85	188.85-189.25			overburden standpipe
19A	94	0.46	193.87	193.41	184.51-185.21	184.51-185.01	185.31-185.81			bedrock piezometer
19B	185	0.54	193.84	193.30	186.56-190.1	186.56-190.1	190.1-191.6			overburden standpipe
20A	94	0.61	190.95	190.34	183.85-184.14	183.85-185.14	185.14-186.14			bedrock piezometer
20B	185	0.67	190.71	190.04	186.93-189.44	186.93-189.54	189.54-190.04			overburden standpipe
21A	94	0.28	194.05	193.77	185.78	185.78				bedrock piezometer
21B	185	0.72	194.66	193.94	190.13	190.13				overburden standpipe
21C	185	0.12	193.94	193.82	188.03	188.03				overburden piezometer
22		0.66	207.47	206.81	193.4	193.4				refuse standpipe
23A	185	0.64	207.45	206.81	193.09-193.7	193.09-194.31	194.31-194.62			overburden piezometer
23B	185	0.65	207.40	206.75	195.78-199.43	195.78-205.99	205.99-206.75			refuse standpipe
24A	185	0.61	208.67	208.06	194.25-194.86	194.25-195.56	195.56-197.09			overburden piezometer
24B	185	0.50	208.37	207.87	196.29-200.86	196.29-207.11	207.11-207.41			refuse standpipe
28	94	0.62	193.86	193.24	185.16-185.77	185.16-185.86	185.86-186.05			bedrock piezometer

Table E.1
Groundwater Monitor Details
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

MONITOR	Borehole Diameter (mm)	Monitor Stick Up (m)	T.O.P. ELEVATION (mASL)	Ground Elevation (mASL)	Screen Bottom / Interval (mASL)	Filter Pack Interval (mASL)	Lower Seal Interval (mASL)	Surface Seal Interval (mASL)	Backfill Interval (mASL)	Monitor Type
30-I	94	0.72	190.26	189.54	182.32-183.02	182.32-184.88	184.88-185.24	186.49-189.54		bedrock piezometer
30-II	105	0.87	190.45	189.58	185.56-188.50	185.56-188.67	188.67-189.58			overburden standpipe
31-I	94	0.89	190.29	189.40	175.90-176.64	175.90-178.70	178.70-189.40			bedrock piezometer
31-II	105	1.02	190.42	189.40	184.85-187.68	184.85-188.8	188.8-189.4			overburden standpipe
33-I	94	0.83	196.96	196.13	182.47-183.23	182.47-183.48	183.48-196.13			deep bedrock piezometer
33-II	185	1.13	197.16	196.03	186.74-187.50	186.74-188.28	188.28-189.18	190.32-196.03		overburden piezometer
33-III	185	1.07	197.10	196.03	192.78-195.75	192.78-195.75	195.75-196.03			overburden standpipe
37-I	94	0.97	195.88	194.92	181.12-181.92	181.12-184.18	184.22-194.92			bedrock piezometer
37-II	185	0.92	195.97	195.04	191.64-194.24	191.64-194.24	194.24-195.04		188.94-191.64	overburden standpipe
38-I	94	0.68	198.33	197.65	180.60-181.04	180.60-181.04	181.04-191.55			deep bedrock piezometer
38-II	185	0.96	198.74	197.78	187.52-188.28	187.52-189.71	189.71-192.45	193.21-197.78		overburden piezometer
38-III	185	0.99	198.77	197.78	193.21-196.26	193.21-196.88	196.88-197.78			overburden standpipe
40-I	94	0.99	196.25	195.27	181.37-182.07	181.37-182.87	182.87-195.27			bedrock piezometer
40-II	105	0.97	196.24	195.27	190.67-193.77	190.67-194.47	194.47-195.27			overburden standpipe
41-I	94	0.79	198.05	197.27	179.90-180.66	179.90-181.27	181.27-192.39	196.66-197.27		deep bedrock piezometer
41-II	94	0.81	198.19	197.39	184.44-185.20	184.44-185.93	185.93-195.56	196.78-197.39		bedrock piezometer
41-III	185	0.81	198.08	197.27	192.76-195.81	192.76-196.66	196.66-197.27			overburden standpipe
42-I	94	0.79	215.13	214.34	187.97-188.74	187.97-189.44	189.44-203.52	206.11-214.34	187.68-187.97	overburden piezometer
42-II	185	0.87	215.20	214.33	204.3-204.76	204.3-205.64	205.64-213.11	214.03-214.33		overburden piezometer
42-III	185	0.77	215.12	214.35	206.27-209.32	206.27-211	211-214.35			overburden standpipe
43-I	94	0.62	228.50	227.88	200.01-200.71	200.01-201.48	201.48-220.87	226.17-227.88	198.47-200.01	overburden piezometer
43-II	85	0.48	228.76	228.28	208.77-209.44	208.77-209.87	209.87-215.48	225.28-228.28		overburden piezometer
43-III	185	0.63	228.51	227.88	221.05-225.56	221.05-226.17	226.17-226.97			overburden standpipe
44-I	94	0.98	197.64	196.66	175.26-175.96	175.26-177.46	177.46-196.66			deep bedrock piezometer
44-II	94	0.98	197.73	196.74	179.98-180.76	179.98-183.03	183.03-196.74			bedrock piezometer
44-III	185	0.99	197.73	196.74	192.14-195.24	192.14-195.94	195.94-196.74			overburden standpipe
45	105	0.69	196.28	195.59	190.97-193.91	190.97-194.78	194.78-195.59		190.56-190.97	overburden standpipe
46-I	94	0.67	194.71	194.04	174.99-175.51	174.99-175.84	175.84-194.04		174-174.99	bedrock piezometer
46-II	185	0.56	194.86	194.30	186.89-187.48	186.89-187.6	187.6-194.3			overburden piezometer
46-III	185	0.59	194.89	194.30	191.51-193.68	191.51-193.99	193.99-194.3			overburden standpipe
47	105	0.70	195.62	194.92	190.44-193.38	190.44-194.01	194.01-194.92		190.02-190.44	overburden standpipe
48	105	0.76	196.59	195.83	191.17-194.11	191.17-194.92	194.92-195.83			overburden standpipe
49	105	0.74	197.31	196.57	192.04-194.98	192.04-195.75	195.75-196.57			overburden standpipe

Table E.1
Groundwater Monitor Details
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

MONITOR	Borehole Diameter (mm)	Monitor Stick Up (m)	T.O.P. ELEVATION (mASL)	Ground Elevation (mASL)	Screen Bottom / Interval (mASL)	Filter Pack Interval (mASL)	Lower Seal Interval (mASL)	Surface Seal Interval (mASL)	Backfill Interval (mASL)	Monitor Type
50-I	94	0.59	194.58	193.99	182.62-183.17	182.62-183.68	183.68-193.99		181.62-182.62	bedrock piezometer
50-II	185	0.67	194.74	194.07	186.06-186.66	186.06-187.15	187.67-193.87			overburden piezometer
50-III	185	0.56	194.48	193.92	187.7-193.48	187.7-193.52	193.52-193.92		187.39-187.7	overburden standpipe
51-I	91	0.67	190.27	189.60	181.54-182.13	181.54-182.45	182.45-189.6			bedrock piezometer
52-I	94	0.68	189.95	189.27	181.84-182.36	181.84-182.69	182.69-189.27		181.39-181.84	bedrock piezometer
52-II	51	1.26	190.31	189.04	187.21-188.00	187.21-188.13	188.13-189.04	188.84-189.04		overburden standpipe
53-I	94	0.79	196.73	195.94	184.29-184.69	184.29-185.08	185.08-195.94		182.4-184.29	bedrock piezometer
53-II	185	0.74	196.78	196.04	189.15-194.93	189.15-195.29	195.29-196.04			overburden standpipe
54-I	94	0.51	195.50	194.99	180.24-181.15	180.24-181.3	181.3-194.99			deep bedrock piezometer
54-II	185	0.45	196.05	195.60	188.96-194.91	188.96-195.03	195.03-195.6			overburden standpipe
59-I	185	0.90	201.44	200.54	192.36-193.11	192.36-193.5	193.5-200.54			overburden piezometer
59-II	185	0.97	201.40	200.43	195.6-199.97	195.6-200.18	200.18-200.43			overburden standpipe
61-I	96	0.81	195.60	194.79	173.02-173.78	173.02-174.37	174.37-194.79			bedrock piezometer
61-II	205	0.81	195.76	194.95	181.18-181.94	181.18-182.25	182.25-194.95			overburden piezometer
61-III	104	0.59	195.66	195.07	190.12-194.69	190.12-194.77	194.77-195.07			overburden standpipe
62-IR	96	0.83	191.95	191.12	183-183.76	183-184.24	184.24-191.12			deep bedrock piezometer
62-II	205	0.79	192.01	191.22	186.88-190.69	186.88-190.82	190.82-191.22			overburden standpipe
63-I	96	0.76	193.29	192.53	170.76-171.52	170.76-171.8	171.8-192.53			deep bedrock piezometer
63-II	205	0.77	193.28	192.51	175.78-176.54	175.78-177.42	177.42-192.51			overburden piezometer
63-III	104	0.48	192.98	192.50	187-191.57	187-192.2	192.2-192.5			overburden standpipe
64-I	96	0.85	190.10	189.25	182.87-183.63	182.87-183.95	183.95-189.25		182.7-182.87	deep bedrock piezometer
64-II	205	0.80	190.16	189.36	185.8-188.85	185.8-188.96	188.96-189.36			overburden piezometer
65-I	205	0.81	198.06	197.25	191.45-196.02	191.45-196.85	196.85-197.25			overburden standpipe
66-I	96	0.69	199.06	198.37	184.54-185.3	184.54-185.54	185.54-198.37		184.12-184.54	deep bedrock piezometer
66-II	205	0.81	199.13	198.32	190.1-190.86	190.1-191.2	191.2-198.32			overburden piezometer
66-III	104	0.76	198.92	198.16	193.39-197.2	193.39-197.66	197.66-198.16		193.28-193.39	overburden standpipe
71-I	96	0.81	197.67	196.86	183.76-184.52	183.76-185.21	185.21-196.86			bedrock piezometer
71-II	205	0.83	197.80	196.97	188.82-189.58	188.82-189.8	189.8-196.97			overburden piezometer
71-III	104	0.87	197.91	197.04	192.77-196.58	192.77-196.74	196.74-197.04			overburden standpipe

Table E.1
Groundwater Monitor Details
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

MONITOR	Borehole Diameter (mm)	Monitor Stick Up (m)	T.O.P. ELEVATION (mASL)	Ground Elevation (mASL)	Screen Bottom / Interval (mASL)	Filter Pack Interval (mASL)	Lower Seal Interval (mASL)	Surface Seal Interval (mASL)	Backfill Interval (mASL)	Monitor Type
72-I	96	0.76	196.56	195.80	167.31-168.07	167.31-168.86	168.86-195.8		166.84-167.31	bedrock piezometer
72-II	96	0.74	196.48	195.74	180.47-181.23	180.47-182.14	182.14-195.74			overburden piezometer
72-III	104	0.75	196.51	195.76	191.19-195.76	191.19-195.46	195.46-195.76		190.88-191.19	overburden standpipe
73-I	96	0.81	195.04	194.23	177.11-177.87	177.11-178.76	178.76-194.23		176.55-177.11	bedrock piezometer
73-II	205	0.78	195.01	194.23	184.04-184.8	184.04-184.96	184.96-194.23			overburden piezometer
73-III	104	0.72	194.99	194.27	188.94-193.51	188.94-193.97	193.97-194.27			overburden standpipe
74-I	96	0.82	195.95	195.13	170.82-171.58	170.82-172.18	172.18-195.13		170.64-170.82	bedrock piezometer
74-II	205	0.78	195.91	195.13	181.38-182.14	181.38-182.5	182.5-195.13		180.35-181.38	overburden piezometer
74-III	104	0.78	195.99	195.21	190.12-194.69	190.12-194.91	194.91-195.21			overburden standpipe
75-I	96	0.80	191.18	190.38	181.32-182.08	181.32-182.6	182.6-190.38			bedrock piezometer
75-II	104	0.79	191.23	190.44	186.17-189.98	186.17-190.14	190.14-190.44			overburden standpipe
76-I	185	0.76	190.49	189.83	171.08-172.43	171.08-173.03	173.03-189.83			deep bedrock piezometer
76-II	185	0.58	190.41	189.83	177.31-178.07	177.31-178.73	178.73-189.83			bedrock piezometer
76-III	185	0.43	190.26	189.83	183-183.75	183-184.33	184.33-189.83			overburden piezometer
76-IV	185	0.40	190.23	189.83	185.31-188.36	185.31-188.77	188.77-189.83			overburden standpipe
77-I	185	0.45	195.36	194.91	189.97-193.01	189.97-193.72	193.72-194.91			overburden standpipe
78-I	185	0.58	195.84	195.26	191.02-193.31	191.02-194.16	194.16-195.26			overburden standpipe
81-I	96	0.89	199.85	198.96	183.29-184.81	183.29-185.11	185.11-198.96			bedrock piezometer
81-II	185	0.92	199.90	198.98	189.84-191.36	189.84-191.71	191.71-198.98			overburden piezometer
81-III	185	0.96	200.00	199.04	193.68-198.25	193.68-198.62	198.62-199.04			overburden standpipe
84-I	130	0.69	202.17	201.48	184.4-186.1	184.4-186.3	186.3-201.48			overburden piezometer
84-II	130	0.64	202.12	201.48	193.0-195.0	193.0-195.5	195.5-201.48			overburden standpipe
85-I	130	0.65	198.80	198.15	184.3-186.3	184.3-186.6	186.6-196.6	197.8-198.15	196.6-197.8	overburden piezometer
85-II	130	0.60	198.75	198.15	193.0-195.4	193.0-196.6		197.8-198.15	196.6-197.8	overburden standpipe
86-I	130	0.85	195.73	194.88	176.1-178.1	176.1-178.3	178.3-193.7	193.7-194.88		bedrock piezometer
86-II	130	0.81	195.69	194.88	185.9-187.7	185.9-187.9	187.9-193.9	193.9-194.88		overburden piezometer
86-III	130	0.87	195.75	194.88	190.3-193.3	190.3-193.5	193.5-193.9	193.9-194.88		overburden standpipe
87-I	130	0.86	200.35	199.49	182.3-184.1	182.3-185.2	185.2-198.5	198.5-199.49		bedrock piezometer
87-II	130	0.82	200.31	199.49	190.3-191.9	190.3-192.3	192.3-198.5	198.5-199.49		overburden piezometer
87-III	130	0.90	200.39	199.49	194.9-197.8	194.9-198.0	198.0-198.3	198.3-199.49		overburden standpipe

Table E.1
Groundwater Monitor Details
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

MONITOR	Borehole Diameter (mm)	Monitor Stick Up (m)	T.O.P. ELEVATION (mASL)	Ground Elevation (mASL)	Screen Bottom / Interval (mASL)	Filter Pack Interval (mASL)	Lower Seal Interval (mASL)	Surface Seal Interval (mASL)	Backfill Interval (mASL)	Monitor Type
88-I	130	0.91	207.52	206.61	186.3-187.8	186.3-188.4	188.4-205.6	205.6-206.61		bedrock piezometer
88-II	130	0.91	207.52	206.61	196.6-198.21	196.6-198.6	198.6-205.6	205.6-206.61		overburden piezometer
88-III	130	0.76	207.37	206.61	201.0-204.0	201.0-204.6	204.6-205.6	205.6-206.61		overburden standpipe
89-I	130	0.28	202.77	202.49	180.5-182.1	180.5-182.5	182.5-201.5	201.5-202.49		bedrock piezometer
89-II	130	0.65	203.14	202.49	188.7-190.4	188.7-190.7	190.7-201.5	201.5-202.49		overburden piezometer
89-III	130	0.73	203.22	202.49	195.7-198.9	195.7-199.7	199.7-201.5	201.5-202.49		overburden standpipe
91-I	130	0.88	206.55	205.67	190.7-192.1	190.7-193.3	193.3-204.7	204.7-205.67		bedrock piezometer
91-II	130	0.89	206.56	205.67	196.5-198.1	196.5-199.6	199.6-204.7	204.7-205.67		overburden piezometer
91-III	130	1.02	206.69	205.67	200.1-203.5	200.1-203.7	203.7-204.7	204.7-205.67		overburden standpipe
92-I	130	0.86	200.46	199.60	183.6-185.2	183.6-185.6	185.6-198.6	198.6-199.60		bedrock piezometer
92-II	130	0.87	200.47	199.60	190.6-192.3	190.6-192.4	192.4-198.6	198.6-199.60		overburden piezometer
92-III	130	0.88	200.48	199.60	193.8-197.1	193.8-197.6	197.6-198.6	198.6-199.60		overburden standpipe
93-I	130	0.62	197.67	197.05	187.9-189.5	187.9-190.1	190.1-196.3	196.3-197.05		overburden piezometer
93-II	130	0.71	197.76	197.05	193.9-195.7	193.9-196.1	196.1-196.3	196.3-197.05		overburden standpipe
94-I	130	0.78	196.80	196.02	185.19-186.56	184.15-184.75	187.15-195.29		195.29-196.02	overburden piezometer
94-II	130	0.86	196.88	196.02	193.53-194.90	193.36-195.14	195.14-195.29		195.29-196.02	overburden standpipe
95-I	130	0.00	195.51	195.51	184.7-186.9	184.7-187.1	187.1-194.7	194.7-195.51		overburden piezometer
95-II	130	-0.02	195.49	195.51	192.7-194.3	192.7-194.8		194.8-195.51		overburden standpipe
100-I	96	0.73	200.35	199.62	184.32-185.84	184.32-186.36	185.84-199.62			bedrock piezometer
100-II	200	0.68	200.41	199.73	190.83-192.35	190.83-193.02	193.02-199.73			overburden piezometer
100-III	200	0.63	200.33	199.70	195.40-198.45	195.40-198.79	198.79-199.70			overburden standpipe
101-I	96	0.53	219.70	219.17	184.60-186.27	184.60-186.57	186.57-219.17			bedrock piezometer
101-II	200	0.59	219.64	219.04	202.54-204.07	202.54-204.84	204.84-219.04			overburden piezometer
101-III	200	0.60	219.51	218.92	212.82-215.87	212.82-216.42	216.42-218.92			overburden standpipe
104-I	130	0.89	205.53	204.64	183.9-185.1	183.9-185.6	185.6-203-6	203.6-204.64		bedrock piezometer
104-II	130	0.94	205.58	204.64	197.1-198.24	197.1-199.6	199.6-201.0	203.6-204.65	201.0-203.6	overburden piezometer
104-III	130	0.89	205.53	204.64	201.0-203.2	201.0-204.0		204.2-204.64	204.0-204.2	overburden standpipe
106-I	130	0.95	199.80	198.85	182.4-183.7	182.4-184.1	184.1-197.9	197.9-198.85		bedrock piezometer
106-II	130	0.90	199.75	198.85	191.3-192.4	191.3-193.5	193.5-197.9	197.9-198.85	194.0-197.3	overburden piezometer
106-III	130	0.86	199.71	198.85	195.3-198.1	195.3-198.3		198.3-198.85		overburden standpipe

Table E.1
Groundwater Monitor Details
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

MONITOR	Borehole Diameter (mm)	Monitor Stick Up (m)	T.O.P. ELEVATION (mASL)	Ground Elevation (mASL)	Screen Bottom / Interval (mASL)	Filter Pack Interval (mASL)	Lower Seal Interval (mASL)	Surface Seal Interval (mASL)	Backfill Interval (mASL)	Monitor Type
107-I	130	0.70	195.99	195.29	179.8-181.1	179.8-181.7	181.7-190.9	190.9-195.29		bedrock piezometer
107-II	130	0.80	196.09	195.29	186.9-188.9	186.9-189.5	189.5-194.3	194.3-195.29		overburden piezometer
107-III	130	0.79	196.08	195.29	192.3-193.8	192.3-195.1		195.1-195.29		overburden standpipe
108-I		0.99	206.32	205.33	190.71					overburden piezometer
108-II		0.80	206.13	205.33	194.20					overburden piezometer
108-III		0.58	205.91	205.33	200.40					overburden standpipe
109-I		0.89	199.19	198.30	181.47					overburden piezometer
109-II (5)	130	1.00	200.10	199.10	188.58-190.11	188.58-190.11	190.11-198.64	198.64-199.10		overburden piezometer
109-III		0.78	199.04	198.26	193.24					overburden standpipe
110-I		0.81	202.55	201.73	184.87					overburden piezometer
110-II		0.89	202.73	201.84	192.10					overburden piezometer
110-III		0.65	202.55	201.90	196.95					overburden standpipe
111-I	185	0.52	200.28	199.76	186.29-184.77	186.88-184.74		199.76-186.88		overburden piezometer
111-II	185	0.59	200.29	199.71	188.19-186.67	188.79-186.64		199.71-188.79		overburden piezometer
111-III	185	0.67	200.41	199.74	196.15-193.10	198.74-193.07		199.74-198.74		overburden standpipe
112-I	185	0.81	208.59	207.78	190.85-189.33	191.45-189.30		207.78-191.45		overburden piezometer
112-II	185	0.83	208.59	207.75	196.47-194.95	197.07-194.92		207.75-197.07		overburden piezometer
112-III	185	0.88	208.60	207.72	203.95-200.90	206.72-200.88		207.72-206.72		overburden standpipe
113-I	185	1.00	195.34	194.34	174.13-172.61	174.73-172.58		194.34-174.73		bedrock piezometer
113-II	185	1.00	195.31	194.31	186.29-184.77	186.89-184.74		194.31-186.89		overburden piezometer
113-III	185	0.85	195.25	194.41	190.57-189.05	193.41-189.03		194.41-193.41		overburden standpipe
T-1	185	0.81	192.24	191.43	187.92-190.52	187.92-190.83	190.83-191.43			trench monitor
T-2	185	0.71	191.55	190.84	187.34-190.08	187.34-190.14	190.14-190.84			trench monitor
T-4	185	0.61	191.19	190.58	186.45-190.11	186.45-190.18	190.18-190.58		186.45-186.45	trench monitor
T3-I	185	0.94	191.59	190.65	185.19-185.95	185.19	186.41-190.65		185.19-185.19	trench monitor
T3-II	185	0.80	191.49	190.69	187.18-189.93	187.18-189.99	189.99-190.69			trench monitor
T5-I	185	0.98	191.25	190.27	185.36-186.12	185.36-186.27	186.27-190.27		185.36-185.36	trench monitor
T5-II	185	0.93	191.25	190.32	186.12-189.17	186.12-189.62	189.62-190.32			trench monitor

NOTES:
1) T.O.P. - Top Of Pipe
2) mASL - Metres Above Sea Level
3) Information presented in table is based on data provided in the 2007 Annual Monitoring Report prepared by Conestoga-Rovers & Associates, May 2008
4) Monitor information is not available for borehole locations 108, 109, and 110.
5) Monitoring well 109-II redrilled in September 2022 with a prepacked monitoring well screen.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	5-IV	5-V	5-VI	16A	18A	18B	19A	19B	20A	20B	23B	33-II	33-III	40-II	41-I
T.O.P. ->	196.30	187.98	194.05	196.64	190.00	189.71	193.87	193.84	190.95	190.79	207.41	197.16	197.10	196.24	198.19
Mar-99	182.82			191.45	189.45		189.38	189.27	189.64	189.64	200.39	196.43	196.06	194.69	197.56
Jul-99	182.84			190.42	188.70	188.06	188.74	188.63	188.28	188.42	200.23	195.88	195.64	194.56	197.50
Dec-99	182.92			191.28	189.14	188.64	189.71	189.53	189.49	189.54	199.70	196.55	195.94	195.01	197.17
Apr-00	183.86			191.45	189.00	188.73	189.68	189.52	189.68	189.67	198.57	196.71	195.95		197.69
Aug-00	184.71			191.13	188.95	188.26	189.09	188.95	188.72	188.75	198.50	196.44	195.92	194.88	197.32
Nov-00	182.94			191.00	189.02	188.93	188.79	188.65	189.34	189.39		196.24	196.03	195.04	195.78
Apr-01	183.99			191.75	189.10	188.56	189.16	189.99	189.36	189.33		196.94	196.00	195.05	197.55
Jul-01	184.59			190.83	188.66	187.76	188.78	188.66	188.44	188.38		196.04	195.69	194.52	197.44
Dec-01	184.02			190.79	188.88	188.52	189.91	189.75	189.44	189.50		196.26	195.82	194.90	194.06
Feb-02															
Mar-02															
Apr-02	185.00			191.79	189.78	188.79	190.14	189.94	189.85	189.80		196.90	195.98	195.07	196.42
May-02															
Jun-02															
Jul-02															
Aug-02	185.72			191.13	189.47	188.31	189.57	189.44	189.04	188.96		196.26	195.75	195.76	197.64
Sep-02															
Oct-02															
Nov-02	182.94			190.65	188.68	188.49	189.11	188.96	188.61	188.52		195.89	195.71	194.83	193.99
Jan-03															
Mar-03	183.96			191.08	189.06	188.89	189.87	189.81	189.13	189.04		196.28	196.01	195.09	196.65
Jul-03	184.82			190.79	188.47	187.49	189.09	188.94	188.30	188.21		196.04	195.78	194.72	197.33
Nov-03	183.44			191.24	188.96	188.67	189.84	190.49	189.70	189.79	199.22	196.48	196.05	195.05	195.20
Mar-04	184.48				189.02		189.50	190.15	189.37	189.43	199.93	196.57	195.93	195.04	196.18
Jul-04	185.38			191.75	189.80	188.61	190.05	190.69	189.51	189.61	200.01	196.74	196.00	195.04	197.68
Nov-04	183.12	183.82	190.00	191.27	188.79	188.71	189.02	189.68	188.99	189.04		196.35	195.93	195.05	197.00
Jan-05															
Feb-05															
Mar-05	184.63	185.27	191.67	191.34	188.98		189.19	189.82	189.18	189.20	199.96		195.96	195.09	197.61
Apr-05						188.65						196.86			
May-05															
Jun-05															
Jul-05	185.61	183.12	189.09	190.90	189.04	187.42	189.50	190.17	188.26	188.10	199.48	195.71	195.59	194.54	197.58
Nov-05	182.61	183.94	190.12	190.60	188.55	188.40	189.31	189.90	188.41	188.40	198.96	195.95	195.79	194.90	194.56
Jan-06															
Feb-06															
Mar-06		185.34	191.80	191.68	188.97		189.73	190.39			199.97		195.80	195.04	196.41
Apr-06															
May-06															
Jun-06															
Jul-06		184.78	190.95		189.17	188.57	189.27		188.86	188.70	199.94	196.20	195.75		
Aug-06	184.75			190.87				189.02						194.72	197.39
Sep-06															
Oct-06															
Nov-06	182.19	184.42	190.59	191.36	189.00	188.69	190.05	189.87	189.77	189.71	200.09	196.48	195.85		
Dec-06														195.07	195.06
Jan-07															
Feb-07															
Mar-07												196.30	195.75		
Apr-07	183.76	185.26	191.77	191.55	188.56	188.38	189.62	189.49	189.51	189.60	200.14			195.08	196.73
May-07															
Jun-07															
Jul-07					189.00	187.97	189.24	189.15	188.62	188.36	199.90	195.87	195.77		
Aug-07	184.69	183.33	189.26	190.88										194.37	197.11
Sep-07															
Oct-07															
Nov-07	182.83	183.29	189.10				189.08	188.92	188.13	187.99		195.59	195.70	194.71	192.68
Dec-07				190.67	188.47	188.39					199.88				

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	5-IV	5-V	5-VI	16A	18A	18B	19A	19B	20A	20B	23B	33-II	33-III	40-II	41-I
T.O.P. ->	196.30	187.98	194.05	196.64	190.00	189.71	193.87	193.84	190.95	190.79	207.41	197.16	197.10	196.24	198.19
Mar-08				190.22			188.87	189.15					195.86		
Apr-08	Dry	185.76	192.14		189.42	188.68			190.06	189.77		196.82		195.07	195.54
Sep-08	184.72	184.22	190.27	190.02	188.82	188.42	188.42	188.73	189.35	189.04		196.47	195.87	194.99	197.28
Oct-08															
Mar-09				190.23			188.80	189.09							
Apr-09	Dry	185.89	192.32		flowing	188.72			190.23	189.78	198.71	196.85	196.00	195.12	197.99
Sep-09		183.09	Dry		189.07	188.03	188.20	188.50	188.94	188.55		195.86	195.61	194.61	197.28
Oct-09	184.15			189.58							198.27				
Mar-10	184.65	184.95	191.27				188.66	188.94							
Apr-10				190.05	188.81	188.56			189.69	189.42		196.55	195.95	195.05	197.49
Sep-10					188.41	187.81			188.60	188.22		195.77	195.73	194.83	196.40
Oct-10	184.08	182.87	188.77	189.17			187.90	188.20			198.30				
Dec-10															
Mar-11															
Apr-11	183.57	185.70	192.36	190.06		188.52	189.50	189.78	189.91	189.67	198.57	196.43	196.03	195.11	197.29
Sep-11															
Oct-11	183.84	183.70	189.69	190.10	189.11	188.49	188.44	188.68	189.66	189.33	198.32	196.35	196.01	195.10	196.71
Mar-12															
Apr-12	185.35	184.57	190.86	190.76	189.78	188.42	188.93	189.25	189.52	189.09	198.48	196.57	195.89	195.06	197.71
Sep-12															
Oct-12	185.11	182.74	188.68	189.77	187.90	187.28	187.75	187.99	188.39	188.17	198.64	195.65	195.63	194.81	196.61
Mar-13	185.19	184.42	190.81				188.54	188.82	189.57	189.30					
Apr-13				191.24	flowing	188.53					198.67	196.34	195.95	195.08	197.26
Jun-13															
Sep-13															
Oct-13	185.46	183.27	188.99	191.28	188.41	188.41	187.89	188.16	188.97	188.63	198.35	195.91	195.82	195.01	196.13
Dec-13															
Mar-14		184.11	190.23	191.75			188.57	188.80				196.23	195.91		
Apr-14									190.29					195.14	197.24
Jun-14															
Sep-14	185.91	183.50	189.41												
Oct-14				191.39	188.42	188.26	187.86	188.13	189.16	188.80	198.49	196.05	195.81	194.99	196.29
Nov-14															
Dec-14															
Mar-15	192.68	185.44	191.85	191.60	188.84	188.45	188.84	189.09	190.11	189.81	198.85	196.39	196.16	195.11	197.22
Jun-15															
Sep-15	192.46	183.25	189.12	191.22	188.38	187.34	187.88	188.15	188.58	188.18	198.48	195.75	195.57	194.77	196.38
Dec-15															
Mar-16															
Apr-16	192.31	185.15	191.60	192.25	189.40	188.48	189.22	189.52	189.67	189.35	198.44	196.68	196.10	195.06	197.62
Jun-16															
Jul-16															
Sep-16	191.76	182.53	188.68	190.48	187.71	186.23	187.68	187.98	187.49	187.12	197.86	195.02	195.00	193.82	196.53
Nov-16															
Mar-17	191.53	184.47	190.79	192.02			188.60	188.86				196.34	195.71		
Apr-17					189.16	188.45			190.18	189.78	198.31			195.07	196.90
Jun-17															
Sep-17															
Oct-17	191.26	183.39	189.30	191.18	188.13	187.67	187.95	188.22	188.63	188.28	198.51	195.77	195.52	194.60	196.26
Dec-17															
Mar-18	191.34	184.95	191.34	191.95						189.83		196.43	195.69		
Apr-18					flowing	188.46	190.10	189.93	190.30		198.71			195.09	197.35
Jun-18															
Sep-18	191.15	182.98	188.77	190.93	187.96	187.27	188.10	188.39	188.44	188.03	197.71	195.47	195.38	194.23	196.57
Dec-18															

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	5-IV	5-V	5-VI	16A	18A	18B	19A	19B	20A	20B	23B	33-II	33-III	40-II	41-I
T.O.P. ->	196.30	187.98	194.05	196.64	190.00	189.71	193.87	193.84	190.95	190.79	207.41	197.16	197.10	196.24	198.19
Mar-19	191.09	184.56	190.79				189.01	189.32							
Apr-19				191.81	flowing	188.41			189.98	189.13	199.00	196.52	195.27	194.98	197.24
May-19															
Aug-19	190.81	183.49	189.33	191.18	189.02	187.43	188.44	188.76	188.81	188.30		195.43	195.25	194.10	196.57
Oct-19											198.92				
Nov-19															
Mar-20															
Apr-20					flowing	188.37			190.13	189.71		196.70	195.68		
May-20	190.81	184.85	191.08	192.17			189.44	190.75			198.79			195.11	197.69
Jun-20															
Aug-20	190.27	183.14	188.95	190.96	188.77	187.20	188.14	188.44	188.36	187.76	198.74	194.98	194.96	193.59	195.67
Nov-20	190.24														
Mar-21	190.14	184.73	191.03	191.92	flowing	188.37	188.80	189.09	190.19	189.70					
Apr-21											198.98	196.45	195.60	195.00	197.20
May-21															
Sep-21	189.95	183.45	189.21	191.25	189.03	188.09	188.19	188.52	189.02	188.61	198.37	195.80	195.50	194.52	195.97
Nov-21															
Mar-22	190.16	185.17	191.39	192.25							198.83				
Apr-22					Flowing	188.35	189.53	189.81	189.88	189.57		196.72	195.79	195.11	197.05
Sep-22	190.17	182.15	188.96	190.85	188.66	187.00	188.10	188.38	188.29	187.76	200.70	195.26	195.27	193.84	196.43
Oct-22															
Mar-23	190.24	184.87	191.22	192.14	Flowing	188.36	189.64	189.98	189.97	189.53	198.75	196.46	195.61	195.01	197.03
Jun-23															
Sep-23	190.32	183.98	190.02	191.45	189.39	187.79	188.61	188.91	189.16	188.67	197.92	195.98	195.53	194.62	196.33
Nov-23															

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	41-II	44-I	44-II	44-III	46-I	46-II	46-III	48	50-I	50-II	50-III	52-I	52-II	53-I	54-II	61-I
T.O.P. ->	198.19	197.64	197.73	197.73	194.71	194.86	194.89	196.59	194.58	194.74	194.48	189.95	190.31	196.73	196.05	195.60
Mar-99	197.35	190.29		196.92	186.23	193.59	193.15	192.34	191.43	191.51	191.67	189.49		192.13	192.05	192.95
Jul-99	196.46	192.84	197.23	196.16	187.76	192.70	192.69	191.47	190.18	190.14	190.06	188.52	188.56	190.90	191.38	192.22
Dec-99	196.53	186.64	197.77	196.61	182.32	193.84	193.34	192.85	191.59	191.54	191.56	188.96	189.93	192.33	192.10	193.26
Apr-00	196.77	191.24	197.73	196.70	185.63	193.92	193.63	191.91	191.74	191.74	191.79	189.43	189.48	191.95	192.47	193.26
Aug-00	197.59	193.64	197.73	196.63	187.49	193.10	192.83	191.75	191.08	191.34	190.81	189.26	189.42	191.70	192.61	192.79
Nov-00	196.71	188.06	197.63	196.77	182.89	193.64	193.28	191.67	191.32	191.36	191.42	189.37	189.49	191.13	191.50	192.70
Apr-01	198.52	192.07	197.86	196.88	186.50	193.74	193.19	192.95	191.92	191.95	192.11	189.50	189.42	192.59	194.15	193.39
Jul-01	197.10	193.52	197.65	196.36	187.84	192.79	192.66	191.48	190.42	190.50	190.05	188.88	188.59	190.87	192.17	192.37
Dec-01	197.04	188.38	197.35	196.57	182.21	193.17	193.26	192.22	190.96	190.97	191.10	189.14	189.32	190.43	190.57	192.13
Feb-02																
Mar-02																
Apr-02	198.48	192.81	197.78	196.76	186.24	194.05	194.02	194.15	192.30	192.24	192.41	189.05	190.04	192.63	194.07	193.58
May-02																
Jun-02																
Jul-02																
Aug-02	197.40	194.52	197.68	196.42	187.94	193.22	192.95	192.29	190.95	190.92	190.86	188.98	189.22	191.47	192.51	192.80
Sep-02																
Oct-02																
Nov-02	196.70	187.97	197.41	196.52	183.13	192.61	192.61	191.59	190.30	190.26	190.26	188.99	189.30	190.25	191.11	191.92
Jan-03																
Mar-03	197.08	191.87	197.68	196.75	186.79	193.49	193.73	192.10	190.92	190.87	190.88	189.56	189.66	191.21	191.13	192.58
Jul-03	197.16	193.90	197.51	196.44	188.49	192.85	192.64	191.54	190.43	190.27	190.18	188.54	188.42	190.99	192.06	192.39
Nov-03	197.65	188.45	197.65	196.76	183.95	193.88	193.70	192.53	191.41	191.74	191.60	189.33	189.34	191.31	191.28	193.03
Mar-04		192.24	197.73	196.77	186.89	193.72	193.45	192.13	192.33	191.44	191.42	189.53		191.77		193.13
Jul-04	198.19	194.96	197.73	196.91	188.88	193.83	193.43	192.85	191.72	192.25	191.53	189.56	189.51	192.42		193.48
Nov-04	197.49	195.14	196.84		186.80	193.41	193.10	191.57	191.27	191.30	191.33	189.40	189.43	191.63		192.74
Jan-05																
Feb-05																
Mar-05	197.91	196.03		196.82	189.18	193.54	193.22	191.99	191.32	191.35	191.39	189.53	189.60	191.33		192.82
Apr-05																
May-05																
Jun-05																
Jul-05	196.91	196.54	197.33	196.26	190.30	192.38	192.32	191.34	190.15	190.00	189.92	188.25	188.26	190.96		191.98
Nov-05	196.68	194.36	197.14	196.55	184.66	192.32	192.49	191.67	189.80	189.84	189.97	188.61	189.25	189.79		191.40
Jan-06																
Feb-06																
Mar-06		195.49		196.73	188.75	193.71	193.38	192.78	191.58	191.57	191.68	189.42		192.41		193.18
Apr-06																
May-06																
Jun-06																
Jul-06								192.04								
Aug-06	197.01	196.08	197.42	196.27	190.02	192.95	192.75		190.63	190.55	190.47	188.81	188.81	190.95	191.83	192.44
Sep-06																
Oct-06																
Nov-06					183.99	193.94	193.65	192.86	191.97	191.87	191.83	189.49	189.50	192.06	191.63	193.33
Dec-06	198.13	189.87	197.73	196.90												
Jan-07																
Feb-07																
Mar-07					187.61	193.66	193.36		191.33	191.31	191.27					192.98
Apr-07	198.19	193.82	197.73	196.76				193.47				189.50	189.45	192.43	193.07	
May-07																
Jun-07																
Jul-07								191.75								
Aug-07	196.47	195.12	197.12	196.17	189.39	192.44	192.39		189.99	189.90	189.80	188.50	188.40	191.02	191.76	191.99
Sep-07																
Oct-07																
Nov-07	196.04	189.55	197.04	196.47				191.28								
Dec-07					183.21	192.60	192.77		189.76	189.84	189.99	188.80	189.22	190.21	190.25	191.53

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	41-II	44-I	44-II	44-III	46-I	46-II	46-III	48	50-I	50-II	50-III	52-I	52-II	53-I	54-II	61-I
T.O.P. ->	198.19	197.64	197.73	197.73	194.71	194.86	194.89	196.59	194.58	194.74	194.48	189.95	190.31	196.73	196.05	195.60
Mar-08					187.14	193.87		192.36	191.96	191.97	192.10					193.26
Apr-08	198.19	194.15	197.73	196.74			193.30					189.41	189.33	192.33	194.71	
Sep-08	197.80	192.32	197.73	196.71	188.12	193.57	193.16	192.32	191.53	191.47	191.58	189.33	189.27	192.04	192.99	193.10
Oct-08																
Mar-09					190.69	193.64	193.42	192.65	191.72	191.80	192.08			192.42	193.35	193.04
Apr-09	flowing	195.43	flowing	196.80									188.84			
Sep-09	196.69	193.33	197.39	196.34	188.07	193.16	193.23	191.68	190.60	190.48		188.98	188.43	190.87	191.24	192.39
Oct-09											190.91					
Mar-10					190.93	194.15	193.86	192.39								193.20
Apr-10	198.14	195.48	197.73	196.68					191.58	191.46	191.37	189.44	189.30	192.04	192.48	
Sep-10	196.70	193.61	196.95	196.17												
Oct-10					189.71	193.39	193.31	191.52	189.97	189.85	189.76	188.35	188.44	190.44	194.83	192.25
Dec-10																
Mar-11					192.99	194.13	193.65		192.11	192.11	192.14					193.32
Apr-11	flowing	195.63	flowing	196.82				192.40				189.60	189.45	192.49	194.74	
Sep-11																
Oct-11	197.26	194.02	197.53	196.66	190.93	193.88	193.12	191.99	190.98	191.03	191.04	189.49	189.11	191.79	191.91	193.15
Mar-12																
Apr-12	flowing	195.74	flowing	196.64	193.18	193.74	193.11	192.08	191.51	191.54	191.72	189.41	189.20	191.81	193.56	193.18
Sep-12																
Oct-12	196.48	194.49	197.08	196.47	192.24	192.73	192.63	191.67	189.75	189.64	189.54	188.30	188.60	190.03	190.27	191.78
Mar-13					193.06	194.05	193.70	192.37	191.51	191.53	191.67					
Apr-13	197.79	195.66	flowing	196.79								189.47	189.26	192.33	192.60	193.48
Jun-13																
Sep-13																
Oct-13	196.70	194.77	197.19	196.49	192.91	193.64	193.02	192.05	190.72	190.79	190.79	189.03	189.12	190.86	191.04	192.62
Dec-13																
Mar-14					193.37	193.74	193.37	192.80	192.02	192.04				192.03	191.95	192.92
Apr-14	198.19	196.14	197.73	196.81								189.59	189.39			
Jun-14																
Sep-14																
Oct-14	196.95	195.24	197.30	196.60	193.20	193.64	193.06	192.05	190.99	191.00	190.95	189.19	189.04	191.39	191.37	192.82
Nov-14																
Dec-14																
Mar-15	197.48	196.44	flowing	196.79	193.44	194.01	193.65	191.93	191.58	191.59	191.63	189.46	189.18	191.66	191.46	193.07
Jun-15																
Sep-15	196.93	193.71	flowing	196.79	193.07	193.17	192.88	191.62	190.21	190.08	189.99	188.47	188.64	190.97	191.21	192.28
Dec-15																
Mar-16																
Apr-16	198.19	195.93	flowing	196.67	193.59	193.69	193.00	193.08	191.70	191.69	191.91	189.49	189.14	192.78	193.81	193.28
Jun-16																
Jul-16																
Sep-16	196.03	193.47	196.85	195.87	192.83	192.03	191.51	191.17	189.17	189.10	189.02	186.70	187.54	189.75	189.82	191.33
Nov-16																
Mar-17								192.13				189.50	189.18	192.55	191.77	
Apr-17	198.19	195.48	flowing	196.61	193.17	193.96	193.44		192.16	192.15	192.29					193.39
Jun-17																
Sep-17																
Oct-17	196.80	194.28	197.40	196.45	193.10	193.17	192.66	191.57	190.59	190.48	190.37	188.38	188.43	191.08	191.40	192.47
Dec-17																
Mar-18					193.39	193.84	193.24	192.72	191.68	191.68	191.71			192.52	191.83	193.13
Apr-18	198.19	195.84	flowing	196.74								189.48	189.14			
Jun-18																
Sep-18	196.50	193.92	197.19	196.17	187.50	192.69	192.32	191.61	189.84	189.76	189.65	187.86	188.18	190.50	190.75	191.86
Dec-18																

NOTES:
1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	41-II	44-I	44-II	44-III	46-I	46-II	46-III	48	50-I	50-II	50-III	52-I	52-II	53-I	54-II	61-I
T.O.P. ->	198.19	197.64	197.73	197.73	194.71	194.86	194.89	196.59	194.58	194.74	194.48	189.95	190.31	196.73	196.05	195.60
Mar-19					189.45	193.61	193.15									
Apr-19	198.04	195.78	flowing	195.43				192.24	191.89	191.91	192.18	189.49	189.11	192.17	191.49	193.12
May-19																
Aug-19	196.82	193.48	197.34	195.93	187.95	192.71	192.15	191.58	190.30	190.21	190.11	188.04		191.12	191.65	192.26
Oct-19																
Nov-19																
Mar-20					189.90	194.11	193.47									
Apr-20								193.00								193.52
May-20	flowing	196.04	flowing	196.46					191.82	191.75	191.97	189.38		192.66	193.72	
Jun-20																
Aug-20	196.29	191.69	197.09	195.66	186.21	192.12	191.55	191.67	189.69	189.57	189.47	187.49		190.65	191.04	191.70
Nov-20																
Mar-21							193.24	192.38						192.41	191.87	
Apr-21	198.11	195.20	Flowing	196.60	188.89	194.00			192.03	191.93	191.96	189.39				193.38
May-21																
Sep-21	196.72	193.32	197.31	196.25	187.67	193.22	192.64	191.91	190.76	190.77	190.73	188.64		191.15	190.92	192.45
Nov-21					187.99											
Mar-22					189.61	193.73	193.12	193.00						192.75	192.96	193.33
Apr-22	Flowing	195.54	Flowing	196.58					191.89	192.62	192.08	189.49				
Sep-22	196.54	193.64	197.11	196.06	186.99	192.07	191.48	191.24	189.70	189.59	189.48	187.78		190.73	190.94	191.66
Oct-22													187.90			
Mar-23	198.12	195.32	Flowing	196.44	188.45	193.81	193.06	192.69	191.99	191.83	191.91	189.38	189.17	192.59	193.64	193.29
Jun-23																
Sep-23	197.32	193.85	197.43	196.26	187.16	193.17	192.55	191.83	190.66	190.56	190.47	188.79	188.63	191.61	191.66	192.59
Nov-23																

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	61-II	61-III	62-I/IR	62-II	63-I	63-II	63-III	64-I	64-II	66-I	66-II	66-III	70-I	70-II	70-III	74-II
T.O.P. ->	195.76	195.66	191.95	192.01	193.29	193.28	192.98	190.10	190.16	199.06	199.13	198.92	195.05	195.97	194.91	195.91
Mar-99	192.96	193.17	187.40	190.86	191.18	191.10	191.36	189.16	188.74	188.73	196.74	196.95	194.90		194.76	194.70
Jul-99	192.50	192.72	188.30	189.27	190.22	190.07	190.24	188.60	187.70	190.14	196.12	196.30	194.31	194.93	194.51	193.88
Dec-99	193.52	193.22	186.22	190.80	191.49	191.37	191.80	189.18	188.48	186.41	196.72	196.90	194.75	195.05	194.61	194.58
Apr-00	193.33	192.26	187.75	190.83	191.53	191.45	191.85	188.70	189.26	186.59	196.76	196.94	195.15	195.20	194.68	194.56
Aug-00	193.08	192.98	188.61	189.45	190.88	190.75	191.02	188.19	189.22	188.16	196.42	196.57	195.09	195.04	194.41	193.92
Nov-00	192.80	193.02	185.93	190.85	190.95	190.96	191.11	188.91	188.61	187.06	196.50	196.74	195.05	195.24	194.63	194.40
Apr-01	193.71	193.20	187.64	190.26	191.61	191.53	191.93	189.78	189.05	186.48	196.73	196.87	195.08	195.00	194.61	194.44
Jul-01	192.65	192.69	188.23	189.13	190.41	190.24	190.45	188.95	188.11	187.46	196.11	196.30	194.82	194.98	194.21	193.21
Dec-01	192.41	192.93	185.23	190.47	190.53	190.51	190.40	188.78	188.06	186.36	196.57	196.88	195.04	194.76	194.55	194.33
Feb-02																
Mar-02																
Apr-02	193.85	193.93	187.42	190.99	191.86	191.80	192.28	189.30	189.23	188.20	196.96	197.12	195.03	195.32	194.57	194.72
May-02																
Jun-02																
Jul-02																
Aug-02	193.18	193.04	188.39	189.90	190.90	190.74	191.05	188.98	188.22	189.64	196.27	196.54	195.07	195.11	194.48	194.07
Sep-02																
Oct-02																
Nov-02	192.39	192.66	185.72	189.57	190.14	190.02	190.09	188.61	188.73	186.32	196.21	196.46	194.79	194.96	194.20	193.46
Jan-03																
Mar-03	192.84	193.31	187.32	190.79	190.86	190.78	190.95	189.65	189.19	188.02	196.65	196.97			194.77	194.47
Jul-03	192.79	192.78	188.20	189.13	190.42	190.26	190.52	188.74	188.00	189.30	196.16	196.39	194.90	194.89	194.10	193.58
Nov-03	193.29	193.27	190.92	190.80	191.34	191.29	191.59	189.27	188.44	186.72	196.76	196.92	194.86	194.93	194.27	194.56
Mar-04	193.29	193.28	189.89	190.64	191.45	191.34	191.75		189.08	188.08	196.68	196.91				194.61
Jul-04	193.78	193.61	190.27	190.35	191.80	191.62	192.14	189.53	189.09	189.47	196.85	197.24				194.46
Nov-04	192.93	193.00	189.89	189.81		190.90	191.03	189.07	188.61	195.95	196.48	196.67			194.61	193.96
Jan-05																
Feb-05																
Mar-05	193.11	193.16	190.47	190.41		190.99	191.25		189.33	196.41	196.58	196.80	195.04			194.42
Apr-05																
May-05																
Jun-05																
Jul-05	192.51	192.32	189.63	188.87		189.92	190.21	188.85	188.04	196.11	195.90	196.14	194.56	194.64	193.94	193.35
Nov-05	191.01	192.63	190.55	190.46		189.57	189.52	188.45	187.76	195.66	196.35	196.72	194.77		194.13	193.80
Jan-06																
Feb-06																
Mar-06	193.54	193.22	190.10	190.13		191.37	191.77	188.99	188.96	196.31	196.70	196.88				195.11
Apr-06																
May-06																
Jun-06																
Jul-06			190.18	190.15				189.23	188.68	195.76	196.30	196.53				194.33
Aug-06	192.77	192.87			190.44	190.31	190.53						194.91	194.93	194.75	
Sep-06																
Oct-06																
Nov-06	193.75	193.54	191.08	191.00	191.76	191.53	191.93	189.23	188.43	196.13	196.69	196.91	194.94	194.93	194.66	
Dec-06																194.72
Jan-07																
Feb-07																
Mar-07	193.22	193.29			191.68	191.10	191.38			195.93	196.36	196.55				194.01
Apr-07			190.60	190.57					189.07				flowing	194.93	194.67	
May-07																
Jun-07																
Jul-07			189.87	189.34						195.70	196.06	196.31		194.44		193.74
Aug-07	192.48	192.67			189.02	189.70	190.04	188.83	187.96				194.43		194.07	
Sep-07																
Oct-07																
Nov-07				189.01				188.44	187.83	195.36	195.99	196.30				
Dec-07	192.13	192.80	188.62		189.66	189.57	189.51						194.79	194.80	194.41	193.28

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	61-II	61-III	62-I/IR	62-II	63-I	63-II	63-III	64-I	64-II	66-I	66-II	66-III	70-I	70-II	70-III	74-II
T.O.P. ->	195.76	195.66	191.95	192.01	193.29	193.28	192.98	190.10	190.16	199.06	199.13	198.92	195.05	195.97	194.91	195.91
Mar-08	193.60	193.26	191.20							196.24	196.79	196.99				194.75
Apr-08				191.02				189.85	189.28				flooded	flooded	flooded	
Sep-08	193.49	193.19	189.92	190.99				189.35	188.72	196.19	196.69	197.00	flooded	flooded	flooded	194.70
Oct-08																
Mar-09	193.39	193.29	190.40	190.41												195.22
Apr-09								189.70	189.38	196.40	196.78	196.96		flowing	194.79	
Sep-09	192.99			189.31				189.00	188.04	195.49	196.02	196.13	195.03	flowing	194.53	193.73
Oct-09		193.46	189.89													
Mar-10	193.46	193.71						189.39	189.07							194.66
Apr-10			190.05	190.09						196.19	196.58	196.75	194.72	flowing	194.69	
Sep-10								188.70	187.88				194.77	flowing	194.65	
Oct-10	192.88	193.38	189.83	188.78						195.45	196.02	196.26				193.59
Dec-10																
Mar-11	193.75	193.53								196.47	196.93	197.29				194.80
Apr-11			191.09	191.05				189.29	189.13				flowing	flowing	194.79	
Sep-11																
Oct-11	193.41	193.30	190.27	190.25				189.30	188.77	195.81	196.32	196.56	flowing	flowing	194.82	194.32
Mar-12																
Apr-12	193.53	193.21	189.97	190.03				189.46	188.83	196.15	196.52	196.74	flowing	flowing	194.73	194.23
Sep-12																
Oct-12	192.49	192.98	189.86	189.25				188.55	187.62	195.30	195.92	196.17	194.86	flowing	194.53	193.35
Mar-13			190.48	190.44												194.52
Apr-13	193.71	193.89						189.23	189.17	196.12	196.62	196.92	flowing	flowing	flowing	
Jun-13																
Sep-13																
Oct-13	192.99	193.10	190.09	190.07				188.98	188.11	195.61	196.23	196.56	194.98	flowing	194.71	193.94
Dec-13																
Mar-14	193.34	193.21	183.37	190.84				189.21	189.03	196.00	196.53					194.56
Apr-14				189.69												
Jun-14																
Sep-14																
Oct-14	193.13	193.10	185.62		191.14	190.96	190.76	188.94	188.24	195.68	196.19	196.44	flowing	flowing	194.73	194.13
Nov-14																
Dec-14																
Mar-15	193.39	193.32	184.87	190.73	191.55	191.39	191.29	188.94	189.28	196.04	196.63	197.02	194.79	flowing	194.83	194.41
Jun-15																
Sep-15	192.71	193.03	184.90	188.99	190.60	190.20	190.16	188.75	188.02	195.32	195.93	196.20	194.67	flowing	194.72	193.52
Dec-15																
Mar-16										196.25	196.87	197.22				194.65
Apr-16	193.67	193.23	186.75	190.87	191.74	191.46	191.46	189.43	189.25				194.79	flowing	194.81	
Jun-16																
Jul-16																
Sep-16	191.58	191.64	184.98	187.86	189.51	189.24	189.20	188.46	187.23	194.58	195.34	195.60				192.30
Nov-16																
Mar-17			186.33	190.82	191.66	191.52	191.67	189.16	189.02							
Apr-17	193.97	193.75								196.31	196.93	197.25				194.66
Jun-17																
Sep-17																
Oct-17	192.94	192.97	185.78	189.29	190.90	190.66	190.59	188.93	187.95	195.35	195.98	196.21				193.49
Dec-17																
Mar-18	193.63	193.33	187.15	190.44	191.63	191.43	191.41			196.20	196.74	197.09				194.56
Apr-18								189.25	189.26							
Jun-18																
Sep-18	192.49	192.74	185.47	189.09	190.08	189.84	189.78	188.97	187.84	195.10	195.84	196.13				193.19
Dec-18																

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	61-II	61-III	62-I/IR	62-II	63-I	63-II	63-III	64-I	64-II	66-I	66-II	66-III	70-I	70-II	70-III	74-II
T.O.P. ->	195.76	195.66	191.95	192.01	193.29	193.28	192.98	190.10	190.16	199.06	199.13	198.92	195.05	195.97	194.91	195.91
Mar-19										195.89	196.43	196.75				
Apr-19	193.35	193.42	187.07	191.14	191.59	191.62	191.58	189.07	189.25							194.51
May-19																
Aug-19	192.72	192.63	184.94	189.18	190.58	190.33	190.33	188.89	188.10	194.97	195.77	196.08				193.22
Oct-19																
Nov-19																
Mar-20																
Apr-20	193.94	193.51	186.93	191.09	191.96	191.82	191.90			196.28	196.82	196.12				
May-20								189.66	188.93							194.38
Jun-20																
Aug-20	192.15	192.05	185.33	188.67	189.96	189.71	189.74	188.86	187.94	194.52	195.45	195.73				192.76
Nov-20																
Mar-21			186.94	191.02	191.67	191.70	191.76	189.27	189.09	195.99	196.50	196.82				
Apr-21	193.69	193.37														
May-21																
Sep-21	192.90	192.95	185.81	189.80	190.81	190.55	190.34	188.90	188.24	195.56	196.00	196.23				193.69
Nov-21																
Mar-22	193.72	193.33	187.29	191.21	191.58	191.39	191.30	189.18	189.06	196.42	197.05	197.48				194.66
Apr-22																
Sep-22	192.08	192.06	184.92	188.67	189.94	189.65	189.75	188.77	188.03	196.82	195.59	195.90				192.86
Oct-22																
Mar-23	193.66	193.26	186.25	190.74	191.77	191.60	191.68	189.83	189.20	196.29	196.72	197.05				194.41
Jun-23																
Sep-23	193.05	192.95	185.23	189.69	190.90	190.65	190.57	189.09	188.46	195.61	196.13	196.41				193.93
Nov-23																

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	74-III	75-I	75-II	76-I	77-I	81-I	81-II	81-III	84-I	84-II	85-I	85-II	86-I	86-II	86-III	87-I
T.O.P. ->	195.99	191.18	191.23	190.49	195.36	199.85	199.90	200.00	202.17	202.12	198.80	198.75	195.73	195.69	195.75	200.35
Mar-99	195.17	182.26	190.10	172.19		192.44	194.13	194.70								
Jul-99	194.04	182.44	189.10	172.87		192.10	193.54	193.84								
Dec-99	194.94	182.07	190.02	172.36	194.85	192.30	194.10	194.60								
Apr-00	194.95	182.39	189.99	173.09	194.85	192.19	193.93	194.72								
Aug-00	194.05	182.68	189.61	173.76	194.64	198.17	193.92	194.35								
Nov-00	194.84	181.82	190.05	172.27	194.85	192.02	193.31	193.52	198.64	198.56		197.92	195.38	194.49	194.41	199.36
Apr-01	194.67	181.62	190.03	173.12	194.86	192.31	194.53	195.09								
Jul-01	193.27	181.45	189.26	173.64	194.25	191.99	193.58	193.94								
Dec-01	194.69	181.59	189.81	172.71	194.76	192.13	191.01	194.35								
Feb-02																
Mar-02																
Apr-02	195.11	181.57	190.11	173.79	194.82	192.81	194.67	195.22								
May-02																
Jun-02																
Jul-02																
Aug-02	194.25	181.68	189.50	174.56	194.61	192.22	194.23	194.68								
Sep-02																
Oct-02																
Nov-02	193.67	181.52	189.39	173.85	194.67	191.99	193.60	193.75								
Jan-03																
Mar-03	195.12	181.57	190.00	174.77		192.11	193.84	194.62								
Jul-03	193.79		189.18	175.51	194.26	192.01	193.82	194.25								
Nov-03	195.21	181.66	190.05	174.70	194.81	192.22	194.36	194.90								
Mar-04	195.05	181.62	190.04	190.49		192.31	194.39	194.90								
Jul-04	194.72	181.72	190.07	176.31	194.85	192.43	194.73	195.07								
Nov-04	194.20	181.83	190.01	173.28	194.80	192.05	193.67	194.00								
Jan-05									199.33	199.09				194.40		199.85
Feb-05									197.72	197.54	198.04	197.86				
Mar-05	195.09	181.85	190.05	174.34		192.14	193.63	193.93	198.99	198.94	198.07	197.96	194.96			199.71
Apr-05					195.06				199.76	199.70	197.46	197.97	195.27	194.91	194.82	199.88
May-05									199.19	198.93		197.69	194.29	194.44	194.34	199.37
Jun-05									198.62	198.42		197.49	195.04	195.22	194.11	199.03
Jul-05	193.59		188.92	175.29	194.01	191.94	193.48	193.77								
Nov-05	194.24		189.43	172.59	194.68	192.00	193.95	194.57								
Jan-06									199.55	199.50	198.63	197.65				198.79
Feb-06									199.47	199.27	198.68	197.79				199.00
Mar-06	194.76		189.98	173.86	194.96	192.31	194.41	194.89	199.44	199.22	198.67	197.79				199.11
Apr-06									199.29	199.08	198.70	197.92	195.41	194.84		199.06
May-06									199.48	199.20	198.67	197.82	195.38	194.86		199.08
Jun-06									199.07	198.79	198.67	197.30	195.31	195.06	194.88	197.91
Jul-06	194.71					192.23	193.98	194.38	198.67	198.40	198.58	197.90	195.42	194.92	194.83	198.71
Aug-06			189.26	174.93	194.67				198.37	198.15	198.36	197.63	195.09	194.56	194.46	198.36
Sep-06									198.24	198.03	198.44	197.92	195.24	194.85	194.78	198.38
Oct-06									198.67	198.58	198.65	198.05	195.43	194.97	194.88	198.97
Nov-06			190.06			192.37	194.56	195.09	199.43	199.18	198.80	198.13	195.65	194.99	194.89	199.23
Dec-06					194.85				199.63	199.40	198.80	198.10	195.73	194.91	194.86	199.26
Jan-07									199.32	199.05	198.80	198.04		194.81	194.72	199.01
Feb-07									198.91	198.65		197.93		194.79	194.72	198.84
Mar-07	194.23		190.11			192.10	193.75	194.08	199.18	199.03	198.80	198.03		194.91		199.14
Apr-07		182.60		172.85	194.78				199.65	199.55	198.80	198.06	195.40	194.95	194.88	199.32
May-07									199.30	199.04	198.80	198.07	195.24	194.86	194.77	199.12
Jun-07									198.78	198.48	198.72	197.98	195.15	194.67	194.56	198.70
Jul-07	193.91					192.13	193.67	193.98	198.44	198.22	198.50	197.76	194.91	194.49	194.40	198.39
Aug-07			188.68	173.79	193.83				198.18	197.99	198.26	197.54	194.69	194.34	194.25	198.14
Sep-07									197.88	197.70	198.17	197.64	194.55	194.33	194.30	197.88
Oct-07									197.72	197.54	198.25	197.91	194.87	194.77	194.72	198.13
Nov-07					194.59	191.84	193.16	193.47	197.78	197.71	198.37	197.96	195.08	194.92	194.88	198.44
Dec-07	193.58	182.96	189.26	171.80					197.93	197.80	198.30	197.80	195.03	194.81	194.79	198.45

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	74-III	75-I	75-II	76-I	77-I	81-I	81-II	81-III	84-I	84-II	85-I	85-II	86-I	86-II	86-III	87-I
T.O.P. ->	195.99	191.18	191.23	190.49	195.36	199.85	199.90	200.00	202.17	202.12	198.80	198.75	195.73	195.69	195.75	200.35
Mar-08						192.26	194.35	194.78			198.80	198.07	195.39	195.05	195.09	
Apr-08	195.40			Dry	195.09				200.07	199.69						199.64
Sep-08	195.21			172.20	195.11	192.29	194.13	194.46	199.23	198.95						
Oct-08											flowing	198.05	195.47	195.21	195.07	199.29
Mar-09	194.88															
Apr-09				174.12	194.90	192.55	194.68	195.24	199.77	199.44	flowing	198.31	195.46	194.98	194.88	199.38
Sep-09				173.70	194.65	192.02	193.47	Dry					194.85	194.59	194.44	198.24
Oct-09	194.72								198.22	198.11	198.51	198.17				
Mar-10	195.12					192.37	194.58	195.08			198.17	197.99	195.44	195.09	194.90	198.49
Apr-10				176.04	194.83				196.74	195.47						
Sep-10						191.82	193.20	193.48	198.22	197.99			194.84	194.64	194.47	197.70
Oct-10	193.94			174.87	194.78						197.84	197.47				
Dec-10																
Mar-11	195.22					192.35	194.56	195.57	198.97	199.03	198.29	198.10	195.51	195.23	195.06	198.73
Apr-11				176.64	194.94											
Sep-11									198.32	198.15	198.02	197.50				
Oct-11				173.87	194.72	192.11	193.57	193.83					195.16	195.01	194.85	197.56
Mar-12									199.46	199.23	198.49	197.94	195.60	195.09	194.90	198.67
Apr-12				175.77	194.88	192.23	193.96	194.48								
Sep-12									197.93	197.69	197.77	197.44	194.96	194.80	194.65	197.67
Oct-12				175.98	194.78	191.77	193.07	193.45								
Mar-13						192.20	193.98	194.22	198.74	198.54	198.47	198.10	195.36		194.90	198.57
Apr-13				177.53	194.92									195.01		
Jun-13																
Sep-13									198.27	198.06	197.42	197.80	195.10	194.94	194.79	197.76
Oct-13	194.97			177.85	194.88	192.08	193.39	193.57								
Dec-13																
Mar-14									198.78	198.63	198.37	198.04				198.41
Apr-14				179.10									195.23	195.16	194.97	
Jun-14																
Sep-14									198.36	198.25	197.78	197.87	195.13	194.99	194.84	195.73
Oct-14	194.50	186.64	189.80	179.09		192.16	193.67	193.88								
Nov-14																
Dec-14																
Mar-15	195.04	184.37	189.98	180.29	194.85	192.32	193.95	197.08	198.61	198.37	197.87	197.25	195.25	195.11	194.92	197.97
Jun-15									198.87	198.99						
Sep-15	193.87	183.34	189.08	180.00	194.71	191.89	193.41	193.66	198.10	198.07	197.82	197.49	195.02	194.89	194.70	197.33
Dec-15									198.37	198.32	198.32	197.69	195.56	195.00	194.82	198.43
Mar-16	195.18								198.97	199.03	198.51	198.10	195.40	195.12	194.94	198.49
Apr-16		183.28	189.95	181.30	194.86	192.34	194.43	195.34								
Jun-16									198.38	198.26	198.13	197.51	195.23	194.79	194.58	198.09
Jul-16									198.01	197.87	197.51	197.04	194.57	194.27	194.03	197.36
Sep-16	192.14	183.52	187.78	181.03	193.68	191.48	192.62	193.45	197.69	197.58	197.15	196.89	194.54	194.37	194.20	196.56
Nov-16									197.44	197.30	197.29	196.99	194.87	194.67	194.52	196.79
Mar-17		183.08	189.98	181.94		192.14	194.12	195.45	198.87	198.83	198.46	198.19	195.33	195.09	194.88	198.50
Apr-17	195.25				194.81											
Jun-17									199.08	199.19	198.64	198.34	195.35	195.08	194.85	198.70
Sep-17									198.25	198.14	198.25	197.70	195.08	194.85	194.63	197.54
Oct-17	193.85	183.50	189.34	181.84	194.52	191.87	193.37	193.92								
Dec-17									198.26	198.11	198.34	197.83	195.38	195.02	194.82	198.37
Mar-18	195.04	182.78	190.00	182.45					198.85	198.91	198.58	198.29	195.34		194.91	198.66
Apr-18					194.84	192.36	194.43	195.49						195.12		
Jun-18									198.69	198.59	198.17	197.73	195.15	194.59	194.92	198.23
Sep-18	193.48	182.47	188.56	182.29	194.08	191.81	193.16	193.62	198.04	197.93	197.70	197.26	194.67	194.52	194.31	197.38
Dec-18									198.64	198.70	198.40	197.99	195.39	195.00	194.81	198.37

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	74-III	75-I	75-II	76-I	77-I	81-I	81-II	81-III	84-I	84-II	85-I	85-II	86-I	86-II	86-III	87-I
T.O.P. ->	195.99	191.18	191.23	190.49	195.36	199.85	199.90	200.00	202.17	202.12	198.80	198.75	195.73	195.69	195.75	200.35
Mar-19						192.27	193.60	195.48	198.44	198.26	198.32	198.17				197.99
Apr-19	194.79	182.87	190.04	182.93	194.65								195.39	194.95	194.96	
May-19									199.26	199.21	198.61	198.18	195.47	195.04	194.81	198.55
Aug-19	193.49	182.88	188.80	182.58	193.72	191.92	193.44	194.02	198.19	198.06	197.75	197.20	194.66	194.37	194.15	197.51
Oct-19																
Nov-19									198.14	198.08	198.25	197.73	195.35	194.98	194.79	198.15
Mar-20									198.94	198.15	198.62	198.29	195.59	195.26	195.02	198.53
Apr-20				183.55		192.51	194.60	195.45								
May-20	195.00	182.49	190.07													
Jun-20									198.74	198.60	198.20	197.79	195.44	194.97	194.76	197.37
Aug-20	192.82	182.22	188.10	182.21	193.34	191.77	193.12	193.70	197.98	197.81	197.52	197.60	194.49	194.20	193.95	197.05
Nov-20									198.03	197.92	198.06	198.59	195.34	194.86	194.69	197.79
Mar-21	194.96			182.87	194.80	192.16	193.78	194.75	198.53	198.48	198.37	198.01	195.37	195.09	194.87	198.42
Apr-21		182.36	190.01													
May-21									198.72	198.57	197.93	197.51	195.16	194.77	194.55	197.43
Sep-21	194.07	182.21	189.42	182.70	194.60	192.47	193.32	193.73	198.17	198.12	197.68	197.49	195.12	194.85	194.65	196.24
Nov-21									198.85	198.80	198.44	197.90	195.70	195.03	194.82	198.45
Mar-22	195.10	182.37	190.10	183.51		192.46	194.32	195.48	198.65	198.59	198.51	198.03	195.54	194.98	194.81	198.29
Apr-22					194.80											
Sep-22	192.96	182.02	188.18	183.26	193.53	191.63	192.99	193.62	196.80	197.09	197.53	197.09	194.90	194.48	194.24	197.20
Oct-22																
Mar-23	195.06	182.40	189.93	184.01	194.83	192.31	194.20	195.44	198.36	200.90	198.36	197.90	195.64	195.10	194.86	198.32
Jun-23									198.09	198.29	197.97	197.65	195.36	194.91	194.69	197.39
Sep-23	194.38	182.28	189.33	183.62	194.22	192.11	193.63	194.10	197.95	198.07	197.72	197.30	195.11	194.72	194.49	197.23
Nov-23									197.56	197.77	197.95	197.47	195.68	194.95	194.76	197.85

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
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Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	87-II	87-III	88-I	88-II	88-III	89-I	89-II	89-III	91-I	91-II	91-III	92-I	92-II
T.O.P. ->	200.31	200.39	207.52	207.52	207.37	202.77	203.14	203.22	206.55	206.56	206.69	200.46	200.47
Mar-99													
Jul-99													
Dec-99													
Apr-00													
Aug-00													
Nov-00	199.16	198.84	206.33	206.52	206.50	198.32	198.29	198.47	201.29	200.81	201.11	198.08	197.87
Apr-01													
Jul-01													
Dec-01													
Feb-02													
Mar-02													
Apr-02													
May-02													
Jun-02													
Jul-02													
Aug-02													
Sep-02													
Oct-02													
Nov-02													
Jan-03													
Mar-03													
Jul-03													
Nov-03													
Mar-04													
Jul-04													
Nov-04													
Jan-05	199.07	198.72			206.21	199.87	199.50	200.08	202.52	202.25	203.92	198.25	197.77
Feb-05	199.09	198.76				198.89	199.04	199.21	202.02	201.53	203.29	198.06	199.73
Mar-05	199.34	199.05	206.86			199.18	199.22	199.64	201.77	201.12	202.02	198.15	198.00
Apr-05	199.41	198.98	206.93	206.71	206.58	200.21	200.27	201.04	201.38	201.13	204.91	198.86	198.42
May-05	198.97	198.70	207.42	206.32	206.25	199.63	199.24	199.74	202.26	201.89	203.58	198.14	197.72
Jun-05	198.75	198.41	205.83	205.74	205.64	198.76	198.49	198.83	201.37	200.89	201.82	197.58	197.19
Jul-05													
Nov-05													
Jan-06	199.07	198.87	206.92	206.83	206.69	199.85	199.92	200.62	199.90	199.45	200.57	197.80	197.53
Feb-06	198.81	198.70		206.47		199.88	199.80	200.46	199.81	199.44	200.51	197.52	196.53
Mar-06	198.87	198.74	206.55	206.67	206.57	199.81	199.75	200.42	199.79	199.44	200.56	198.20	197.67
Apr-06	198.78	198.66	206.61	206.53	206.48	199.66	199.50	200.10	199.81	199.44	200.57	197.49	197.45
May-06	198.75	198.59	206.61	206.43	206.37	199.61	199.53	199.97	200.00	199.58	201.47	198.04	197.52
Jun-06	198.57	198.13	206.19	206.06	205.98	199.22	198.89	199.29	199.98	199.65	200.59	197.41	197.29
Jul-06	198.44	198.21	205.80	205.72	205.63	198.53	198.39	198.68	199.68	199.40	200.47	197.25	197.15
Aug-06	197.99	197.75	205.26	205.18	205.10	198.21	198.05	198.34	199.35	199.14	200.48	196.90	196.74
Sep-06	198.00	197.82	205.03	204.97	204.89	198.09	197.90	198.16	199.36	199.07	200.48	196.96	196.74
Oct-06	198.72	198.75	206.19	206.40	206.41	198.09	198.06	198.07	199.51	199.15	200.48	197.76	197.93
Nov-06	198.90	198.78	206.81	206.69	206.58	199.41	199.27	199.72	200.21	200.05	203.35	197.76	197.77
Dec-06	198.92	198.78	206.84	206.66	206.55	199.94	199.93	200.60	200.43	200.28	203.39	197.77	197.76
Jan-07	198.70	198.56	206.50	206.40	206.34	199.71	199.54	200.00	200.35	200.18	202.54	197.56	197.46
Feb-07	198.50	198.37	206.31	206.27	206.21	199.09	198.77	199.13	199.92	199.71	200.59	197.32	197.17
Mar-07	198.87	198.83	206.75	206.62	206.61	199.17	199.24	199.79	199.94	199.71	200.59	197.57	197.56
Apr-07	199.01	198.91	206.89	206.69	206.59	199.94	200.05	200.82	200.38	200.00	203.22	197.84	197.87
May-07	198.78	198.65	206.54	206.44	206.39	199.67	199.49	200.12	200.39	200.13	202.50	197.57	197.45
Jun-07	198.39	198.20	205.88	205.79	205.68	198.91	198.73	199.09	199.92	199.76	200.60	197.20	197.02
Jul-07	197.99	197.80	205.36	205.29	205.20	198.54	198.30	198.66	199.57	199.42	200.58	196.86	196.60
Aug-07	197.72	197.53	204.94	204.88	204.80	198.33	198.00	198.36	199.28	199.10	200.58	196.61	196.36
Sep-07	197.45	197.28	204.34	204.28	204.18	198.02	197.69	198.04	199.05	198.84	200.58	196.42	196.12
Oct-07	197.88	197.85	203.95	203.97	203.90	197.79	197.52	197.77	199.02	198.70	200.58	196.70	196.40
Nov-07	198.26	198.27	204.20	204.44	204.43	197.77	197.55	197.67	199.08	198.69	200.58	197.30	197.27
Dec-07	198.19	198.19	204.66	204.81	204.78	197.82	197.65	197.74	199.16	198.78	200.58	197.28	197.32

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	87-II	87-III	88-I	88-II	88-III	89-I	89-II	89-III	91-I	91-II	91-III	92-I	92-II
T.O.P. ->	200.31	200.39	207.52	207.52	207.37	202.77	203.14	203.22	206.55	206.56	206.69	200.46	200.47
Mar-08	199.33	198.91											
Apr-08			206.36	206.45	206.47	200.53	200.36	201.21	201.05	201.01	204.75	198.16	198.11
Sep-08						199.54	199.23	199.73	200.32	199.98	201.86	197.95	197.96
Oct-08	199.11	198.88	206.50	206.37	206.41								
Mar-09													
Apr-09	199.20	198.83	206.71	206.52	206.55	200.26	200.17	201.00	201.04	200.93	203.94	197.16	198.05
Sep-09	198.09	197.83										197.05	196.78
Oct-09			205.56	205.64	205.67	198.40	198.03	198.27	199.54	199.22	Dry		
Mar-10	198.52	198.76							199.37	199.01	Dry		
Apr-10			206.69	206.52	206.54	199.91	199.78	200.49				198.58	198.14
Sep-10	197.65	197.60	205.03	204.89	204.91	198.21	197.88	198.19	198.50	198.00	200.58	197.95	196.51
Oct-10													
Dec-10													
Mar-11	198.80	199.07	206.00	206.59	206.37	200.27	200.29	201.10	198.88	198.43	203.32	199.07	198.27
Apr-11													
Sep-11			205.45	205.76	205.73	198.51	198.18	198.46	198.79	198.35	200.57	198.62	197.93
Oct-11	197.69	198.33											
Mar-12	198.65	198.69	206.49	206.45	206.52	200.16	199.98	200.65	199.64	198.98	203.24	199.13	198.31
Apr-12													
Sep-12	197.64	197.64				198.12	197.63	197.90	198.53	197.98	200.58	198.51	197.72
Oct-12			204.76	205.32	205.39								
Mar-13	198.59	198.68	206.43	206.65	206.73	198.86	198.67	199.02	199.20	198.72	200.54	198.94	198.17
Apr-13													
Jun-13									199.36	198.74	200.59	199.04	198.27
Sep-13	197.77	197.89	205.50	205.75	205.81	198.33	197.95	198.23	198.82	198.28	200.58	198.49	197.63
Oct-13													
Dec-13									199.34	198.81	200.58	199.03	198.05
Mar-14	198.41	198.48	206.78			199.14	199.10	199.43	198.93	198.46	200.57	198.75	197.79
Apr-14				206.68	206.69								
Jun-14									199.40	198.89	201.73	198.66	197.83
Sep-14	196.04	197.80	206.10	206.28	206.39	198.53	198.15	198.41	199.01	198.47	200.58	198.59	197.93
Oct-14													
Nov-14									199.17	198.69	200.57	198.92	197.92
Dec-14													
Mar-15	197.93	197.87	206.24	206.48	206.63	198.73	198.45	198.81	198.68	198.24	200.58	198.49	197.60
Jun-15			206.45	206.49	206.57				199.50	198.89	201.58	199.00	198.23
Sep-15	197.33	197.73	205.09	205.56	205.67	198.60	198.17	198.46	198.82	198.27	200.58	198.83	197.94
Dec-15	198.44	198.57	205.99	206.30	206.43	198.72	198.65	199.09	199.26	198.71	200.58	199.00	198.02
Mar-16	198.50	198.65	206.45	206.55	206.61	200.22	200.41	201.36	199.39	198.80	202.46	199.25	198.32
Apr-16													
Jun-16	198.08	198.16	205.62	205.78	205.83	199.11	198.64	199.06	199.06	198.54	200.59	198.04	197.53
Jul-16	197.32	197.27	204.80	204.95	205.07	198.47	198.02	198.39	198.50	197.94	200.58	197.87	197.20
Sep-16	196.59	196.82	204.21	204.56	204.77	198.05	197.66	197.96	198.16	197.60	200.58	197.54	197.16
Nov-16	196.85	197.13	203.70	203.99	204.15	197.76	197.38	197.58	198.08	197.59	200.58	198.18	197.34
Mar-17	198.55	198.84	206.45	206.55	206.61	199.66	199.58	200.25	199.19	198.70	203.69	199.14	198.22
Apr-17													
Jun-17	198.73	198.96	206.53	206.57	206.61	200.31	200.57	201.59	199.82	199.20	203.41	199.32	198.37
Sep-17	197.58	198.08	205.45	205.62	205.70	198.68	198.29	198.62	199.06	198.52	200.58	198.00	197.61
Oct-17													
Dec-17	198.38	198.57	206.06	206.26	206.39	198.38	198.09	198.33	199.29	198.72	200.57	198.96	198.01
Mar-18	198.70	198.89	206.42	206.54	206.64	199.85	199.90	200.71	199.44	198.90	200.96	199.20	198.25
Apr-18													
Jun-18	198.23	198.38	206.00	206.16	206.29	199.58	199.23	199.86	199.42	198.86	200.59	198.41	198.07
Sep-18	197.41	197.62	204.89	205.21	205.33	198.54	198.02	198.34	198.63	198.13	200.57	198.55	197.67
Dec-18	198.40	198.64	206.16	206.36	206.49	199.43	199.44	200.16	199.34	198.90	200.57	199.10	198.20

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	87-II	87-III	88-I	88-II	88-III	89-I	89-II	89-III	91-I	91-II	91-III	92-I	92-II
T.O.P. ->	200.31	200.39	207.52	207.52	207.37	202.77	203.14	203.22	206.55	206.56	206.69	200.46	200.47
Mar-19	198.06	198.31	205.93	206.18	206.68	198.85	198.49	198.87	198.99	198.53	200.58	198.78	197.87
Apr-19													
May-19	198.57	198.75	206.48	206.48	206.55	200.43	200.51	201.47	199.94	199.46	203.70	199.27	198.35
Aug-19	197.49	197.55	205.16	205.25	205.31	198.78	198.28	198.65	198.80	198.31	200.55	198.51	197.59
Oct-19													
Nov-19	198.20	198.32	205.90	206.28	206.47	198.32	197.99	198.22	199.13	198.67	200.57	199.00	198.08
Mar-20	198.56	198.91	206.63	206.58	206.60	200.55	200.71	201.62	199.87	199.30	203.71	199.36	198.39
Apr-20													
May-20													
Jun-20	197.41	198.26	206.16	206.24	206.39	199.65	199.24	199.85	199.47	199.48	201.09	198.79	198.02
Aug-20	197.04	197.13	204.75	204.87	204.94	198.54	197.97	198.32	198.53	198.02	200.57	198.22	197.37
Nov-20	197.79	197.92	205.26	205.76	206.01	198.19	197.87	198.12	198.85	198.46	200.55	198.80	197.86
Mar-21	198.45	198.67	206.40	206.63	206.62	198.94	198.74	199.16	199.31	198.78	200.59	199.04	198.13
Apr-21											202.50		
May-21	197.49	198.10	205.91	205.96	206.03	199.53	199.17	199.75	199.32	198.82	201.78	198.70	197.89
Sep-21	196.44	198.12	205.40	205.78	206.02	198.59	198.19	198.49	198.89	198.40	202.83	198.51	197.89
Nov-21	198.48	198.69	206.47	206.49	206.56	199.78	199.72	200.45	199.51	198.92	203.12	199.13	198.23
Mar-22	198.35	198.64	206.68	206.67	206.67	199.34	199.24	199.72	199.55	199.01	204.02	199.15	198.24
Apr-22													
Sep-22	197.27	197.57	204.62	205.03	205.09	198.54	197.93	198.30	198.50	197.94	200.57	198.21	197.31
Oct-22													
Mar-23	198.40	198.71	206.06	206.32	206.50	199.79	199.84	200.65	199.43	198.87	203.71	199.10	198.22
Jun-23	197.47	198.31	205.80	206.10	206.25	199.23	199.25	199.83	199.17	198.65	200.58	198.44	197.87
Sep-23	197.30	198.15	205.57	205.77	205.86	198.98	198.59	199.02	199.03	198.51	200.56	198.15	197.77
Nov-23	197.85	197.97	204.98	205.37	205.55	198.22	197.79	198.02	198.67	198.22	200.57	198.66	197.70

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	92-III	93-I	93-II	94-I	94-II	95-I	95-II	101-I	101-II	101-III	104-I	104-II	104-III	106-I	106-II	106-III
T.O.P. ->	200.43	197.67	197.76	196.80	196.88	195.51	195.49	219.70	219.64	219.51	205.53	205.58	205.53	199.80	199.75	199.71
Mar-99																
Jul-99								204.07	213.25	212.78						
Dec-99								205.32	214.08	217.35						
Apr-00								205.11	213.62	217.45						
Aug-00								205.28	213.30	216.03						
Nov-00	198.50	196.77	196.83		195.68		194.56	204.33	212.55	215.03	202.94	204.47	204.46	199.47	199.72	198.93
Apr-01								205.77	214.38	217.39						
Jul-01								205.18	212.94	215.73						
Dec-01								204.56	212.66							
Feb-02																
Mar-02																
Apr-02								206.52	214.24	217.86						
May-02																
Jun-02																
Jul-02																
Aug-02								205.90	213.05	215.83						
Sep-02																
Oct-02																
Nov-02								205.48	212.34	214.67						
Jan-03																
Mar-03								205.12	212.85	215.50						
Jul-03								205.97	212.97	215.77						
Nov-03								206.09	213.35	217.19						
Mar-04								206.22	213.72	217.08						
Jul-04								206.43	214.16	217.19						
Nov-04								206.06	212.94	215.71						
Jan-05	198.14		196.60		195.41						203.69	204.24				
Feb-05	198.19		195.78		194.87						203.80					198.46
Mar-05	198.73	197.10	196.89	196.70	195.99	195.45		206.19	213.25	215.85	204.23			199.72	199.53	198.55
Apr-05	199.17	196.97	196.85	196.57	195.77	194.68	194.39				204.44	204.80	204.64	199.45	199.60	198.60
May-05	198.11	196.67	196.59	196.70	195.36		194.29				203.94	204.27	204.10	199.46	199.41	198.55
Jun-05	197.49	196.29	196.01	196.39	194.94	195.36	194.49				203.00	203.53	203.68	198.54	199.16	198.96
Jul-05								205.37	212.24	215.19						
Nov-05								204.50	211.72	213.61						
Jan-06	198.92	197.16	196.93	195.84							204.49	204.71	204.86	198.08	198.23	198.05
Feb-06	198.18		196.59			194.17					204.30			197.92		
Mar-06	197.62	195.90	196.66	195.64		195.02		205.96	214.01	217.16	204.30	204.73	204.63			
Apr-06	197.94	196.93	197.57	196.80	195.49						204.19	204.51	204.49	199.06	198.21	198.01
May-06	197.58	196.67	197.01	196.80	195.40						204.12	204.40	204.28	199.08	198.22	198.02
Jun-06	197.66	196.41	196.20	196.80	196.37	195.34	193.72				203.32	204.08	203.88	198.80	198.24	198.09
Jul-06	197.50	196.27	195.89	196.53	194.94	flowing	194.67				203.65	203.72	203.75	198.71	198.22	198.08
Aug-06	196.89	195.83	195.47	196.16	194.43	195.45	194.55	204.95	212.72	215.58	203.10	203.21	203.14	198.37	197.65	197.87
Sep-06	196.84	195.90	195.45	196.17	194.59	flowing	194.49				203.24	203.07	203.35	198.38	198.17	198.08
Oct-06	198.99	196.90	196.72	196.80	195.66	flowing	194.59				204.30	204.39	204.36	198.98	198.35	198.24
Nov-06	198.70	196.90	196.66	196.80	195.66	flowing	194.54				204.53	204.78	204.64	199.23	198.43	198.30
Dec-06	198.40	196.86	196.64	196.80	195.61	flowing	194.47	205.70	214.12	217.63	204.55	204.76	204.63	199.26	198.42	198.22
Jan-07	197.88	196.66	196.49	196.80	195.40	flowing	194.34				204.12	204.33	204.18	199.04	198.33	198.13
Feb-07	197.27	196.62	196.47	196.80	195.35	flowing	194.33				203.88	204.19	203.92	198.85	198.20	198.02
Mar-07	198.09		196.58	196.80	195.62						204.50				198.40	198.21
Apr-07	198.76	196.67	196.62	196.80	195.66	flowing	194.44	205.91	213.98	217.26	204.55	204.78	204.63	199.14	198.47	198.29
May-07	197.88	196.72	196.49	196.75	195.36	flowing	194.34				204.18	204.40	204.25	198.92	198.39	198.23
Jun-07	197.20	196.28	195.88	196.41	194.88	flowing	194.06				203.64	203.91	203.67	198.70	198.28	198.12
Jul-07	196.66	195.96	195.56	195.99	194.37	195.19	193.57	204.94	212.20	215.54	203.07	203.33	203.10	198.39	198.12	197.94
Aug-07	196.49	195.59	195.19	195.70	193.93	194.90	193.33				202.61	202.71	202.64	198.14	197.93	197.71
Sep-07	196.27	195.16	194.71	195.36	193.60	194.57	193.12				201.85	201.84	202.06	197.89	197.90	197.72
Oct-07	196.62	195.82	195.36	195.70	194.22	195.07	194.02				202.14	201.65	202.15	198.14	198.05	197.91
Nov-07	198.10	196.51	196.35	196.50	195.08	flowing	194.34	203.86	211.26	212.82	203.60	202.57	203.98	198.44	198.19	198.17
Dec-07	198.05	196.54	196.42	196.54	195.30	flowing	194.43				203.71	203.85	203.41	198.45	198.05	197.89

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	92-III	93-I	93-II	94-I	94-II	95-I	95-II	101-I	101-II	101-III	104-I	104-II	104-III	106-I	106-II	106-III
T.O.P. ->	200.43	197.67	197.76	196.80	196.88	195.51	195.49	219.70	219.64	219.51	205.53	205.58	205.53	199.80	199.75	199.71
Mar-08						flowing		205.23	213.36	217.13					198.47	198.22
Apr-08	199.02	196.79	196.51	196.80	195.71		195.49				204.60	204.92	204.67	199.66		
Sep-08	198.97			flowing	195.31			205.20	212.84	216.15	204.07	204.41	204.15	199.31	198.50	198.51
Oct-08		196.74	196.47			flowing	194.93									
Mar-09																
Apr-09	198.88	196.87	196.46	flowing	195.46	flowing	194.61	206.20	213.89	217.14	204.52	204.79	204.64	199.50	198.65	198.55
Sep-09	197.08							205.05	212.02	214.96						
Oct-09		196.32	196.01	196.41	194.79	flowing	194.24				203.86	203.69	203.75	198.42	198.20	198.25
Mar-10											204.27	204.63	204.49	198.27	198.02	198.00
Apr-10	196.74	193.20	194.52	195.92	195.34	flowing	194.26	205.62	213.34	217.00						
Sep-10	196.27	195.80	195.12	194.66	195.11	195.28	194.06	204.80	211.92	214.98	203.02	203.28	203.48	197.75	197.75	197.80
Oct-10																
Dec-10																
Mar-11	197.87	197.05	196.51	196.02	195.73						204.51	204.68	204.79	198.58	198.11	198.10
Apr-11						flowing	194.37	206.08	213.87	217.45						
Sep-11	197.18	196.16	195.50			195.44	194.07				203.66	203.92	203.82	198.09	197.90	197.90
Oct-11				195.74	195.67			205.11	212.46	215.50						
Mar-12	197.82	196.78	196.32	195.99		flowing	194.29				204.52	204.86	204.74	198.74	198.29	198.22
Apr-12					195.43			206.02	213.26	216.20						
Sep-12	196.82	195.73	194.99	195.05	194.13	195.42	193.80				201.63	202.28	202.71	197.66	197.60	197.72
Oct-12								204.83	211.72	214.11						
Mar-13	197.85	196.95	196.38	195.81	195.47	flowing	194.45	205.23	212.68	215.65	200.05	203.41	203.44	198.49	198.19	198.20
Apr-13																
Jun-13	197.98			195.75	195.27						199.65	203.39	203.55			
Sep-13	197.55	196.04	195.57	195.35	194.67	195.36	194.65				199.61	202.47	202.70	197.73	197.80	197.87
Oct-13								204.78	211.97	214.60						
Dec-13	198.04			195.76	195.39						199.28	203.46	203.45			
Mar-14	197.58								212.51	215.34	199.92	203.51	203.58			
Apr-14		197.11	196.80	196.24	195.79	195.51	195.38									
Jun-14	197.95			195.56	194.92						199.86	203.23	203.33			
Sep-14	198.08	196.42	196.30	195.72	195.07	194.98	194.68				199.79	203.16	203.14	199.80	197.47	197.86
Oct-14									212.29	215.43						
Nov-14	197.90			195.92	195.48						199.50	203.68	203.76			
Dec-14																
Mar-15	197.21	196.54	196.47	195.46	195.15	195.08	194.85	204.92	212.42	215.17	199.95	202.87	202.79	197.61	197.52	197.47
Jun-15	198.53	196.90	196.63	196.13	195.79						200.57	203.64	203.72	199.80	199.75	199.71
Sep-15	197.98	196.42	196.43	195.70	195.40	195.13	194.61	205.65	212.05	214.95	200.05	203.43	203.41	197.25	197.51	197.81
Dec-15	198.07	196.72	196.56	195.77	195.36	195.25	194.71				199.16	203.57	203.59	198.13	198.05	198.04
Mar-16	198.53	196.94	196.62	196.04	195.74	195.34	194.73				199.72	203.76	203.76	198.19	198.01	198.11
Apr-16								206.42	213.35	216.42						
Jun-16	197.75	196.29	195.91	195.46	194.87	195.21	194.54				199.53	203.26	203.28	197.79	197.88	197.92
Jul-16	197.12	195.50	195.05	194.84	193.96	194.84	194.02				199.29	202.55	202.58	197.06	197.35	197.33
Sep-16	196.91	195.41	194.90	194.79	193.70	194.69	193.87	204.68	211.03	213.90	199.07	202.54	202.55	196.33	197.08	197.18
Nov-16	196.94	195.80	195.46	195.11	194.48	195.06	194.31				197.90	202.85	202.84	196.50	197.20	197.26
Mar-17	198.48	196.77	196.54	195.95	195.23	195.36	194.68	205.50	213.07	216.49	198.74	203.80	203.82	198.20	198.13	198.14
Apr-17																
Jun-17	198.62	196.96	196.61	196.36	195.44	flowing	194.87				199.48	203.93	203.95	198.39	198.27	198.25
Sep-17	197.66	196.08	195.69	195.32	194.51	195.24	194.57				199.63	203.45	203.46	198.01	197.96	198.02
Oct-17								205.25	211.93	215.07						
Dec-17	198.18	196.62	196.56	195.71	195.18	195.43	194.62				199.08	203.65	203.64	198.06	198.06	198.06
Mar-18	198.45	196.89	196.62	196.10	195.45	195.46	194.75	205.88	213.14	216.29	199.80	204.00	204.01	198.38	198.26	198.20
Apr-18																
Jun-18	198.05	196.65	196.52	195.75	194.91	195.41	194.66				199.66	203.65	203.62	197.70	197.89	197.97
Sep-18	197.55	196.05	195.73	195.22	194.27	195.18	194.30	204.78	211.65	214.73	199.53	203.29	203.34	197.09	197.52	197.57
Dec-18	198.46	196.79	196.59	196.00	195.36	flowing	194.68				198.79	203.75	203.72	198.08	198.06	198.06

NOTES:
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Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	92-III	93-I	93-II	94-I	94-II	95-I	95-II	101-I	101-II	101-III	104-I	104-II	104-III	106-I	106-II	106-III
T.O.P. ->	200.43	197.67	197.76	196.80	196.88	195.51	195.49	219.70	219.64	219.51	205.53	205.58	205.53	199.80	199.75	199.71
Mar-19	197.99	196.91	196.58	195.94	195.39	flowing	194.89	205.33	212.51	215.45	203.24	203.53	203.56	197.71	197.85	197.87
Apr-19																
May-19	198.48	197.09	196.60	196.12	195.39	flowing	194.75				203.55	203.96	203.98	198.25	198.20	198.12
Aug-19	197.46	195.77	195.36	195.08	194.07	195.12	194.04	205.17	211.91	215.13	202.23	202.97	202.93	197.22	197.56	197.56
Oct-19																
Nov-19	198.54	196.67	196.55	195.81	195.08	flowing	194.63				200.56	203.66	203.66	197.88	197.97	198.01
Mar-20	198.88	197.03	196.64	196.37	195.80	flowing	194.98				203.36	203.82	203.81	198.24	198.19	198.14
Apr-20								206.53	213.58	216.74						
May-20																
Jun-20	198.05	196.70	196.53	196.01	195.13	195.27	194.81				202.86	203.62	203.60	197.32	197.73	197.93
Aug-20	197.24	195.29	194.83	194.91	193.67	194.86	193.77	204.80	211.52	214.87	201.74	202.53	202.57	196.77	197.35	197.31
Nov-20	197.81	196.57	196.56	195.68	195.10	195.36	194.57				200.32	203.34	203.42	197.50	197.78	197.82
Mar-21	198.57	197.01	196.67	196.19	195.46	195.44	194.71	205.39	212.69	215.67	200.76	203.72	203.72	198.14	198.09	198.06
Apr-21																
May-21	197.87	196.45	196.27	195.72	194.93	195.27	194.44				203.17	203.46	203.46	197.24	197.69	197.81
Sep-21	197.88	196.40	196.41	195.63	194.65	195.42	194.55	204.88	211.92	214.89	202.99	203.43	203.44	196.62	197.48	197.79
Nov-21	198.38	196.84	196.57	196.10	195.40	flowing	194.84				203.24	203.64	203.61	198.15	198.10	198.09
Mar-22	198.66	196.73	196.57	195.85	195.67	Flowing	194.69	205.74	213.07	216.33	203.54	203.56	203.70	198.04	198.00	197.95
Apr-22																
Sep-22	197.14	195.60	195.29	194.89	193.87	194.93	193.92	204.83	211.63	214.91	202.72	203.31	203.16	196.96	197.40	197.41
Oct-22																
Mar-23	198.69	196.79	196.55	196.02	195.34	Flowing	194.61	205.77	213.28	216.61	203.47	203.64	203.71	198.06	198.07	198.04
Jun-23	198.11	196.59	196.45	195.82	194.95	195.36	194.55				202.46	203.51	203.53	197.29	197.73	197.91
Sep-23	197.87	196.24	195.92	195.60	194.78	195.45	194.44	205.59	212.63	215.68	202.32	203.29	203.27	196.79	197.51	197.69
Nov-23	197.72	196.31	196.36	195.51	194.86	195.46	194.54				200.96	203.26	203.11	197.57	197.76	197.79

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	107-I	107-II	107-III	108-I	108-II	108-III	109-I	109-II	109-III	110-I	110-II	110-III	111-I	111-II	111-III	112-I
T.O.P. ->	195.99	196.09	196.08	206.32	206.13	205.91	199.19	200.10	199.04	202.55	202.73	202.55	200.28	200.29	200.41	208.59
Mar-99																
Jul-99																
Dec-99																
Apr-00																
Aug-00																
Nov-00	194.89		194.76													
Apr-01																
Jul-01																
Dec-01																
Feb-02																
Mar-02																
Apr-02																
May-02																
Jun-02																
Jul-02																
Aug-02																
Sep-02																
Oct-02																
Nov-02																
Jan-03																
Mar-03																
Jul-03																
Nov-03																
Mar-04																
Jul-04																
Nov-04																
Jan-05			194.39													
Feb-05			194.54													
Mar-05			194.97													
Apr-05	195.98	194.75	194.71													
May-05			194.39													
Jun-05	193.99	193.80														
Jul-05																
Nov-05																
Jan-06			195.03													
Feb-06																
Mar-06			194.91													
Apr-06			194.87													
May-06			194.87													
Jun-06	195.97	flowing	194.79													
Jul-06	flowing	flowing	194.63													
Aug-06	flowing	flowing	194.16													
Sep-06	flowing	flowing	194.73													
Oct-06	flowing	flowing	194.84													
Nov-06	flowing	flowing	194.91													
Dec-06	flowing	flowing	194.68													
Jan-07	flowing	flowing	194.44													
Feb-07		flowing	194.53													
Mar-07	flowing	flowing	194.62													
Apr-07	flowing	flowing	194.64													
May-07	flowing	flowing	194.48													
Jun-07	flowing	flowing	194.28													
Jul-07	flowing	flowing	193.89													
Aug-07	flowing	flowing	193.61													
Sep-07	flowing	flowing	193.53													
Oct-07	flowing	flowing	194.37													
Nov-07	flowing	flowing	194.81													
Dec-07	flowing	flowing	194.60													

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	107-I	107-II	107-III	108-I	108-II	108-III	109-I	109-II	109-III	110-I	110-II	110-III	111-I	111-II	111-III	112-I
T.O.P. ->	195.99	196.09	196.08	206.32	206.13	205.91	199.19	200.10	199.04	202.55	202.73	202.55	200.28	200.29	200.41	208.59
Mar-08	195.71	flowing														
Apr-08			194.73													
Sep-08																
Oct-08	194.58	flowing	194.76													
Mar-09																
Apr-09	flowing	flowing	194.64													
Sep-09																
Oct-09	flowing	flowing	194.69													
Mar-10	flowing	196.09	194.70													
Apr-10																
Sep-10																
Oct-10	flowing	flowing	194.31													
Dec-10				200.44	201.33	204.31	196.06	196.11	196.27	197.44	197.58	197.75				
Mar-11	flowing	flowing	194.67	200.39	202.39	204.39	195.86	195.87	195.89	197.57	197.62	197.97				
Apr-11																
Sep-11	194.61	flowing	194.05	200.26	202.46	203.93	195.46	195.44	195.28	198.25	197.96	198.29				
Oct-11																
Mar-12	flowing	flowing	194.51	201.26	202.88	204.45	195.79	195.78	195.74	198.58	198.43	199.27				
Apr-12																
Sep-12				200.16	202.32	204.08	195.10	195.06	194.88	197.81	197.67	197.70				
Oct-12	194.37	flowing	194.52													
Mar-13	195.80	flowing	194.61	201.20	202.84	204.57	195.74	195.75	195.73	198.45	198.32	199.10				
Apr-13																
Jun-13				201.12	202.92	204.47	195.75	195.74	195.71	198.56	198.38	199.28				
Sep-13	195.97	flowing	195.15	200.42	202.60	204.17	195.30	195.27	195.10	198.13	197.94	198.19				
Oct-13																
Dec-13				201.57	203.14	204.54	195.76	195.74	195.62	198.65	198.47	199.54				
Mar-14				201.43	203.02	204.40	195.64	195.63	195.51	198.28	198.11	198.84				
Apr-14	195.99	196.09	195.55													
Jun-14				201.00	202.93	204.29	195.60	195.58	195.47	198.66	198.46	199.42				
Sep-14	195.99	196.09	195.22	200.91	202.85	204.51	195.52	195.48	195.30	198.33	198.12	198.31				
Oct-14																
Nov-14				201.72	203.11	204.75	195.95	195.95	196.07	198.50	198.31	198.75				
Dec-14																
Mar-15			195.40	200.96	202.55	203.92	195.47	195.44	195.28	198.11	197.93	198.84				
Jun-15			196.08	201.22	202.94	204.63	196.11	196.14	196.26	198.68	198.50	199.66				
Sep-15			195.14	200.23	202.51	204.54	195.70	195.69	195.58	198.08	197.94	198.92				
Dec-15			195.16	200.99	202.88	204.55	195.74	195.74	195.68	198.48	198.34	199.86				
Mar-16	flowing	flowing	195.38	201.06	202.88	204.60	196.25	196.28	196.47	198.60	198.44	199.92				
Apr-16																
Jun-16	flowing	flowing	195.03	200.50	202.61	204.40	195.43	195.41	195.27	198.21	198.05	199.02				
Jul-16	flowing	flowing	194.42	200.05	202.08	203.78	194.97	194.94	194.79	197.71	197.54	198.28				
Sep-16	flowing	flowing	194.29	199.61	201.98	203.91	194.94	194.92	194.96	197.52	197.35	197.79				
Nov-16	flowing	flowing	195.02	199.71	202.18	204.29	195.15	195.13	195.03	197.49	197.35	197.61				
Mar-17	flowing	flowing	195.17	201.13	202.87	204.57	195.95	195.94	195.99	198.53	198.40	199.97	195.64	195.67	196.87	204.38
Apr-17																
Jun-17	flowing	flowing	195.38	201.40	202.96	204.61	196.46	196.48	196.75	199.03	198.87	200.08	196.77	196.72	197.39	204.93
Sep-17	flowing	flowing	194.97	200.61	202.70	204.41	195.37	195.34	195.23	198.34	198.19	199.23	195.61	195.14	196.39	203.83
Oct-17																
Dec-17	flowing	flowing	195.17	201.10	202.88	204.55	195.73	195.71	195.72	198.53	198.39	199.87	195.78	195.42	196.70	204.15
Mar-18	flowing	flowing	195.23	201.28	203.02	204.63	196.12	196.13	196.27	198.74	198.60	200.40	196.36	195.87	197.65	204.88
Apr-18																
Jun-18	flowing	flowing	195.06	201.02	202.84	204.48	195.82	195.80	195.94	198.67	198.52	199.52	196.00	195.59	196.83	204.33
Sep-18	flowing	flowing	194.80	200.35	202.48	204.08	195.35	195.32	195.25	198.04	197.89	198.68	195.58	195.26	196.27	203.18
Dec-18	flowing	flowing	195.11	201.25	202.97	204.53	195.98	195.98	196.07	198.69	198.56	200.04	196.02	195.67	196.94	204.19

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	107-I	107-II	107-III	108-I	108-II	108-III	109-I	109-II	109-III	110-I	110-II	110-III	111-I	111-II	111-III	112-I
T.O.P. ->	195.99	196.09	196.08	206.32	206.13	205.91	199.19	200.10	199.04	202.55	202.73	202.55	200.28	200.29	200.41	208.59
Mar-19	flowing	flowing	195.41	201.01	202.87	204.32	195.66	195.63	195.70	198.32	198.15	199.02	195.84	195.46	196.58	204.16
Apr-19																
May-19	flowing	flowing	195.28	201.34	203.19	204.62	196.18	196.17	196.42	199.18	199.02	200.39	196.22	195.85	197.26	205.10
Aug-19	flowing	flowing	194.65	200.41	202.56	203.97	195.23	195.21	195.13	198.19	198.01	198.73	195.61	195.29	196.25	203.60
Oct-19																
Nov-19	flowing	flowing	195.16	201.13	203.04	204.64	195.86	195.82	195.90	198.53	198.42	199.94	196.01	195.64	196.82	203.88
Mar-20	flowing	flowing	195.42	201.59	203.23	204.73	196.27	196.44	196.68	198.99	198.82	201.55	196.41	196.04	197.59	204.99
Apr-20																
May-20																
Jun-20	flowing	flowing	195.04	201.02	203.02	204.57	195.94	196.00	196.19	198.71	198.54	199.60	196.10	196.14	196.91	204.49
Aug-20	flowing	flowing	194.42	200.08	202.30	203.78	195.13	195.35	195.61	197.90	197.69	198.10	195.35	195.17	196.07	203.20
Nov-20	flowing	flowing	195.17	200.57	202.85	204.31	195.69	195.70	195.85	198.23	198.15	199.38	195.70	195.43	196.59	203.47
Mar-21	flowing	flowing	195.44	201.39	203.03	204.77	196.15	196.12	197.28	198.63	198.46	199.81	195.92	195.70	197.08	204.67
Apr-21																
May-21	flowing	flowing	194.86	200.89	202.92	204.32	195.76	195.69	195.87	198.63	198.43	199.55	196.01	195.56	196.80	204.44
Sep-21	flowing	flowing	195.25	200.59	202.81	204.53	195.76	195.70	196.30	198.26	198.09	198.74	195.80	195.42	198.22	203.50
Nov-21	flowing	flowing	195.29	201.36	203.19	204.67	196.12	196.10	196.81	198.83	198.64	200.29	196.24	195.80	197.15	204.92
Mar-22	Flowing	Flowing	195.40	201.24	203.14	204.68	196.21	197.02	196.95	198.71	198.51	200.45	196.20	195.71	197.16	204.91
Apr-22																
Sep-22	Flowing	Flowing	194.57	200.44	202.66	204.24	195.05	195.80	195.05	197.85	198.63	198.20	195.25	194.95	195.90	203.26
Oct-22								194.90								
Mar-23	Flowing	Flowing	195.26	201.18	203.13	204.71	196.09	196.11	196.41	198.78	198.57	200.22	196.30	195.73	197.12	204.79
Jun-23	Flowing	Flowing	195.03	200.73	202.95	204.54	195.86	195.87	196.43	198.49	198.32	199.43	196.21	195.55	196.90	204.25
Sep-23	Flowing	Flowing	194.87	200.68	202.93	204.35	195.66	195.66	195.81	198.40	198.23	199.40	195.89	195.43	196.64	203.95
Nov-23	Flowing	Flowing	195.10	200.64	202.84	204.68	195.53	195.51	195.73	198.12	197.94	198.14	195.94	195.38	196.48	203.42

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	112-II	112-III	113-I	113-II	113-III	T-1	T-2	T-3I	T-3II	T-4	T-5I	T-5II
T.O.P. ->	208.59	208.60	195.34	195.31	195.25	192.24	191.55	191.59	191.49	191.19	191.25	191.25
Mar-99						189.38	188.70	187.75	187.51	186.91	188.26	188.19
Jul-99						187.90	187.29	187.60		186.84	187.64	187.25
Dec-99						188.49	187.37	187.80	187.29	186.69	187.94	187.63
Apr-00						188.88	187.60	188.09	187.29	186.95	188.24	187.97
Aug-00							187.39	187.77	187.28	186.91	187.88	187.48
Nov-00						189.52	187.73	188.00	187.46	186.97	188.22	188.03
Apr-01						188.16	187.55	187.91	187.29	186.93	188.24	187.89
Jul-01						187.91	187.35	187.67	187.27	186.89	187.76	187.36
Dec-01												
Feb-02												
Mar-02												
Apr-02												
May-02												
Jun-02												
Jul-02												
Aug-02												
Sep-02												
Oct-02												
Nov-02												
Jan-03												
Mar-03							187.61	187.79	187.46	186.92	188.17	187.87
Jul-03												
Nov-03												
Mar-04							187.49	187.79		186.93	188.11	187.79
Jul-04						189.52	189.31	189.24	188.66	188.35	189.33	188.91
Nov-04							187.37	187.61		186.88	187.85	
Jan-05												
Feb-05												
Mar-05							187.47	187.73		186.92	188.08	187.77
Apr-05												
May-05												
Jun-05												
Jul-05						188.28	188.43	188.61	188.30	188.03	188.62	188.13
Nov-05							187.30	187.42		186.51	187.76	187.51
Jan-06												
Feb-06												
Mar-06							187.44	187.73		186.87	188.07	187.48
Apr-06												
May-06												
Jun-06												
Jul-06						187.98	188.10	188.10				
Aug-06												
Sep-06												
Oct-06												
Nov-06												
Dec-06												
Jan-07												
Feb-07												
Mar-07												
Apr-07						188.29	187.57			186.97		
May-07												
Jun-07												
Jul-07						188.47	188.21					
Aug-07												
Sep-07												
Oct-07												
Nov-07						188.00	187.46			186.91		
Dec-07												

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	112-II	112-III	113-I	113-II	113-III	T-1	T-2	T-3I	T-3II	T-4	T-5I	T-5II
T.O.P. ->	208.59	208.60	195.34	195.31	195.25	192.24	191.55	191.59	191.49	191.19	191.25	191.25
Mar-08												
Apr-08												
Sep-08												
Oct-08												
Mar-09												
Apr-09												
Sep-09												
Oct-09												
Mar-10												
Apr-10												
Sep-10												
Oct-10												
Dec-10												
Mar-11												
Apr-11												
Sep-11												
Oct-11												
Mar-12												
Apr-12												
Sep-12												
Oct-12												
Mar-13												
Apr-13												
Jun-13												
Sep-13												
Oct-13												
Dec-13												
Mar-14												
Apr-14												
Jun-14												
Sep-14												
Oct-14												
Nov-14												
Dec-14												
Mar-15												
Jun-15												
Sep-15												
Dec-15												
Mar-16												
Apr-16												
Jun-16												
Jul-16												
Sep-16												
Nov-16												
Mar-17	205.34	205.84										
Apr-17			flowing	flowing	194.63							
Jun-17	206.04	206.60										
Sep-17	204.71	205.42										
Oct-17			195.06	194.80	194.30							
Dec-17	204.80	205.27										
Mar-18	205.89	206.50										
Apr-18			flowing	flowing	194.64							
Jun-18	205.21	206.10										
Sep-18	203.91	204.95	194.80	194.52	193.84							
Dec-18	204.69	205.27										

NOTES: 1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Table E.2
Groundwater Elevations
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

DATE	112-II	112-III	113-I	113-II	113-III	T-1	T-2	T-3I	T-3II	T-4	T-5I	T-5II
T.O.P. ->	208.59	208.60	195.34	195.31	195.25	192.24	191.55	191.59	191.49	191.19	191.25	191.25
Mar-19	204.89	205.63										
Apr-19			flowing	flowing	194.94							
May-19	206.11	206.86										
Aug-19	204.46	205.39	194.73	194.38	193.60							
Oct-19												
Nov-19	204.44	205.20										
Mar-20	205.94	206.76										
Apr-20												
May-20			flowing	flowing								
Jun-20	205.50	206.42										
Aug-20	204.05	205.13	194.31	193.97	193.05							
Nov-20	203.89	204.76										
Mar-21	205.34	206.08										
Apr-21			flowing	flowing	194.58	189.87				189.20		
May-21	206.35	206.32										
Sep-21	204.28	205.30	195.17	195.02	194.46	188.90				188.90		
Nov-21	205.79	206.55										
Mar-22	205.89	206.80										
Apr-22			Flowing	Flowing	194.39	190.16				189.40		
Sep-22	204.00	205.18	194.56	194.19	193.30	188.48		188.45	188.34		188.68	188.34
Oct-22							188.45			187.75		
Mar-23	205.76	206.74	Flowing	Flowing	194.57	191.00	190.55	190.33	190.33	189.77	190.40	190.04
Jun-23	205.03	206.11										
Sep-23	204.70	205.64	195.29	195.00	194.31	188.86	188.88	188.83	188.73	188.16	189.07	188.73
Nov-23	203.87	204.78										

NOTES:
1) Water level elevations are in metres Above Sea Level (mASL)
2) T.O.P. - Top of pipe elevation
3) Blank indicates water level not measured.

Figure E.1
Water Level Hydrograph: BH5

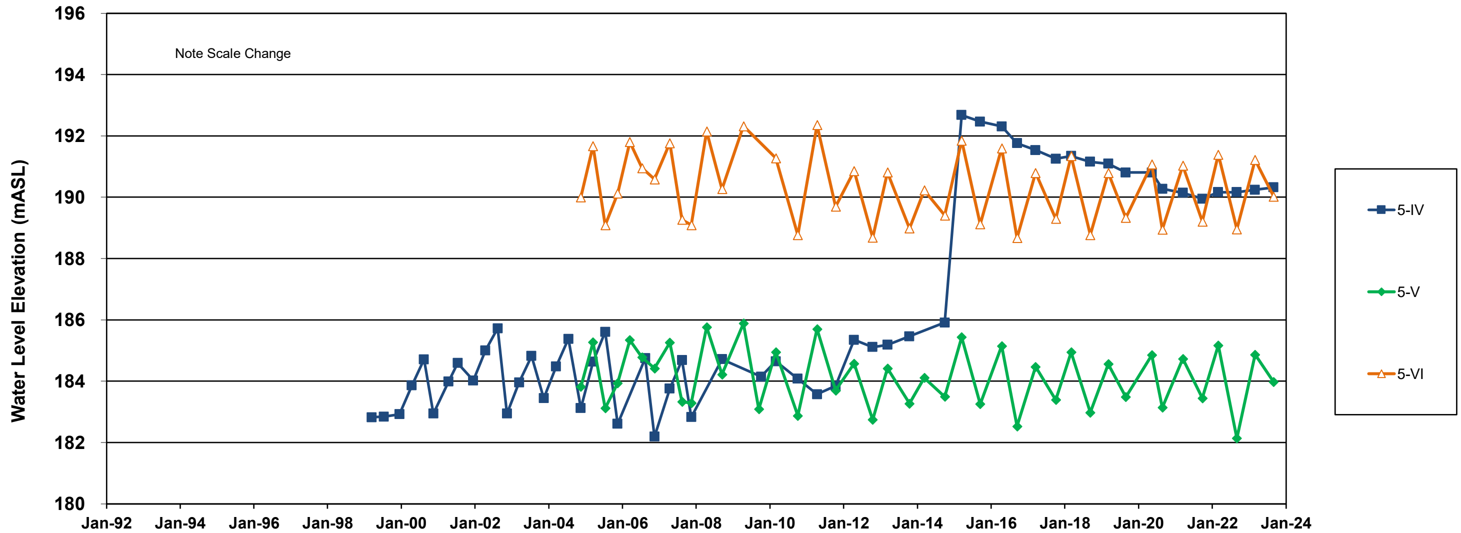

Figure E.2
Water Level Hydrograph: BH16

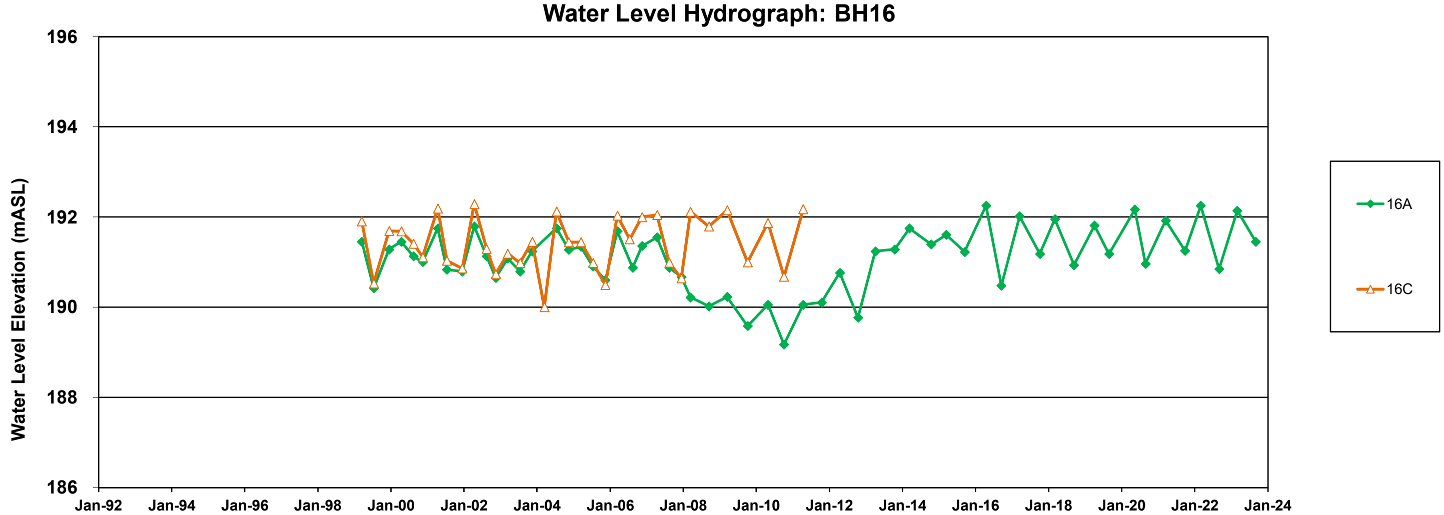

Figure E.3
Water Level Hydrograph: BH18

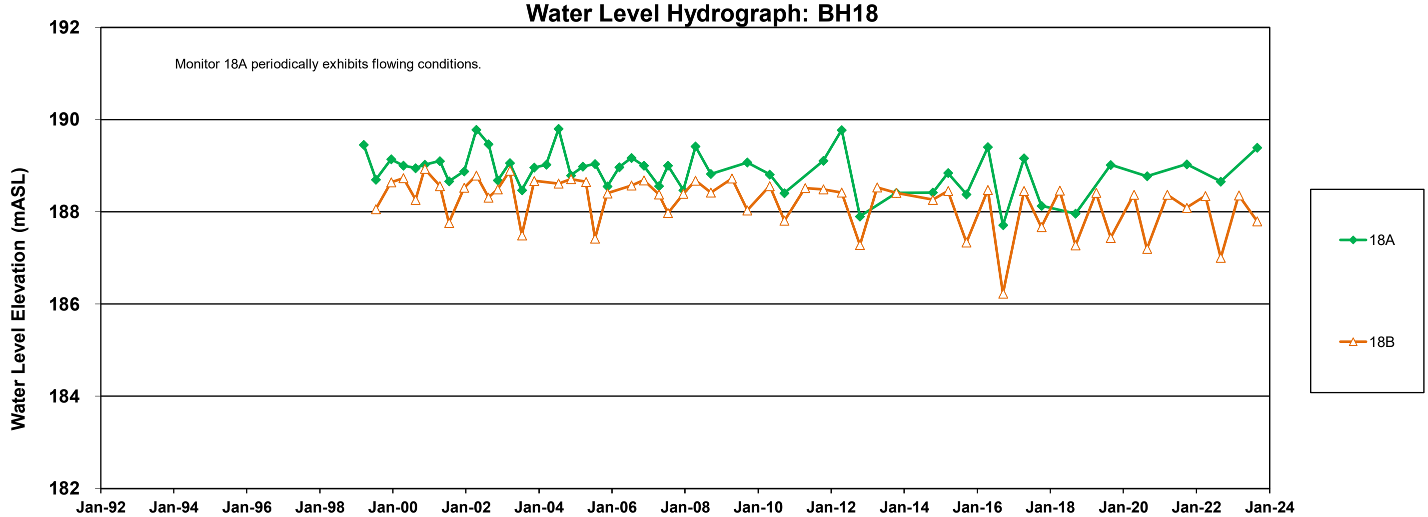

Figure E.4
Water Level Hydrograph: BH19

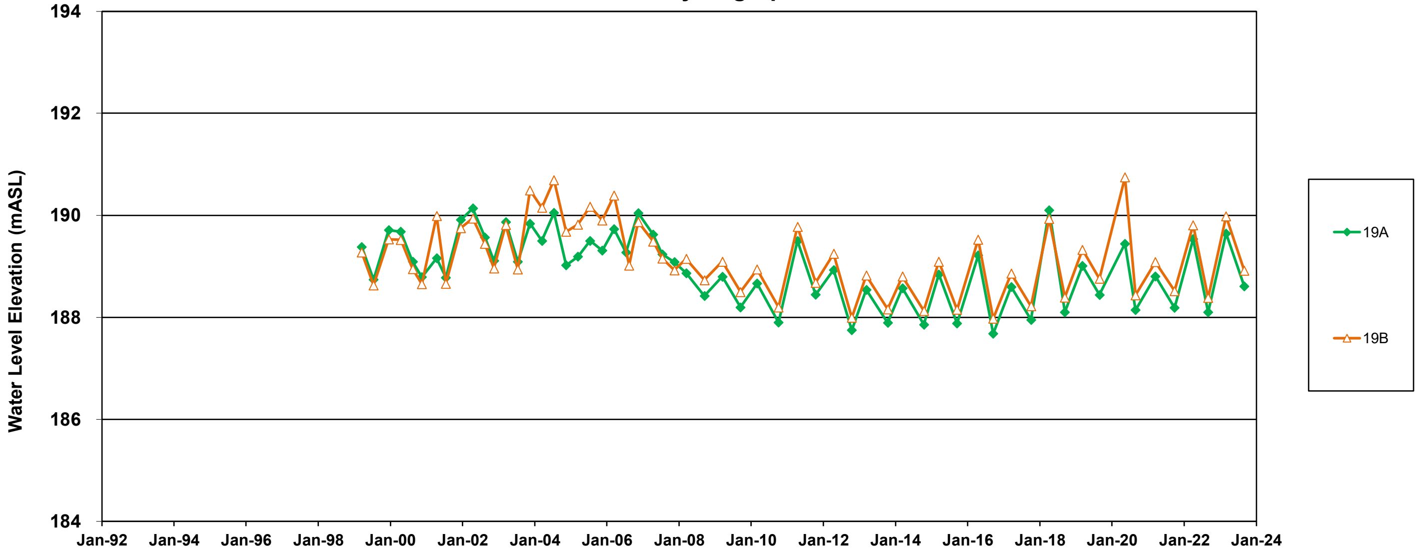

Figure E.5
Water Level Hydrograph: BH20

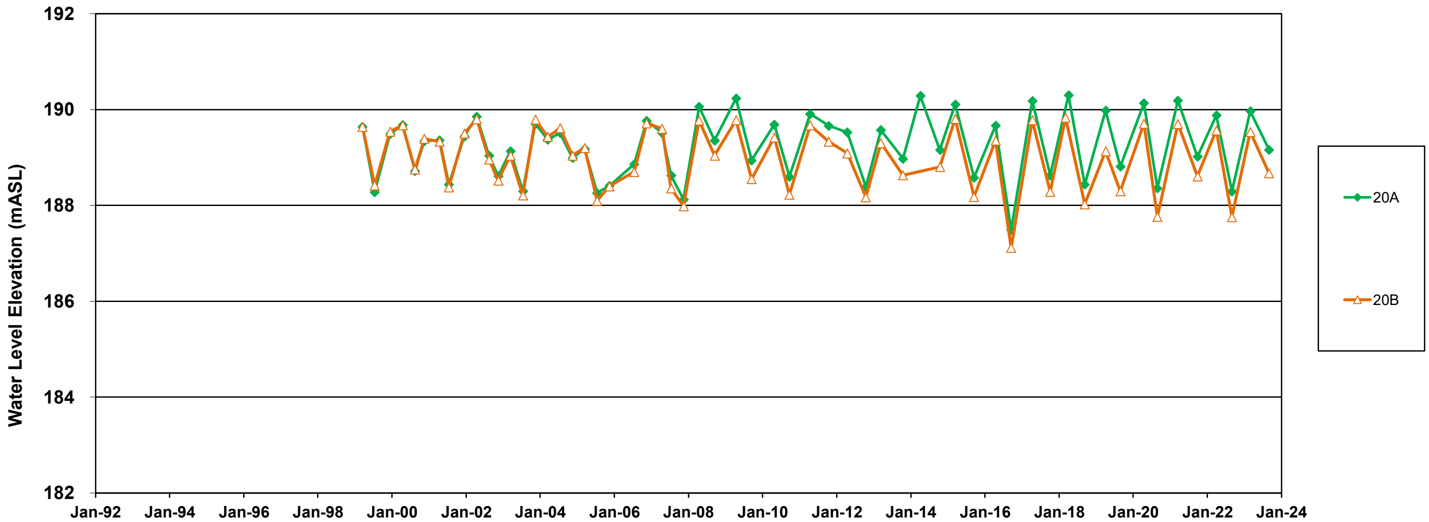

Figure E.6
Liquid Level Hydrographs: BH23

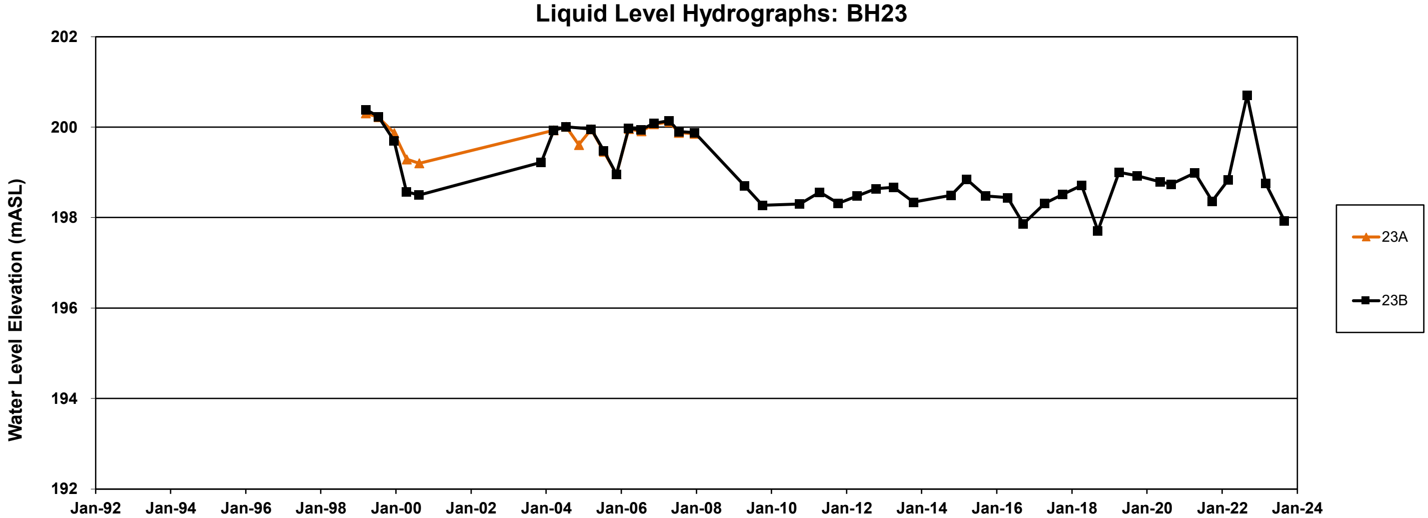

Figure E.7
Water Level Hydrograph: BH33

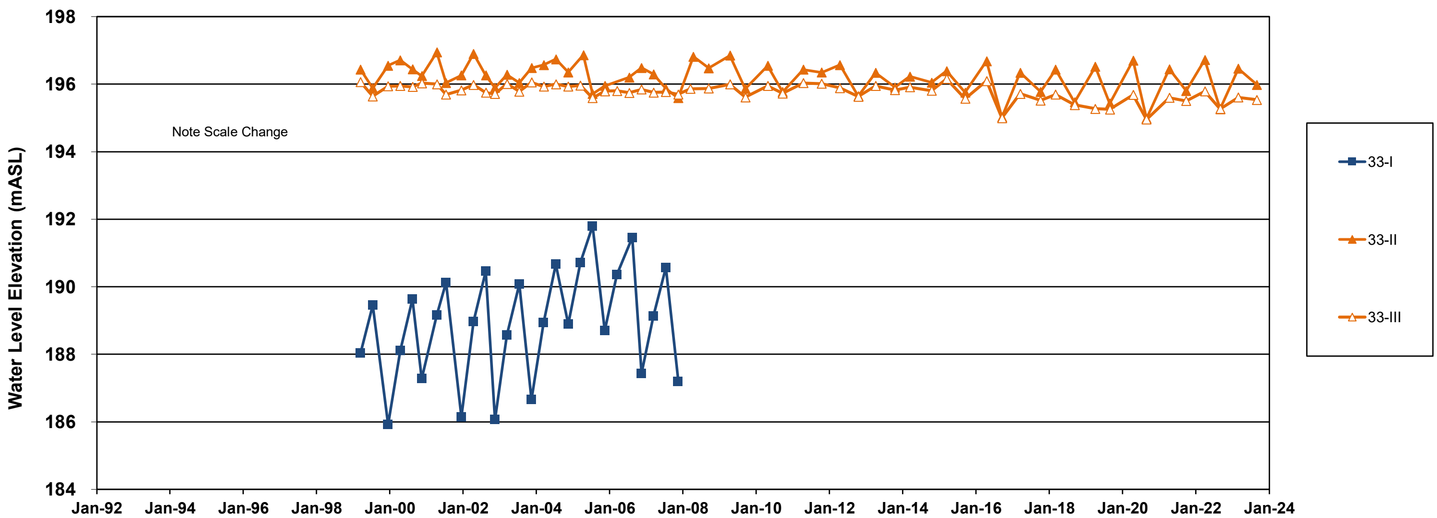

Figure E.8
Water Level Hydrograph: BH40

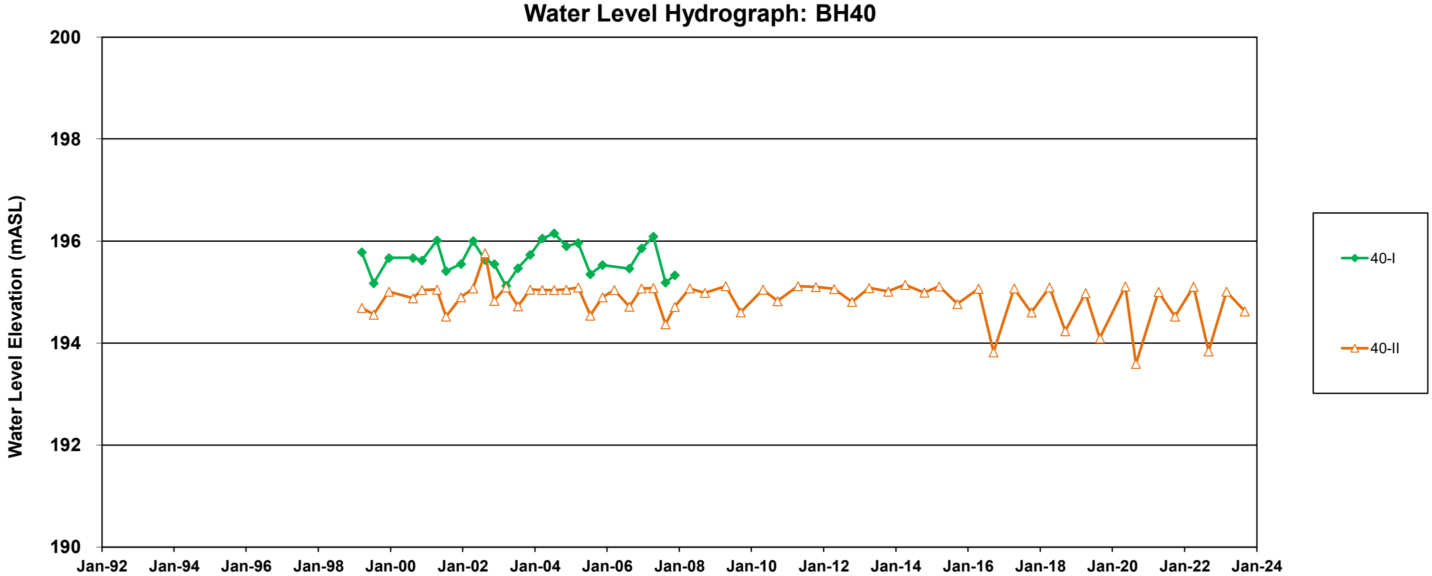

Figure E.9
Water Level Hydrograph: BH41

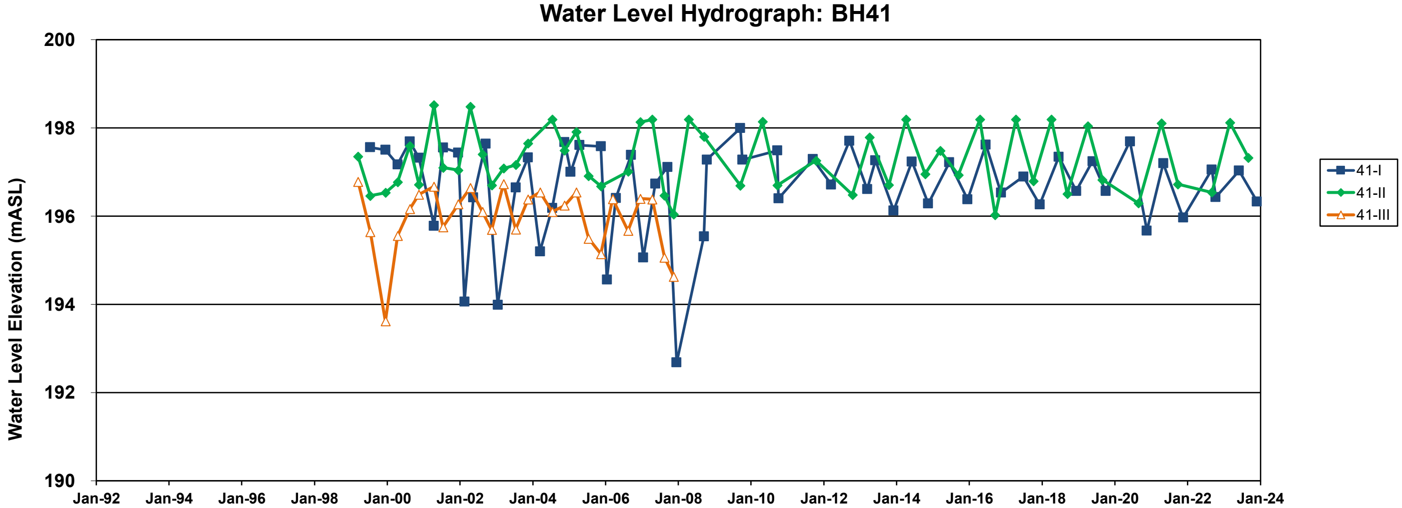

Figure E.10
Water Level Hydrograph: BH44

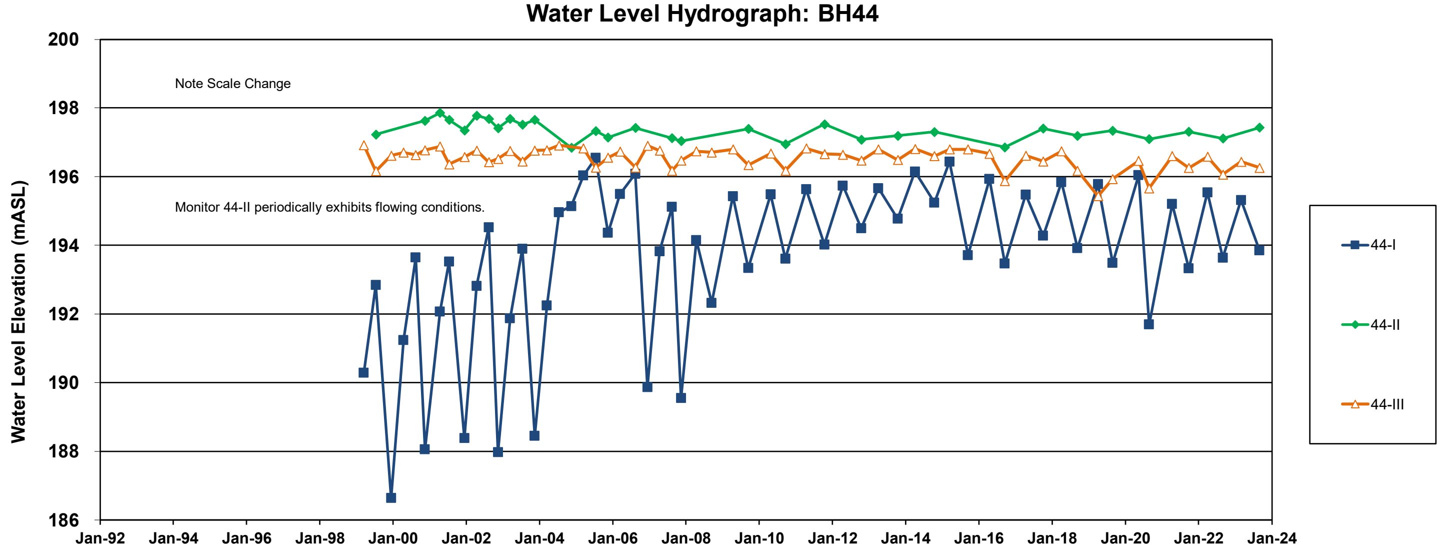

Figure E.11
Water Level Hydrograph: BH46

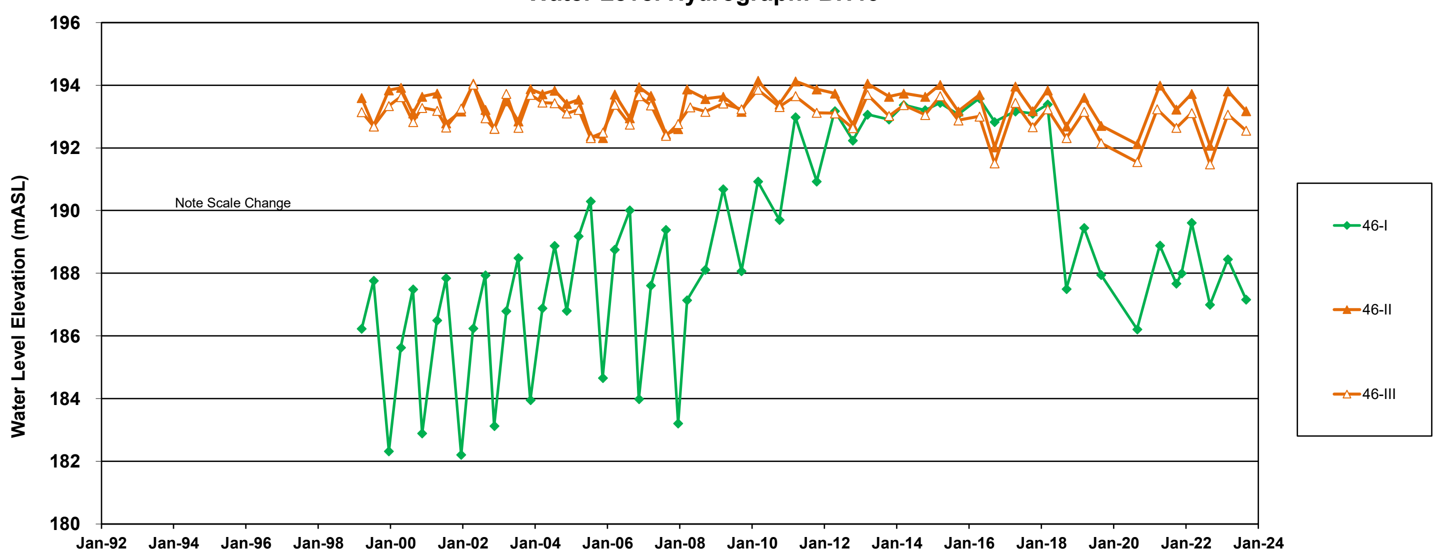

Figure E.12
Water Level Hydrograph: BH48

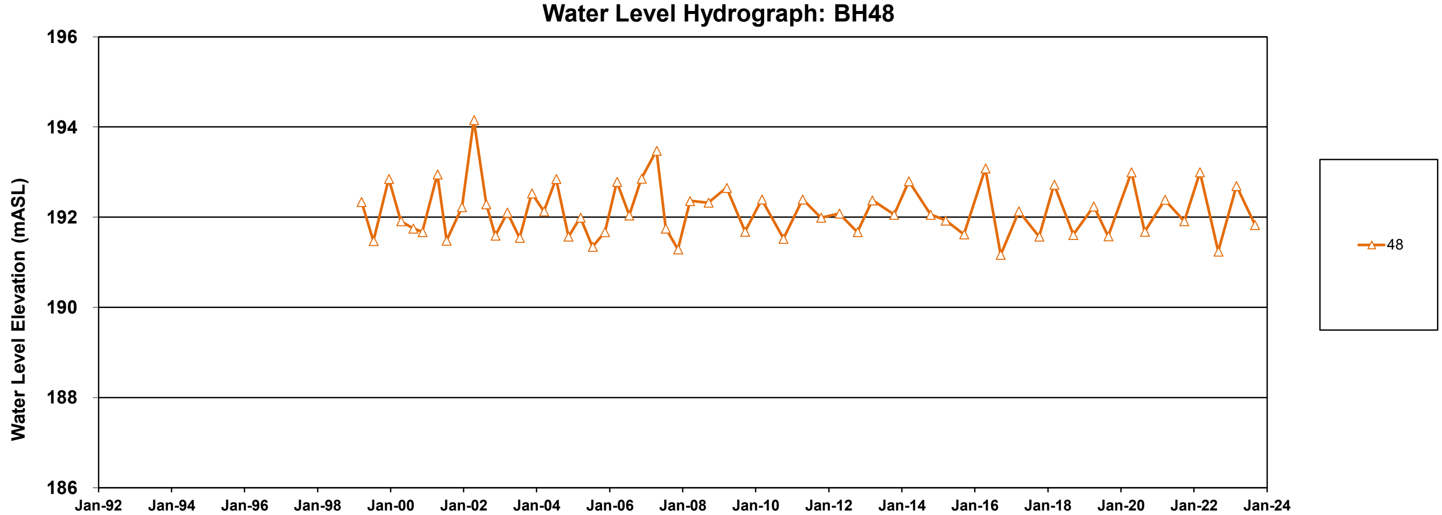

Figure E.13
Water Level Hydrograph: BH50

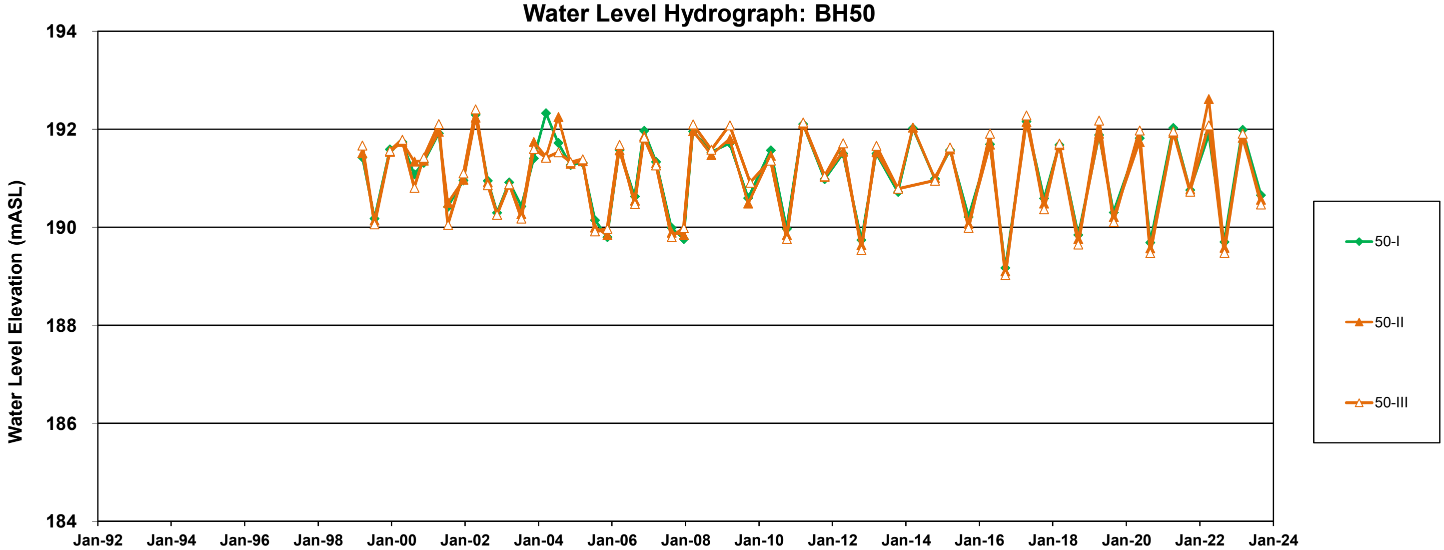

Figure E.14
Water Level Hydrograph: BH52

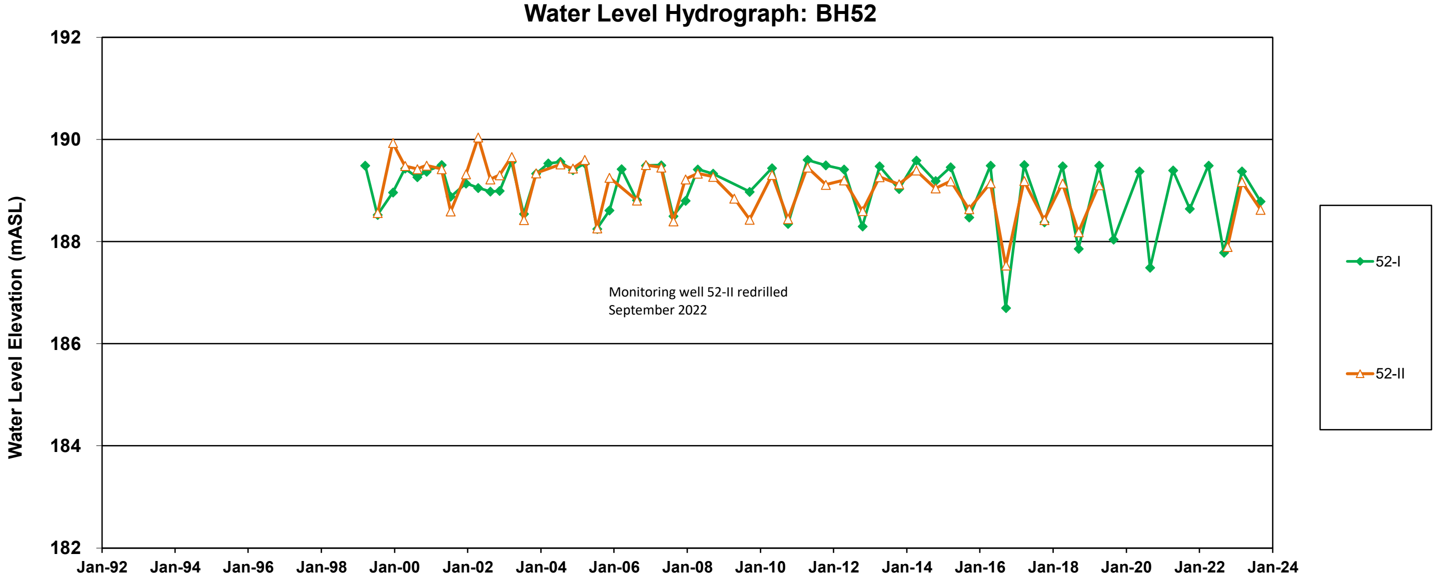

Figure E.15
Water Level Hydrograph: BH53

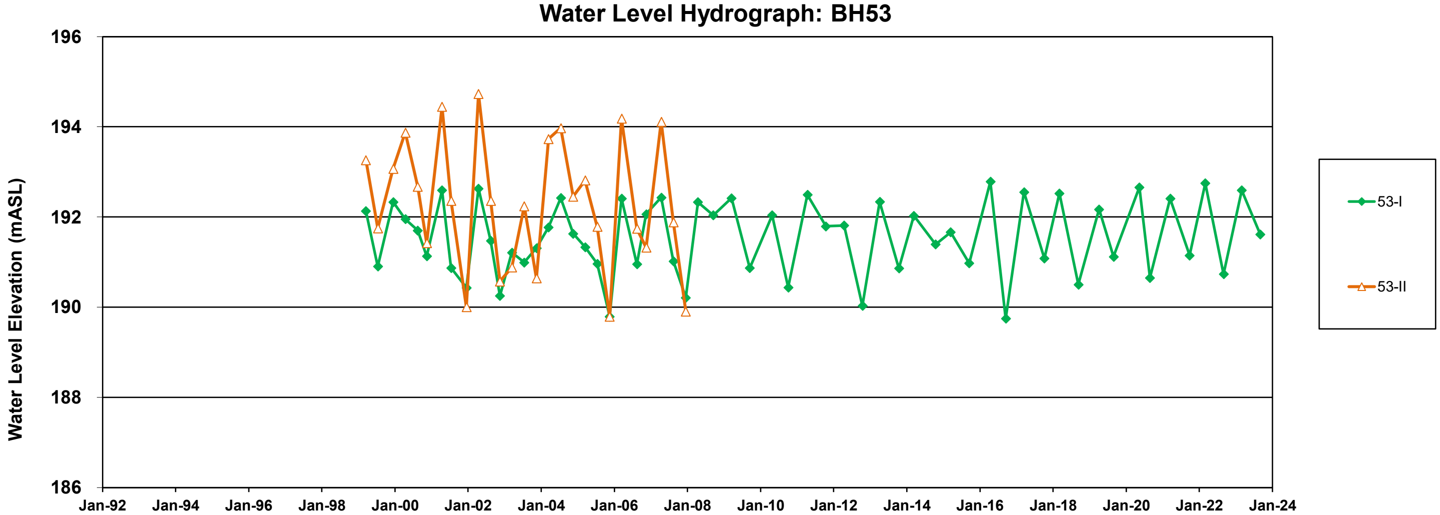

Figure E.16
Water Level Hydrograph: BH54

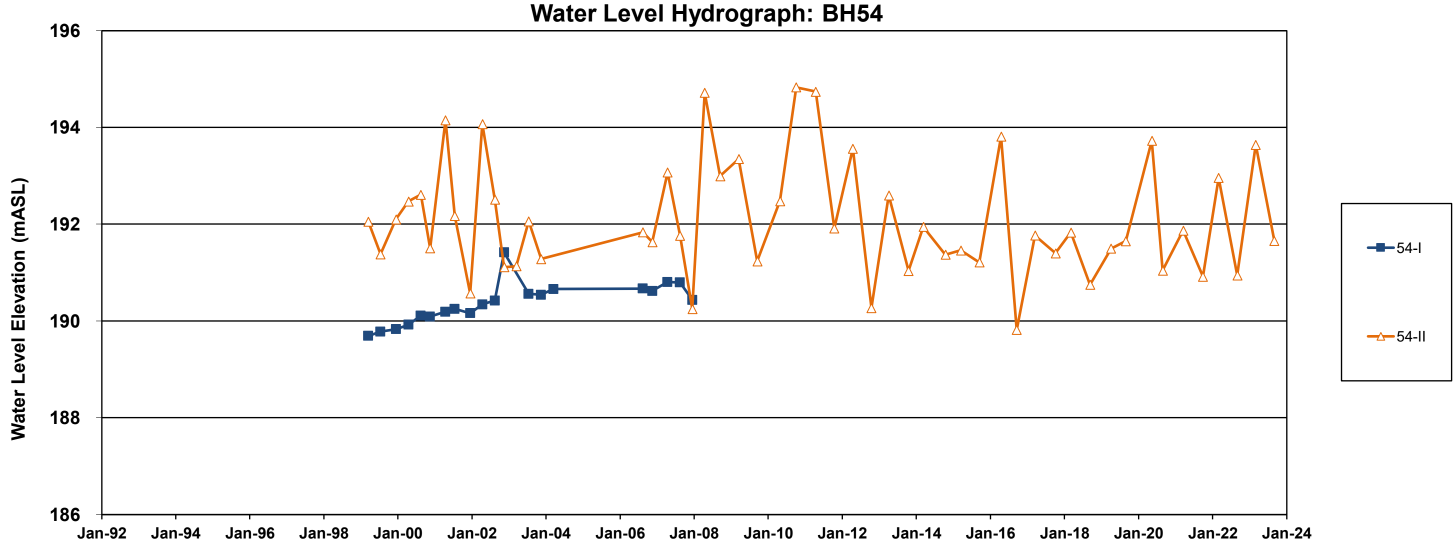

Figure E.17
Water Level Hydrograph: BH61

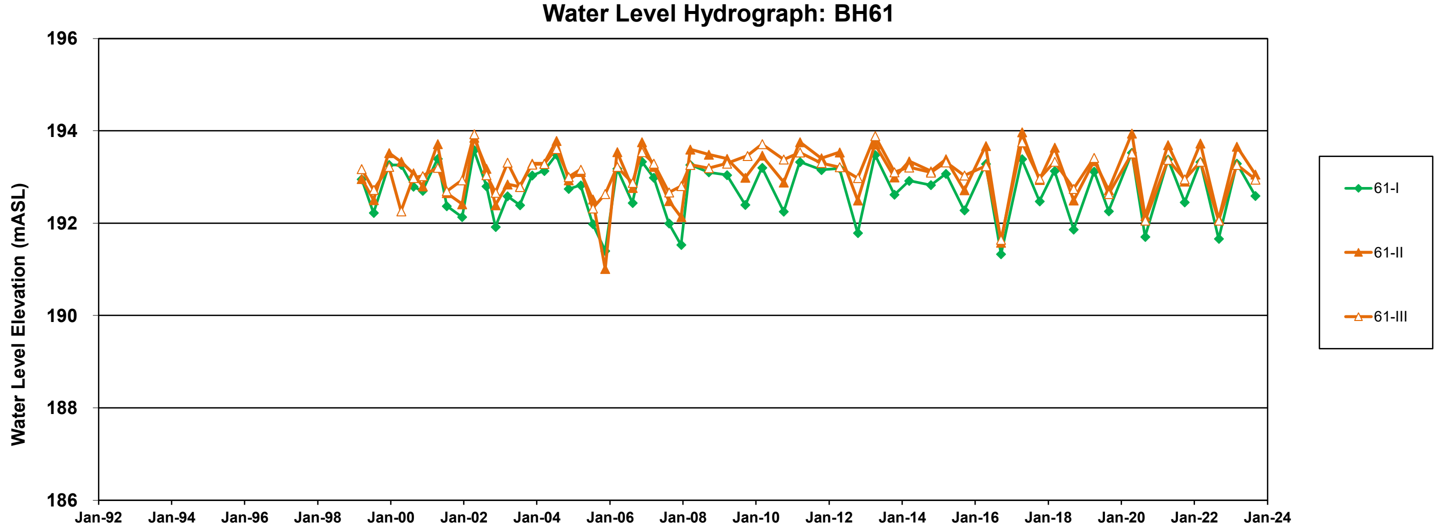

Figure E.18
Water Level Hydrograph: BH62

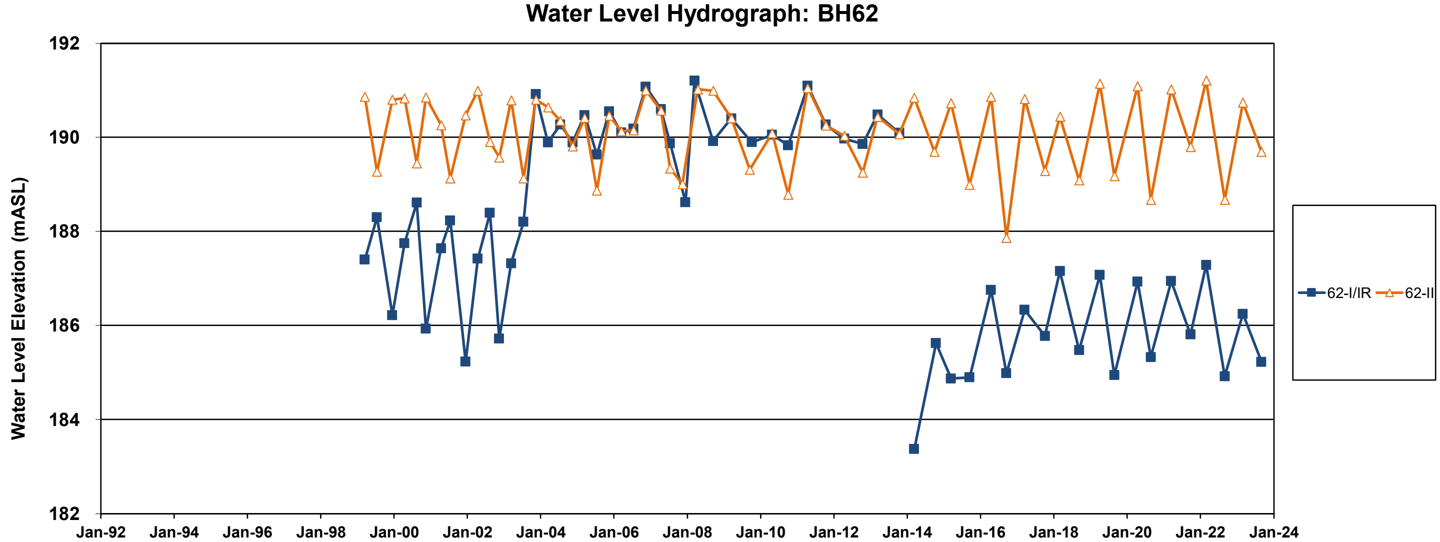

Figure E.19
Water Level Hydrograph: BH63

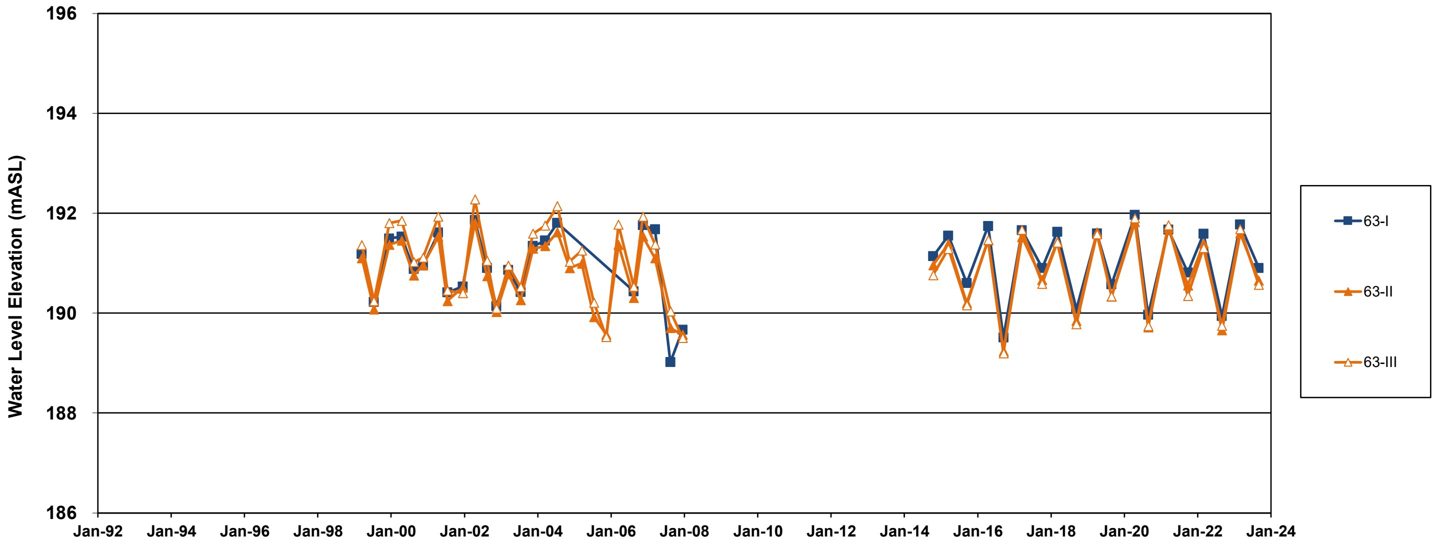

Figure E.20
Water Level Hydrograph: BH64

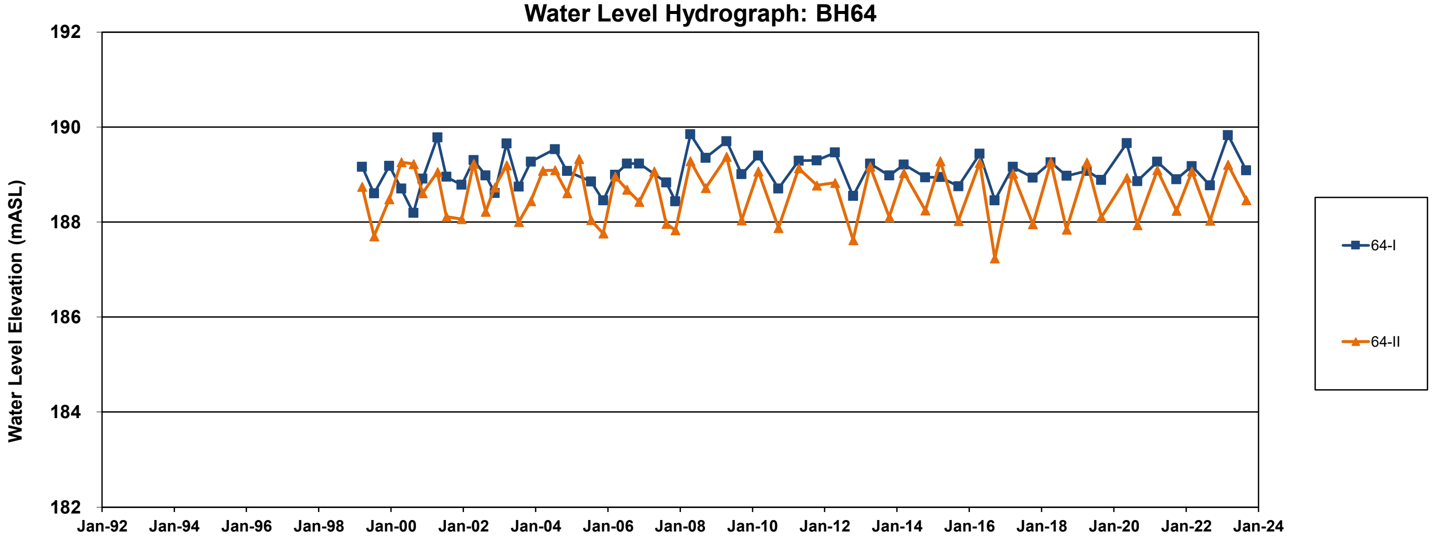

Figure E.21
Water Level Hydrograph: BH66

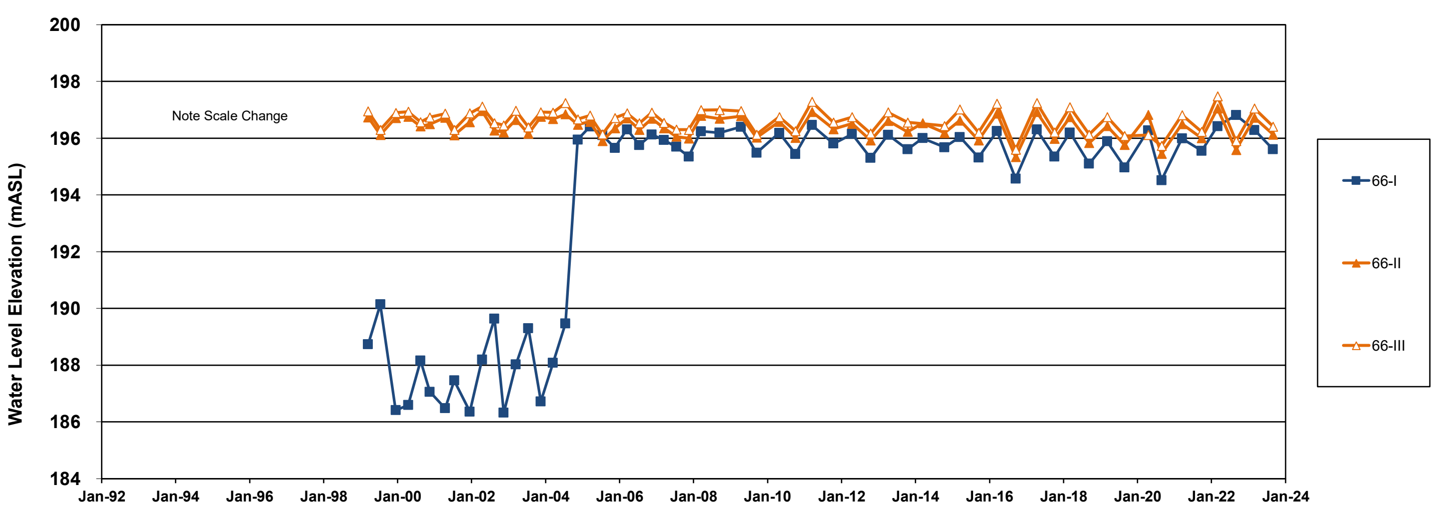

Figure E.22
Water Level Hydrograph: BH70 / BH113

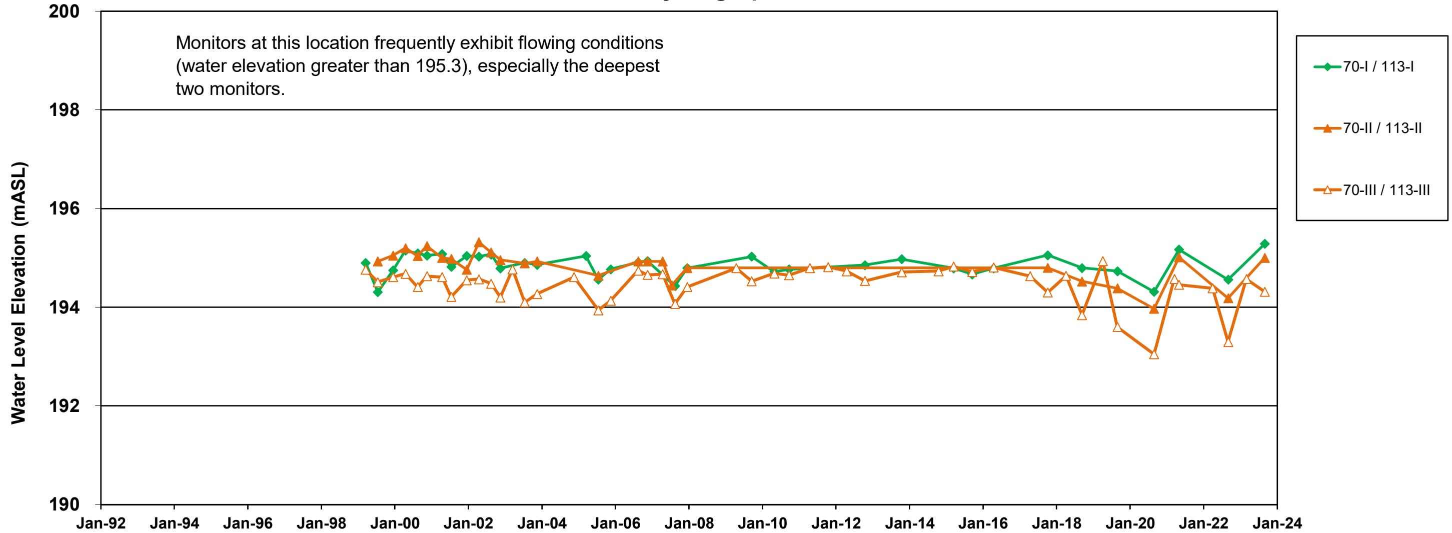

Figure E.23
Water Level Hydrograph: BH74

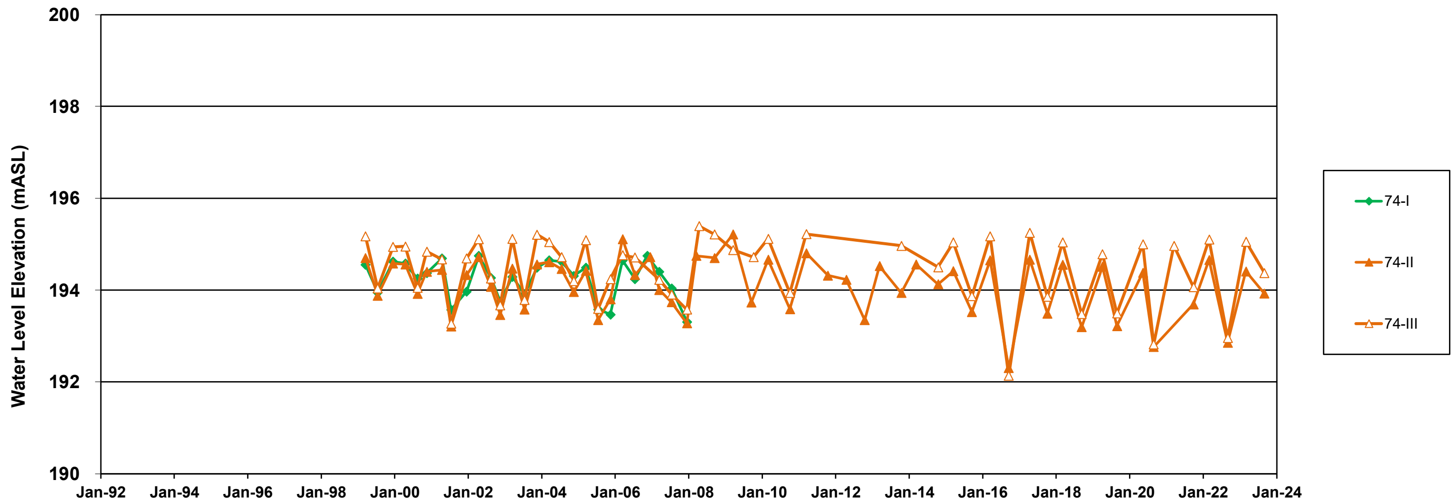

Figure E.24
Water Level Hydrograph: BH75

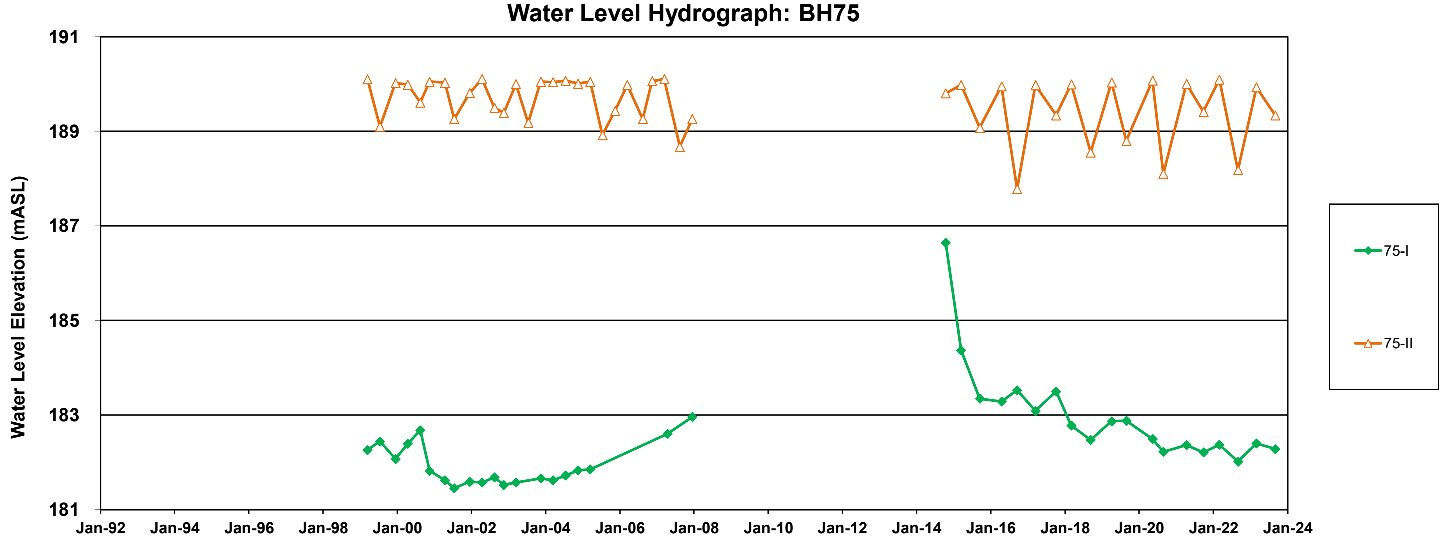

Figure E.25
Water Level Hydrograph: BH76

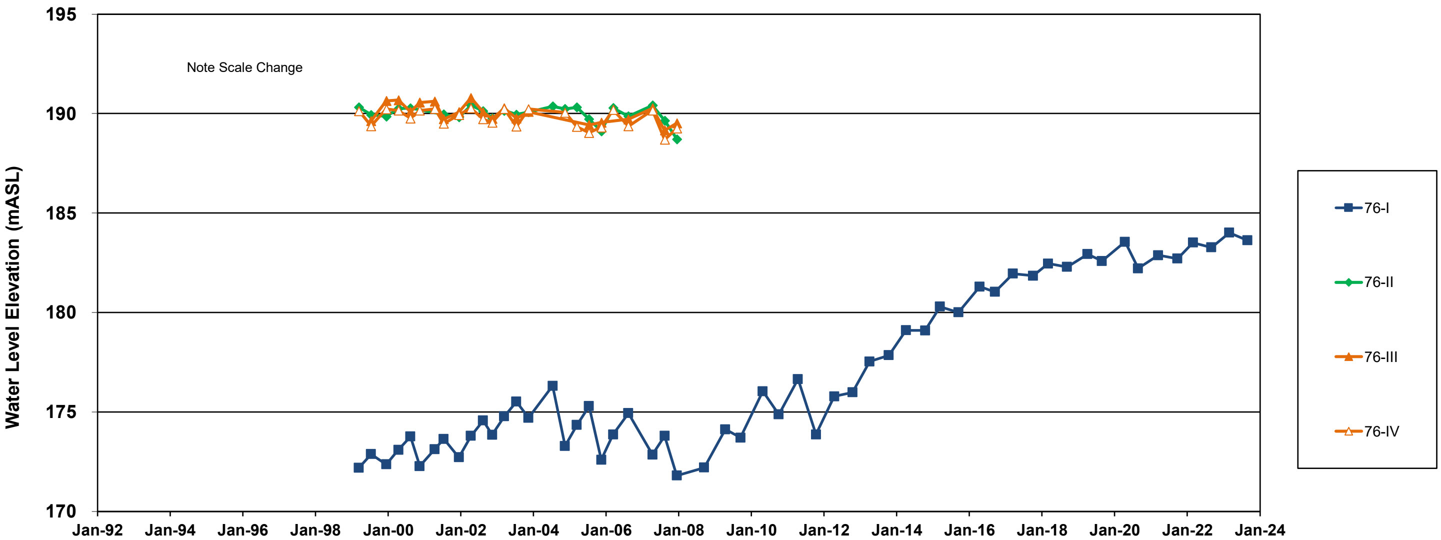

Figure E.26
Water Level Hydrograph: BH77

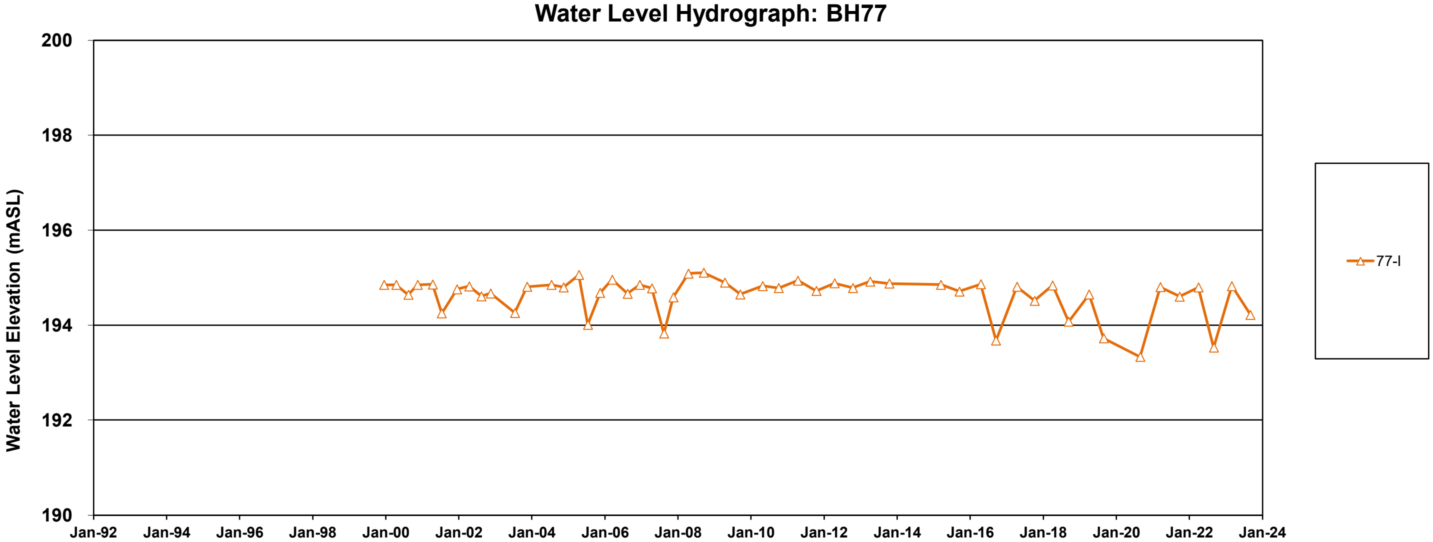

Figure E.27
Water Level Hydrograph: BH81

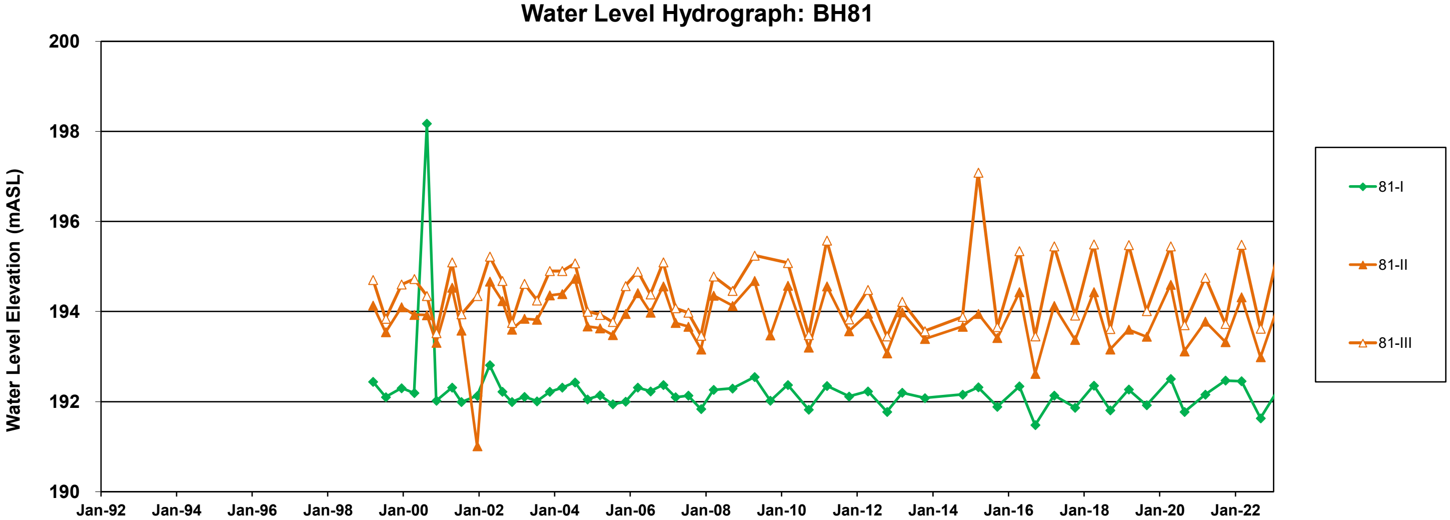

Figure E.28
Water Level Hydrograph: BH84

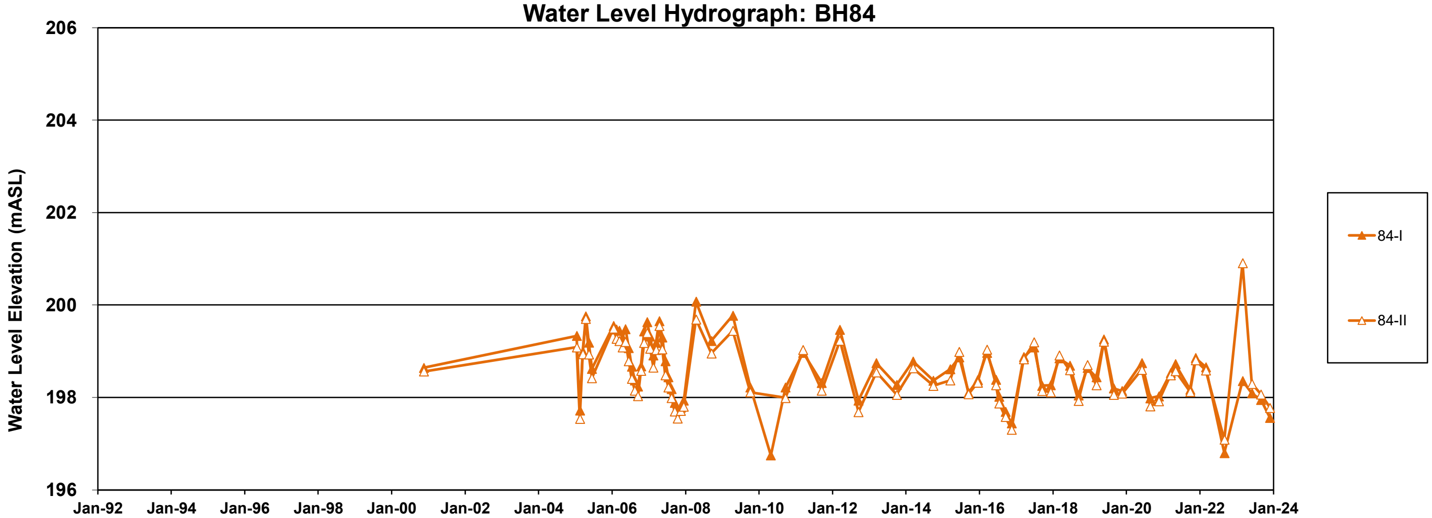

Figure E.29
Water Level Hydrograph: BH85

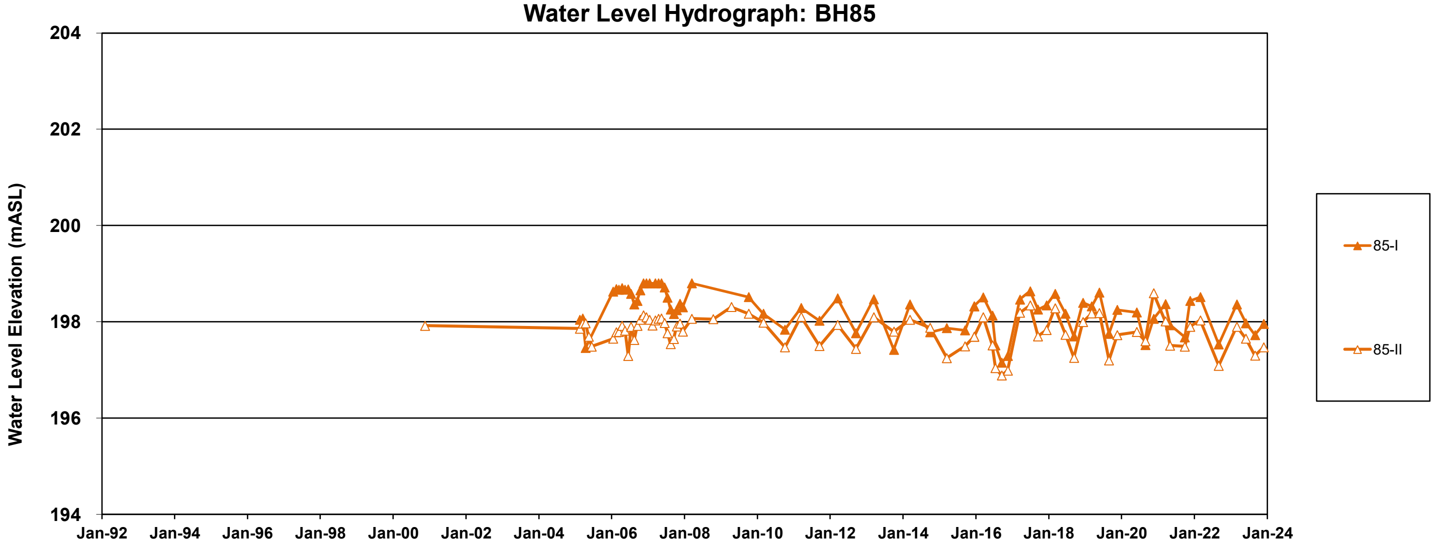

Figure E.30
Water Level Hydrograph: BH86

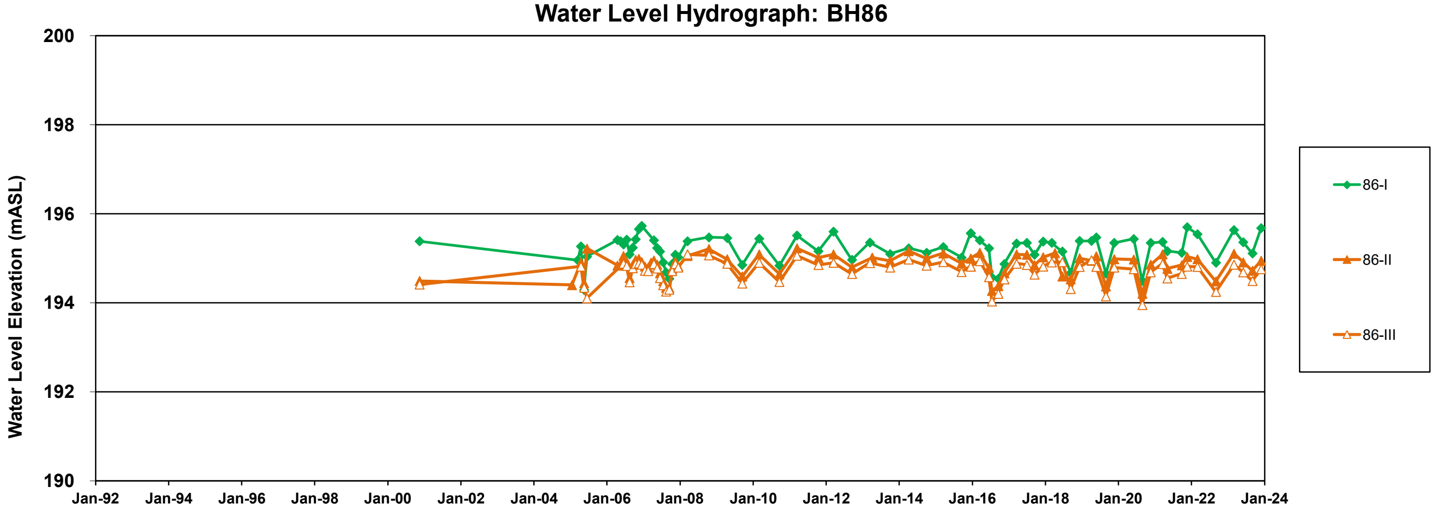

Figure E.31
Water Level Hydrograph: BH87

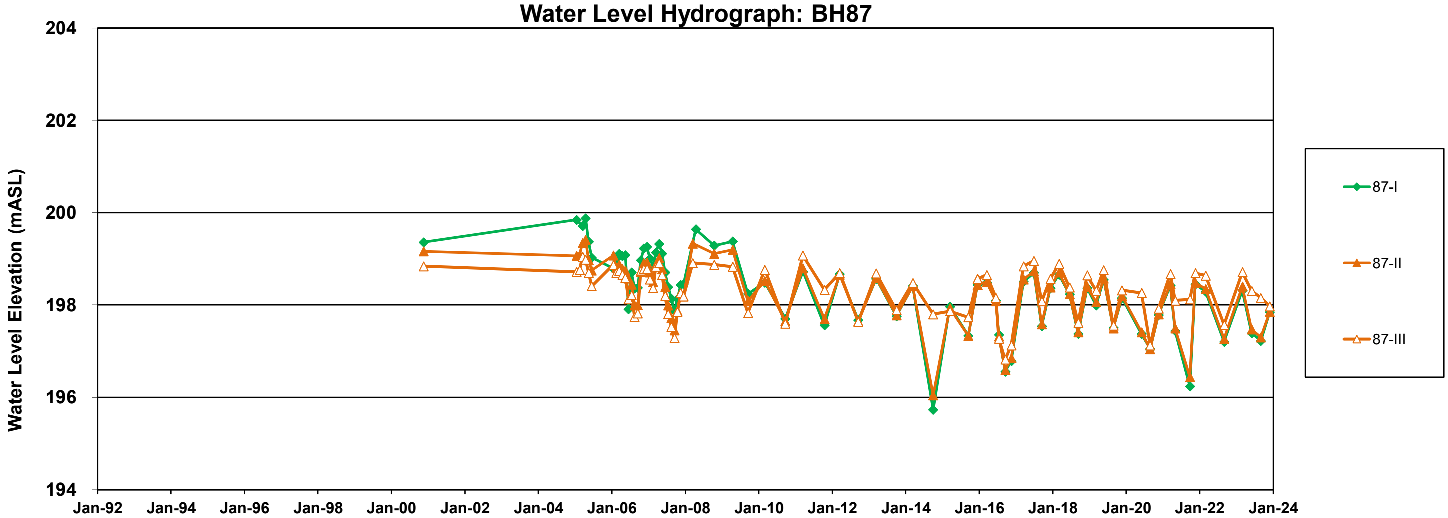

Figure E.32
Water Level Hydrograph: BH88

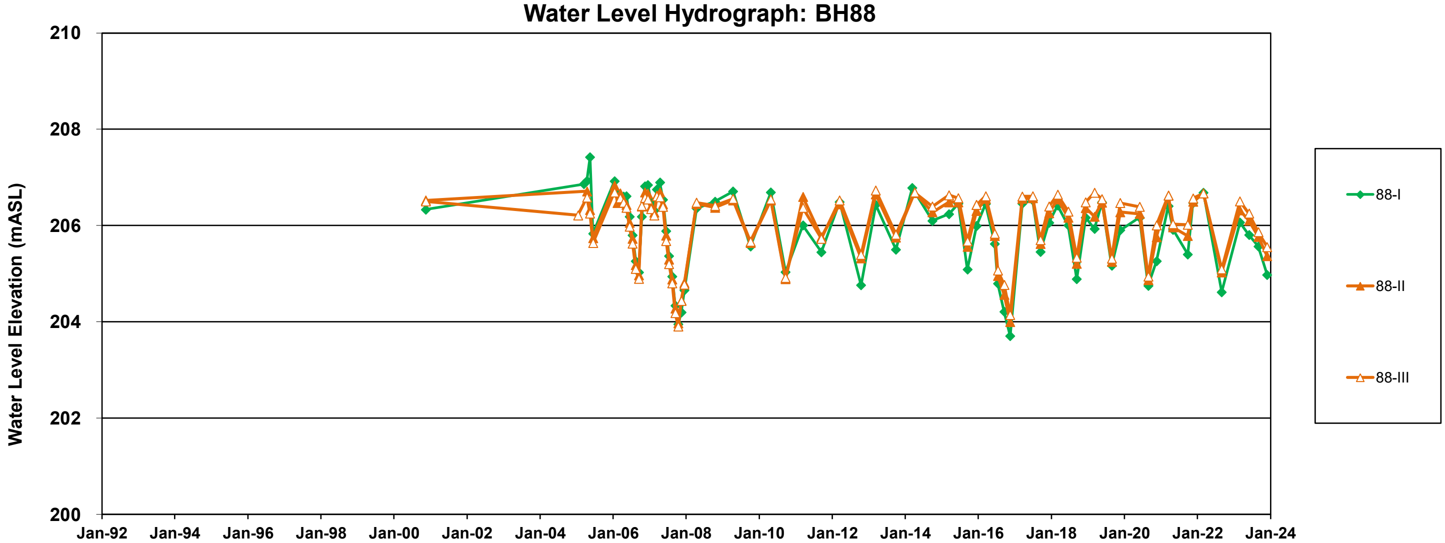

Figure E.33
Water Level Hydrograph: BH89

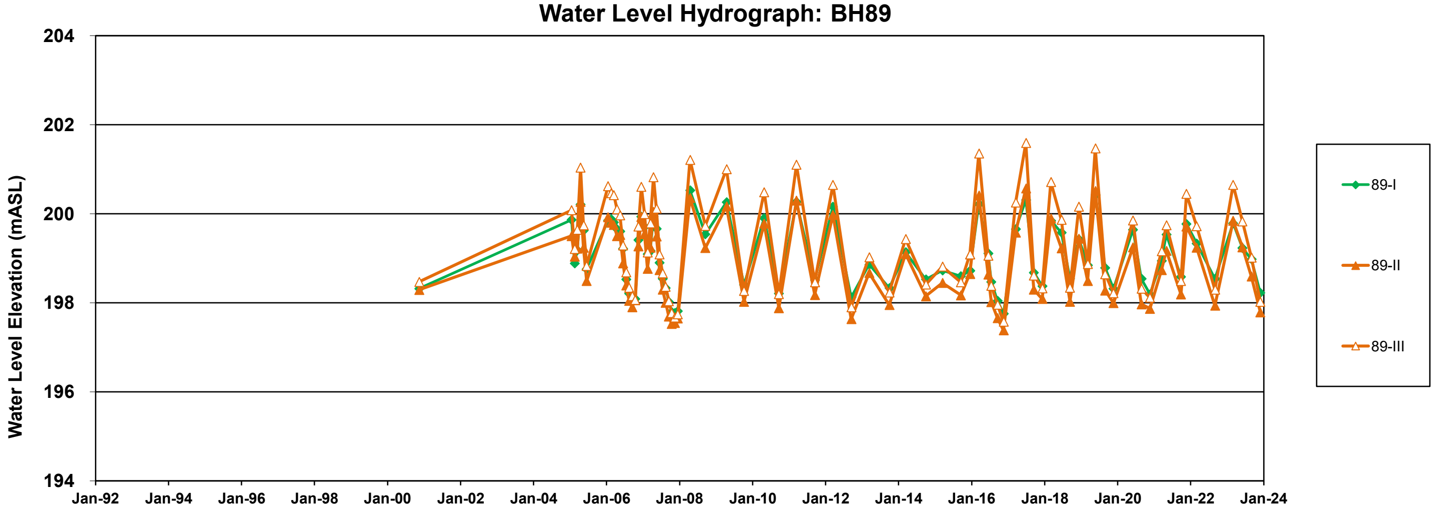

Figure E.34
Water Level Hydrograph: BH91

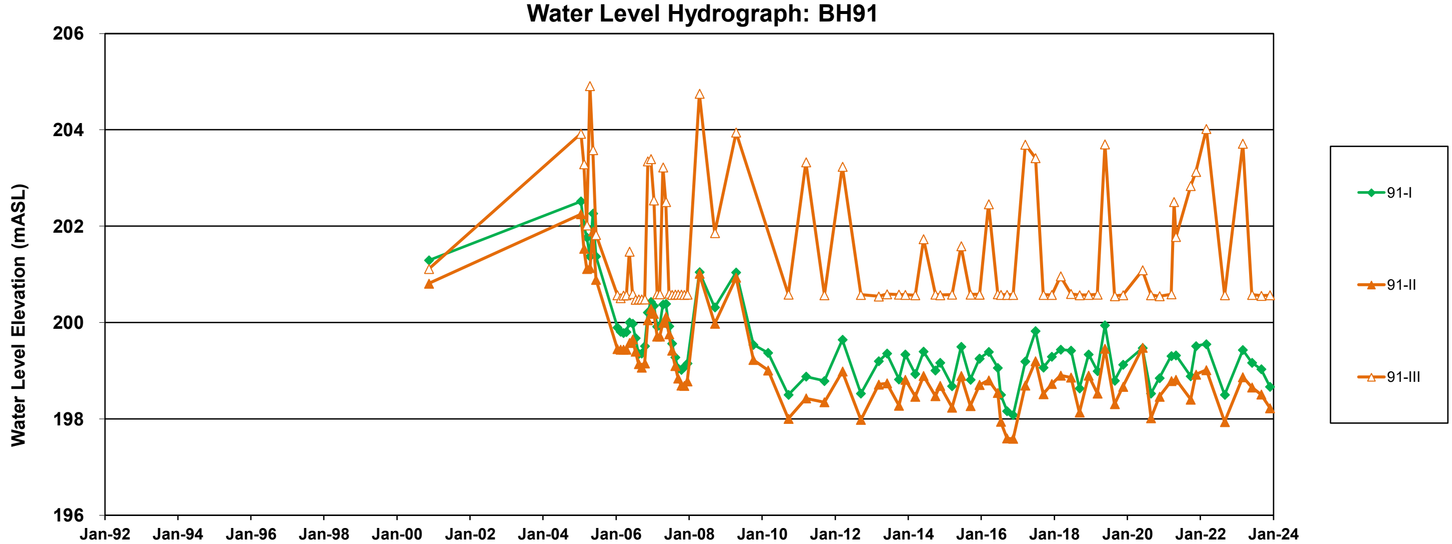

Figure E.35
Water Level Hydrograph: BH92

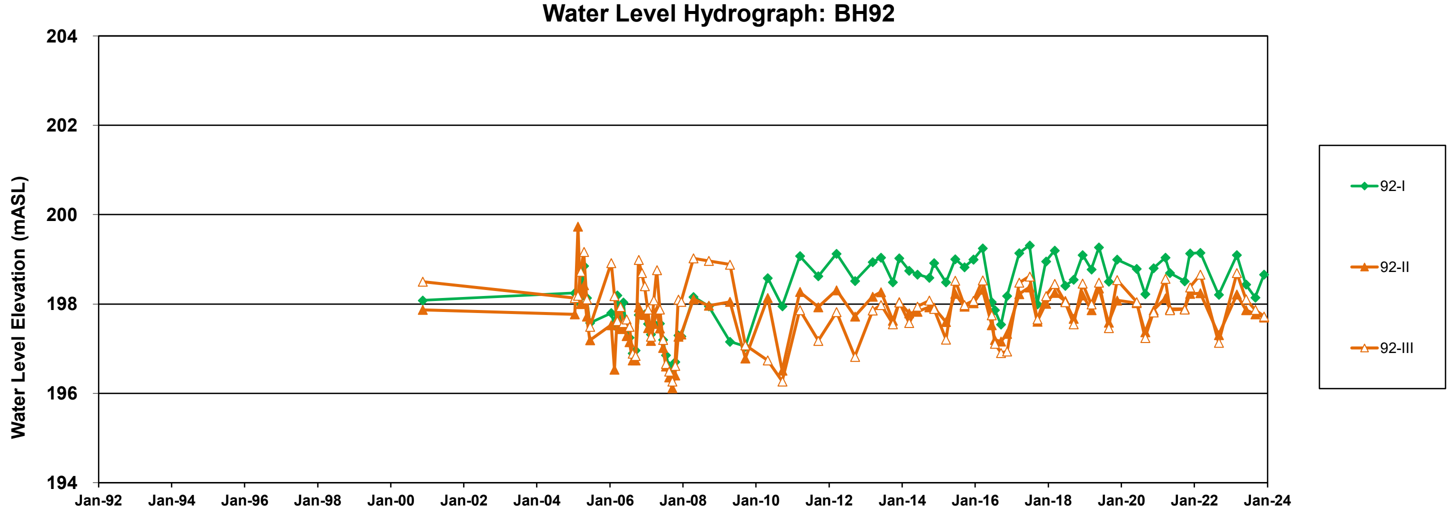

Figure E.36
Water Level Hydrograph: BH93

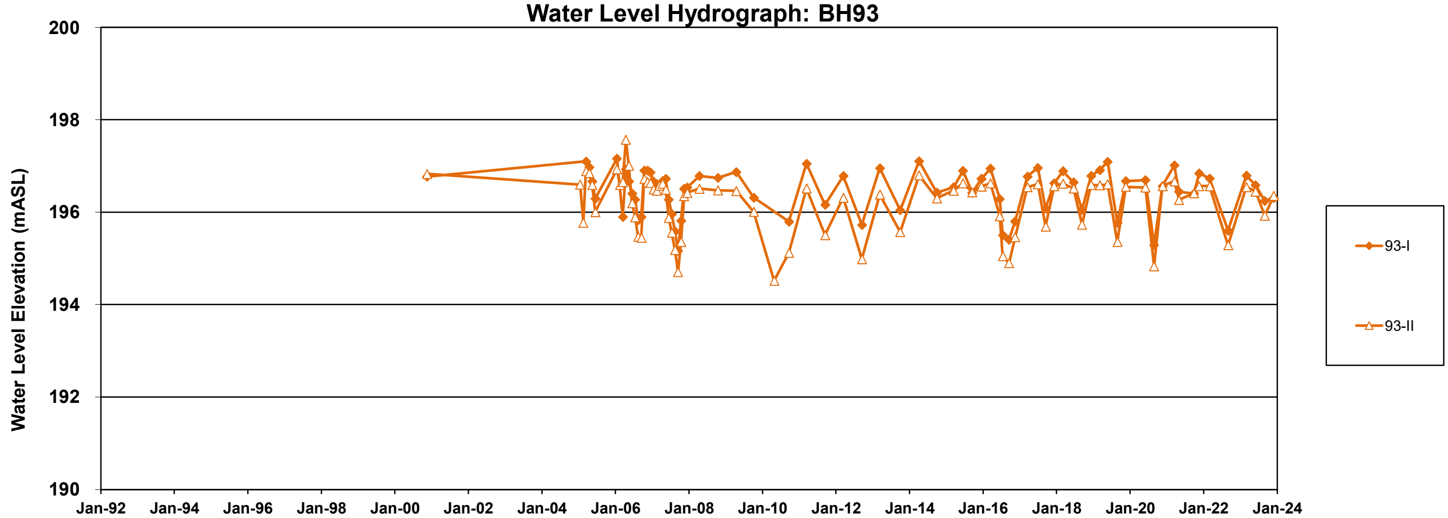

Figure E.37
Water Level Hydrograph: BH94

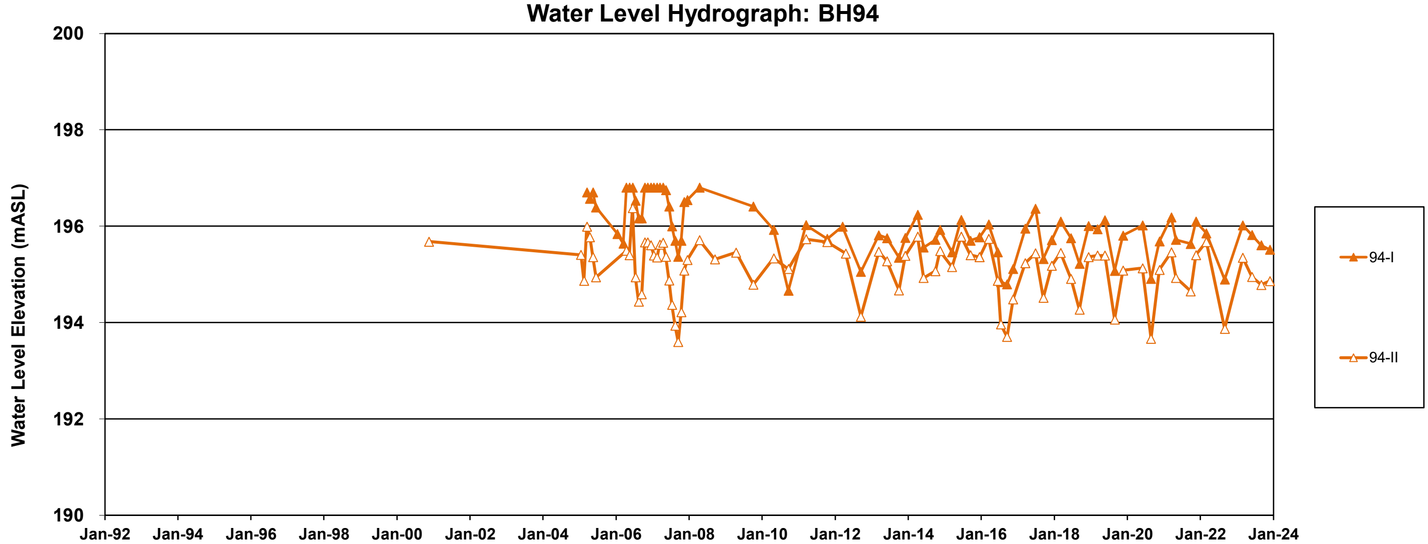

Figure E.38
Water Level Hydrograph: BH95

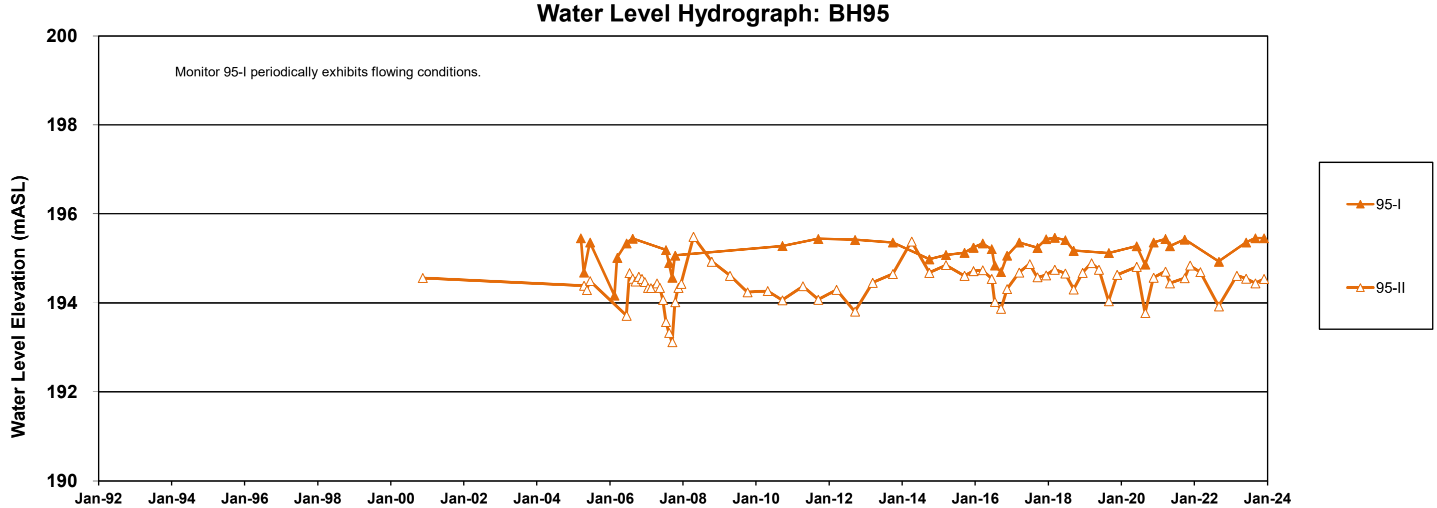

Figure E.39
Water Level Hydrograph: BH101

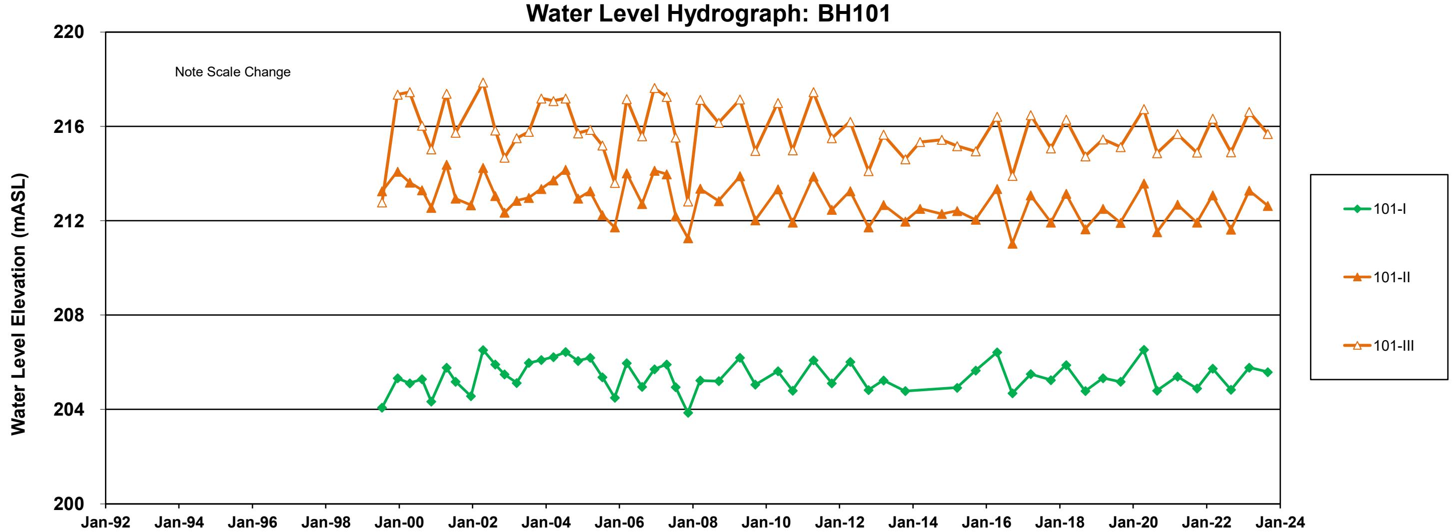

Figure E.40
Water Level Hydrograph: BH104

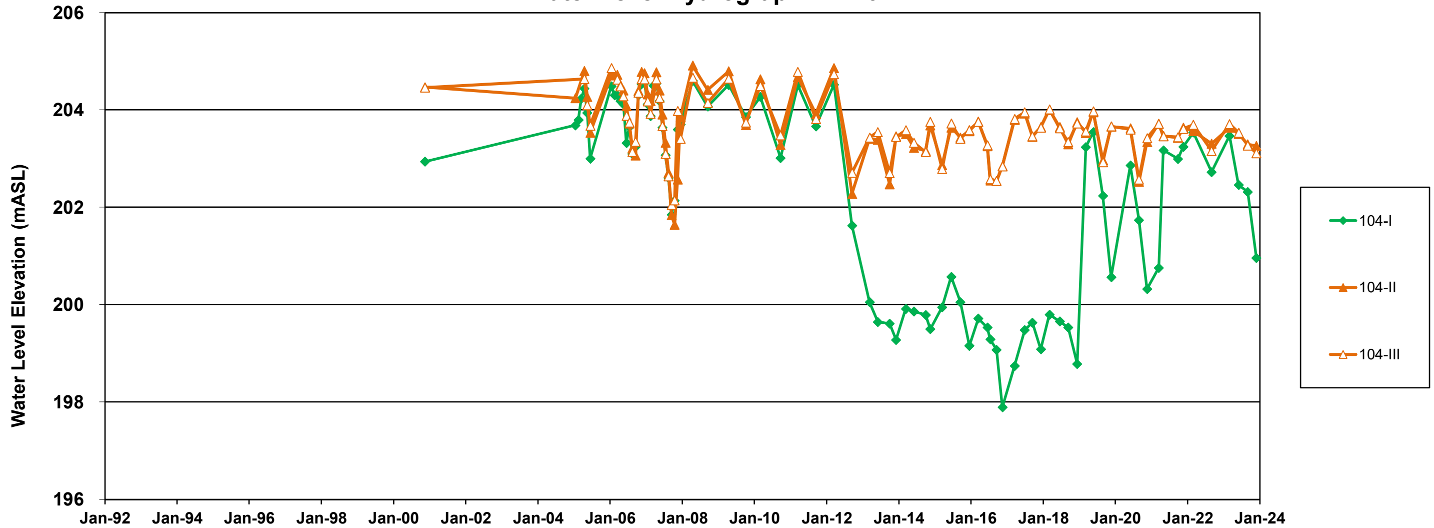

Figure E.41
Water Level Hydrograph: BH106

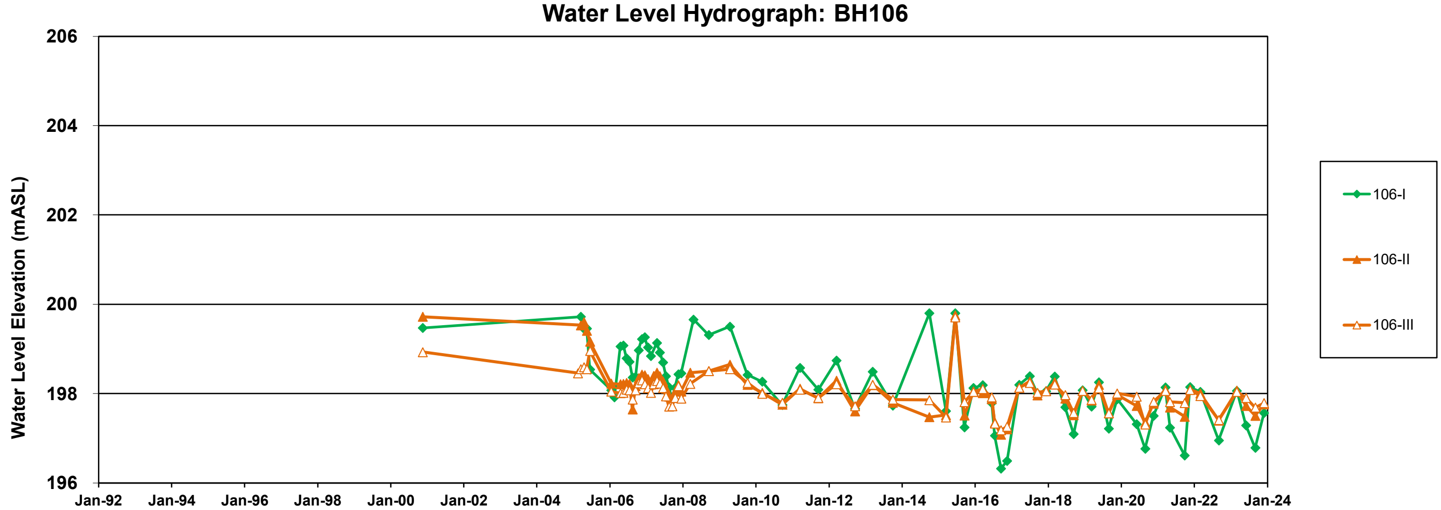

Figure E.42
Water Level Hydrograph: BH107

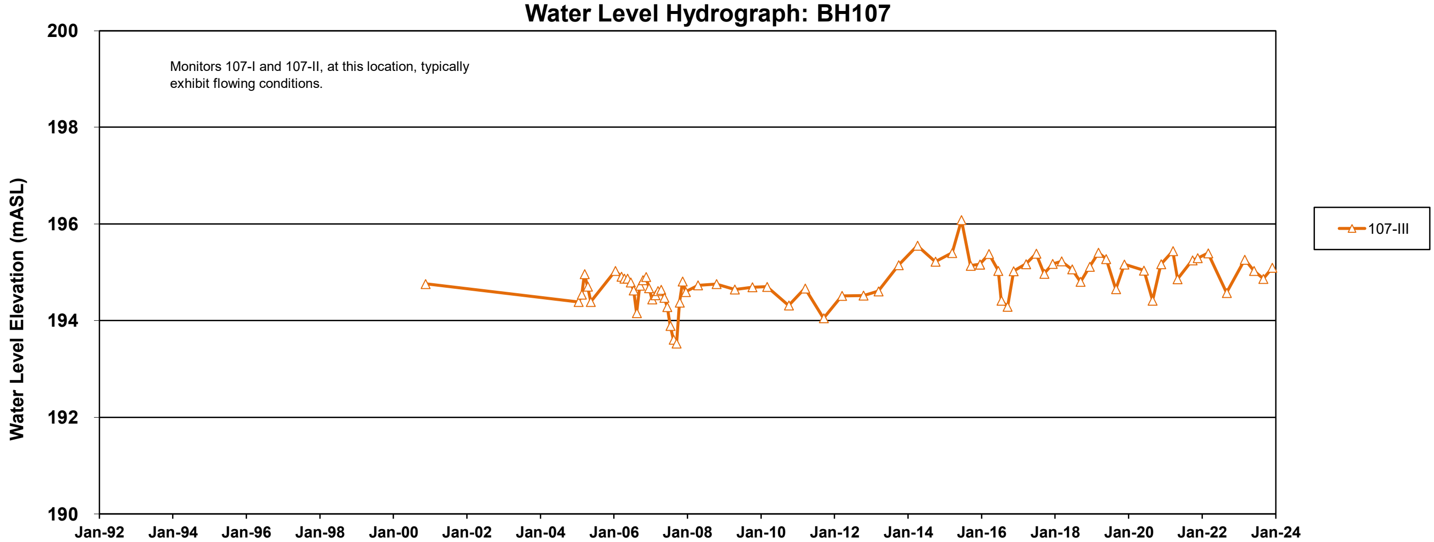

Figure E.43
Water Level Hydrograph: BH108

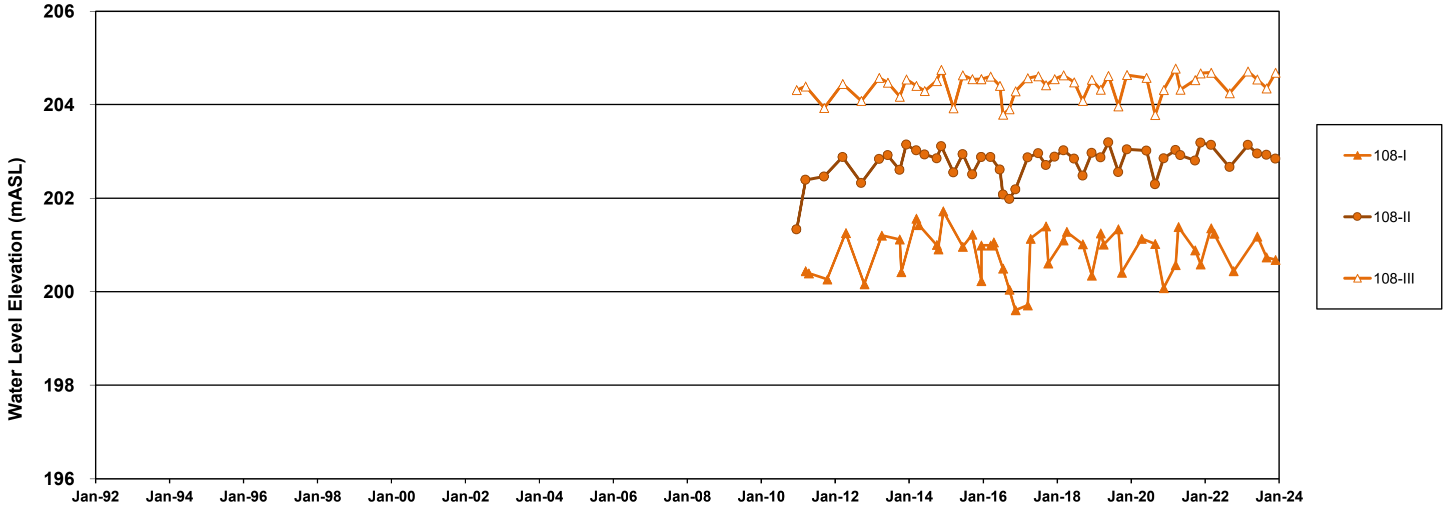

Figure E.44
Water Level Hydrograph: BH109

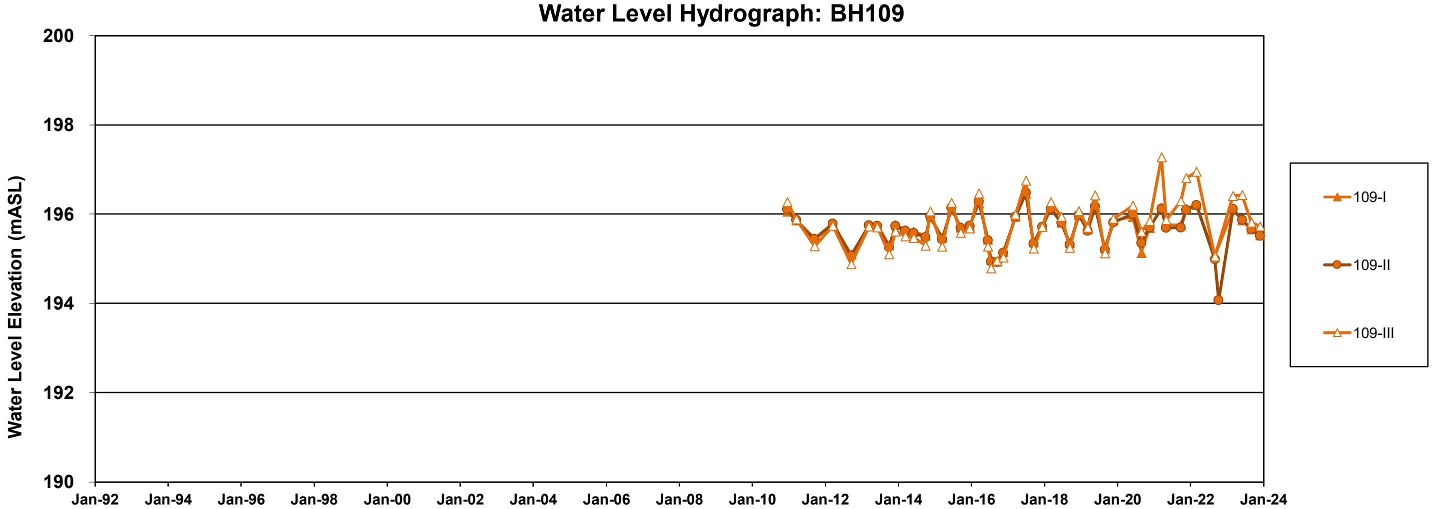

Figure E.45
Water Level Hydrograph: BH110

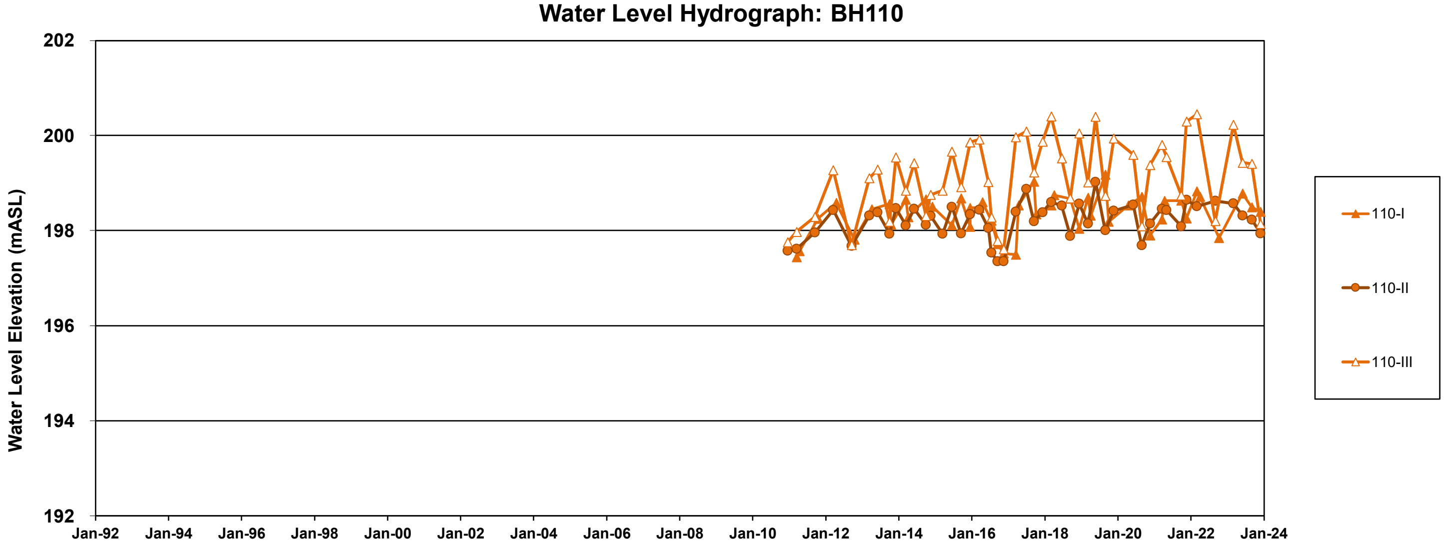

Figure E.46
Water Level Hydrograph: BH111

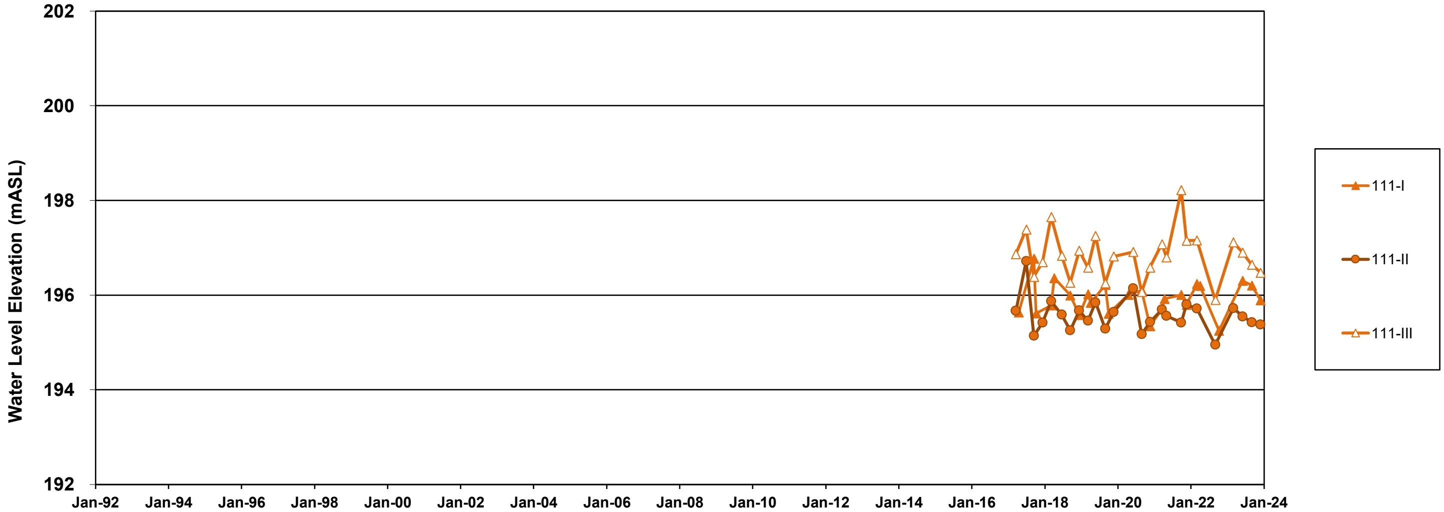

Figure E.47
Water Level Hydrograph: BH112

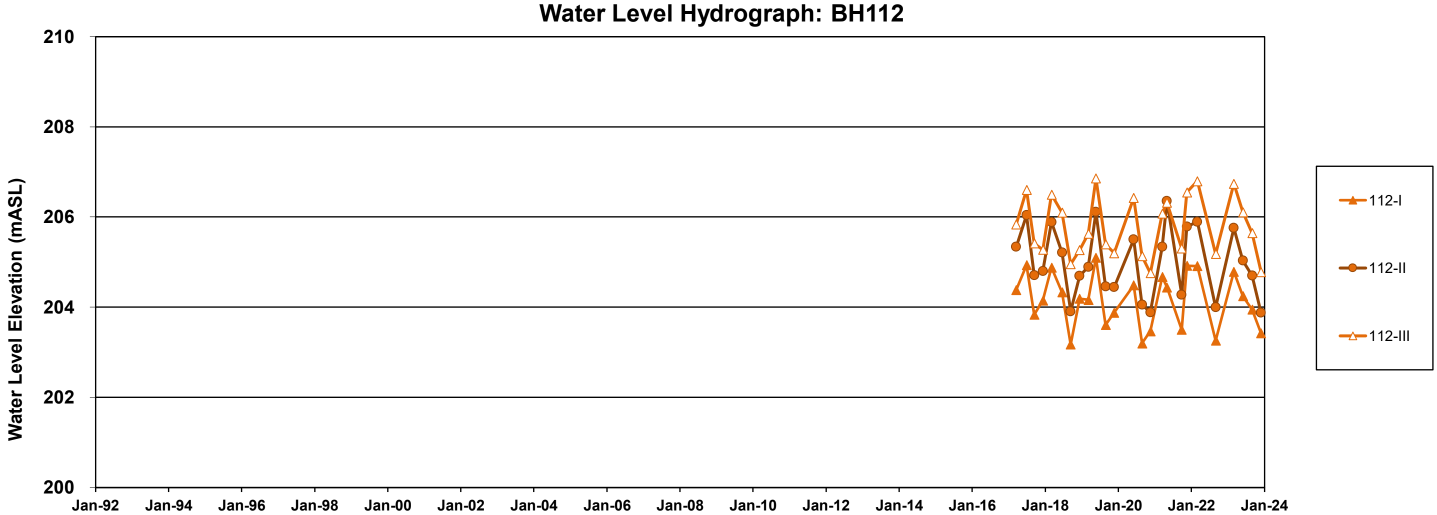

Figure E.48
Water Level Hydrograph: SOUTHEAST - BH92 vs Cell 2 Liner

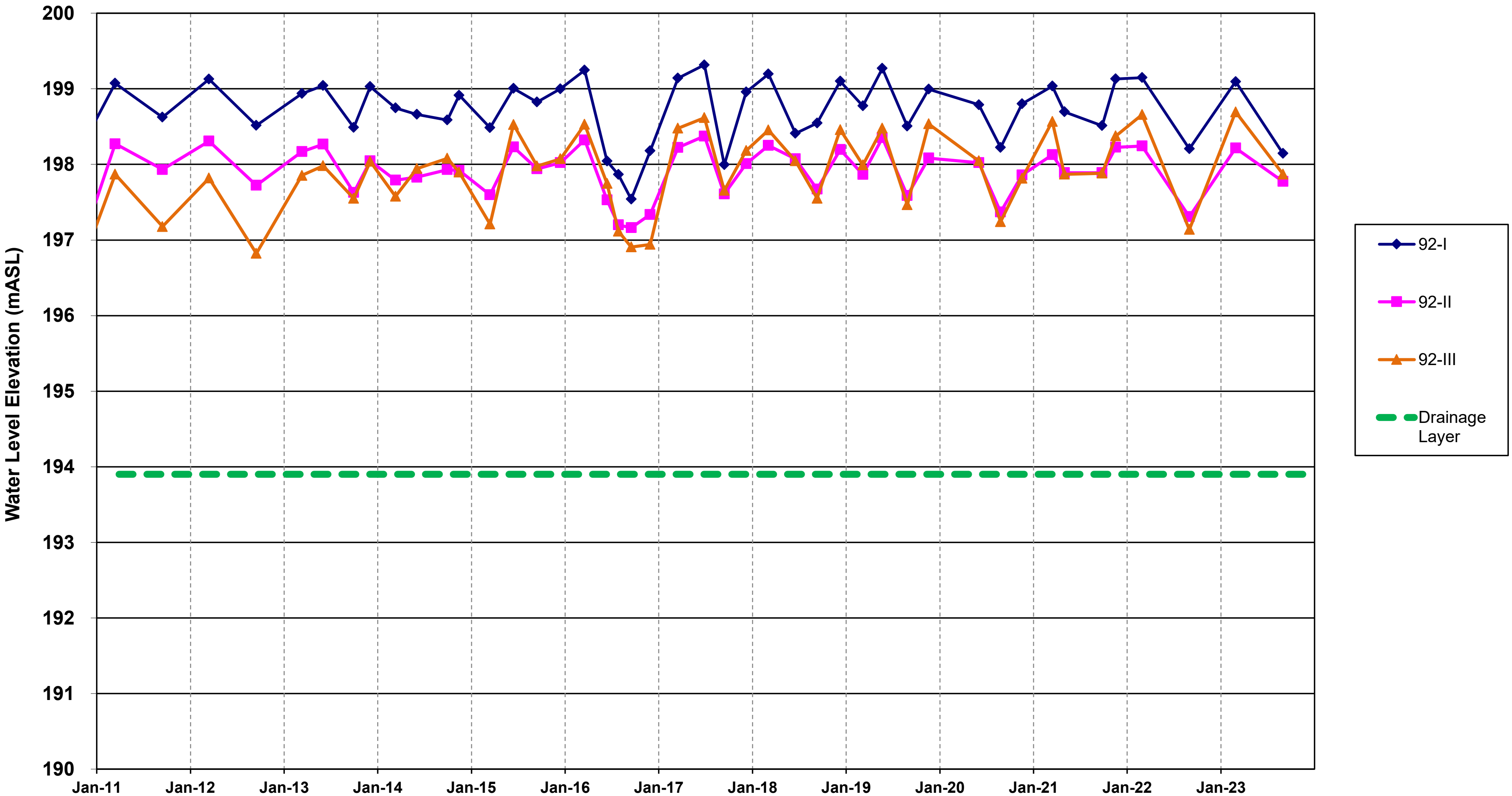

Figure E.49
Water Level Hydrograph: NORTH - BH108 vs Cell 2 Liner

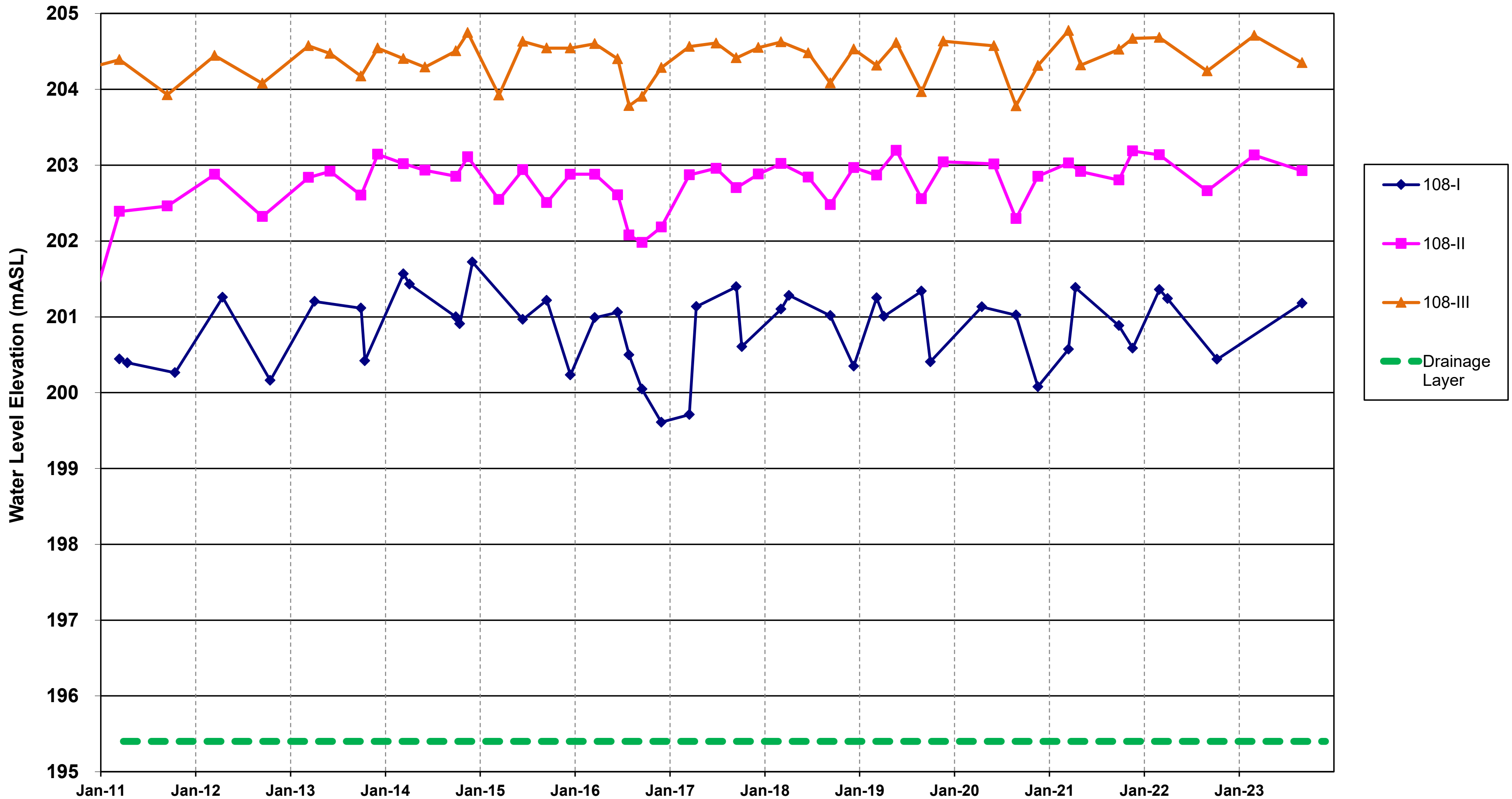

Figure E.50
Water Level Hydrograph: SOUTH - BH109 vs Cell 2 Liner

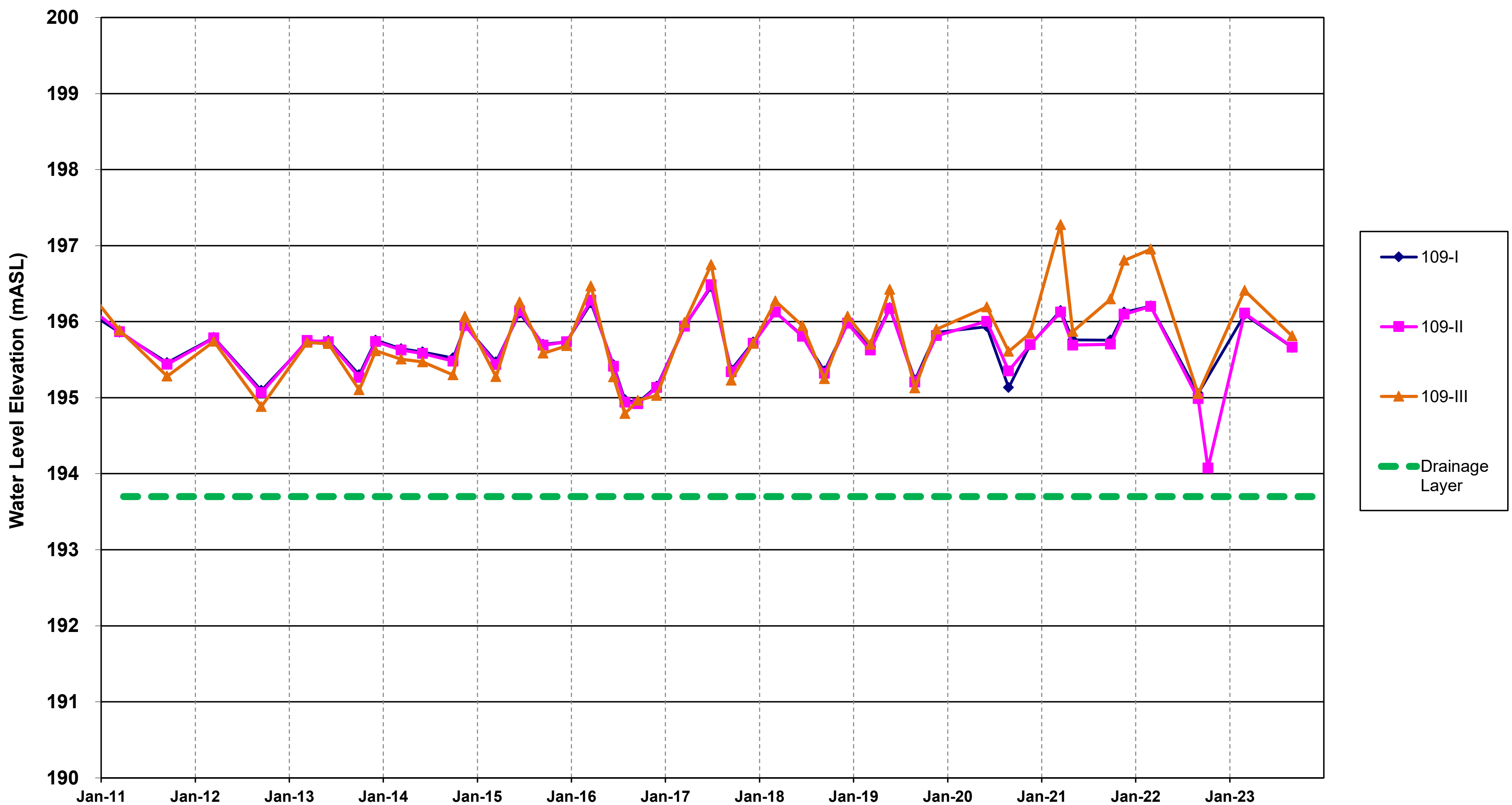

Figure E.51
Water Level Hydrograph: EAST - BH110 vs Cell 2 Liner

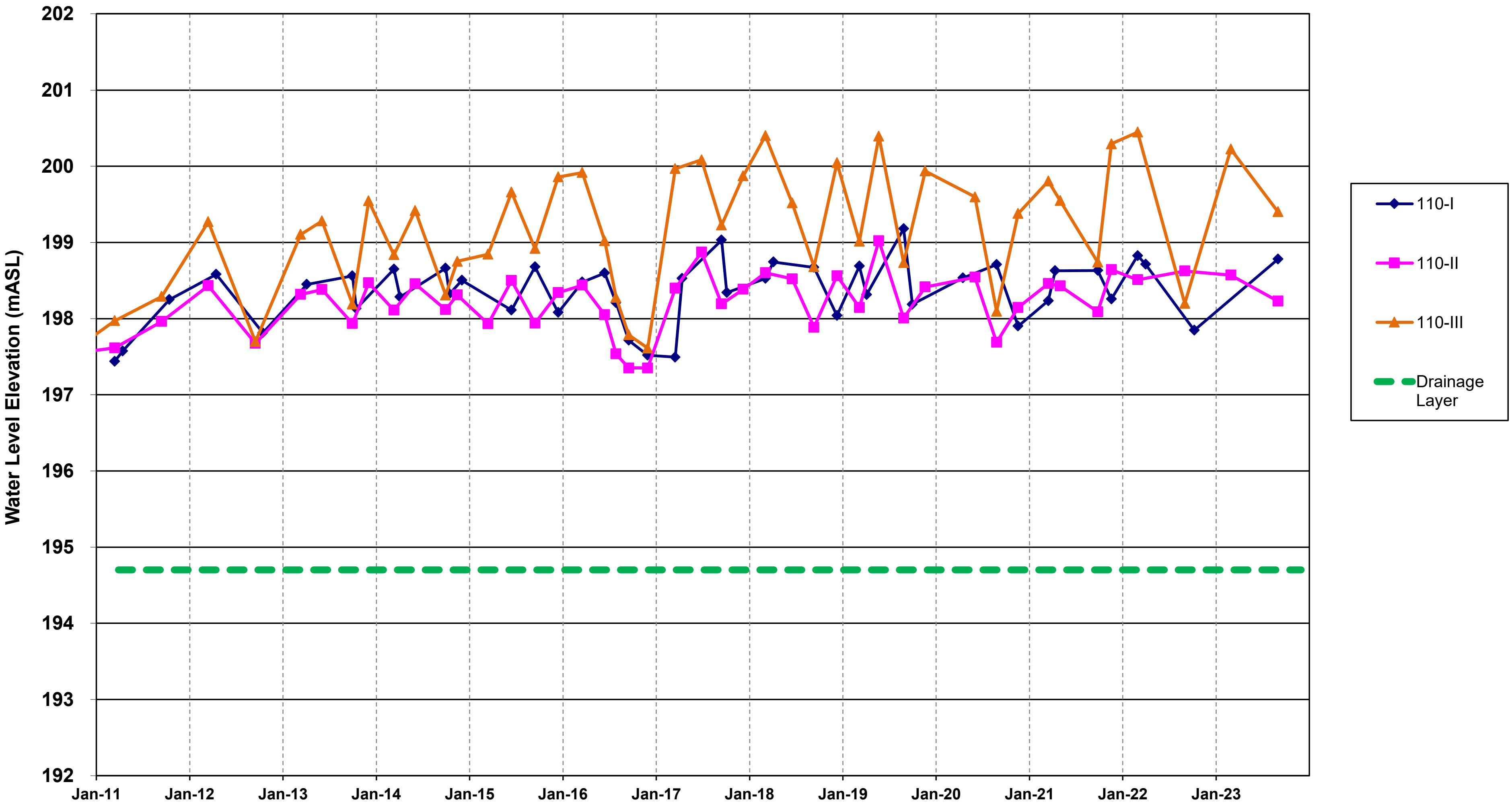

Figure E.52
Water Level Hydrograph: SOUTH - BH111 vs Cell 3 Liner

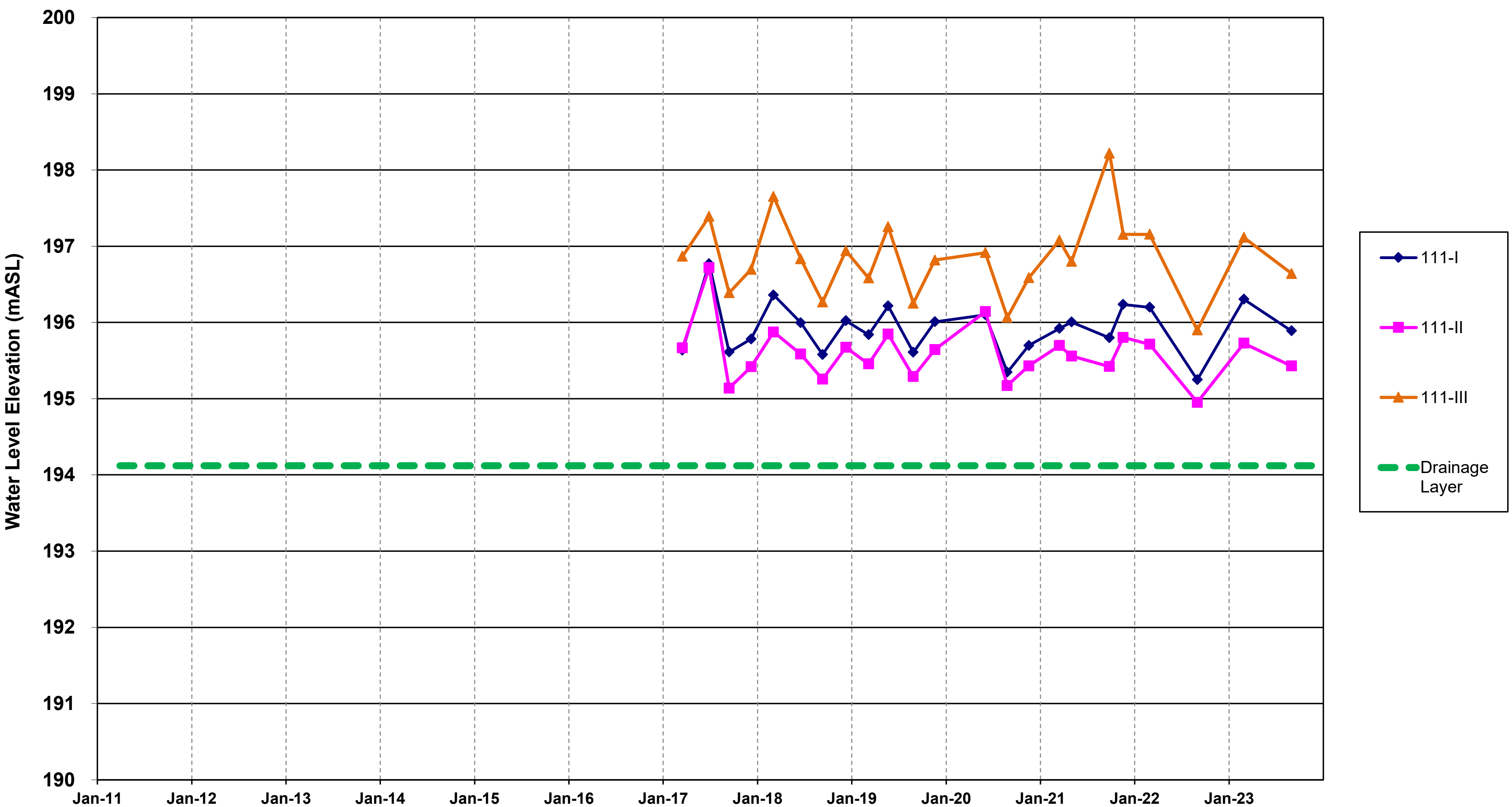

Figure E.53
Water Level Hydrograph: NORTH - BH112 vs Cell 3 Liner

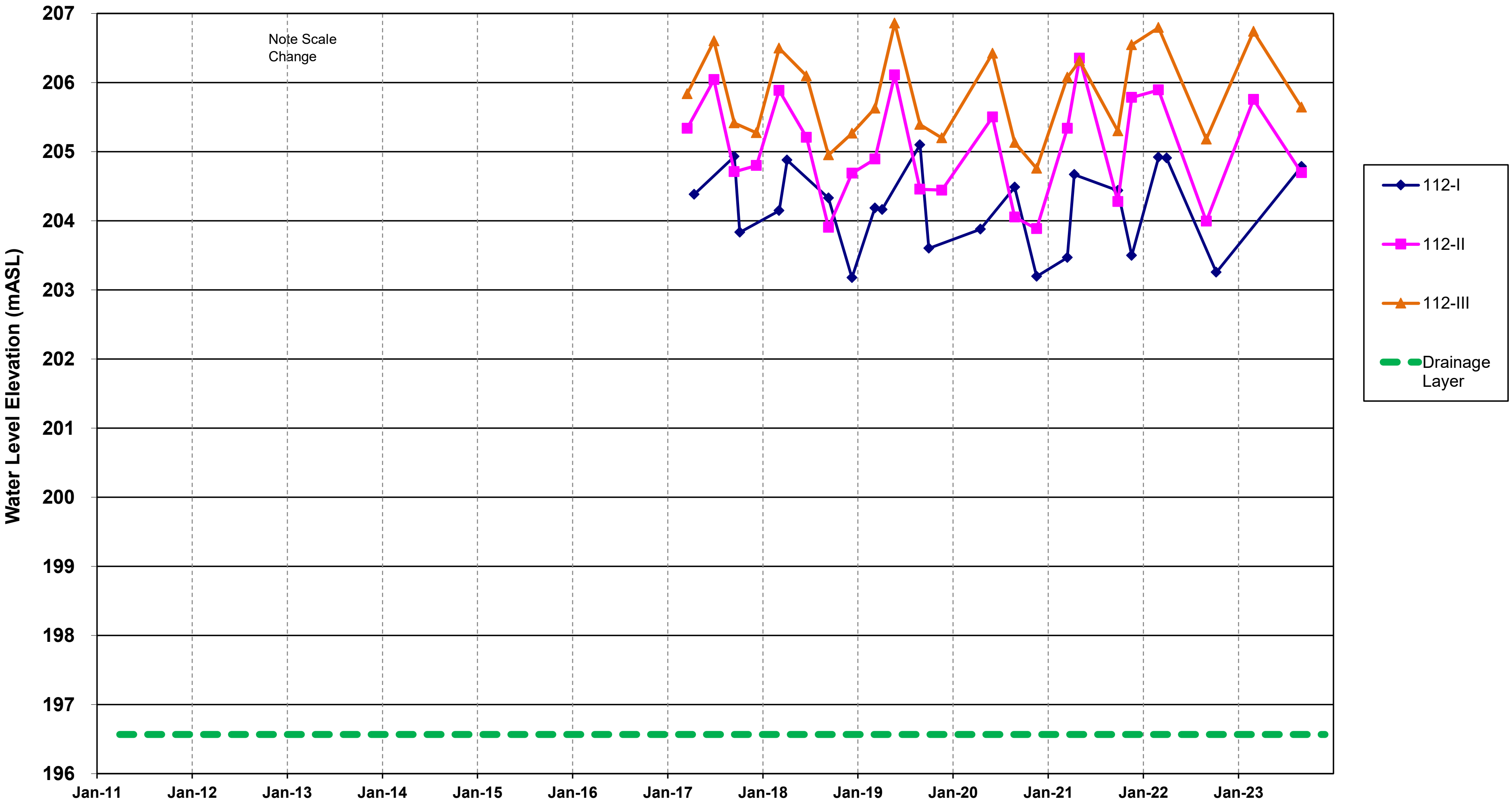

Table E.3
Vertical Standpipe Measurements
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PHASE 1		Feb-23	Apr-23	Jun-23	Aug-23	Oct-23	Nov-23	
Location	Length of Pipe (m)	Level (m)	Level (m)	Level (m)	Level (m)	Level (m)	Level (m)	COMMENTS
SP1-90	2.94	2.85 / dry	2.89 / dry	2.94 / dry	2.94 / dry	2.90 / dry	2.88 / dry	Dry - moderate to strong LCH odour, ok repair.
SP2-90	3.67	3.56 / dry	3.56 / dry	3.57 / dry	3.67 / dry	3.59 / dry	3.55 / dry	Dry - slight to moderate LCH odour, slight south or downhill lean but ok repair.
SP3-90	2.99	2.99 / dry	2.98 / dry	2.99 / dry	2.99 / dry	2.99 / dry	2.93 / dry	Dry - none to slight LCH odour, good repair.
SP4-90	3.78	3.77 / dry	3.77 / dry	3.78 / dry	3.78 / dry	3.78 / dry	3.76 / dry	Dry - none to light LCH odour, good repair.
SP6-90	4.62	4.41 / dry	4.42 / dry	4.62 / dry	4.46 / dry	4.56 / dry	4.42 / dry	Dry - none to slight LCH odour, ok to good repair.
SP7-90	4.20	3.91 / dry	4.04 / dry	3.94 / dry	3.82	4.08 / dry	3.88	Dry - none to slight LCH odour, good repair.
SP8-90	5.25	4.79	4.99 / dry	4.98 / dry	5.02 / dry	4.97 / dry	4.93	Nearly dry. None to moderate LCH odour, SP loose at ground surface coupling but still usable - levels not impacted.
SP10-94	5.70	5.49 / dry	5.69 / dry	5.70 / dry	5.66 / dry	5.66 / dry	5.67 / dry	Dry. Moderate to strong LCH odour, good repair.
SP11-94	7.15	7.09 / dry	7.09 / dry	7.15 / dry	7.10 / dry	7.13 / dry	7.07 / dry	Dry. Strong LCH odour, good repair.
SP14-94	4.83	3.46	3.64	4.83 / dry	3.82	3.70	3.85	Light to strong LCH odour, good repair. Black sludge on end of tape.
SP15-91	3.95	3.95 / dry	3.94 / dry	3.95 / dry	3.95 / dry	3.95 / dry	3.94 / dry	Dry. None to strong LCH odour, good repair.
SP16-91	4.11	3.95 / dry	3.96 / dry	3.97 / dry	3.99 / dry	4.01 / dry	4.01 / dry	Dry - moderate to strong LCH odour, good repair.
SP18-96	3.71	3.71 / dry	3.71 / dry	3.71 / dry	3.71 / dry	3.71 / dry	3.70 / dry	Dry - slight to moderate LCH odour, good repair.
SP19-96	4.54	4.49 / dry	4.45 / dry	4.54 / dry	4.54 / dry	4.54 / dry	4.49 / dry	Dry - slight to moderate LCH odour. Slight downhill (north) lean to SP but OK repair overall.
SP20-96	5.98	5.90 / dry	5.88 / dry	5.89 / dry	5.85 / dry	5.87 / dry	5.89 / dry	Dry - slight to strong LCH odour, ok repair.

NOTE: If standpipe has less than 0.3 m of standing water in it, it is considered dry.

Table E.4
Inclined Standpipe Measurements
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

Location	Measured Length of Pipe (m)	Feb-23 Level (m)	Apr-23 Level (m)	Jun-23 Level (m)	Aug-23 Level (m)	Oct-23 Level (m)	Nov-23 Level (m)	COMMENTS
ISP7-95	10.69	8.58	8.33	8.67	8.62	8.57	8.86	No leachate odour from incline. Some odour from mound when walking from access road up slope to ISP 7. OK repair and is secure.
ISP8	11.80	N/A	N/A	N/A	N/A	N/A	N/A	ISP 8 decommissioned August 05, 2020. Stand Pipe to be replaced in the near future.
ISP9	13.53	N/A	N/A	N/A	N/A	N/A	N/A	ISP 9 decommissioned August 05, 2020. Stand Pipe to be replaced in the near future.
ISP11	38.12 *	36.55	N/A	37.66	37.99 / dry	37.70 / dry	37.10	Nearly dry. Moderate to Very strong leachate odour. Blockage observed at 6.09m in April but was able to pass the blockage in June, possibly snagged on coupling seam. Multiple snags along length of incline in Aug, all passed with tubing/tape with some difficulty. Thick dark leachate on level tape. No surface water observed around casing.
ISP12	34.45	33.90	34.37	33.97	34.38 / dry	34.21 / dry	34.45 / dry	Dry. Strong to very strong leachate odour. Thick black sludge on end of tape which impacts measurement - level recorded at first beep. Casing is very corroded but is secured with a zip-tie - hinge is broken off. No surface water evident in winter. Standing water to west in small trench/swale with decayed cattails.
ISP13	35.88	34.18	N/A	35.88 / dry	35.52 / dry	35.88 / dry	35.19 / dry	Dry. Strong to very strong leachate odour. Thick black sludge on end of tape and level recorded at first beep due to this sludge. Casing is extremely corroded and hinge is broken off. Lid secured with a zip tie. Couple small standing water puddles beside well to west. Blockage in April likely due to pipe coupling seam @ 24.725m, pipe was dry down to blockage.
ISP14	21.56	20.37	20.32	20.44	20.44	20.43	20.47	Nearly dry. Light to strong leachate odour. Casing is very corroded and cannot be secured due the lid being corroded and bent - casing should be replaced. Some snags on coupling seams on the way down inclined standpipe. Dilute black leachate like liquid on end of tape. No standing water in area.
ISP15 (NFA)	21.44	16.68	15.43	16.34	11.50	15.19	17.20	Light to very strong leachate odour. Orange rustic sediment or thick liquid on tape after measurement (especially bottom 2-3 m). Casing and incline standpipe in very bad shape as was disturbed several times by contractors in the past and is not secure. Very hard to get tape and pex tube down pipe for measurement, seems like coupling ~1.5 m down is loose and partially detached. Incline should be replaced with standpipe in Cell 2 - results may be inaccurate. Tape beeped at 11.150 m in Aug; removed and cleaned, remeasured but continued to beep once reaching this point, would not stop when continued past this point - measurement was marked at this level. Standpipe likely damaged below grade. No SW noticeable in ditch to direct south.
ISP16 (NFA)	19.23	19.22 / dry	19.2 / dry	19.23 / dry	19.23 / dry	19.23 / dry	19.23 / dry	Dry - Moderate to very strong LCH odour. Ok repair - 4 inch pipe - no casing. Hard to get past several coupling seams in the incline pipe. Some visible sediment or staining on the tape after measurement. Mud and litter in ditch around incline area - no surface water observed around incline.
ISP17 (NFA)	27.65	N/A	N/A	27.65 / dry	27.65 / dry	27.65 / dry	27.60 / dry	New inclined standpipe for cell 4. Dry - little to no odour. No standing water in area or adjacent ditch. Some garbage collecting around adjacent fencing from wind. Active waste filling currently in cell 2 and 3 mostly although cell 4 also has some waste present, mostly to east and north sides.
ISPL-1-91	12.76	12.68 / dry	12.76 / dry	12.76 / dry	12.73 / dry	12.74 / dry	12.76 / dry	Dry - Slight to moderate leachate odour. Casing very corroded but secure - casing zip-tied closed. Some shallow standing water in ditch to direct east.
ISPL-2-91	12.62	12.21 / dry	12.39 / dry	12.4 / dry	12.52 / dry	12.43 / dry	12.38 / dry	Dry - Slight to moderate leachate odour. Casing very corroded but secure - casing zip-tied closed. Some shallow standing water in ditch to direct east.
ISPL2-1-91	12.79	12.77 / dry	12.78 / dry	12.79 / dry	12.79 / dry	12.79 / dry	12.79 / dry	Dry - slight to moderate leachate odour. Some shallow standing water in ditch to direct east. Casing very rusted and hinge broken, ziptied but not secure - casing should be replaced.
ISPL2-2-91	12.65	12.65 / dry	12.65 / dry	12.65 / dry	12.64 / dry	12.65 / dry	12.65 / dry	Dry - slight to moderate leachate odour. Some shallow standing water in ditch to direct east. Casing very rusted, secured with ziptie as locks don't last.

NOTES: 1) If standpipe has less than 0.3 m of standing water in it, it is considered dry.
2) * - Indicates length is installation length, instead of measured length as current length cannot be measured.

APPENDIX

F

GROUNDWATER QUALITY DATA

Table F.1

Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	5-IV												5-V			
			Mar-18	Oct-18	Apr-19	Oct-19	May-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Apr-23	Sep-23	Mar-18	Oct-18	Apr-19	Oct-19
Alkalinity	mg/L	30-500 *	244		234		216		223		214		223		242	228	216	400
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		7.4		6.1		9.2		6.6		8.8		5.3		0.1	0.2	<0.1	0.4
Anion sum	meq/L		280		245		232		255		356		265		5.13	4.82	4.6	8.17
Arsenic	mg/L	0.010 **	<0.005		0.001		0.0005		0.0008		0.0006		<0.005		<0.005	<0.005	<0.0005	<0.005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		244		234		216		223		214		223		241	227	214	398
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		1330		1030		922		984		1140		1020		48.4	47.5	47.8	46
Carbonate	mg/L		<1		<1		<1		<1		<1		<1		1	1	2	2
Cation sum	meq/L		304		240		215		242		273		229		5.04	5.01	4.99	4.92
Chemical Oxygen Demand	mg/L		240		300		240		190		90		<250		20	20	<10	<10
Chloride	mg/L	250 *	9760		8530		8070		8900		12500		9270		8.9	8.4	6.8	7.9
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		35400		29000		26200		28100		40000		30600		480	475	460	455
Conductivity - field	µS/cm		34100	27100	35400	26400	32300	24000	31700	27900	34700	20400	32700	29000	618	500	443	465
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	6.4		6.6		3.2		5.7		5.1		7.4		2.8	2.9	3	1.6
Dissolved Oxygen - field	mg/L		0.85	1.17	1.39	0.88	0.84	0.18	0.89	1.61	0.30	0.84	1.16	0.89	3.65	1.1	3.92	1.75
Hardness	mg/L	80-100 *	6970		5440		4910		5310		6140		5160		222	224	225	221
Ion Percentage	%		4.15		1.18		3.65		2.66		13.3		7.45		0.9	1.97	4.1	24.8
Iron	mg/L	0.3 *	4.46		3.34		2.59		3.16		4.19		3.05		<0.05	0.33	0.011	0.3
Lead	mg/L	0.01 **																
Magnesium	mg/L		885		696		634		692		799		634		24.6	25.5	25.7	25.7
Manganese	mg/L	0.05 *	0.078		0.075		0.0647		0.0697		0.0810		0.0652		0.002	0.016	0.0017	0.012
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<10		<5.0		<5		0.8		<5		<5.0		<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<10		<5.0		<5		<0.5		<5		<5.0		<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-32.8	-83.7	-71.2	-189.4	-153.8	-182.3	-87.1	-81.6	-56.5	-146.1	-106.1	-128.5	-11.8	-124.8	-63.2	-157.8
pH	units		6.85		7.13		7.14		6.98		6.85		6.96		7.75	7.76	8.03	7.81
pH - field	units		6.46	6.22	6.57	6.78	6.52	6.7	6.86	6.56	6.42	6.76	6.09	6.39	7.63	7.92	7.84	7.74
Phenols	µg/L		2		3		10		5		3		3		<1	<1	<1	<1
Phosphate	mg/L		0.11		0.1		0.07		0.06		0.05				<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L												<3.0					
Phosphorus	mg/L		0.2		0.13		0.36		0.06		0.06		0.24		0.05	<0.02	<0.02	<0.02
Potassium	mg/L		69.7		59		49.7		57		75.3		53.6		2.2	2	2.2	2.2
Sodium	mg/L	200 *	3710		2950		2630		3060		3370		2830		11.6	10.3	9.3	9
Sulphate	mg/L	500 *	<40		30.8		<20		<20		<20		<20		9.5	8.3	11	10
Temperature - field	°C		8	8.5	6.5	9.3	10.4	9	8	10.6	8.4	11.4	8	9.4	7.3	8.6	6	11.4
Total Dissolved Solids	mg/L	500 *	18900		15200		16700		14100		20200		14400		280	190	350	260
Total Kjeldahl Nitrogen	mg/L		8.3		8		13.3		9.3		8.8		6.2		2.1	<0.1	3.5	<1
Zinc	mg/L	5 *																

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	5-V								5-VI							
			May-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Apr-23	Sep-23	Mar-18	Apr-19	May-20	Mar-21	Oct-21	Mar-22	Apr-23	Sep-23
Alkalinity	mg/L	30-500 *	208	208	222	227	218	224	223	226	316	349	296	300	364	297	248	359
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.2	0.1	0.1	0.3	0.2	0.5	0.1	0.2	0.1	<0.1	0.2	0.1	0.2	0.2	0.2	0.1
Anion sum	meq/L		4.48	4.47	4.73	4.84	4.65	4.8	4.79	4.83	6.37	6.99	6	6.03	7.3	6.04	4.98	7.2
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.005	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		206	207	221	226	216	222	221	224	315	348	295	299	363	296	247	358
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		49.9	47.2	48.4	46.9	45.2	46.5	42.6	53.9	102	124	121	107	126	106	81.2	132
Carbonate	mg/L		2	1	1	1	2	1	2	2	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		5.24	4.99	5.02	4.86	4.71	4.88	4.62	5.45	5.91	7.21	7.03	6.17	7.25	6.1	4.8	7.65
Chemical Oxygen Demand	mg/L		30	20	20	<10	10	<10	210	20	<10	<10	10	<10	<10	<10	10	10
Chloride	mg/L	250 *	8.8	8.4	7.4	7	8.2	8.4	8.8	8.7	2.6	1.3	2.6	1.8	1.3	6.1	1.5	1
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		454	454	454	475	467	439	450	463	583	679	612	565	714	592	436	672
Conductivity - field	µS/cm		506	452	513	491	743	477	689	418	561	685	598	595	712	550	471	600
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	2	1.6	<1.0	11.1	1.2	1.6	1.6	2.8	1.4	3.3	1	2	1.6	1.2	1.9	3.3
Dissolved Oxygen - field	mg/L		3.31	0.63	2.94	1.83	3.83	1.79	4.82	1.03	9.14	4.46	10.3	9.37	5.13	7.41	9.78	4.22
Hardness	mg/L	80-100 *	235	225	225	219	210	219	200	246	288	354	343	302	355	299	233	374
Ion Percentage	%		7.78	5.45	2.94	0.17	0.58	0.8	1.76	6.07	3.75	1.51	7.95	1.15	0.38	0.5	1.87	3.06
Iron	mg/L	0.3 *	0.028	0.337	0.016	0.356	0.007	0.297	0.022	0.431	<0.05	0.706	0.005	0.008	0.012	0.035	<0.005	0.551
Lead	mg/L	0.01 **																
Magnesium	mg/L		26.7	25.9	25.2	24.7	23.6	24.9	22.8	27.1	8.18	10.7	10	8.5	9.87	8.32	7.44	10.9
Manganese	mg/L	0.05 *	0.0021	0.0133	0.0019	0.0178	0.001	0.0248	0.0007	0.0305	<0.001	0.361	0.0772	0.0013	0.0648	0.0713	<0.0005	0.253
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
Oxidation Reduction Potential	mV		36.4	-126.9	-19.4	-67.8	-94.1	-90	25.4	-140.6	90.5	-17.1	64.8	66.3	83	-1.2	94.2	-81.7
pH	units		8.03	7.87	7.69	7.83	7.87	7.85	7.95	7.87	7.3	7.42	7.38	7.34	7.24	7.38	7.43	7.32
pH - field	units		7.83	7.76	8.26	7.27	7.85	7.5	7.77	7.6	7.04	7.14	7.32	7.41	6.88	7.08	7.29	6.98
Phenols	µg/L		2	1	<1	1	<1	<1	<1	<1	<1	<1	1	<1	1	<1	<1	<1
Phosphate	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02		<0.02
Phosphorus - Dissolved	mg/L								<0.03								<0.03	
Phosphorus	mg/L		<0.01	0.02	0.02	0.01	<0.02	<0.02	0.03	<0.02	0.04	<0.02	0.01	0.02	<0.01	<0.02	0.03	<0.02
Potassium	mg/L		2.2	2.2	2.3	2.1	2.2	2.1	1.9	2.4	<0.5	0.5	0.6	<0.5	0.6	<0.5	<0.5	1
Sodium	mg/L	200 *	10.3	9.4	9.9	8.7	9.4	8.9	12.4	9.7	2.8	2.4	2.7	2.4	2.2	2.2	2.4	2.6
Sulphate	mg/L	500 *	10.1	10.3	10.9	12.1	9.8	11	11	10.1	8.9	9.9	9.4	8.4	10.8	6.0	6.8	10.9
Temperature - field	°C		9	8.8	7.1	11.4	7.7	9.6	7.1	10.4	4.7	4.7	5.9	4.5	12.4	4.2	4.6	11.3
Total Dissolved Solids	mg/L	500 *	280	290	320	280	640	290	280	270	340	310	470	310	400	310	260	380
Total Kjeldahl Nitrogen	mg/L		2.6	<2.0	2.7	0.1	<2.0	2.4	<2.0	<0.3	<0.1	<0.1	0.1	<0.1	0.1	<0.1	<0.3	<0.3
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1

Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	16A						18A									
			Mar-18	Apr-19	May-20	Mar-21	Mar-22	Mar-23	Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Sep-20	Apr-21	Oct-21	Apr-22	Sep-22
Alkalinity	mg/L	30-500 *	304	295	256	254	239	244	566	271	554	255	567	249	260	246	469	257
Aluminum	mg/L	0.1 *							<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.1	0.2	<0.1	0.1	0.1	0.2	2.9	0.8	3.8	1	6.1	1	1.2	9.3	4.5	1.2
Anion sum	meq/L		8.81	10.7	6.91	6.33	5.46	5.69	14.2	9.08	15.8	9.37	15.3	9.26	8.45	8.37	14.3	9.93
Arsenic	mg/L	0.010 **	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **							0.38		0.492		0.64		0.286		0.5	
Beryllium	mg/L								<0.0001		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		303	294	255	253	238	243	565	270	553	254	566	248	259	245	468	256
Boron	mg/L	5 **							0.22		0.284		0.296		0.112		0.26	
Cadmium	mg/L	0.005 **							<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		105	124	100	89.4	82.9	81.1	142	83.2	152	73.3	162	92.9	90.7	79.8	135	82.9
Carbonate	mg/L		<1	<1	<1	<1	1	<1	<1	1	<1	1	<1	<1	<1	1	<1	<1
Cation sum	meq/L		8.31	10.1	6.99	6.39	5.45	5.51	14.1	8.8	15.3	10.8	17.5	11.4	9.02	8.71	15.6	9.61
Chemical Oxygen Demand	mg/L		<10	<10	10	30	<10	20	40	20	30	<10	50	<10	<10	<10	20	<10
Chloride	mg/L	250 *	89.3	157	54.3	39	24.1	27.8	106	97.1	174	125	151	124	76.2	85.3	178	138
Chromium	mg/L	0.05 **							<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L								0.0001		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		804	1050	684	641	543	455	1320	900	1560	990	1560	989	842	854	1480	876
Conductivity - field	µS/cm		825	1100	752	689	530	520	1290	914	1600	1030	1540	996	850	821	1410	1010
Copper	mg/L	1 *							<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	1.7	2.7	1.1	1.6	1.4	1.9	7.6	1.8	11.1	1.4	8.8	1.4	1.9	1	5.6	1.6
Dissolved Oxygen - field	mg/L		9.34	5.73	9.7	9.37	11.7	10.7	1.84	1.33	1.55	1.6	1.24	0.58	2.16	2.25	1.26	1.93
Hardness	mg/L	80-100 *	323	411	298	262	235	235	525	334	562	337	620	395	358	317	536	344
Ion Percentage	%		2.96	2.77	0.59	0.43	0.13	1.58	0.35	1.54	1.59	7.11	6.83	10.3	3.25	2.01	4.6	1.63
Iron	mg/L	0.3 *	<0.05	<0.001	<0.005	0.005	0.007	<0.005	6.12	0.35	10.3	0.3	9.16	0.368	0.722	0.342	5.36	0.261
Lead	mg/L	0.01 **							<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		14.7	24.7	11.7	9.5	6.86	7.86	41.3	30.7	44.4	37.5	52.3	39.7	32	28.5	48.4	33.3
Manganese	mg/L	0.05 *	0.001	0.0064	<0.0005	<0.0005	<0.0005	<0.0005	0.213	0.02	0.265	0.013	0.215	0.0189	0.0347	0.0165	0.142	0.0161
Molybdenum	mg/L								<0.0005		0.0006		<0.0005		0.0005		<0.0005	
Nickel	mg/L								0.002		0.007		0.006		<0.002		0.005	
Nitrate	mg/L	10.0 **	1.05	1.5	2.9	2.2	1.16	1.28	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Oxidation Reduction Potential	mV		119.2	76.5	48.9	141.1	84.2	114.5	-176.8	-217.7	-156	-223	-49.2	-219.1	-197.2	-197	-146.4	-222.6
pH	units		7.5	7.46	7.56	7.54	7.69	7.62	7.12	7.63	7.18	7.72	7.17	7.62	7.52	7.68	7.11	7.56
pH - field	units		7.23	7.29	7.38	7.58	7.31	7.24	6.93	7.59	6.98	7.35	6.92	7.6	7.32	7.39	6.84	7.48
Phenols	µg/L		<1	<1	<1	1	<1	<1	<1	<1	2	<1	<1	2	1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.05	<0.02	0.01	0.01	<0.02	<0.01	0.01	<0.02	<0.02	<0.02	0.02	<0.01	0.02	<0.01	<0.02	<0.02
Potassium	mg/L		1.2	1.5	1.5	1.2	1.2	1.2	7.2	4.7	8.6	7.9	11.1	6.6	4.8	4.4	10.4	5.6
Sodium	mg/L	200 *	41.3	41.1	22.5	25	16	17.4	71.8	43.9	80.9	86.1	100	73.7	37	36.1	98.4	56.6
Sulphate	mg/L	500 *	16.5	21	10.6	7.8	3.8	4.5	10.5	52.9	8.9	44.1	3.1	45.7	61.2	57.9	8.9	51.4
Temperature - field	°C		7.9	7.9	7.2	7.6	7	6.6	6.7	9.9	6.6	10.3	6.6	9.7	7.2	11	7.4	10.4
Total Dissolved Solids	mg/L	500 *	480	610	380	290	320	290	730	480	910	530	880	560	470	530	780	590
Total Kjeldahl Nitrogen	mg/L		<0.1	0.5	<0.5	<0.1	<0.1	<0.3	2.5	0.2	4.3	0.9	7.4	<2.0	2.9	15.1	4.2	2.6
Zinc	mg/L	5 *							<0.0005		0.0011		0.0005		<0.0005		<0.0005	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	18A		18B												19A	
			Mar-23	Sep-23	Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Sep-20	Apr-21	Oct-21	Apr-22	Oct-22	Mar-23	Sep-23	Apr-18	Oct-18
Alkalinity	mg/L	30-500 *	433	258	377	445	422	480	509	495	380	530	455	482	438	554	593	550
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		1.69		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		3.9	0.9	0.2	0.1	0.2	0.9	0.6	0.3	0.4	0.5	0.3	0.3	0.4	0.6	3.3	3.7
Anion sum	meq/L		13.1	10.3	8.88	11.2	10.7	11.9	12.7	12.9	9.43	12.7	11.3	12.8	11.5	14	46.2	65.4
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.005
Barium	mg/L	1 **	0.464		0.073		0.102		0.193		0.096		0.104		0.128		3.5	
Beryllium	mg/L		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001	
Bicarbonate	mg/L		432	257	376	444	421	479	508	494	379	529	454	481	437	554	593	550
Boron	mg/L	5 **	0.259		0.02		0.0519		0.138		0.0695		0.0489		0.076		0.158	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		120	79.7	145	174	146	177	218	197	150	186	170	178	140	171	287	335
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		12.9	10.1	9.34	11.5	10	12.4	16.1	15.2	10.6	12.7	11.9	12.9	10.1	13.5	40.5	62.1
Chemical Oxygen Demand	mg/L		20	40	<10	30	<10	<10	10	<10	<10	20	<10	10	20	20	60	120
Chloride	mg/L	250 *	151	157	29.1	49.2	70.2	60.5	88.4	99.2	62.4	75.7	72.1	94.2	90.4	98.8	1230	1940
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		0.0016		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		0.0001		<0.0005		0.0022		0.001		0.0013		0.0008		0.0013	
Conductivity	µS/cm		1160	1080	757	1070	1040	1130	1240	1250	920	1240	1120	1120	1080	1280	5040	7050
Conductivity - field	µS/cm		1290	927	845	1100	1110	1150	1090	1290	939	1240	1010	1250	1030	1220	4460	6890
Copper	mg/L	1 *	<0.0005		<0.0005		0.0015		0.003		0.0014		0.0007		0.0007		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	5.8	2.6	2.7	3.8	6.5	4.9	8.2	5.1	3.7	4.1	4.2	4.5	4.5	6.8	9.3	14.3
Dissolved Oxygen - field	mg/L		2.77	1.82	1.97	1.78	3.23	5.56	3.21	3.09	2.61	2.11	4.14	4.87	4.37	2.66	1.62	1.33
Hardness	mg/L	80-100 *	454	344	421	516	440	538	671	615	457	555	516	533	426	544	1210	1550
Ion Percentage	%		0.82	0.79	2.52	1.67	3.07	2.35	12.1	8.18	5.96	0.04	2.87	0.51	6.46	1.81	6.53	2.55
Iron	mg/L	0.3 *	5.29	0.16	0.013	0.18	0.068	0.39	1.99	0.392	1.14	1.65	1.8	0.336	0.486	1.66	16.7	19.3
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		0.0008		<0.0005		<0.0005		<0.0005		0.0016	
Magnesium	mg/L		37.6	35.1	14.4	19.7	18.2	23.3	30.8	30	20.1	22	22.3	23.8	18.5	28.3	119	173
Manganese	mg/L	0.05 *	0.155	0.0132	0.0431	0.125	0.108	0.161	0.318	0.224	0.237	0.286	0.262	0.0325	0.175	0.34	0.3	0.203
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		0.005		<0.002		0.003		0.008		0.004		0.003		0.005		0.013	
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.14	0.26	<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		-191.9	-215.2	-64.7	-106.6	-42.2	-23.5	39.9	-74.1	-81.5	-87.2	-48.7	38.6	-36.5	-81.2	-46.2	-68.5
pH	units		7.18	7.53	7.31	7.24	7.25	7.12	7.18	7.06	7.22	7.11	7.13	7.24	7.16	6.96	6.89	6.85
pH - field	units		6.95	7.13	7.07	7.06	7.06	6.99	6.94	7.16	7.02	6.83	6.93	6.85	6.99	6.6	6.52	6.64
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	2	1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L			<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.02	0.02	<0.02	<0.02		<0.02	0.02	0.04
Phosphorus - Dissolved	mg/L		<0.03												<0.03			
Phosphorus	mg/L		0.01	<0.02	0.01	<0.02	<0.02	<0.02	0.01	<0.01	0.07	0.01	<0.02	<0.02	0.01	<0.02	0.05	0.04
Potassium	mg/L		8	6	0.6	1.1	0.8	1.4	2.9	2.5	1.5	1.6	1.3	1.9	1.6	2.9	13.1	13.6
Sodium	mg/L	200 *	75.6	68.5	19.8	26.6	27.4	35.5	58.9	63.4	31.9	33.5	34.8	44.3	35.2	56.1	361	698
Sulphate	mg/L	500 *	23.4	41	36.9	55.7	25.8	42	15.6	25.2	15.6	14	20.6	36.6	24.2	22.1	3.9	4.1
Temperature - field	°C		6.7	10	3.9	12.1	2.1	13	4.5	14.6	4	13.3	4.5	15.1	3.4	13.3	9.1	10.8
Total Dissolved Solids	mg/L	500 *	840	550	460	590	620	650	720	770	530	730	640	750	730	730	2800	3690
Total Kjeldahl Nitrogen	mg/L		4	0.9	0.2	0.1	0.4	<1	0.8	<1.0	0.3	2	0.4	6.5	0.5	0.9	5.2	7
Zinc	mg/L	5 *	<0.005		<0.0005		0.0015		0.0057		0.0006		0.0008		<0.005		0.0017	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	19A										19B					
			Apr-19	Sep-19	May-20	Sep-20	Mar-21	Oct-21	Apr-22	Sep-22	Mar-23	Sep-23	Apr-18	Oct-18	Apr-19	Sep-19	May-20	Sep-20
Alkalinity	mg/L	30-500 *	596	572	532	522	562	551	622	580	562	574	631	587	551	744	565	531
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		3.4	3.2	3.1	3.4	2.6	3.4	2.4	3.5	2	3.1	3.5	4.4	4.4	2.8	1.4	3.6
Anion sum	meq/L		50.4	75	36.6	56.9	44.8	42.6	35.5	68.1	41.3	59.3	37.6	41.5	50.9	21.1	24.4	51.1
Arsenic	mg/L	0.010 **	<0.0005	<0.010	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0022	0.001	0.0008	<0.005	<0.0005	<0.010	<0.0005	<0.0005
Barium	mg/L	1 **	3.78		3.4		3.72		2.72		2.69		2.3		3.75		1.21	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005	
Bicarbonate	mg/L		596	572	532	522	561	551	621	579	562	574	631	587	550	744	565	531
Boron	mg/L	5 **	0.225		0.267		0.279		0.22		0.2		0.162		0.259		0.193	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		269	313	237	291	262	253	201	268	216	357	276	284	277	238	222	280
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		42.9	59.3	41.8	53.4	51	40.9	35.2	51.9	36.6	69.5	36	43.9	46.7	20.7	24.2	47.9
Chemical Oxygen Demand	mg/L		100	90	80	130	80	70	60	100	80	180	50	110	100	10	40	90
Chloride	mg/L	250 *	1373	2270	935	1660	1200	1130	829	2020	1070	1710	894	1070	1430	239	469	1450
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		0.0013		0.001		0.0009		0.0013		0.0013		0.0001		<0.0005		<0.0005	
Conductivity	µS/cm		5120	7070	4990	6460	5160	4740	3940	6240	4940	7190	4300	5250	5580	2690	2740	5520
Conductivity - field	µS/cm		5080	6240	4350	5840	4790	4710	3600	6230	4240	5700	4060	4890	5400	4160	3070	5040
Copper	mg/L	1 *	<0.0005		0.0007		<0.0005		0.0006		0.0006		<0.0005		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	12.5	14.9	12.8	16.1	13.3	17	11.4	13.7	12.2	19.1	9	13.7	11.6	9.2	7.4	15.3
Dissolved Oxygen - field	mg/L		5.39	1.96	1.38	2.39	0.91	1.68	3.42	1.81	1.55	2.01	1.05	1.47	1.42	1.29	2.06	1.25
Hardness	mg/L	80-100 *	1160	1450	1050	1330	1200	1080	875	1240	921	1600	1090	1270	1230	756	783	1220
Ion Percentage	%		8.06	11.7	6.59	3.09	6.52	2.02	0.43	13.5	6.08	7.89	2.12	2.8	4.35	0.96	0.3	3.28
Iron	mg/L	0.3 *	18.8	13.7	12.7	18.4	12	17.9	9.19	17.2	8.87	21.6	17.3	20.2	13.8	32.6	22	18
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0008		<0.0005		<0.0005	
Magnesium	mg/L		119	162	112	147	133	109	90.5	140	92.7	171	97.5	135	130	39.3	55.6	127
Manganese	mg/L	0.05 *	0.315	0.215	0.182	0.166	0.166	0.224	0.137	0.132	0.142	0.167	0.516	0.297	0.275	0.532	0.627	0.291
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		0.018		0.018		0.024		0.016		0.018		0.01		0.021		0.008	
Nitrate	mg/L	10.0 **	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-69.4	-79.9	-47.1	-51.3	-66.4	-70.5	-69	-49.4	-52.2	-60.4	-36.1	-60.9	-67.9	-62.8	-42.8	-59.1
pH	units		6.92	6.9	6.95	6.97	7.02	6.88	6.94	7.03	6.92	6.81	6.8	6.62	7.02	6.56	6.74	6.91
pH - field	units		6.66	6.76	6.76	6.8	6.74	6.74	6.69	6.56	6.74	6.52	6.46	6.55	6.6	6.49	6.6	6.78
Phenols	µg/L		2	<1	1	2	3	2	<1	<1	2	<1	<1	<1	1	<1	<1	2
Phosphate	mg/L		<0.02	0.07	0.03	0.05	0.03	0.04	<0.02	<0.02	0.03	0.05	<0.02	<0.02	<0.02	0.03	<0.02	0.04
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.02	0.03	0.04	0.04	0.02	0.05	<0.02	<0.02	0.03	<0.02	0.03	0.04	0.06	0.03	0.01	0.05
Potassium	mg/L		12	13.8	11.9	14	11.4	11.1	10.1	12.4	7.9	13.8	12	12.5	13.7	6.7	6.4	13.2
Sodium	mg/L	200 *	437	681	462	599	606	429	394	604	408	846	311	410	491	119	189	522
Sulphate	mg/L	500 *	11.4	0.5	<2	<2	4.4	5.4	3.5	<2.0	16	1	8.5	0.9	<2	<0.2	10.6	<2
Temperature - field	°C		9.4	11	9	12.2	10.2	12.2	9.6	11	9.6	11.5	7.8	11.9	6.5	12.2	8	13.9
Total Dissolved Solids	mg/L	500 *	2770	3790	2600	3710	2800	3210	2080	4460	2850	4200	2280	2740	3090	1080	1380	3220
Total Kjeldahl Nitrogen	mg/L		6.8	9.1	4.6	4.9	6.4	3.8	5.1	6.3	4.5	6.2	5.2	7.4	7.5	8	2.7	5.2
Zinc	mg/L	5 *	0.0017		0.0015		0.0015		0.0016		<0.005		0.002		0.0016		0.0014	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	19B						20A						20B			
			Mar-21	Oct-21	Apr-22	Sep-22	Mar-23	Sep-23	Apr-18	Apr-19	Apr-20	Mar-21	Apr-22	Mar-23	Apr-18	Oct-18	Apr-19	Oct-19
Alkalinity	mg/L	30-500 *	595	574	633	604	671	836	348	315	299	297	299	317	296	316	281	324
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025								<0.025		<0.025	
Ammonia (as N)	mg/L		4	4.1	3.5	4.2	2.4	11	0.7	0.3	0.7	0.8	0.9	1.2	0.3	0.1	0.2	0.7
Anion sum	meq/L		39.4	37	32	42.1	29.3	22.7	10.5	12.5	9.7	10.7	11	17.3	6.34	6.82	5.95	6.97
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	0.0007	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005
Barium	mg/L	1 **	2.6		1.97		1.4								0.028		0.027	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005								<0.0001		<0.0005	
Bicarbonate	mg/L		594	574	633	604	671	836	346	313	297	296	298	316	295	315	280	323
Boron	mg/L	5 **	0.238		0.2		0.167								0.0108		0.009	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001								<0.0001		<0.0001	
Calcium	mg/L		240	243	195	232	217	289	76.3	70.7	66.9	94.8	71	75.8	110	118	94.1	119
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	2	2	2	1	1	<1	<1	1	1	<1
Cation sum	meq/L		40.2	38.7	31.6	38.4	26.9	25.3	11.2	8.62	8.49	16.2	9.98	13.7	6.55	7.13	5.59	7.27
Chemical Oxygen Demand	mg/L		50	<10	50	80	70	60	30	<10	30	<10	10	20	<10	20	20	20
Chloride	mg/L	250 *	989	912	701	1080	567	233	128	224	136	171	183	392	6.4	7.7	5.3	7.5
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005								<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005								<0.0001		<0.0005	
Conductivity	µS/cm		4620	4700	3570	4350	3790	2280	1040	1320	1050	1120	1200	1750	592	673	551	673
Conductivity - field	µS/cm		4350	4670	3190	4320	3100	2080	1080	1040	1090	1440	1130	1280	591	653	551	679
Copper	mg/L	1 *	<0.0005		<0.0005		<0.0005								0.0006		0.0022	
Dissolved Organic Carbon	mg/L	5 *	11.5	9.1	10.6	12.2	9.9	16.2	2.6	4.4	2.2	1.7	2.4	2	3.9	3.4	5.6	1.8
Dissolved Oxygen - field	mg/L		1.32	2.18	2.05	1.28	2.13	2.68	3.01	2.25	4.56	0.9	8.81	5.41	3.1	3.76	4.03	5.19
Hardness	mg/L	80-100 *	1060	1040	832	1000	812	893	363	330	313	454	338	387	303	329	261	335
Ion Percentage	%		1.06	2.26	0.58	4.64	4.13	5.29	3.06	18.4	6.65	20.3	4.88	11.4	1.58	2.24	3.05	2.09
Iron	mg/L	0.3 *	13.8	14.8	4.48	17.6	11.6	40.1	1.98	0.473	1.84	3.04	1.73	2.32	0.01	0.05	0.011	0.17
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005								<0.0005		<0.0005	
Magnesium	mg/L		111	106	83.8	103	65.5	41.6	42	37.2	35.4	52.7	39	47.9	6.76	8.36	6.42	9.29
Manganese	mg/L	0.05 *	0.229	0.255	0.174	0.233	0.472	0.662	0.08	0.0829	0.0688	0.115	0.081	0.0927	0.0058	0.21	0.0079	0.041
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005								<0.0005		<0.0005	
Nickel	mg/L		0.018		0.014		0.012								<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	2.8	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-67.3	-77.5	-19.1	-37.6	-63	-53.3	-59.6	-95.6	-10.2	-109.6	-79.8	-82.6	14.7	-66.8	73.3	16.1
pH	units		6.99	6.87	6.92	6.9	6.8	6.56	7.74	7.78	7.88	7.65	7.71	7.51	7.52	7.61	7.74	7.49
pH - field	units		6.67	6.68	6.49	6.46	6.56	6.28	7.38	7.56	7.52	7.47	7.32	7.12	7.43	7.34	7.56	7.38
Phenols	µg/L		<1	2	<1	<1	<1	1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.02	0.03	<0.02	<0.02	0.02	<0.02	0.05	<0.02	0.01	0.02	<0.02	0.06	0.01	<0.02	0.05	<0.02
Potassium	mg/L		12.8	12	11.4	11	7.8	12.2	6.9	4.5	4.9	7.9	6.1	6.9	<0.5	0.5	<0.5	<0.5
Sodium	mg/L	200 *	422	394	330	405	236	144	83.6	42.5	46.5	156	68	131	10.6	11.8	7.8	11.4
Sulphate	mg/L	500 *	<0.2	0.3	<0.2	<2.0	14.9	<0.2	8.4	4.6	4.2	7.6	3	4.1	20.9	23.4	17.3	23.7
Temperature - field	°C		10.7	13.6	9.1	12	7.4	12.4	6	5.1	6.2	7.5	8.5	6.9	5.5	13.5	3.2	12.2
Total Dissolved Solids	mg/L	500 *	2400	2900	1900	2640	1840	1220	550	730	580	550	590	870	350	390	350	380
Total Kjeldahl Nitrogen	mg/L		7.4	4.4	5.4	7.3	4.1	12.5	0.6	0.3	0.7	3.8	0.8	3.2	0.4	0.3	0.2	<1
Zinc	mg/L	5 *	0.0014		0.0012		<0.005								0.0007		0.0017	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	20B								23B							
			Apr-20	Sep-20	Mar-21	Oct-21	Apr-22	Oct-22	Mar-23	Sep-23	Apr-18	Oct-18	Apr-19	Oct-19	May-20	Sep-20	Mar-21	Oct-21
Alkalinity	mg/L	30-500 *	285	293	299	339	361	344	240	335	446		809		1490		1060	
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025			0.03		0.04		0.032		<0.025
Ammonia (as N)	mg/L		<0.1	0.2	0.2	0.2	0.1	0.1	0.1	<0.1	18.2		74.3		60.3		78.1	
Anion sum	meq/L		6.09	6.38	6.31	7.12	7.52	7.45	5.18	7.11	11.4		18.8		35.8		24.7	
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	0.007	<0.005	0.0009		0.0011		0.0008	
Barium	mg/L	1 **	0.028		0.029		0.035		0.022			0.437		0.545		0.655		0.414
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005			<0.001		<0.001		<0.0005		<0.0005
Bicarbonate	mg/L		283	292	298	338	360	343	239	334	445		808		1490		1060	
Boron	mg/L	5 **	0.0111		0.0064		0.0072		0.009			1.48		1.52		1.58		1.05
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001			0.001		<0.001		<0.0001		<0.0001
Calcium	mg/L		116	121	111	114	135	124	83.7	119	104	170	161		180		182	
Carbonate	mg/L		2	1	<1	<1	<1	<1	1	<1	<1		<1		1		<1	
Cation sum	meq/L		6.91	7.33	6.56	6.82	8.01	7.51	5.07	7.16	11.1		21.6		32.4		25.6	
Chemical Oxygen Demand	mg/L		30	<10	20	30	20	20	20	10	40		50		180		100	
Chloride	mg/L	250 *	6.4	8.9	6.5	5.6	7	11.2	6.6	7.5	58.9		95.3		244		136	
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005			0.002		0.001		0.0059		0.0031
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005			0.008		0.007		0.0081		0.0039
Conductivity	µS/cm		611	572	597	684	656	650	479	665	1120		1900		4000		2450	
Conductivity - field	µS/cm		600	667	637	685	688	730	476	604	1050	4720	1970	4830	3480		2520	2660
Copper	mg/L	1 *	0.0007		0.0012		0.0007		0.0006			<0.005		0.016		<0.0005		0.0005
Dissolved Organic Carbon	mg/L	5 *	2.3	3.1	4.3	3.4	2.1	2	2.5	3.3	12.8		24		92.4		28.3	
Dissolved Oxygen - field	mg/L		2.91	2.98	6.25	3.7	3.04	4.32	5.95	3.63	4.89	1.96	1.58	1.34	1.39		2.45	2.27
Hardness	mg/L	80-100 *	321	339	307	316	376	358	234	332	352		574		869		706	
Ion Percentage	%		6.32	6.95	1.88	2.19	3.15	0.35	1.13	0.39	1.35		6.88		4.93		1.79	
Iron	mg/L	0.3 *	<0.005	0.03	0.013	0.008	<0.005	0.13	0.013	0.27	3.02	30.3	9.56		27.9		28.1	24.4
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005			<0.01		0.01		<0.0005		<0.0005
Magnesium	mg/L		7.53	8.93	7.21	7.72	9.36	9.38	6.06	8.44	22.4		41.7		102		61.2	
Manganese	mg/L	0.05 *	0.0046	0.0912	0.0019	0.0014	0.0025	0.069	0.0014	0.142	0.072	0.352	0.254		0.28		0.48	
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005			<0.005		<0.005		0.0007		<0.0005
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002			0.03		0.035		0.026		0.014
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	0.36	<0.05	<0.05	9		<0.5		<0.5		<0.5	
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	0.6		<0.5		<0.5		<0.5	
Oxidation Reduction Potential	mV		43.2	15.8	39.1	0.2	224.5	263.5	50.2	21.8	42.6	-102.2	-46.2	-104.6	-46.8		-85.3	-62
pH	units		7.76	7.65	7.55	7.44	7.39	7.35	7.67	7.36	7.14		6.94		6.96		6.78	
pH - field	units		7.43	7.38	7.48	7.28	7.06	7.04	7.34	6.94	7.01	6.6	6.64	6.72	6.67		6.47	6.56
Phenols	µg/L		<1	<1	1	1	<1	2	<1	<1	<1		3		4		7	
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	0.02	0.45	<0.02		0.15		0.25	
Phosphorus - Dissolved	mg/L								<0.03									
Phosphorus	mg/L		<0.01	0.01	0.03	<0.01	<0.02	<0.02	<0.01	<0.02	0.04		0.06		0.11		0.19	
Potassium	mg/L		<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	21.5		37.3		99.7		56.9	
Sodium	mg/L	200 *	11	12.1	9	10.6	10.9	11.6	8.5	11.7	50.5	224	86.7		185		99.7	
Sulphate	mg/L	500 *	18.8	22.2	16.7	19.6	16.4	22	17	19.9	21.4		21.6		3.5		16.2	
Temperature - field	°C		5	15.1	4.1	13.9	4.6	11.9	3.5	14	9.5	12.5	11.3	13.1	12.5		12.2	
Total Dissolved Solids	mg/L	500 *	370	380	330	410	430	400	240	350	580		880		1570		1090	
Total Kjeldahl Nitrogen	mg/L		4.7	<2.0	3	0.3	<2.0	0.2	<2.0	2.2	31.6		76.6		122		85	
Zinc	mg/L	5 *	0.0006		<0.0005		<0.0005		<0.005			<0.01		<0.01		0.0028		

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	23B				33-II						33-III					
			Mar-22	Sep-22	Apr-23	Sep-23	Mar-18	Apr-19	Apr-20	Apr-21	Apr-22	Mar-23	Mar-18	Apr-19	Apr-20	Apr-21	Apr-22	Mar-23
Alkalinity	mg/L	30-500 *	1010		756		384	356	349	369	295	381	427	372	375.39	396	317	391
Aluminum	mg/L	0.1 *		<0.025		<0.025												
Ammonia (as N)	mg/L		84.3		42.1		0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
Anion sum	meq/L		23.4		16.8		12.4	11.5	10.5	10.6	8.83	10.3	13.2	11.3	11.1	10.9	9.14	10.3
Arsenic	mg/L	0.010 **	0.0006		<0.0005		<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.587		0.51												
Beryllium	mg/L			<0.0005		<0.0005												
Bicarbonate	mg/L		1010		756		383	355	348	368	295	380	426	371	375	395	317	390
Boron	mg/L	5 **		1.39		1.22												
Cadmium	mg/L	0.005 **		<0.0001		<0.0001												
Calcium	mg/L		133		163		151	149	139	134	135	134	176	162	163	155	153	155
Carbonate	mg/L		<1		<1		1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1
Cation sum	meq/L		22.7		18		12.2	12.1	11.4	10.8	10.8	10.7	13	12	12	11.2	11.1	10.8
Chemical Oxygen Demand	mg/L		80		50		<10	<10	<10	<10	20	20	40	<10	20	<10	<10	20
Chloride	mg/L	250 *	130		62.6		110	98.1	66.8	56.7	47.9	43.8	97.8	71.2	59.6	43.2	41.3	34.4
Chromium	mg/L	0.05 **		0.0045		0.004												
Cobalt	mg/L			0.0069		0.0058												
Conductivity	µS/cm		2270		1480		1200	1120	1050	1020	967	821	1260	1080	1100	1010	934	846
Conductivity - field	µS/cm		2160	4320	1620	3310	1160	1140	1030	1010	939	936	1210	1120	1080	1020	958	920
Copper	mg/L	1 *		<0.0005		<0.0005												
Dissolved Organic Carbon	mg/L	5 *	24.5		16.2		4.5	5.4	5.5	4.5	4.1	4.5	5.5	7.2	5.8	5.2	4.3	5.1
Dissolved Oxygen - field	mg/L		1.13	2.44	0.85	2.77	3.11	0.95	1.32	1.76	3.36	2.7	6.39	3.43	3.43	9.71	3.77	3.06
Hardness	mg/L	80-100 *	543		567		461	459	429	412	414	412	508	468	475	450	444	448
Ion Percentage	%		1.56		3.4		0.58	2.38	4.07	0.97	10.1	1.62	0.83	3.05	3.76	1.51	9.52	2.48
Iron	mg/L	0.3 *	3.87		7.22		<0.05	0.142	0.017	0.029	0.033	0.032	0.09	0.348	0.13	0.008	0.01	<0.005
Lead	mg/L	0.01 **		<0.0005		<0.0005												
Magnesium	mg/L		51.3		38.9		20.3	21.1	19.8	18.9	18.7	18.7	16.7	15.4	16.5	15.3	15	14.9
Manganese	mg/L	0.05 *	0.245		0.394		0.008	0.0129	0.0077	0.0117	0.0088	0.0107	0.018	0.067	0.0931	0.011	0.0299	0.0056
Molybdenum	mg/L			<0.0005		0.0005												
Nickel	mg/L			0.018		0.014												
Nitrate	mg/L	10.0 **	<0.5		0.17		<0.5	<0.5	0.5	<0.5	<0.5	0.43	<0.5	<0.5	0.8	0.8	0.6	0.71
Nitrite	mg/L	1.0 **	<0.5		<0.05		<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
Oxidation Reduction Potential	mV		-2.4	-108	15.5	-99.1	133.2	96.3	31.7	77.3	90.8	173	154.9	130.7	12.1	88.8	116.7	184.9
pH	units		6.84		6.64		7.45	7.45	7.4	7.33	7.2	7.25	7.41	7.39	7.36	7.37	7.21	7.26
pH - field	units		6.56	6.6	6.45	6.51	6.98	7.13	7.1	7.14	7.15	7	6.92	7.23	7.13	7.14	7.08	6.98
Phenols	µg/L		2		2		<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1
Phosphate	mg/L		0.03				<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L				<0.03													
Phosphorus	mg/L		0.09		0.08		0.03	<0.010	<0.01	0.02	<0.02	<0.02	0.05	0.02	<0.01	0.03	<0.02	<0.02
Potassium	mg/L		53.4		34.6		1.3	1.4	1.3	1.4	1.4	1.4	1.1	2.1	1.1	1.2	1	1.2
Sodium	mg/L	200 *	101		62.6		68	64.7	62.1	56.4	56.6	54.2	64.4	58.1	54.7	49.6	49	41.4
Sulphate	mg/L	500 *	11		20.3		89	89	86	88.1	85.1	80.8	107	98.9	100	94	86.5	82.7
Temperature - field	°C		11.8	13.4	13.1	13	7.4	8.2	8.1	8.2	8.2	8.3	4.9	4.8	5.5	5.2	4.9	5.5
Total Dissolved Solids	mg/L	500 *	960		470		720	660	640	580	610	590	750	650	680	610	600	570
Total Kjeldahl Nitrogen	mg/L				42.1		0.2	0.3	1.1	<0.1	0.2	0.4	0.2	0.5	0.9	<0.1	0.2	<0.3
Zinc	mg/L	5 *		0.002		<0.005												

NOTES:
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4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	40-II						41-I						41-II			
			Apr-18	Apr-19	May-20	Apr-21	Apr-22	Mar-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Mar-23	Apr-18	Apr-19	May-20	Apr-21
Alkalinity	mg/L	30-500 *	249	236	246	235	250	257	236	197	193	209	218	216	270	260	240	263
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.2	0.1	<0.1	0.2	0.1	0.1	11.2	8.4	7.3	7.7	8.9	8.9	0.3	0.1	0.1	0.2
Anion sum	meq/L		5.6	5.28	5.62	5.27	5.64	5.78	108	111	121	132	107	127	6.2	6	5.67	6.09
Arsenic	mg/L	0.010 **	<0.005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.005	<0.0005	0.0006	<0.0005	<0.0005	<0.005	<0.005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		248	235	245	234	249	256	235	196	193	208	217	215	269	259	239	262
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		72.4	64.1	72.5	63.1	68.8	67.8	441	317	498	396	453	433	91.2	77.8	79.2	86.1
Carbonate	mg/L		1	<1	1	1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Cation sum	meq/L		6.19	5.4	5.92	5.49	5.85	5.95	110	96.6	136	111	113	122	7.13	5.83	6.31	6.44
Chemical Oxygen Demand	mg/L		10	<10	20	<10	<10	20	290	130	120	100	20	460	<10	<10	<10	10
Chloride	mg/L	250 *	5.7	4.2	7.2	4.2	5.7	5.5	3670	3810	4160	4540	3640	4370	4.2	2.8	9	4.6
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		514	501	548	507	543	499	13400	12800	14300	12800	12600	13200	563	573	571	584
Conductivity - field	µS/cm		521	531	531	498	511	506	11300	11300	10000	12800	9540	12700	560	575	564	579
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	1.4	1.5	1.3	<1.0	1.1	1.9	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.1	2.1	<1.0	1.3
Dissolved Oxygen - field	mg/L		2.72	2.78	3.29	1.66	1.9	2.75	1.06	1.57	1.19	1.33	1.5	2.55	1.7	1.34	1.83	1.41
Hardness	mg/L	80-100 *	281	246	272	253	268	275	2290	1750	2690	2190	2420	2560	329	277	289	307
Ion Percentage	%		5	1.14	2.63	2.06	1.84	1.44	0.94	7	5.73	8.52	3	1.98	6.99	1.48	5.3	2.77
Iron	mg/L	0.3 *	<0.05	0.04	0.025	0.015	0.038	0.017	9.23	2.08	6.14	3.65	6.32	3.47	0.44	0.695	0.253	0.497
Lead	mg/L	0.01 **																
Magnesium	mg/L		24.3	20.9	22.1	23.1	23.4	25.7	288	232	352	291	314	358	24.6	20.1	22.2	22.3
Manganese	mg/L	0.05 *	0.043	0.0264	0.0378	0.0272	0.0333	0.0305	0.075	0.0636	0.0733	0.0768	0.0665	0.03	0.01	0.01	0.0074	0.01
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		19.8	66.9	-3.1	137.7	42.8	155.7	-114.8	-96.6	-54	-86.8	2.4	45.9	-82.2	-50.3	-61.7	-52.7
pH	units		7.65	7.65	7.68	7.74	7.58	7.65	7.4	7.44	7.41	7.56	7.42	7.45	7.57	7.57	7.61	7.66
pH - field	units		7.37	7.6	7.71	7.54	7.6	7.34	7.19	7.45	7.48	7.42	7.3	7	7.33	7.49	7.65	7.53
Phenols	µg/L		<1	1	<1	<1	<1	<1	3	2	3	4	<1	<1	<1	<1	<1	1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	0.01	<0.01	<0.01	<0.02	<0.02	0.49	0.02	0.23	<0.01	<0.02	<0.2	0.03	<0.01	<0.01	0.01
Potassium	mg/L		1.8	1.6	1.7	1.6	1.7	1.6	55	48.3	50.8	37.7	50.1	42.7	2	1.8	2.1	1.8
Sodium	mg/L	200 *	11.2	9.4	9.4	8.1	9.5	8.5	1420	1370	1830	1510	1440	1590	10.2	4.8	10	5
Sulphate	mg/L	500 *	30	28.7	31.4	28.9	31	31.4	<2	<2	<2	<0.2	<2	<0.2	41	42.9	37.2	42.1
Temperature - field	°C		4.2	4.8	6	5.5	4.4	5.2	7.4	7	7.3	8.3	7.7	7	7.4	7.8	8	8
Total Dissolved Solids	mg/L	500 *	310	300	330	290	290	280	6710	6950	7750	6650	7140	6860	380	390	380	390
Total Kjeldahl Nitrogen	mg/L		<0.1	<0.1	<0.2	<0.1	<0.2	<0.3	12.3	13.9	8.8	10.9	9.8	8.9	<0.1	<0.2	<0.2	<0.1
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	41-II		44-I						44-II						44-III	
			Apr-22	Mar-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Apr-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Apr-23	Apr-18	Apr-19
Alkalinity	mg/L	30-500 *	255	269	160	136	139	154	165	153	204	200	175	196	184	202	204	215
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.2	0.2	21.8	26.4	21.4	11.5	23.4	22.3	0.8	0.7	0.9	0.9	1.1	1.1	0.1	0.1
Anion sum	meq/L		5.94	6.15	454	539	451	417	474	496	5.86	4.98	5	5.42	5.15	5.47	5.36	5.44
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.005	0.0016	0.0011	0.0018	0.0006	<0.005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		254	268	160	136	139	154	165	153	203	199	173	195	183	201	202	213
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		79.5	78.9	1870	1740	1760	1790	1560	1780	54.8	51.3	46.7	58.2	47.6	54.3	56	68.1
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	1	1	2	1	1	1	2	2
Cation sum	meq/L		6.29	6.32	442	438	431	442	413	437	5.88	4.79	5.43	5.71	5.59	6.67	5.39	5.37
Chemical Oxygen Demand	mg/L		<10	<10	780	40	360	310	110	<400	<10	<10	20	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	7.2	4.3	16000	19000	15900	14700	16600	17500	46.2	15.1	45.9	35.7	40.1	37.6	26.2	6.1
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		583	565	54600	55500	55700	51600	56000	56000	569	499	538	559	543	536	513	527
Conductivity - field	µS/cm		734	552	41200	44600	42100	41900	40100	43100	606	581	533	568	517	540	497	523
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	1.7	1.5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	2.6	<1.0	<1.0	<1.0	1	1.3	2.8
Dissolved Oxygen - field	mg/L		1.62	1.92	1.28	1.96	1.87	3.06	1.09	1.07	1.12	1.6	1.09	0.89	6.49	1.32	8.67	9.13
Hardness	mg/L	80-100 *	294	299	9730	9080	9380	9370	8550	9470	220	205	202	231	205	253	229	248
Ion Percentage	%		2.93	1.31	1.3	10.4	2.2	2.96	6.83	6.26	0.15	1.94	4.1	2.64	4.13	9.91	0.3	0.72
Iron	mg/L	0.3 *	0.338	0.307	1.98	1.32	1.12	1.72	0.836	0.408	0.74	0.637	0.389	0.591	0.406	0.476	<0.05	0.161
Lead	mg/L	0.01 **																
Magnesium	mg/L		23.3	24.8	1230	1150	1210	1190	1130	1220	20.2	18.7	20.7	20.7	20.9	28.5	21.7	18.9
Manganese	mg/L	0.05 *	0.008	0.0084	0.133	0.111	0.113	0.116	0.12	0.103	0.011	0.0098	0.0063	0.0089	0.0069	0.0079	0.011	0.0465
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.05	<0.5	<5.0	<5	<5.0	39	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	0.6	0.6
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.5	<5.0	<5	<5.0	<5.0	<5.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		-62.3	4.3	82.6	102.1	98	7.2	53.5	28.3	-107.9	-118.6	-74.4	-154.4	-82.1	-88	54.9	3.9
pH	units		7.52	7.59	7.21	7.43	7.56	7.31	7.19	7.35	7.76	7.89	8.03	7.82	7.78	7.81	7.96	7.98
pH - field	units		7.58	7.26	6.99	6.99	7.19	7.25	7.12	6.98	7.91	7.7	7.87	7.9	7.93	7.83	8	7.81
Phenols	µg/L		<1	<1	7	13	11	8	7	6	<1	<1	2	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02
Phosphorus - Dissolved	mg/L									<3.0						<0.03		
Phosphorus	mg/L		<0.02	<0.02	0.9	0.41	0.35	<0.01	<0.02	0.37	0.04	0.02	0.01	0.02	<0.02	<0.01	0.03	<0.02
Potassium	mg/L		1.8	1.8	146	92.4	99.2	100	105	101	3.9	3	4	3.9	4.3	3.3	3.2	1.9
Sodium	mg/L	200 *	7.3	5.6	5540	5760	5480	5760	5440	5580	29.8	12.5	27.6	21	29.5	32.7	16	7.6
Sulphate	mg/L	500 *	38.4	39.7	0.9	46.2	<20	<20.0	<20	<20	29.3	33.1	15.4	29.8	22.1	24.2	30.4	51.4
Temperature - field	°C		8.1	8	6.8	8	8.4	7.8	8	7.9	6.9	8	7.9	7.9	7.9	7.7	4.2	5
Total Dissolved Solids	mg/L	500 *	420	350	26300	29600	30400	27200	28300	26900	480	480	600	570	310	370	310	330
Total Kjeldahl Nitrogen	mg/L		<0.2	<0.3	21.2	26	21.3	22.8	24.9	22	0.7	0.6	0.9	0.4	0.8	0.8	0.1	<0.1
Zinc	mg/L	5 *																

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	44-III				46-I						46-II					
			May-20	Apr-21	Apr-22	Apr-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
Alkalinity	mg/L	30-500 *	238	242	228	253	368	295	303	300	296	370	320	272	275	286	284	273
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		<0.1	0.1	0.2	0.1	20.4	4.9	8.7	4.8	5.5	4.9	0.2	0.1	0.1	0.1	0.2	0.2
Anion sum	meq/L		6.45	6.49	6.25	6.62	33.2	43.2	38	44.2	45.2	40.4	7.1	7.53	6.79	6.95	6.66	7.67
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	0.006	<0.005	0.0013	0.0017	0.0014	0.0018	0.0012
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		236	241	227	252	367	294	301	299	295	369	319	271	274	285	283	272
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		101	93.7	81.8	101	82.8	110	99.7	98.9	109	104	92.2	96.4	93.3	84.5	92.7	93.1
Carbonate	mg/L		1	<1	<1	<1	<1	1	2	1	1	1	<1	1	1	1	1	<1
Cation sum	meq/L		7.15	6.89	6.37	7.52	33.5	42.1	36.3	42	39.9	37.9	7.35	7.91	7.12	6.94	7.25	7.82
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	80	50	70	20	30	160	<10	<10	<10	<10	<10	30
Chloride	mg/L	250 *	7.1	11.9	11.3	12	925.25	1320	1140	1350	1400	1180	16.1	61.6	33.1	28.4	17.7	60.8
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		631	593	638	602	3770	5000	4360	4840	4460	4900	647	760	658	673	662	692
Conductivity - field	µS/cm		627	596	594	612	3550	4810	4330	4720	4300	4440	637	762	639	687	621	731
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	<1.0	1.3	<1.0	<1.0	8.8	1.6	2.1	<1.0	<1.0	1.2	1.7	2.2	1.3	1.7	1.4	1.7
Dissolved Oxygen - field	mg/L		5.62	3.89	2.74	4.05	1.05	0.46	0.45	0.24	1.04	1.18	2.17	1.89	1.66	1.85	1.34	1.92
Hardness	mg/L	80-100 *	339	320	289	356	389	540	463	504	539	532	346	357	334	321	339	356
Ion Percentage	%		5.18	3.05	0.97	6.37	0.5	1.3	2.26	2.5	6.16	3.22	1.74	2.48	2.39	0.04	4.25	1
Iron	mg/L	0.3 *	0.033	0.023	0.005	<0.005	1.27	0.894	0.104	0.57	0.825	0.67	0.09	0.061	0.396	0.08	0.154	0.184
Lead	mg/L	0.01 **																
Magnesium	mg/L		21.1	20.9	20.5	25.3	44.2	64.5	52	62.3	64.7	66.1	28.1	28.3	24.6	26.7	26.2	30.1
Manganese	mg/L	0.05 *	0.0056	0.0068	0.0019	0.0012	0.118	0.0125	0.0545	0.0131	0.0173	0.024	0.026	0.0192	0.0269	0.0161	0.0226	0.0215
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	0.8	1.76	0.8	2.63	<1.25	<1.25	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.05	<1.25	<1.25	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Oxidation Reduction Potential	mV		39.1	18.3	-8	95.1	-105.6	-93.6	8.7	-88.5	-74.1	-62	-29.3	5	54.1	-11.6	35.1	28.6
pH	units		7.82	7.62	7.54	7.61	7.17	7.56	7.8	7.64	7.63	7.47	7.47	7.68	7.7	7.68	7.67	7.49
pH - field	units		7.63	7.65	7.58	7.69	6.91	7.37	7.29	7.35	7.24	6.97	7.18	7.43	7.35	7.39	7.23	7.21
Phenols	µg/L		2	<1	<1	<1	2	2	<1	2	<1	<1	<1	1	<1	3	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02		2.5	0.16	0.94	0.15	0.2	0.17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L					<0.03												
Phosphorus	mg/L		0.01	0.03	<0.02	<0.01	2.35	0.14	1.04	0.18	0.17	0.17	0.03	0.04	<0.02	0.01	<0.02	<0.01
Potassium	mg/L		1.5	2	2.2	1.1	20.9	22.7	19.3	20.1	25	20	2.3	2.6	2.1	2.2	2.8	2.7
Sodium	mg/L	200 *	7	9.4	11.6	7.4	545	697	595	714	645	605	7.4	15.1	7.9	9.9	7.9	13.2
Sulphate	mg/L	500 *	76.1	64.5	70.3	57.4	<5.0	16	0.6	17.2	<2	<2.0	21.7	25.4	25.7	29.6	31.9	32.3
Temperature - field	°C		6.2	5.9	5.3	4.7	8.8	9.7	9	9.6	8.1	8.8	8.7	8.5	8.1	9	8.4	8
Total Dissolved Solids	mg/L	500 *	420	310	360	360	1830	2570	2200	2300	2350	2390	370	430	390	400	390	440
Total Kjeldahl Nitrogen	mg/L		<0.2	<0.1	<0.2	<2.0	22.7	10.7	11	9.1	6.9	5.9	<0.1	<0.1	<0.1	<0.1	<0.1	<0.3
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	46-III						48								50-I	
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Apr-18	Apr-19	Apr-20	Mar-21	Oct-21	Mar-22	Mar-23	Sep-23	Apr-18	Apr-19
Alkalinity	mg/L	30-500 *	300	259	232	257	286	185	917	712	787	704	689	774	570	651	214	202
Aluminum	mg/L	0.1 *							<0.025	<0.025	<0.025	<0.025		<0.025	<0.025			
Ammonia (as N)	mg/L		0.2	<0.1	<0.1	0.1	0.2	0.1	2	0.8	0.8	0.9	1.4	1.1	0.6	1.4	1.3	1.2
Anion sum	meq/L		7.1	7.19	5.85	6.42	6.83	4.49	20.8	23.5	17.8	21.4	15.9	17.2	12.2	14.6	7.33	7.15
Arsenic	mg/L	0.010 **	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0021	0.0025	0.0017	0.0006	0.0007	0.0017	0.0016	0.0008	<0.005	<0.0005
Barium	mg/L	1 **							0.26	0.298	0.226	0.269		0.206	0.113			
Beryllium	mg/L								<0.0001	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005			
Bicarbonate	mg/L		299	258	231	256	285	184	917	712	787	704	689	774	570	651	213	200
Boron	mg/L	5 **							0.0157	0.0138	0.0159	0.0179		0.0123	0.007			
Cadmium	mg/L	0.005 **							<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001			
Calcium	mg/L		129	136	115	110	131	77.2	288	248	275	274	225	275	190	197	41.9	34.2
Carbonate	mg/L		<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2
Cation sum	meq/L		7.25	7.65	6.37	6.23	7.35	4.36	18.6	19.8	18.1	21.6	15.7	20	11.2	14.2	7.61	7.08
Chemical Oxygen Demand	mg/L		<10	<10	30	10	<10	20	30	20	20	<10	20	10	20	20	40	<10
Chloride	mg/L	250 *	13.6	24.2	15.6	16.3	13.8	9.9	93.3	335	75.9	264	83.4	68.8	19.2	67	106	110
Chromium	mg/L	0.05 **							<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005			
Cobalt	mg/L								0.0029	<0.0005	0.0022	<0.0005		0.0008	0.0006			
Conductivity	µS/cm		678	742	604	635	696	439	1650	2060	1580	2070	1520	1510	1080	1350	777	790
Conductivity - field	µS/cm		667	755	590	653	664	434	1730	2180	1660	2170	1530	1520	1150	1190	761	583
Copper	mg/L	1 *							<0.0005	<0.0005	0.0007	<0.0005		<0.0005	<0.0005			
Dissolved Organic Carbon	mg/L	5 *	2.7	2.9	3.4	3.2	2.3	4.2	8.1	4	5.1	3.6	5.9	5.2	5.6	6.4	3.3	2.7
Dissolved Oxygen - field	mg/L		3.87	2.26	4.38	3.54	3.02	5.01	2.06	2.03	2.49	3.49	2.76	1.67	2.24	2.51	1.4	1.88
Hardness	mg/L	80-100 *	347	368	306	297	353	208	851	736	813	804	649	815	522	556	196	169
Ion Percentage	%		1.06	3.09	4.28	1.48	3.65	1.5	5.61	8.56	0.64	0.48	0.62	7.42	4.51	1.52	1.9	0.47
Iron	mg/L	0.3 *	<0.5	0.083	0.273	<0.005	<0.005	0.011	35	27.8	37.5	33.5	23.5	34.2	6.48	7.54	0.05	0.012
Lead	mg/L	0.01 **							<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005			
Magnesium	mg/L		6.13	6.81	4.66	5.33	6.19	3.63	32	28.4	30.6	29.2	21.1	31.1	11.6	15.5	22.2	20.2
Manganese	mg/L	0.05 *	0.01	0.0214	0.0103	0.0083	0.0015	0.0009	0.908	0.991	1.04	0.964	0.697	0.68	0.651	0.38	0.008	0.0056
Molybdenum	mg/L								<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005			
Nickel	mg/L								<0.002	<0.002	0.003	<0.002		<0.002	<0.002			
Nitrate	mg/L	10.0 **	8.85	16.3	8.8	10.1	8.94	5.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		5.4	31.5	76.7	44.8	84.9	93.3	-82.1	-57.8	-14.4	-67.6	-84.6	-132.6	-45.5	-35.6	-138.4	-47.2
pH	units		7.26	7.55	7.67	7.59	7.56	7.5	6.51	6.66	6.59	6.58	6.66	6.66	6.61	6.77	7.66	7.94
pH - field	units		6.94	7.29	7.36	7.37	7.11	7.21	6.23	6.24	6.43	6.65	6.36	6.35	6.42	6.37	7.6	7.76
Phenols	µg/L		<1	2	<1	2	<1	<1	2	<1	<1	<1	1	<1	<1	<1	1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	0.05	<0.02	0.03	<0.02	0.02	0.04	<0.02	<0.02	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		<0.5	0.5	<0.5	<0.5	<0.5	<0.5	1.7	2.2	1.4	2	1.7	1.9	0.5	1.6	7.1	6.5
Sodium	mg/L	200 *	6.4	6.1	5.4	6.4	6.2	4.4	31.5	113	38.7	123	59.3	80.2	14.7	66.8	78	79.1
Sulphate	mg/L	500 *	13.6	15.9	14.1	12.7	13.1	11.7	22.5	14	23.2	16.1	12	13.8	31.1	7	9.7	7
Temperature - field	°C		3.8	4	3.5	4.7	3.6	3.8	6.9	8.2	8.6	6.6	14.4	7.5	7.4	14.3	7.3	9.3
Total Dissolved Solids	mg/L	500 *	380	460	380	390	420	310	1010	1250	970	1140	890	890	710	820	410	420
Total Kjeldahl Nitrogen	mg/L		<0.1	<0.1	<1	1.9	<2.0	<0.3	2	1	0.8	0.1	1.3	1	0.8	1.4	1.7	0.8
Zinc	mg/L	5 *							0.0006	0.0016	0.0014	0.0009		0.0008	<0.005			

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	50-I				50-II						50-III					
			May-20	Apr-21	Apr-22	Mar-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Mar-23	Apr-18	Oct-18	Apr-19	Oct-19	May-20	Sep-20
Alkalinity	mg/L	30-500 *	214	226	227	220	338	293	279	307	266	308	248		180		251	
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.3	0.6	0.1	0.2	0.3	0.2	<0.1	0.3	0.2	0.2	0.2		0.2		<0.1	
Anion sum	meq/L		6.74	8.23	6.79	7.6	12.1	13.1	11.9	13.8	12.9	14.2	8.37		5.3		7.68	
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	0.0009	0.0008	<0.0005	0.0007	0.0009	<0.005		<0.0005		<0.0005	
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		212	225	226	219	337	292	278	306	265	307	247		179		250	
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		81.3	74	76.3	74.5	105	109	115	124	130	117	112		59.6		109	
Carbonate	mg/L		2	<1	<1	1	<1	1	1	<1	<1	<1	<1		1		1	
Cation sum	meq/L		7.33	8.38	7.2	7.28	12.3	12.3	12.8	13.4	14	12.4	8.48		4.96		8.22	
Chemical Oxygen Demand	mg/L		30	30	10	20	30	<10	<10	<10	<10	<10	20		<10		10	
Chloride	mg/L	250 *	74.6	116	71.1	96.9	171	236	200	245	240	255	106		52		85.2	
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		722	857	720	783	1210	1280	1270	1410	1440	1440	837		533		811	
Conductivity - field	µS/cm		712	869	681	767	1190	1390	1250	1390	1330	1400	822	1070	548	881	799	1140
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	6.8	4.8	5.7	5.1	2.3	2.4	2.8	1.9	1.8	2	5.4		6.3		7.6	
Dissolved Oxygen - field	mg/L		2.11	1.32	2.5	1.46	2.41	2.08	2.74	3.42	6.61	3.86	5.54	3.17	3.98	2.25	2.6	4.42
Hardness	mg/L	80-100 *	271	272	256	245	407	425	441	472	486	431	320		170		310	
Ion Percentage	%		4.19	0.9	2.99	2.15	1.1	3.25	3.77	1.55	4.21	7.13	0.67		3.32		3.41	
Iron	mg/L	0.3 *	0.142	0.115	0.009	0.031	0.22	1.03	0.953	0.213	0.776	1.15	<0.05		<0.001		0.027	
Lead	mg/L	0.01 **																
Magnesium	mg/L		16.5	21.3	15.9	14.4	35.1	37	37.4	39.4	39.2	33.8	9.7		5.08		9.09	
Manganese	mg/L	0.05 *	0.0137	0.014	0.004	0.0222	0.013	0.0262	0.0266	0.0161	0.0249	0.0277	<0.001		0.0016		0.0184	
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5		<0.5		<0.5	
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5		<0.5		<0.5	
Oxidation Reduction Potential	mV		112	-86.8	240.7	17.9	-55.7	-83.1	6.4	-10.1	110.6	-7	31.1	28.4	23.2	-45.7	82.9	48.5
pH	units		7.91	7.64	7.52	7.76	7.45	7.59	7.69	7.46	7.32	7.5	7.49		7.86		7.77	
pH - field	units		7.83	7.69	7.35	7.45	7.2	7.32	7.37	7.39	7.3	7.11	7.25	7.17	7.69	7.64	7.45	7.39
Phenols	µg/L		<1	2	<1	<1	1	<1	1	2	<1	<1	1		1		<1	
Phosphate	mg/L		<0.02	<0.02	<0.02		<0.01	<0.02	<0.02	<0.02	<0.02		<0.01		<0.02		<0.02	
Phosphorus - Dissolved	mg/L					<0.03						<0.03						
Phosphorus	mg/L		<0.01	0.03	<0.02	0.02	<0.02	<0.02	<0.01	0.03	<0.02	<0.01	<0.02		0.04		0.02	
Potassium	mg/L		3.9	5.9	4.4	4.4	3.1	2.8	2.8	3.1	3.4	3.1	1.6		1.5		2.6	
Sodium	mg/L	200 *	40.6	62.4	44.7	51.2	93.1	84.4	89	87.3	94.9	82.5	46.4		34.5		44.8	
Sulphate	mg/L	500 *	23.8	28.5	18.8	29.4	33.6	38.4	40.6	46.1	45.9	52.9	28.1		16.8		20.4	
Temperature - field	°C		9.7	9.4	7.2	8.8	7	8.1	8	6.4	6.5	7.6	2.7	12.9	2.8	12.3	7.9	13.2
Total Dissolved Solids	mg/L	500 *	440	490	350	390	650	740	710	760	730	790	480		300		500	
Total Kjeldahl Nitrogen	mg/L		0.3	0.2	0.3	0.4	0.7	0.2	<0.2	<0.1	<0.2	<0.3	2.8		0.3		0.3	
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	50-III						52-I						52-II			
			Apr-21	Oct-21	Apr-22	Sep-22	Mar-23	Sep-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Apr-23	Apr-15	Apr-16	Apr-17	Apr-18
Alkalinity	mg/L	30-500 *	260		232		193		354	253	253	260	253	255	431	432	268	365
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.2		0.1		0.1		2.7	3.3	2.1	3	3.3	2.6	<0.1	0.2	0.2	0.3
Anion sum	meq/L		8.67		6.72		6.09		40.1	81.2	76.3	41.4	81.2	35.7	18.7	18.4	20.5	17.7
Arsenic	mg/L	0.010 **	<0.0005		<0.0005		<0.0005		<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		259		231		192		352	253	252	259	253	254	430	431	266	364
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		107		93.8		69.1		200	228	241	172	228	169	224	242	232	287
Carbonate	mg/L		<1		<1		<1		2	<1	1	<1	<1	<1	<1	1	2	<1
Cation sum	meq/L		8.48		7		5.43		51.7	53.3	61.1	40.4	53.3	37.9	15.9	17.1	16.4	20.6
Chemical Oxygen Demand	mg/L		30		<10		20		60	30	40	40	30	<250	<10	<10	20	30
Chloride	mg/L	250 *	101		67.5		62		1180	2710	2530	1290	2710	1090	211	200	382	240
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		880		697		594		4740	9250	6140	5040	9250	4520	1630	1690	1630	1700
Conductivity - field	µS/cm		880	749	659	954	588	872	3890	4090	5650	4670	4090	4220	1520	1650	1650	1760
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	5		5.1		4.2		1.2	<1.0	<1.0	<1.0	<1.0	<1.0	4.4	6	7.9	5.1
Dissolved Oxygen - field	mg/L		7.69	4.98	4.62	4.90	9.11	1.71	1.61	0.82	5.74	1.93	0.82	2.18	3.06	1.77	2.46	3.22
Hardness	mg/L	80-100 *	307		270		205		1060	1210	1310	882	1210	850	728	776	698	912
Ion Percentage	%		1.12		2.03		5.73		12.6	20.8	11.1	1.19	20.8	2.99	8.15	3.58	11.1	7.58
Iron	mg/L	0.3 *	<0.005		0.012		0.007		1.9	4.73	3.38	0.992	4.73	1.28	0.13	0.054	0.07	0.59
Lead	mg/L	0.01 **																
Magnesium	mg/L		9.71		8.58		7.79		135	156	173	110	156	104	40.9	41.8	28.9	47.4
Manganese	mg/L	0.05 *	0.0018		0.0035		0.0021		0.069	0.108	0.0672	0.0518	0.108	0.0532	0.0897	0.0621	0.135	0.226
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5		<0.5		0.88		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Nitrite	mg/L	1.0 **	<0.5		<0.5		<0.05		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Oxidation Reduction Potential	mV		46.7	58.2	319.4	174.6	46.6	31.4	51.7	-113.5	-87.3	-108.1	-113.5	-61.6	25.5	15.5	-51.2	68.5
pH	units		7.53		7.45		7.74		7.76	7.22	7.71	7.6	7.22	7.4	7.32	7.52	7.79	7.23
pH - field	units		7.42	7.2	7.46	6.98	7.39	6.84	7.48	7.52	7.51	7.66	7.52	7.25	6.88	7.05	7.21	6.91
Phenols	µg/L		<1		<1		<1		<1	<1	2	<1	<1	<1	<1	8	<1	<1
Phosphate	mg/L		<0.02		<0.02				<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L						<0.03							<0.3				
Phosphorus	mg/L		0.04		<0.02		0.02		0.04	<0.02	0.04	0.12	<0.02	0.02	0.04	0.04	0.04	0.03
Potassium	mg/L		1.9		2.1		1.4		22.7	24.4	23.6	18.1	24.4	16.9	1.1	1.2	0.8	1.2
Sodium	mg/L	200 *	51.9		35.3		29.6		682	644	779	506	644	463	28.6	34.2	54.5	52.2
Sulphate	mg/L	500 *	38.2		16		26.5		<2	<2	5.3	2.5	<2	1.3	212	211	220	187
Temperature - field	°C		3.6	15.2	2.5	13.8	2	15.2	6.4	6.8	9.7	7.9	6.8	7.7	3.3	6.2	4.7	4.5
Total Dissolved Solids	mg/L	500 *	490		360		330		2370	5180	4230	2770	5180	2260	990	1120	1320	1190
Total Kjeldahl Nitrogen	mg/L		<0.1		0.2		<0.3		2	5.3	4.7	5.9	5.3	3.3	0.2	0.1	0.6	0.2
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	52-II		53-I						54-II						61-I	
			Apr-19	Apr-23	Apr-18	Apr-19	May-20	Mar-21	Mar-22	Apr-23	Apr-18	Apr-19	May-20	Mar-21	Mar-22	Mar-23	Mar-18	Apr-19
Alkalinity	mg/L	30-500 *	322	336	275	315	310	314	348	318	324	315	290	347	311	272	179	172
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.2	0.1	0.2	0.2	<0.1	0.1	0.7	0.2	0.2	0.2	<0.1	0.1	0.2	0.2	0.3	0.4
Anion sum	meq/L		18.1	27	6.46	7.17	6.98	7.08	7.43	6.8	8.34	8.59	6.68	8.41	6.63	7.55	4.24	4.35
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	0.0035	0.0019	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		321	336	274	314	309	313	347	317	324	313	289	346	310	271	177	169
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		247	332	105	91.4	96.4	88.9	117	97.2	150	140	121	139	125	120	18.6	19.2
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	2	2
Cation sum	meq/L		18.1	25.9	8.12	7.14	7.53	7.09	8.45	6.32	8.93	8.4	7.19	8.5	7.47	7.14	4.37	4.1
Chemical Oxygen Demand	mg/L		<10	70	40	<10	20	<10	<10	<10	30	<10	<10	30	<10	20	<10	20
Chloride	mg/L	250 *	281	650	2.7	1.7	2	1.4	1.1	0.7	46.8	50.4	15.4	28.2	10.2	47.8	8.2	11.3
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		1760	2600	644	681	681	658	681	547	843	736	674	822	606	691	415	449
Conductivity - field	µS/cm		1890	2740	660	697	674	675	675	613	827	875	652	844	634	707	418	450
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	3.9	<1.0	2	1.3	1.5	2.1	2.6	2.6	4.7	5.5	3.8	4	2.7	5.1	2	<1.0
Dissolved Oxygen - field	mg/L		2.87	2.48	1.75	1.48	1.32	1.29	2.85	3.85	2.43	3.72	6.38	2.77	5.6	9.69	2.74	3.76
Hardness	mg/L	80-100 *	807	1140	384	341	359	339	404	304	414	387	321	384	346	319	144	120
Ion Percentage	%		0.02	2.15	11.4	0.16	3.82	0.12	6.45	3.66	3.44	1.15	3.68	0.53	5.91	2.73	1.52	2.99
Iron	mg/L	0.3 *	0.28	0.019	1.25	1.14	1.13	1.05	0.629	0.148	<0.05	0.039	0.056	0.016	0.082	0.008	<0.05	<0.001
Lead	mg/L	0.01 **																
Magnesium	mg/L		46.1	75.3	29.7	27.5	28.8	28.4	27.2	14.8	9.56	8.98	4.51	8.86	8.13	4.75	23.6	17.4
Manganese	mg/L	0.05 *	0.128	0.282	0.02	0.0192	0.0181	0.0188	0.021	0.0161	0.006	0.0072	0.0072	0.0016	0.0284	0.001	0.001	0.0047
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	0.06	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		-5.2	40.5	5.7	-85.7	-42.2	-22.9	22.2	111.3	105.6	21	58.2	76.2	-52.2	120.2	-185.7	-206
pH	units		7.37	7	7.34	7.38	7.34	7.37	7.35	7.32	7.2	7.75	7.36	7.24	7.28	7.47	8.06	8.19
pH - field	units		7.15	6.9	7	7.2	7.2	7.4	7.15	6.93	6.9	7.14	7.27	7.27	7.08	7.16	7.94	8.18
Phenols	µg/L		<1	<1	2	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02		<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.41	0.24
Phosphorus - Dissolved	mg/L			<0.03						<0.03								
Phosphorus	mg/L		0.01	0.01	0.03	<0.02	<0.01	0.02	<0.02	<0.02	0.03	<0.02	0.01	0.02	<0.02	0.02	0.38	0.17
Potassium	mg/L		1.3	2.6	1.7	1.6	1.9	1.6	1.9	1.2	0.9	0.8	<0.5	0.7	<0.5	<0.5	2.9	3.3
Sodium	mg/L	200 *	42.2	68	7.7	5.2	6.1	5.4	5.5	4.1	13.7	14.1	17.6	18.1	12.1	16.9	31.6	36.2
Sulphate	mg/L	500 *	189	107	51.2	49.2	44.5	46.3	32	30	36	51.8	30.6	43.4	15.9	45	26	33.8
Temperature - field	°C		5	5.9	8	8.8	8.6	8.3	8.1	7.2	6.9	7.5	6.2	6.8	7	5.6	9	8.1
Total Dissolved Solids	mg/L	500 *	1260	1760	410	410	390	330	410	380	510	510	390	440	340	410	230	260
Total Kjeldahl Nitrogen	mg/L		0.2	<0.3	<0.1	<0.1	<0.2	<0.1	2	<0.3	0.2	0.3	<0.2	<0.1	0.2	0.8	0.3	0.3
Zinc	mg/L	5 *																

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	61-I				61-II						61-III					
			Apr-20	Apr-21	Mar-22	Mar-23	Mar-18	Apr-19	Apr-20	Apr-21	Mar-22	Mar-23	Mar-18	Apr-19	Apr-20	Apr-21	Mar-22	Mar-23
Alkalinity	mg/L	30-500 *	164	173	168	176	196	225	179	182	181	189	279	252	292	278	278	270
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.5	0.7	0.4	0.3	0.1	2.9	0.3	0.1	0.1	0.1	0.2	<0.1	<0.1	0.1	0.1	0.1
Anion sum	meq/L		4.27	4.49	4.38	4.54	5.14	5.58	4.95	5.07	5.07	5.35	8.31	9.17	6.16	7.66	8.42	5.62
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	0.0024	0.0016	0.0016	0.0016	0.0015	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		163	171	167	174	193	221	177	180	178	186	278	250	291	277	277	269
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		22.6	23.2	24.9	20.1	21.3	20	25.9	25.4	28.4	27	108	101	112	112	131	87.6
Carbonate	mg/L		1	2	1	2	3	4	2	2	3	3	<1	2	<1	<1	<1	1
Cation sum	meq/L		4.39	4.79	5.31	4.35	5.53	5.3	5.26	5.49	6.2	5.12	8.39	8.75	6.87	8.57	11	5.25
Chemical Oxygen Demand	mg/L		<10	10	<10	<10	<10	20	<10	<10	<10	<10	<10	30	<10	10	<10	10
Chloride	mg/L	250 *	13.4	16.7	15.5	17.1	34.4	35.3	38.8	40.3	42.1	44.9	92.7	141	13.9	72.3	99.6	10.5
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		458	468	465	447	509	546	527	533	533	525	811	940	565	788	899	519
Conductivity - field	µS/cm		453	460	446	440	493	560	533	522	509	512	784	878	625	749	779	522
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	1.1	1.4	1.7	1.4	1.5	5.6	1.1	1.3	1.6	1.9	2.5	2.1	2	2	1.8	3.3
Dissolved Oxygen - field	mg/L		1.1	1.92	1.95	6.77	7.24	7.71	5.24	6.46	8.03	8.19	7.38	3.81	10.1	9.51	7.85	11.5
Hardness	mg/L	80-100 *	107	125	151	132	151	134	155	170	193	166	373	398	320	393	497	247
Ion Percentage	%		1.32	3.23	9.61	2.16	3.66	2.57	2.97	3.93	10.1	2.17	0.47	2.32	5.45	5.63	13.5	3.33
Iron	mg/L	0.3 *	0.01	<0.005	<0.005	<0.005	<0.05	0.039	0.084	<0.005	0.006	<0.005	<005	<0.001	0.016	0.085	0.006	<0.005
Lead	mg/L	0.01 **																
Magnesium	mg/L		12.2	16.2	21.6	19.8	23.8	20.4	22	26	29.6	23.9	25	35.5	9.87	27.5	41.3	6.85
Manganese	mg/L	0.05 *	0.0113	0.0046	0.0027	0.0024	0.01	0.085	0.0399	<0.0005	0.0011	<0.0005	<0.001	0.0016	<0.0005	0.0108	<0.0005	<0.0005
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.5	0.08	0.19	<0.5	<0.5	<0.5	<0.5	<0.5	0.76	<0.5	<0.5	<0.5	0.54	<0.5	0.37
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Oxidation Reduction Potential	mV		-211.5	-233.3	-249.9	-201.1	-77.4	-6.9	46.8	22.4	176.3	-3.5	7	101.5	52.6	77.2	207	75
pH	units		7.95	8.04	7.96	8.05	8.18	8.31	8.06	8.06	8.19	8.17	7.48	7.83	7.48	7.54	7.46	7.64
pH - field	units		8.08	8.04	7.95	7.94	8.01	7.93	7.87	7.93	7.99	7.86	7.28	7.37	7.34	7.34	7.19	7.3
Phenols	µg/L		<1	1	<1	<1	<1	<1	<1	1	<1	<1	<1	1	<1	2	<1	<1
Phosphate	mg/L		0.06	0.08	0.22	0.25	0.75	0.92	0.46	0.46	0.47		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.06	0.08	0.17	0.26	0.73	1.09	0.28	0.54	0.43	0.39	0.03	0.02	<0.02	0.03	<0.02	<0.01
Potassium	mg/L		3.5	4.3	4.4	3.2	1.9	2.3	1.9	2.2	2.4	1.9	1.2	1.4	<0.5	1.2	1.7	<0.5
Sodium	mg/L	200 *	48.7	48.7	48.8	36.5	55.8	53.6	47.3	45.7	51.7	39.6	19.9	16.3	10.2	14.7	23	6.8
Sulphate	mg/L	500 *	34.8	32.2	32.9	30.6	18.2	11	19	20	18.2	17.8	14.7	15.5	5.6	9.7	11.5	3.4
Temperature - field	°C		9.1	8.7	9.5	9	8.4	6.7	11.7	8.2	8.5	8.5	6.8	5.8	6.5	6.2	6.9	6.3
Total Dissolved Solids	mg/L	500 *	270	308	260	260	270	290	290	270	280	240	450	540	340	350	520	280
Total Kjeldahl Nitrogen	mg/L		0.7	2.5	0.3	<0.3	0.1	3.3	0.2	<2.0	<0.1	<0.3	0.3	0.1	0.2	2.1	<0.1	<0.3
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	62-I						62-II									
			Mar-18	Apr-19	Apr-20	Mar-21	Mar-22	Mar-23	Mar-18	Oct-18	Apr-19	Sep-19	Apr-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22
Alkalinity	mg/L	30-500 *	262	237	253	247	238	279	361	383	330	418	330	349	325	412	425	427
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		5	5.2	5.1	5.2	5.6	5.3	0.1	<0.1	0.2	<0.1	<0.1	0.1	0.1	0.2	0.2	0.5
Anion sum	meq/L		72.6	78.7	72.3	75.9	77	73.5	8.37	9.27	7.68	9.8	8.13	8.88	8.24	9.81	9.91	10.6
Arsenic	mg/L	0.010 **	<0.005	0.0007	<0.0005	<0.0005	0.001	<0.0005	<0.005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		261	236	251	246	238	278	360	382	329	417	329	348	324	411	424	426
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		205	192	235	197	191	205	138	154	125	165	150	158	128	153	162	163
Carbonate	mg/L		<1	1	2	<1	<1	<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1
Cation sum	meq/L		74.9	69.5	76.4	75.9	63.5	66.3	8.2	9.68	7.47	10.1	9.05	10.3	7.89	9.53	9.78	10.6
Chemical Oxygen Demand	mg/L		50	50	220	60	30	530	<10	10	<10	<10	20	<10	20	10	20	20
Chloride	mg/L	250 *	2390	2630	2380	2520	2570	2400	19.7	27.1	17.5	25.4	22.4	24.6	28.1	22.6	28.2	35.5
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		8530	8920	9160	9150	9100	9820	773	904	738	936	812	874	795	940	947	1020
Conductivity - field	µS/cm		7770	8340	8130	8220	7780	8150	765	905	768	944	782	877	821	934	902	1020
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	1.1	<1.0	1.7	<1.0	<1.0	<1.0	4.5	4.8	7.3	7.7	4.7	4.2	4.7	4.8	4.9	4
Dissolved Oxygen - field	mg/L		1.48	2.36	1.96	6.46	2.72	4.9	6.24	5.64	4.24	2.44	6.77	4.8	1.95	6.3	2.88	4.03
Hardness	mg/L	80-100 *	1090	1050	1250	1120	1050	1100	373	431	340	461	405	446	346	421	441	466
Ion Percentage	%		1.58	6.23	2.77	0.03	9.64	5.14	1.05	2.18	1.37	1.56	5.36	7.63	2.14	1.44	0.68	0.4
Iron	mg/L	0.3 *	0.6	1.01	0.492	0.229	1.75	0.091	<0.05	<0.05	0.008	1.05	0.028	0.009	0.009	0.153	0.016	0.045
Lead	mg/L	0.01 **																
Magnesium	mg/L		141	139	160	153	138	142	6.95	11.3	6.74	11.9	7.38	12.6	6.5	9.49	8.78	14
Manganese	mg/L	0.05 *	0.029	0.0262	0.0284	0.021	0.0182	0.0279	<0.001	0.004	0.0126	0.235	0.135	0.001	0.0085	0.0143	0.112	0.0153
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Oxidation Reduction Potential	mV		-57.8	-78.1	70.5	44.8	3.1	-44	78.6	72	55.6	-42.2	81.3	17.2	81.7	48.3	95.8	214.8
pH	units		7.51	7.69	7.91	7.63	7.34	7.4	7.29	7.33	7.56	7.25	7.66	7.26	7.42	7.34	7.14	7.34
pH - field	units		7.18	7.35	7.35	7.33	7.16	7.24	7.06	7.07	7.33	7.07	7.32	7.12	7.21	7.07	7	6.89
Phenols	µg/L		<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	2	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.06	0.1	0.13	0.03	<0.02	<0.02	0.03	<0.02	0.03	<0.02	0.01	0.01	0.02	0.01	<0.02	<0.02
Potassium	mg/L		31	38	36.9	30.7	31.9	32.6	<0.5	1.1	<0.5	1.1	<0.5	1.1	<0.5	0.8	0.5	1.2
Sodium	mg/L	200 *	1190	1080	1150	1200	948	989	16.4	23.2	14.9	19.4	21.5	31.2	21.7	24.2	21.2	26.8
Sulphate	mg/L	500 *	8.1	2.5	16.6	5.7	1.3	22.9	40.1	52.5	38.6	48.1	53.5	68.7	55.6	57.6	41.1	65.9
Temperature - field	°C		8.8	8.2	7.9	11.3	10	8	5.7	13.4	5.4	12.3	5.6	12.8	4.9	14.6	5.1	13.4
Total Dissolved Solids	mg/L	500 *	4580	4860	4850	4230	5500	4710	490	530	490	570	530	570	500	550	630	600
Total Kjeldahl Nitrogen	mg/L		6.6	3.2	8.1	8.9	6.4	6.1	0.1	0.4	0.3	0.2	<0.1	<1.0	<0.1	2.1	0.4	2.5
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	62-II		63-I												63-II	
			Mar-23	Sep-23	Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Apr-23	Sep-23	Apr-18	Oct-18
Alkalinity	mg/L	30-500 *	285	447	199	234	163	302	291	289	275	276	278	286	289	291	223	207
Aluminum	mg/L	0.1 *			<0.025		2.84		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	<0.1	10.5	7.4	2	11	8.1	9.5	0.1	0.6	0.2	0.4	0.1	0.3	0.3	0.2
Anion sum	meq/L		7.31	10.7	4.69	6.13	4.05	7.62	7.39	7.48	7.71	7.69	7.67	7.92	7.95	7.9	5.36	4.97
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0029	<0.005
Barium	mg/L	1 **			0.074		0.077		0.081		0.098		0.084		0.091		0.102	
Beryllium	mg/L				<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001	
Bicarbonate	mg/L		284	446	198	231	161	300	289	286	273	270	274	280	285	286	222	206
Boron	mg/L	5 **			0.453		0.266		0.474		0.66		0.6		0.616		0.0231	
Cadmium	mg/L	0.005 **			<0.0001		0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		118	171	10	10.6	10.9	12	10.7	10.3	7.8	6.3	8.1	6.7	7.8	7.4	57.3	56.2
Carbonate	mg/L		<1	<1	<1	3	2	2	2	3	2	6	4	6	4	4	1	1
Cation sum	meq/L		7.19	11	8.22	5.78	4	6.86	7.39	8.13	8.3	6.7	9.25	7.85	8.82	8.5	5.27	5.26
Chemical Oxygen Demand	mg/L		20	20	<10	20	30	30	<10	20	<10	<10	<10	<10	<10	20	<10	<10
Chloride	mg/L	250 *	27.9	26.4	26.1	48.4	20.6	54.8	54.8	57.3	64.4	65.3	64.1	66.5	65.3	63.4	9.4	8.5
Chromium	mg/L	0.05 **			<0.0005		0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L				<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0016	
Conductivity	µS/cm		667	942	496	659	420	822	819	812	797	817	824	726	804	745	491	494
Conductivity - field	µS/cm		706	884	560	483	409	849	808	810	811	796	779	827	799	669	485	497
Copper	mg/L	1 *			<0.0005		0.0016		0.0016		0.0014		<0.0005		0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	5.3	6.3	1.1	2.7	4.5	12.6	2.9	2.3	2.5	1.5	1.4	2	1.2	3.8	1	1.4
Dissolved Oxygen - field	mg/L		4.94	2.85	1.11	0.9	2.92	1.1	0.55	2.01	2.16	1.83	5.79	2.46	4.94	1.91	0.99	0.83
Hardness	mg/L	80-100 *	318	481	31.1	32.4	34.5	37.7	34.7	33.5	26.7	21.5	27.8	23.2	27.1	24.8	244	243
Ion Percentage	%		0.85	1.37	27.3	2.88	0.69	5.24	0.02	4.23	3.73	6.88	9.37	0.44	5.16	3.64	0.92	2.88
Iron	mg/L	0.3 *	0.056	0.4	0.203	0.88	1.94	3.75	1.57	0.51	0.055	0.215	0.024	0.08	0.012	0.15	0.389	0.52
Lead	mg/L	0.01 **			<0.0005		0.0019		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		5.67	13.2	1.5	1.44	1.78	1.88	1.93	1.9	1.76	1.4	1.83	1.57	1.85	1.54	24.6	25
Manganese	mg/L	0.05 *	0.0372	0.0702	0.0977	0.117	0.0842	0.543	0.335	0.171	0.0075	0.0309	0.0043	0.0125	<0.0005	0.021	0.0123	0.012
Molybdenum	mg/L				<0.0005		0.0006		<0.0005		<0.0005		<0.0005		<0.0005		0.0007	
Nickel	mg/L				<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	0.1	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5	0.08	0.25	0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		47.7	30.3	-194.3	-190.5	-97.2	-156	-142.1	-149.4	-46.4	-148	215.7	-38.9	97.5	-65.2	-124.7	-120.1
pH	units		7.45	7.22	7.67	8.17	8.2	7.88	7.89	8.03	7.88	8.34	8.21	8.34	8.18	8.22	7.77	7.85
pH - field	units		7.25	6.78	7.62	7.73	7.99	7.46	7.79	7.9	7.61	7.93	8.14	8.01	8.25	7.95	7.55	7.6
Phenols	µg/L		<1	<1	1	<1	<1	49	<1	1	<1	1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	0.03	0.06	0.06	0.09	0.14	0.03	<0.02	<0.02	0.03	0.03	0.02		0.03	<0.02	<0.02
Phosphorus - Dissolved	mg/L														<0.03			
Phosphorus	mg/L		0.02	<0.02	0.05	0.07	0.12	0.09	0.04	0.03	0.02	0.03	0.03	0.02	0.03	0.03	<0.01	<0.02
Potassium	mg/L		<0.5	1.2	5.7	6.6	7.7	9	7.9	6.8	4.2	3.6	4.6	3.8	3.6	4.2	2	2.1
Sodium	mg/L	200 *	18.4	29.2	154	102	68.2	117	136	152	176	141	197	167	238	181	6.4	6.9
Sulphate	mg/L	500 *	48.2	60.7	5.2	11.3	15.4	11.2	10.3	13	23.7	24.4	23.3	24.5	24.2	23.1	37.7	34.7
Temperature - field	°C		4.2	13.6	8.1	10.4	8.1	9.8	8.6	10.6	8.4	11.8	7.8	9.5	8.6	10.2	8.6	10.7
Total Dissolved Solids	mg/L	500 *	460	550	210	350	250	380	440	410	470	450	460	470	490	470	300	290
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	10.2	9	2.8	15.8	9.6	10.6	<0.5	0.6	<0.2	2	<0.3	<0.3	<2.0	<0.1
Zinc	mg/L	5 *			<0.0005		0.0062		0.0018		0.0012		<0.0005		<0.005		<0.0005	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	63-II										63-III					
			Apr-19	Oct-19	Apr-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Apr-23	Sep-23	Apr-18	Oct-18	Apr-19	Oct-19	Apr-20	Sep-20
Alkalinity	mg/L	30-500 *	218	209	203	203	214	245	208	214	220	216	260	240	242	235	216	221
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.1	0.2	<0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Anion sum	meq/L		5.17	5.02	4.94	4.91	5.1	5.83	4.99	5.16	5.29	5.19	6.58	6.66	6.41	6.38	5.96	5.89
Arsenic	mg/L	0.010 **	0.0034	<0.005	0.0031	0.0031	0.0031	0.0024	0.0045	0.0036	0.0038	0.004	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005
Barium	mg/L	1 **	0.111		0.107		0.116		0.105		0.104		0.028		0.034		0.033	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005	
Bicarbonate	mg/L		216	208	201	202	212	244	207	212	219	215	259	239	240	234	215	220
Boron	mg/L	5 **	0.0173		0.0185		0.0174		0.0175		0.02		0.0084		0.0032		0.0039	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		53.3	56.5	58.2	58.4	57.8	74.1	64.7	55.7	61.7	59.2	116	118	110	114	113	118
Carbonate	mg/L		2	1	2	1	2	1	1	2	1	1	1	1	2	<1	1	<1
Cation sum	meq/L		5	5.24	5.41	5.44	5.46	5.39	6	5.22	6.21	5.35	6.33	6.68	6.04	6.4	6.27	6.65
Chemical Oxygen Demand	mg/L		20	<10	<10	<10	<10	40	<10	<10	60	20	<10	20	<10	<10	<10	<10
Chloride	mg/L	250 *	7.5	8.8	9	9.4	8.3	6.8	8.5	9.9	9.5	9.6	11.9	13.1	6.2	7.4	11.2	13.4
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		0.0012		0.0015		0.0016		0.0013		0.0015		<0.0001		<0.0005		<0.0005	
Conductivity	µS/cm		492	494	493	489	493	576	501	437	495	494	613	670	587	644	615	604
Conductivity - field	µS/cm		499	503	490	484	503	576	476	500	488	409	608	665	640	657	608	609
Copper	mg/L	1 *	<0.0005		<0.0005		0.001		<0.0005		<0.0005		0.0006		0.001		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	<1.0	2.4	<1.0	<1.0	2	2.3	1.1	2	<1.0	3.2	3	1.4	3	2.2	1.3	1.8
Dissolved Oxygen - field	mg/L		0.99	0.98	0.87	0.42	0.93	1.42	1.23	0.94	2.69	2.54	10.5	9.21	11.9	8.78	10.8	8.99
Hardness	mg/L	80-100 *	232	243	252	252	253	255	278	242	287	247	310	325	296	312	307	324
Ion Percentage	%		1.67	2.16	4.53	5.1	3.32	3.95	9.11	0.61	8.02	1.5	1.94	0.19	2.94	0.21	2.48	6.02
Iron	mg/L	0.3 *	0.538	0.41	0.454	0.51	0.438	0.011	0.143	0.225	0.306	0.31	0.03	0.07	0.003	<0.05	<0.005	0.199
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		24	24.8	25.8	25.7	26.4	17	28.2	24.9	32.3	24	4.86	7.48	5.15	6.76	5.93	7.09
Manganese	mg/L	0.05 *	0.0126	0.018	0.0131	0.012	0.0137	0.011	0.0127	0.0124	0.0123	0.011	<0.0005	0.001	<0.0005	<0.001	<0.0005	0.0099
Molybdenum	mg/L		0.0007		0.0008		0.0008		0.0008		0.0007		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	3.8	<0.5	<0.05	<0.05	<0.05	12.7	18.4	17	18	16.3	13.2
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-119.8	-73.2	-24.5	-81.6	-75.4	45.7	85	-46.8	-45.3	-26.2	7.2	53.3	103.8	35.8	60.1	31.8
pH	units		7.96	7.78	7.93	7.82	7.88	7.77	7.73	7.99	7.73	7.7	7.71	7.68	7.83	7.57	7.74	7.61
pH - field	units		7.6	7.57	7.65	7.73	7.6	7.36	7.58	7.44	7.76	7.4	7.43	7.43	7.49	7.38	7.51	7.57
Phenols	µg/L		<1	<1	<1	1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L										<0.03							
Phosphorus	mg/L		<0.02	<0.02	<0.02	0.01	0.02	<0.01	<0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.02
Potassium	mg/L		2	1.9	2.1	2.2	2.1	1.7	2.4	2	1.5	2.2	<0.5	0.6	<0.5	<0.5	<0.5	0.6
Sodium	mg/L	200 *	6.4	6.5	6.8	7.2	7	4.8	7.7	6.6	8.8	7.3	2.6	3.3	2.6	3.2	2.8	3.2
Sulphate	mg/L	500 *	35.7	34.8	36.5	34.5	35.1	30.2	35.1	35.4	36.8	35.6	14.6	15.9	16.2	16.1	14.6	14.2
Temperature - field	°C		8.5	9.4	8.9	9.3	8.4	10.4	8.4	9.8	8.8	9.5	4.7	14.5	3.4	12	5.4	13.8
Total Dissolved Solids	mg/L	500 *	300	290	320	300	320	370	290	300	240	320	380	460	380	410	390	380
Total Kjeldahl Nitrogen	mg/L		0.1	<0.1	0.3	<1.0	<0.5	<2.0	<0.2	<2.0	<0.3	<0.3	<2.0	<0.1	1.6	1	0.3	<1.0
Zinc	mg/L	5 *	<0.0005		<0.0005		<0.0005		<0.0005		<0.005		0.0007		0.0007		<0.0005	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	63-III					64-I						64-II				
			Mar-21	Mar-22	Sep-22	Apr-23	Sep-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Apr-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22
Alkalinity	mg/L	30-500 *	209	219	238	200	214	243	237	223	236	247	265	274	274	261	266	313
Aluminum	mg/L	0.1 *	<0.025	<0.025		0.051												
Ammonia (as N)	mg/L		<0.1	0.1	0.2	0.2	0.1	0.4	0.2	0.2	0.3	0.1	0.2	0.2	0.1	0.1	0.1	0.1
Anion sum	meq/L		6.14	6.49	6.84	6.69	7.04	8.41	8.37	7.99	7.81	8.12	8.97	5.55	5.53	5.26	5.36	6.33
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.031	0.029		0.032												
Beryllium	mg/L		<0.0005	<0.0005		<0.0005												
Bicarbonate	mg/L		208	218	236	199	213	241	234	221	235	246	264	273	273	260	265	312
Boron	mg/L	5 **	0.0017	0.0044		<0.005												
Cadmium	mg/L	0.005 **	<0.0001	<0.0001		<0.0001												
Calcium	mg/L		115	138	119	130	131	56.9	54.9	52	53.6	48.4	51.1	107	104	106	91.3	115
Carbonate	mg/L		1	<1	2	<1	<1	2	3	2	1	1	1	<1	1	1	<1	<1
Cation sum	meq/L		6.3	7.5	6.78	7.14	7.25	9.13	8.98	8.5	8.51	7.88	7.99	6.15	5.9	6.4	5.18	6.56
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	20	60	<10	<10	<10	<10	<10	<10	<10	10	20	<10
Chloride	mg/L	250 *	12.7	10.6	13.7	11.5	11.6	96.3	101	99.7	79.3	75.6	98	2.6	1.9	2.2	2.4	2.8
Chromium	mg/L	0.05 **	<0.0005	<0.0005		<0.0005												
Cobalt	mg/L		<0.0005	<0.0005		<0.0005												
Conductivity	µS/cm		629	679	559	648	705	834	877	848	799	848	869	510	537	526	505	627
Conductivity - field	µS/cm		639	647	673	664	592	835	884	837	820	792	869	500	518	534	505	571
Copper	mg/L	1 *	0.0021	<0.0005		0.0005												
Dissolved Organic Carbon	mg/L	5 *	2.2	1.8	1.9	1.6	3.4	1.7	7.1	1.8	1.3	1.1	1.3	2	2.8	1.2	1.8	2
Dissolved Oxygen - field	mg/L		9.1	11.7	8.41	12.6	10.1	2.03	3.78	3.46	12.1	7.5	4.73	6.51	4.83	4.51	5.7	4.49
Hardness	mg/L	80-100 *	308	367	328	349	353	275	268	260	264	243	241	300	289	312	254	321
Ion Percentage	%		1.29	7.26	0.49	3.26	1.5	4.15	3.5	3.12	4.28	1.49	5.76	5.07	3.24	9.81	1.71	1.82
Iron	mg/L	0.3 *	0.019	0.006	0.215	0.066	<0.05	<0.05	0.059	0.017	<0.005	0.009	0.007	<0.05	0.335	0.353	0.084	0.016
Lead	mg/L	0.01 **	<0.0005	<0.0005		<0.0005												
Magnesium	mg/L		5.09	5.47	7.85	5.87	6.32	32.2	31.7	31.7	31.6	29.6	27.5	7.9	7.13	11.4	6.37	8.33
Manganese	mg/L	0.05 *	0.0008	<0.0005	0.007	0.0043	<0.001	0.008	0.0018	0.0069	0.0013	<0.0005	0.0006	0.008	0.0315	0.372	0.0117	0.0564
Molybdenum	mg/L		<0.0005	<0.0005		<0.0005												
Nickel	mg/L		<0.002	<0.002		<0.002												
Nitrate	mg/L	10.0 **	20.5	23.1	21.8	29.1	30.3	<0.5	0.7	<0.5	0.6	0.8	0.66	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		71.4	119.5	90.7	124.2	46.7	5.5	10.9	44.7	13.7	174.4	144	54.6	55.2	89.8	46.3	112.1
pH	units		7.76	7.56	7.85	7.61	7.6	7.82	8.1	8	7.75	7.72	7.74	7.46	7.64	7.65	7.47	7.24
pH - field	units		7.5	7.48	7.3	7.7	7.16	7.53	7.81	7.66	7.56	7.57	7.41	7.21	7.44	7.27	7.4	7.14
Phenols	µg/L		<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	1	3	<1
Phosphate	mg/L		<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L					<0.03							<0.03					
Phosphorus	mg/L		0.01	<0.02	<0.02	<0.01	<0.02	0.03	<0.01	<0.01	0.02	<0.02	<0.01	0.03	0.01	<0.01	<0.01	<0.02
Potassium	mg/L		<0.5	<0.5	0.7	<0.5	0.6	9.3	8	7.2	8	7.7	6.6	<0.5	<0.5	0.6	<0.5	<0.5
Sodium	mg/L	200 *	2.9	3.2	3.2	3.1	3.5	76.8	77.5	70.4	68.3	64.1	68.1	2.9	2.2	3	1.8	2.6
Sulphate	mg/L	500 *	13.2	14.5	14.2	20	19.5	47.7	42.7	41.5	46.5	55.3	49.6	8.7	8.3	7.1	7.1	9.4
Temperature - field	°C		4.3	4	12.9	4.8	13.8	5.2	5.7	7.5	5.3	5.9	5.4	2.9	2.5	5.3	3.5	3.6
Total Dissolved Solids	mg/L	500 *	460	450	480	450	580	460	480	490	420	450	520	260	300	330	290	350
Total Kjeldahl Nitrogen	mg/L		2.9	2.4	<2.0	<2.0	<0.3	0.3	0.4	<0.2	<0.1	<0.2	<0.3	<0.1	<0.1	<0.2	<0.1	<0.2
Zinc	mg/L	5 *	0.0012	<0.0005		<0.005												

NOTES:
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	64-II	66-I						66-II						66-III		
			Apr-23	Mar-18	Mar-19	Apr-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Apr-20	Mar-21	Mar-22	Mar-23	Apr-18	Oct-18	Mar-19
Alkalinity	mg/L	30-500 *	223	410	365	482	807	601	592	1000	1140	1060	1060	1160	1200	732	1220	876
Aluminum	mg/L	0.1 *														<0.025		<0.025
Ammonia (as N)	mg/L		0.1	0.7	0.3	0.7	1.3	0.6	1	21.7	23	19.5	13.6	23.9	14.3	12	41.6	14.9
Anion sum	meq/L		4.56	10.1	9.02	12.1	19.6	14.4	14.5	22.2	26.9	25.6	25.3	27.4	28.3	17.9	27.5	20.5
Arsenic	mg/L	0.010 **	<0.0005	<0.005	0.0013	<0.0005	<0.0005	0.0013	0.0012	<0.005	0.0102	0.0075	0.0074	0.0064	0.0057	0.0047	<0.005	0.0767
Barium	mg/L	1 **														0.285		0.476
Beryllium	mg/L															<0.0001		<0.0005
Bicarbonate	mg/L		222	409	364	481	806	600	591	1000	1140	1060	1060	1160	1200	732	1220	876
Boron	mg/L	5 **														1.21		1.51
Cadmium	mg/L	0.005 **														<0.0001		<0.0001
Calcium	mg/L		70.1	94.6	67.3	94.8	157	115	145	195	235	270	229	258	230	212	255	264
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		4.24	12.7	9.76	12.9	19.2	15.1	18.1	20.8	26.2	29.2	24.7	29.7	26.1	17.6	26.7	21.5
Chemical Oxygen Demand	mg/L		<10	30	30	30	50	20	50	60	100	90	90	90	90	80	90	60
Chloride	mg/L	250 *	2.2	70.2	65.1	95.2	137	93	104	100	168	175	139	171	171	124	139	118
Chromium	mg/L	0.05 **														0.0006		0.0008
Cobalt	mg/L															0.004		0.0083
Conductivity	µS/cm		424	955	909	1230	1820	1350	1370	1840	2410	2590	2310	2480	2620	1580	2450	1950
Conductivity - field	µS/cm		430	1020	1020	1250	1910	1260	1320	1930	2340	2420	2390	2360	2340	1730	2530	2070
Copper	mg/L	1 *														<0.0005		0.0005
Dissolved Organic Carbon	mg/L	5 *	1.9	11.2	8.5	10.2	17.8	10.1	14.8	20.3	24.8	30	26.8	27.8	29.1	18.7	29.9	20.1
Dissolved Oxygen - field	mg/L		7.96	2.06	2.46	2.17	1.31	0.86	2.33	2.01	3.51	2.53	2.19	2.05	4.65	2.2	2.11	3.63
Hardness	mg/L	80-100 *	206	402	292	410	659	486	604	656	831	962	810	934	837	609	801	765
Ion Percentage	%		3.68	11.7	3.91	2.92	1	2.43	11.1	3.35	1.22	6.73	1.18	4.14	4.04	0.92	1.43	2.43
Iron	mg/L	0.3 *	0.039	4.41	1.65	3.12	9.62	2.38	7.38	19.4	24.5	23	23.6	22.4	23.2	34.5	42.3	43.2
Lead	mg/L	0.01 **														<0.0005		<0.0005
Magnesium	mg/L		7.55	40.2	30.2	42.2	64.9	48.3	58.8	41	59.2	70	57.8	70.4	63.7	19.3	40	25.7
Manganese	mg/L	0.05 *	0.0123	0.055	0.0212	0.0676	0.107	0.0585	0.0829	0.2	0.268	0.208	0.226	0.17	0.151	0.557	0.476	1.01
Molybdenum	mg/L															<0.0005		0.0035
Nickel	mg/L															0.009		0.02
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		150.6	-55	-82.7	-69	-93.7	-45.1	-25.3	-50	-52.2	-41.2	-48.1	-41.8	-49.1	-59.4	-80.4	-65.5
pH	units		7.49	7.25	7.25	7.23	6.88	6.98	6.97	6.66	6.81	6.79	6.71	6.63	6.74	6.64	6.6	6.68
pH - field	units		7.18	6.77	6.9	6.91	6.57	6.72	6.76	6.46	6.75	6.51	5.91	6.6	6.53	6.42	6.51	6.5
Phenols	µg/L		<1	<1	<1	<1	1	<1	<1	<1	2	3	2	<1	<1	<1	<1	2
Phosphate	mg/L			0.15	0.06	0.12	0.19	0.06	0.14	0.07	0.14	0.21	0.08	0.07	0.1	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L		<0.03															
Phosphorus	mg/L		<0.02	0.14	0.09	0.04	0.22	0.05	0.09	0.08	0.05	0.04	0.05	0.04	0.03	0.03	0.03	0.07
Potassium	mg/L		<0.5	4.7	4.1	4.9	6.2	5.7	6.6	24.7	25.4	21.8	33.6	27.5	26.2	11.7	36.8	16.9
Sodium	mg/L	200 *	2.2	103	86.2	102	131	118	132	125	167	183	151	197	175	96.6	155	107
Sulphate	mg/L	500 *	8.9	6.9	6.1	6.3	6	6.3	6	3.1	4.8	5.8	40	6	13.4	11.4	<2	9.8
Temperature - field	°C		3.5	9	8.8	8.9	9.2	8.5	8.8	8.1	8.3	8.6	8.4	7.6	8	5.6	13.9	6.5
Total Dissolved Solids	mg/L	500 *	330	540	510	700	1070	750	790	1100	1400	1390	1270	1390	1320	870	1260	1120
Total Kjeldahl Nitrogen	mg/L		<0.3	1.1	0.6	1.6	1.9	0.8	2	23.3	24.4	20.8	36.3	24.7	26.6	16	43.4	25.3
Zinc	mg/L	5 *														0.0007		0.0017

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	66-III									70-I / 113-I						70-II/113-II
			Oct-19	Apr-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Mar-23	Apr-18
Alkalinity	mg/L	30-500 *	1290	1100	651	724	623	796	1290	595	902	284	164	154	164	149	163	170
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025								
Ammonia (as N)	mg/L		42.9	44.4	9.2	10.8	8.1	35.6	47.7	12.8	22.2	0.8	0.9	0.8	0.8	0.8	1	0.2
Anion sum	meq/L		30.1	25.8	14.1	18.1	14.7	17.3	38.2	14.7	19.5	5.9	3.56	3.39	3.64	3.32	3.8	7.76
Arsenic	mg/L	0.010 **	<0.025	0.0586	0.0034	0.0029	0.0661	0.0113	0.0175	0.0282	0.0311	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
Barium	mg/L	1 **		0.675		0.254		0.366		0.278								
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0005								
Bicarbonate	mg/L		1290	1100	651	724	623	796	1290	595	902	277	160	150	161	146	160	170
Boron	mg/L	5 **		3.46		0.616		1.1		0.335								
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001								
Calcium	mg/L		257	267	222	220	197	193	237	181	272	26.7	23.2	37.1	22.8	22.6	21.6	137
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	7	4	4	3	3	3	<1
Cation sum	meq/L		28.6	28.1	17.2	16.3	15.1	19.1	29.4	14.3	23.5	4.51	3.85	4.67	3.78	3.79	3.68	11.1
Chemical Oxygen Demand	mg/L		120	110	20	50	20	60	120	50	80	20	<10	20	10	<10	20	<10
Chloride	mg/L	250 *	181	162	34.2	139	74.5	54.7	469	82	73.7	8.1	8	8.8	10.6	9.7	10.3	112
Chromium	mg/L	0.05 **		0.0013		0.0005		0.0007		<0.0005								
Cobalt	mg/L			0.0071		0.0018		0.0033		0.0014								
Conductivity	µS/cm		2750	2650	1360	1640	1420	1560	2670	1390	1780	371	367	370	379	381	373	987
Conductivity - field	µS/cm		2850	2620	1450	1650	1470	1540	2800	1410	1610	358	373	363	368	351	358	969
Copper	mg/L	1 *		<0.0005		<0.0005		<0.0005		<0.0005								
Dissolved Organic Carbon	mg/L	5 *	40.2	33	11.3	10.3	10.5	14.2	41.3	9.5	25.2	2	2.6	2.4	1.6	1.4	1.6	2.5
Dissolved Oxygen - field	mg/L		1.72	6.13	2.1	2.5	5.09	3.06	3.16	3.62	3.23	0.85	1.42	1.35	0.87	4.1	1.59	1.38
Hardness	mg/L	80-100 *	836	855	622	619	552	594	846	524	811	106	86.3	124	85.4	84.7	81.6	454
Ion Percentage	%		2.5	4.14	9.96	5.31	1.41	4.92	13.1	1.54	9.22	13.4	3.81	15.9	1.9	6.67	1.52	17.6
Iron	mg/L	0.3 *	42.4	35.1	25.4	34.8	22.8	33.7	33.9	16.2	40.3	<0.05	0.398	0.497	0.008	0.006	0.012	1.58
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005								
Magnesium	mg/L		47.2	45.8	16.4	17	14.7	27.2	61.7	17.6	31.9	9.51	6.9	7.61	6.92	6.87	6.71	27.1
Manganese	mg/L	0.05 *	0.389	0.432	0.84	0.962	0.806	0.583	0.332	0.819	0.77	0.004	0.0095	0.0209	0.0037	0.0033	0.0036	0.024
Molybdenum	mg/L			0.002		<0.0005		<0.0005		0.0011								
Nickel	mg/L			0.025		0.005		0.01		0.004								
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5
Oxidation Reduction Potential	mV		-69.4	-39.1	-58.5	-70.7	-64.5	-65.3	-44.2	-61	-57.5	-252.4	-227.7	-187.2	-252.6	-183	-138.4	-101.4
pH	units		6.62	6.8	6.6	6.69	6.63	6.77	6.88	6.82	6.7	8.44	8.44	8.44	8.35	8.36	8.33	7.47
pH - field	units		6.52	6.61	6.5	6.51	6.47	6.57	6.47	6.63	6.42	8	7.95	8.12	8.25	8.12	7.82	7.22
Phenols	µg/L		3	4	2	<1	1	1	2	<1	1	<1	3	<1	1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	0.04	0.01	0.01	0.04	<0.02	<0.02	0.08	<0.02	0.05	0.01	0.01	0.02	<0.02	<0.02	0.03
Potassium	mg/L		42.4	32.1	10.1	7.9	9.5	23.4	38.9	13.4	20.7	5.8	4.9	5.3	5.1	5	4.9	2.5
Sodium	mg/L	200 *	176	159	88.8	66.1	74.5	92.9	183	58	118	50	44.2	45.8	43.1	43.8	42.5	43.1
Sulphate	mg/L	500 *	<0.2	<2	27	8	27.2	17.7	0.5	44.4	0.5	8.5	8	7.9	8	7.8	17	63
Temperature - field	°C		13.3	7.4	13.4	6.9	14.1	5.2	11.7	6.2	12.4	8.1	8.6	9.1	9	8.7	7.9	8.1
Total Dissolved Solids	mg/L	500 *	1410	1350	810	950	810	770	1490	820	970	230	210	200	220	200	260	570
Total Kjeldahl Nitrogen	mg/L		52	45.5	9.8	11.8	9.7	36.2	48.7	17	24.1	0.3	0.1	0.7	<2.0	0.6	<2.0	<0.1
Zinc	mg/L	5 *		0.0018		0.0009		<0.0005		<0.005								

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	70-II / 113-II					70-II / 113-III						74-II				
			Apr-19	May-20	Apr-21	Apr-22	Mar-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Mar-23	Mar-18	Apr-19	May-20	Mar-21	Mar-22
Alkalinity	mg/L	30-500 *	256	252	279	215	279	276	282	280	284	311	311	183	172	135	171	165
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.2	0.2	0.2	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2
Anion sum	meq/L		9.24	9.14	10.2	8.21	9.61	6.58	6.84	7.06	7.15	8	8.36	4.89	4.79	4.59	4.81	4.63
Arsenic	mg/L	0.010 **	0.0007	0.0006	<0.0005	<0.0005	0.0007	<0.005	0.0007	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	0.0009	0.0011	0.0008	0.0008
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		255	251	278	214	278	275	281	279	283	310	310	181	170	132	169	163
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		124	123	126	118	121	82.4	81	96.2	85.2	105	105	37.6	30.7	31.9	38.7	40
Carbonate	mg/L		<1	1	<1	<1	<1	1	1	1	1	<1	<1	2	2	3	2	2
Cation sum	meq/L		9.99	9.99	10.2	9.52	9.79	7.33	7.22	8.1	7.37	8.36	8.62	4.68	4.67	5.11	4.82	5.27
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	<10	10	<10	<10	10	<10	10	<10	<10	10	<10	<10
Chloride	mg/L	250 *	109	111	123	103	106	19.8	21.8	25.1	24.1	30.5	33.6	22	20	21.3	19.8	19.1
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		936	954	1000	932	957	616	554	703	695	799	780	473	479	486	483	491
Conductivity - field	µS/cm		988	935	990	894	923	607	690	691	693	745	763	454	480	501	490	466
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	1.2	1.7	1.8	1.7	2.4	1.9	2.4	3.1	2.2	7.7	3.8	2.3	3.9	1.2	1.7	1.5
Dissolved Oxygen - field	mg/L		1.02	0.98	10.1	0.84	2.31	1.84	1.62	1.4	1.37	2.83	0.97	7.51	7.44	3.74	7.84	7.81
Hardness	mg/L	80-100 *	411	413	418	393	403	326	318	363	327	375	385	175	137	145	171	179
Ion Percentage	%		3.93	4.43	0.06	7.4	0.95	5.39	2.68	6.86	1.54	2.22	1.54	2.19	1.27	5.31	0.09	6.49
Iron	mg/L	0.3 *	0.674	1.4	1.37	1.38	1.48	0.34	0.168	0.038	0.036	0.019	<0.005	<0.05	0.01	0.188	<0.005	0.01
Lead	mg/L	0.01 **																
Magnesium	mg/L		24.7	25.6	25	23.9	24.6	29.3	28.2	29.8	27.7	27.3	29.8	19.7	14.7	15.8	18.1	19.2
Manganese	mg/L	0.05 *	0.0228	0.0205	0.0209	0.0223	0.0209	0.046	0.0504	0.0492	0.0332	0.0535	0.0494	0.002	0.0207	0.0126	0.0007	0.0034
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-73.2	-60.2	-80	-85	-46.3	-75.2	-9.3	14.9	-30.5	28.6	59.9	57.1	212	45.8	82.9	308.7
pH	units		7.45	7.67	7.51	7.4	7.42	7.62	7.58	7.68	7.63	7.36	7.45	8.11	8.16	8.41	8.15	8.08
pH - field	units		7.32	7.31	7.46	7.23	7.03	7.35	7.44	7.37	7.49	7.31	7.06	7.93	8.03	8.14	8.03	7.83
Phenols	µg/L		<1	1	2	<1	<1	<1	1	1	2	<1	<1	<1	1	1	<1	<1
Phosphate	mg/L		<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02		0.13	0.06	0.09	0.1	0.13
Phosphorus - Dissolved	mg/L												<0.02					
Phosphorus	mg/L		<0.01	<0.01	0.02	<0.02	<0.02	0.03	0.01	<0.01	0.02	<0.02	<0.02	0.18	0.13	0.08	0.15	0.13
Potassium	mg/L		2.4	2.3	2.4	2.2	2.4	1.8	1.6	1.5	1.5	1.2	1.4	1.8	1.8	1.6	1.8	2
Sodium	mg/L	200 *	38.1	37.6	39.6	35.9	37.4	16.1	17.6	17.3	17.3	18.2	19.4	25.5	42.8	49.4	30.4	36.9
Sulphate	mg/L	500 *	58.2	54.8	62.7	55.2	58.9	32.8	37.2	44.9	46.9	53.9	67	35.2	43.4	66.3	45.3	43.1
Temperature - field	°C		9.1	9.2	9.2	9.1	8.6	5.6	6	8.1	6.7	6.3	5.2	8.9	7.7	9.8	9	7.2
Total Dissolved Solids	mg/L	500 *	570	570	510	510	580	360	410	430	380	440	500	280	300	310	230	280
Total Kjeldahl Nitrogen	mg/L		<0.1	<0.1	<0.1	0.2	<0.3	0.1	<0.1	2.9	3	2.8	2.2	<0.1	<0.2	<0.2	<0.1	<0.1
Zinc	mg/L	5 *																

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	74-II	74-III												75-I		
			Mar-23	Mar-18	Oct-18	Apr-19	Oct-19	May-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Oct-19	May-20
Alkalinity	mg/L	30-500 *	173	298		280		269		269		329		249		463	436	428
Aluminum	mg/L	0.1 *														<0.025		<0.025
Ammonia (as N)	mg/L		0.2	0.1		0.1		0.1		0.1		0.2		0.2		0.6	1.1	0.8
Anion sum	meq/L		4.83	5.97		5.62		5.4		5.37		6.5		4.98		11.7	11.2	11.1
Arsenic	mg/L	0.010 **	0.001	<0.005		<0.0005		<0.0005		<0.0005		<0.0005		0.0007		0.0006	<0.005	0.0008
Barium	mg/L	1 **														0.303		0.315
Beryllium	mg/L															<0.0001		<0.0005
Bicarbonate	mg/L		171	297		279		268		268		328		248		458	432	420
Boron	mg/L	5 **														1.45		1.28
Cadmium	mg/L	0.005 **														<0.0001		<0.0001
Calcium	mg/L		34.8	95.8		85.6		102		87.6		124		84.6		22.7	22.5	24.7
Carbonate	mg/L		2	<1		1		1		<1		<1		<1		5	4	8
Cation sum	meq/L		4.96	5.74		5.08		6.14		5.29		7.31		5.07		12.2	11.5	12.2
Chemical Oxygen Demand	mg/L		<10	<10		<10		<10		<10		<10		<10		20	30	20
Chloride	mg/L	250 *	21	3.2		3.4		3.5		3.5		2.1		3.9		97.1	97.7	95.2
Chromium	mg/L	0.05 **														<0.0005		<0.0005
Cobalt	mg/L															<0.0001		<0.0005
Conductivity	µS/cm		443	550		537		550		513		619		454		1170	1160	1180
Conductivity - field	µS/cm		478	530	591	532	649	565	555	513	614	616	674	474	588	1090	1160	1170
Copper	mg/L	1 *														<0.0005		0.0021
Dissolved Organic Carbon	mg/L	5 *	1.9	2.3		3.8		1.3		1.9		1.7		2.9		2.9	4.2	4.7
Dissolved Oxygen - field	mg/L		8.23	2.93	3.81	7.99	5.64	3.93	9.7	1.73	5.75	4.19	4.66	4.85	2.61	1.42	1.85	6.48
Hardness	mg/L	80-100 *	155	277		243		296		254		354		244		111	110	121
Ion Percentage	%		1.37	1.9		5.03		6.41		0.8		5.85		0.82		1.84	1.34	4.77
Iron	mg/L	0.3 *	0.019	<0.05		0.216		0.073		0.082		0.034		0.428		0.044	0.09	0.022
Lead	mg/L	0.01 **														<0.0005		<0.0005
Magnesium	mg/L		16.6	9.11		7.19		10.1		8.51		10.7		7.89		13.2	13.1	14.4
Manganese	mg/L	0.05 *	0.0082	0.039		0.078		0.0319		0.0242		0.0745		0.0766		0.0026	0.006	<0.0005
Molybdenum	mg/L															0.0005		<0.0005
Nickel	mg/L															<0.002		<0.002
Nitrate	mg/L	10.0 **	0.09	<0.5		<0.5		<0.5		<0.5		<0.5		<0.05		<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.5		<0.5		<0.5		<0.5		<0.5		<0.05		<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		133.7	28.8	-21.2	206.9	-114.9	-17.1	61	-24.4	-51.4	122.9	-160.4	-11.1	-148	-109.7	-125.2	82.9
pH	units		8.11	7.53		7.62		7.74		7.57		7.48		7.56		8.02	7.95	8.3
pH - field	units		7.76	7.23	7.36	7.54	7.54	7.35	7.41	7.32	7.21	7.11	7.07	7.17	6.79	7.79	7.95	8.06
Phenols	µg/L		<1	<1		<1		<1		2		<1		<1		<1	2	<1
Phosphate	mg/L		0.1	<0.02		<0.02		<0.02		<0.02		<0.02		<0.02		0.02	<0.02	0.03
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.15	0.02		0.02		0.01		0.02		<0.02		<0.02		0.07	0.05	0.03
Potassium	mg/L		1.7	<0.5		1.1		<0.5		0.5		<0.5		<0.5		8.3	7.6	7.9
Sodium	mg/L	200 *	41	4.3		3.9		4.5		4.1		4.6		3.8		223	207	219
Sulphate	mg/L	500 *	42.5	5.3		5.3		4.9		3.4		3.6		2.8		2.6	<2	6.9
Temperature - field	°C		8.5	5.8	12.3	5.4	11.5	7.5	12	5.9	13.7	4	12	4.6	12.6	9.7	10.3	10.3
Total Dissolved Solids	mg/L	500 *	240	310		320		330		280		330		260		650	640	700
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.1		<0.2		<0.2		<0.1		<0.1		<0.3		0.6	<1.5	0.8
Zinc	mg/L	5 *														0.0036		0.0045

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	75-I						75-II									
			Sep-20	Apr-21	Oct-21	Mar-22	Apr-23	Sep-23	Apr-18	Oct-18	Apr-19	Oct-19	May-20	Sep-20	Apr-21	Oct-21	Mar-22	Sep-22
Alkalinity	mg/L	30-500 *	447	490	496	482	487	498	263	282	338	274	266	261	287	315	297	286
Aluminum	mg/L	0.1 *		<0.025		<0.025	<0.025		<0.025		<0.025		1.05		<0.025		<0.025	
Ammonia (as N)	mg/L		0.4	0.9	0.8	0.8	0.5	0.7	0.1	0.2	0.1	0.6	<0.1	0.9	0.6	0.2	0.2	0.6
Anion sum	meq/L		11.7	10.8	13.2	12.6	13.3	13	5.71	8	7.9	7.67	6.54	7.22	6.39	8.1	5.85	8.3
Arsenic	mg/L	0.010 **	0.0008	0.0006	0.0007	0.0006	0.0009	0.001	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.358		0.334	0.22		0.025		0.044		0.058		0.046		0.038	
Beryllium	mg/L			<0.0005		<0.0005	<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		442	487	492	479	482	495	262	281	337	273	265	260	286	314	296	285
Boron	mg/L	5 **		1.49		1.72	1.56		0.0045		0.003		0.0119		0.0113		0.0067	
Cadmium	mg/L	0.005 **		<0.0001		<0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		26.5	28.6	27	30.6	30.9	28.1	93.1	118	121	112	149	111	121	119	125	116
Carbonate	mg/L		5	3	4	3	5	3	<1	<1	1	<1	<1	<1	<1	1	<1	1
Cation sum	meq/L		12.5	13.6	11.6	14.1	14.7	12.1	5.64	8.27	7.39	7.97	9.02	7.86	7.33	7.56	7.59	8.34
Chemical Oxygen Demand	mg/L		50	20	30	10	30	20	<10	30	30	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	98.6	38.2	106	95.4	99.6	98.8	16.2	74.8	39.1	68.3	40.7	61.2	2.3	59.4	3.1	83.5
Chromium	mg/L	0.05 **		<0.0005		<0.0005	<0.0005		<0.0005		<0.0005		0.0011		<0.0005		<0.0005	
Cobalt	mg/L			<0.0005		<0.0005	<0.0005		<0.0001		<0.0005		0.001		<0.0005		<0.0005	
Conductivity	µS/cm		1210	1280	1310	1300	1180	1280	495	808	764	794	682	714	632	805	649	705
Conductivity - field	µS/cm		-	-	-	-	-	1040	525	808	774	803	672	735	680	791	642	845
Copper	mg/L	1 *		0.0009		0.0005	0.0027		<0.0005		0.0009		0.002		0.0006		0.0006	
Dissolved Organic Carbon	mg/L	5 *	8.2	3.2	6.3	1.6	4.6	2.3	1.2	2.5	3.6	4	1.7	2.1	2.3	3	2.2	5
Dissolved Oxygen - field	mg/L		-	-	-	-	-	8.12	2.33	1.57	2.47	2.36	2.88	1.49	2.69	3.3	4.82	5.63
Hardness	mg/L	80-100 *	130	141	131	150	176	129	253	340	333	326	415	322	331	332	342	339
Ion Percentage	%		3.48	11.5	6.64	5.51	5.27	3.34	0.63	1.67	3.33	1.97	15.9	4.24	6.81	3.43	13	0.28
Iron	mg/L	0.3 *	0.116	0.015	0.09	0.08	0.163	0.07	0.012	<0.05	0.039	<0.05	1.51	0.014	0.019	0.035	0.011	0.149
Lead	mg/L	0.01 **		<0.0005		<0.0005	<0.0005		<0.0005		<0.0005		0.0007		<0.0005		<0.0005	
Magnesium	mg/L		15.4	16.9	15.5	17.9	23.9	14.4	5.02	11.1	7.52	11.2	10.4	10.8	6.91	8.38	7.3	12.1
Manganese	mg/L	0.05 *	0.0062	0.0064	0.0068	0.0054	0.007	0.003	0.0045	0.001	0.0123	0.002	0.116	0.0044	0.0193	0.0178	0.0075	0.0075
Molybdenum	mg/L			<0.0005		<0.0005	0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L			<0.002		<0.002	0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	0.07	<0.05	0.12	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.1
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05
Oxidation Reduction Potential	mV		-	-	-	-	-	-43.3	3.2	114	38.4	32.7	98.5	79.1	92.3	142.9	133	24.5
pH	units		8.1	7.87	7.97	7.87	8.04	7.81	7.52	7.46	7.53	7.52	7.6	7.48	7.37	7.54	7.3	7.61
pH - field	units		-	-	-	-	-	7.38	7.27	7.16	7.26	7.35	7.31	7.3	7.45	7.07	7.2	7.23
Phenols	µg/L		2	<1	1	<1	<1	<1	<1	<1	<1	<1	1	2	<1	1	<1	<1
Phosphate	mg/L		0.02	0.06	<0.02	0.06		<0.02	<0.02	<0.02	<0.02	<0.02	0.09	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L						<0.03											
Phosphorus	mg/L		0.07	0.12	0.03	0.1	0.03	0.08	0.01	<0.02	<0.02	<0.02	<0.01	0.01	0.02	0.01	<0.02	<0.02
Potassium	mg/L		8.7	9.1	8.2	9.9	8.1	8.6	<0.5	1.2	<0.5	1.1	0.7	1.2	<0.5	0.6	<0.5	1.2
Sodium	mg/L	200 *	222	241	199	247	252	213	12.8	32.3	16.3	31.5	15.8	30.2	15.1	20.4	16.5	33.6
Sulphate	mg/L	500 *	11.8	12	30	28.3	49.7	26.6	7.9	20.7	12.6	21.2	11.9	21.4	37.2	16.1	0.8	19.4
Temperature - field	°C		-	-	-	-	-	9.4	4.4	12.7	2.4	11.5	5.8	11.7	5.6	13.3	3.3	11.3
Total Dissolved Solids	mg/L	500 *	710	720	760	700	826	730	270	460	430	410	400	450	350	470	390	460
Total Kjeldahl Nitrogen	mg/L		<1.0	0.4	1	1.1	2.1	0.9	0.1	0.2	0.1	<1	<0.2	<2.0	<0.1	0.3	<0.2	2.1
Zinc	mg/L	5 *		0.0059		0.0016	<0.005		<0.0005		0.0008		0.0032		0.0008		0.0034	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	75-II		76-I						77-I						81-I	
			Apr-23	Sep-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Apr-23	Apr-18	Apr-19	May-20	Apr-21	Apr-22	Apr-23	Apr-18	Oct-18
Alkalinity	mg/L	30-500 *	221	291	218	216	227	187	170	209	235	218	208	229	225	254	459	388
Aluminum	mg/L	0.1 *	<0.025														<0.025	
Ammonia (as N)	mg/L		0.1	0.1	19	20.2	20.2	25.8	27.1	20.2	0.2	0.2	0.1	0.2	0.3	0.1	0.5	0.3
Anion sum	meq/L		5.13	8.02	649	712	416	672	752	500	8.13	7.45	7.51	8.14	8.08	8.6	12.7	11.7
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.005	0.0096	0.0058	0.008	0.0063	<0.005	<0.005	0.0006	0.0006	<0.0005	<0.0005	0.0007	0.0007	<0.005
Barium	mg/L	1 **	0.028														2.18	
Beryllium	mg/L		<0.0005														<0.0001	
Bicarbonate	mg/L		220	290	218	216	227	187	170	209	234	217	207	228	224	253	458	387
Boron	mg/L	5 **	<0.005														0.332	
Cadmium	mg/L	0.005 **	<0.0001														<0.0001	
Calcium	mg/L		84.8	119	3490	2410	1420	2830	3530	2190	115	97.2	108	125	112	115	74.8	70.5
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	1	<1
Cation sum	meq/L		5.45	8.38	654	530	364	605	726	474	8.28	7.02	7.81	9.55	8.53	9.3	12.8	12.1
Chemical Oxygen Demand	mg/L		<10	20	1370	220	400	460	140	430	<10	<10	10	10	<10	<10	40	60
Chloride	mg/L	250 *	24.5	71.2	22900	25100	14600	23700	26500	17600	96.2	88.2	95.9	99.5	98.6	94.4	134	140
Chromium	mg/L	0.05 **	<0.0005														<0.0005	
Cobalt	mg/L		<0.0005														<0.0001	
Conductivity	µS/cm		446	770	82000	65600	46400	71900	84600	42000	792	745	783	834	837	758	1220	1180
Conductivity - field	µS/cm		476	658	111000	91700	35500	85000	89100	77800	794	753	785	801	782	801	1190	1220
Copper	mg/L	1 *	0.0005														<0.0005	
Dissolved Organic Carbon	mg/L	5 *	3	3.8	1.6	2.4	2.8	1.2	1.6	1.5	1.3	1.3	1.4	1.6	2.1	1.8	6.1	8.9
Dissolved Oxygen - field	mg/L		3.27	3.62	1.08	0.5	0.79	0.64	1.49	0.69	2.29	2.44	4.94	4.34	1.99	1	1.13	0.85
Hardness	mg/L	80-100 *	240	339	15800	11500	7020	13400	16700	10600	378	323	362	412	371	424	550	526
Ion Percentage	%		3.08	2.2	0.37	14.6	6.58	5.28	1.79	2.7	0.91	2.96	2	8	2.71	3.95	0.49	1.51
Iron	mg/L	0.3 *	0.267	0.06	4.52	4.14	1.36	6.16	8.4	2.77	0.88	0.668	0.413	1.23	1.05	0.885	0.409	0.32
Lead	mg/L	0.01 **	<0.0005														<0.0005	
Magnesium	mg/L		6.78	10.2	1710	1340	843	1530	1920	1240	22	19.4	22.4	24.3	22.3	33.2	88.2	85.1
Manganese	mg/L	0.05 *	0.0163	0.004	0.138	0.144	0.124	0.177	0.188	0.166	0.022	0.0258	0.0209	0.0209	0.0211	0.0244	0.0165	0.016
Molybdenum	mg/L		<0.0005														0.0007	
Nickel	mg/L		<0.002														<0.002	
Nitrate	mg/L	10.0 **	<0.05	0.12	<0.5	<5.0	<0.5	<5.0	<5.0	<5.0	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.5	<5.0	<0.5	<5.0	<5.0	<5.0	<0.5	<0.5	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		64.3	50.7	-17.1	-59.1	-71.4	-67.9	-57.1	27.7	-68.6	-29.4	-23.6	-23.2	-52.1	-33.1	-119.1	-165.4
pH	units		7.53	7.46	7.1	7.04	7.21	6.82	6.69	7.06	7.58	7.59	7.79	7.62	7.64	7.43	7.48	7.41
pH - field	units		7.18	6.92	6.25	6.66	7.15	6.5	6.55	6.46	7.28	7.46	7.43	7.37	7.29	7.28	7.25	7.43
Phenols	µg/L		<1	<1	8	10	9	28	28	9	<1	2	<1	2	<1	<1	<1	<1
Phosphate	mg/L			<0.02	0.02	0.06	<0.02	0.04	0.07		<0.02	<0.02	<0.01	<0.02	<0.02		<0.02	<0.02
Phosphorus - Dissolved	mg/L		<0.03							<3.0						<0.03		
Phosphorus	mg/L		0.01	<0.02	0.86	0.11	0.34	0.07	0.06	0.08	0.03	<0.01	<0.01	0.02	<0.02	0.02	0.02	<0.02
Potassium	mg/L		<0.5	1.2	160	139	131	161	160	140	1.7	1.6	1.7	1.9	1.6	1.6	7.5	6.2
Sodium	mg/L	200 *	14.7	35.5	7630	6740	5020	7590	8810	5880	14.7	11.2	11.4	27.9	23.1	17	34.4	29.1
Sulphate	mg/L	500 *	7.7	18.1	3.4	22.2	<2	57.2	109	<20	42	35.8	37.5	43.4	45.4	49.2	1.7	12.2
Temperature - field	°C		4.2	12.2	4.9	9.4	9.2	8.8	9.1	11.3	5.3	5	7	5.8	6.2	6.5	9.6	11.4
Total Dissolved Solids	mg/L	500 *	260	480	41100	33900	24500	35800	43300	31700	480	450	590	340	469	540	710	650
Total Kjeldahl Nitrogen	mg/L		<0.3	<0.3	21	20.6	25.33	25.6	27.1	20.3	<0.1	<0.2	<0.1	<2.0	<0.2	<0.3	0.5	0.1
Zinc	mg/L	5 *	<0.005														0.0011	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	81-I										81-II					
			Apr-19	Sep-19	Apr-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Oct-18	Apr-19	Sep-19	Apr-20	Sep-20
Alkalinity	mg/L	30-500 *	440	342	448	415	491	511	510	457	530	619	829	809	805	831	790	784
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.5	0.1	0.3	0.4	0.4	0.8	0.5	0.6	0.6	0.3	0.2	0.3	0.2	0.3	0.3	0.3
Anion sum	meq/L		12.5	10.8	12.8	11.9	13.2	13.2	13.3	12.6	13.7	15.7	17.6	17.2	17.3	17.5	16.8	16.6
Arsenic	mg/L	0.010 **	0.0005	<0.005	0.0008	<0.0005	0.0008	0.0006	0.0008	0.0005	0.0008	0.0006	0.0009	<0.005	0.0024	<0.02	0.0016	0.0031
Barium	mg/L	1 **	2.31		2.06		1.87		1.9		1.91		0.146		0.157		0.177	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005	
Bicarbonate	mg/L		439	341	446	414	489	509	509	456	529	617	828	809	804	831	789	784
Boron	mg/L	5 **	0.359		0.238		0.286		0.288		0.233		0.0487		0.0494		0.0452	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		72.9	69.2	78.1	78	73.2	75.6	67.7	68.4	72.4	72.6	211	202	199	206	221	222
Carbonate	mg/L		1	<1	2	1	2	2	1	1	1	2	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		13	11.4	13.9	14.4	14.1	13.7	13.2	12.7	14	14.5	18.5	18	18.1	17.8	19.4	20.2
Chemical Oxygen Demand	mg/L		30	90	50	20	20	60	10	30	10	20	20	50	30	20	30	<10
Chloride	mg/L	250 *	127	138	134	126	118	107	108	121	110	120	31.7	32	33.4	28.2	31.3	28.5
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0006		0.0008		0.0008	
Conductivity	µS/cm		1220	1110	1240	1200	1270	1300	1300	1100	1220	1210	1530	1550	1590	1550	1570	1550
Conductivity - field	µS/cm		1220	1180	1230	1220	1310	1280	1270	1310	1310	1190	1500	1650	1510	1590	1530	1570
Copper	mg/L	1 *	<0.0005		0.0008		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0007	
Dissolved Organic Carbon	mg/L	5 *	6.1	13.8	8.2	5.6	6.2	4.4	4.7	5.2	3.2	6.3	7.2	8	6.8	6.8	6.7	6.2
Dissolved Oxygen - field	mg/L		1.41	1.68	1.49	0.35	9.79	1.2	2.17	1.57	1.93	1.74	1.73	1.38	1.89	1.19	1.57	0.85
Hardness	mg/L	80-100 *	560	492	596	619	599	590	560	546	597	626	791	792	784	774	834	864
Ion Percentage	%		2.27	2.64	4.24	9.67	3.17	1.7	0.22	0.59	1.29	4.01	2.58	2.24	2.49	0.97	7.14	9.62
Iron	mg/L	0.3 *	0.145	0.2	0.44	0.195	0.242	0.165	0.182	0.078	0.175	0.08	0.816	12.4	4.78	13.3	4.34	7.34
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		91.7	77.5	97.4	103	101	97.5	95	91.2	101	108	64.2	69.8	69.8	63.1	68.4	75.1
Manganese	mg/L	0.05 *	0.0163	0.011	0.0166	0.0164	0.0168	0.0176	0.0151	0.0121	0.0159	0.0129	0.0608	0.068	0.0655	0.067	0.0644	0.0611
Molybdenum	mg/L		0.0005		0.0006		0.0005		0.0005		0.0005		0.0013		0.0011		0.0011	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		0.003		0.003		0.003	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-83.1	-163	29.2	-135.4	-149.8	-131.6	-51	-155.6	-143.8	-166.4	-61.1	-82.3	-39.9	-113.5	43	-62.5
pH	units		7.51	7.23	7.63	7.42	7.61	7.61	7.43	7.51	7.37	7.47	6.99	6.76	6.88	6.73	7.03	6.71
pH - field	units		7.3	6.84	7.3	7.38	7.3	7.13	7.15	7.3	7.03	6.93	6.59	6.72	6.56	6.52	6.64	6.67
Phenols	µg/L		1	<1	<1	1	<1	2	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.06	<0.02	0.02	<0.01	0.03	0.02	0.03	<0.02	0.02	<0.02	0.02	<0.02	0.03	0.04	<0.01	0.02
Potassium	mg/L		7.2	5.6	6.7	6.8	7.2	7	6.8	5.9	6.8	6.2	5.5	4.7	5	4.9	5.2	5.3
Sodium	mg/L	200 *	35.3	29.8	39.1	39.7	40.7	35.1	39.7	35.2	41.4	37.9	56.6	45.2	51.3	49.3	57.9	60.8
Sulphate	mg/L	500 *	18	13.3	16.4	14.1	17.9	15	18.7	16.6	16.5	14.9	31.5	32.8	35.7	30.5	32.1	31.3
Temperature - field	°C		8.3	12.6	9.2	13.2	7.8	13.5	10.6	12.3	8.9	12.6	10.5	11.9	8.2	12.3	8.7	14
Total Dissolved Solids	mg/L	500 *	690	680	690	680	710	770	720	710	880	690	960	870	980	910	970	960
Total Kjeldahl Nitrogen	mg/L		4.3	<0.1	0.4	<1.0	<0.5	0.6	0.5	<2.0	0.6	<0.3	0.4	0.2	0.4	0.2	0.4	<1.0
Zinc	mg/L	5 *	0.0016		0.0026		0.0014		0.001		<0.005		0.0017		0.0054		0.0016	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	81-II						81-III								84-I	
			Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Apr-19	Apr-20	Mar-21	Oct-21	Mar-22	Mar-23	Sep-23	Mar-18	Sep-18
Alkalinity	mg/L	30-500 *	812	861	806	790	786	816	430	766	446	666	568	563	765	735	143	130
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025	<0.025	<0.025	<0.025		<0.025	<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.5	0.2	0.7	0.2	0.2	1.8	5.4	3	2.8	0.6	1.6	0.6	3.4	0.2	0.3
Anion sum	meq/L		17.2	18.2	17	16.6	16.4	17.1	8.74	15.1	8.92	14	12.1	11.2	15.1	14.4	6.1	5.96
Arsenic	mg/L	0.010 **	0.0007	0.0074	0.0017	0.0057	0.0007	0.0018	0.0006	0.0014	0.0009	0.0008	0.0093	0.0018	0.002	0.001	0.0007	<0.005
Barium	mg/L	1 **	0.176		0.159		0.167		0.141	0.235	0.131	0.183		0.136	0.111		0.096	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0001	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0001	
Bicarbonate	mg/L		811	860	806	790	785	815	430	766	446	666	568	563	765	735	142	128
Boron	mg/L	5 **	0.0483		0.0557		0.043		0.0162	0.0265	0.0245	0.0167		0.0122	0.005		0.392	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	
Calcium	mg/L		217	216	192	194	188	213	204	260	182	248	183	200	184	250	23.1	22.5
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1
Cation sum	meq/L		19.3	19.2	17.2	16.9	16.5	19.3	11.8	15.2	10.7	14.3	10.4	11.3	10.6	14.4	6.53	6.34
Chemical Oxygen Demand	mg/L		<10	20	<10	20	20	20	30	140	30	20	240	20	50	40	20	40
Chloride	mg/L	250 *	28.6	28.4	26.8	22.9	20.6	23.4	7.5	10.1	6.6	12.5	5.4	8.3	5.4	5	118	122
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005	0.001	0.0006	0.0006		<0.0005	<0.0005		<0.0005	
Cobalt	mg/L		0.0006		0.0006		0.0005		0.0001	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0001	
Conductivity	µS/cm		1540	1600	1560	1290	1360	1510	773	1350	863	1220	1110	1040	906	1210	679	681
Conductivity - field	µS/cm		1600	1640	1570	1580	1520	1420	682	1460	878	1260	1140	1050	943	1180	673	692
Copper	mg/L	1 *	<0.0005		<0.0005		<0.0005		<0.0005	0.001	<0.0005	0.0007		<0.0005	0.0006		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	5.9	5.4	5.4	4.8	5.6	6.4	6.7	29.9	6.6	7.7	58.8	4.8	12.9	8.3	4.8	4.6
Dissolved Oxygen - field	mg/L		0.87	1.62	1.05	1.56	4.51	2.73	1.92	3.53	1.69	2.06	2.62	1.41	2.24	2.83	1.4	0.94
Hardness	mg/L	80-100 *	827	832	732	722	704	831	567	723	505	685	502	545	512	691	105	104
Ion Percentage	%		5.8	2.48	0.48	0.98	0.21	6.09	15	0.48	8.86	1.04	7.74	0.43	17.7	0.17	3.34	3.08
Iron	mg/L	0.3 *	0.721	13.8	1.88	17.1	0.383	4.05	24	39.4	19.8	22.9	35	14.6	8.13	34.2	0.118	0.27
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		<0.0005	
Magnesium	mg/L		69.3	71	61.4	57.6	57	72.7	13.9	17.9	12.2	15.9	10.9	11	12.8	16.3	11.6	11.5
Manganese	mg/L	0.05 *	0.0664	0.0673	0.0616	0.0613	0.067	0.065	1.52	1.76	1.21	0.737	0.803	0.831	0.475	1.05	0.0053	0.006
Molybdenum	mg/L		0.0012		0.001		0.0013		<0.0005	<0.0005	<0.0005	<0.0005		<0.0005	<0.0005		0.0066	
Nickel	mg/L		0.004		0.003		0.003		<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		-31.5	-64.1	-9	-100.4	26.6	-56.9	-71.6	-73	-19.6	-104.9	-53.5	-107	-119.5	-39.1	-144.2	-151.9
pH	units		7.04	6.82	6.8	6.79	6.88	6.84	6.82	6.63	6.97	6.64	6.54	6.62	6.7	6.58	7.8	8.08
pH - field	units		6.6	6.48	6.47	6.6	6.67	6.27	6.61	6.32	6.63	6.27	6.26	6.31	6.38	6.12	7.96	7.87
Phenols	µg/L		<1	2	<1	<1	<1	<1	<1	7	<1	<1	22	<1	7	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	0.09	0.06	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.01	0.03	<0.02	<0.02	<0.02	<0.02	0.05	0.25	0.09	0.11	0.13	0.05	0.06	0.03	0.02	0.1
Potassium	mg/L		5.3	4.8	4.8	4.8	4.8	5.4	1.9	2.3	1.9	1.7	1.1	1.2	0.9	2.2	2.2	2
Sodium	mg/L	200 *	58.3	52.4	54.1	51	49.9	55.5	6.7	7.2	6.4	7.8	5.8	5.6	4.9	6.2	99.7	96.3
Sulphate	mg/L	500 *	32.7	37	33.4	30.5	28.9	29.6	10.2	<2	5.3	37.4	47.2	4	6.7	0.9	0.7	0.6
Temperature - field	°C		8.3	13	9.9	12.8	8.6	12.5	6.1	8.7	7.5	7.6	14.7	8.3	8.1	15.4	8.6	11.8
Total Dissolved Solids	mg/L	500 *	930	940	920	910	1040	920	460	870	490	750	790	620	590	750	340	390
Total Kjeldahl Nitrogen	mg/L		<0.1	0.4	0.4	4.6	<0.3	<0.3	1.7	5.2	3.4	2.1	3.1	2.1	1.2	4.3	0.2	<2.0
Zinc	mg/L	5 *	0.0017		0.0011		<0.005		0.0008	0.0025	0.0008	0.0018		<0.0005	<0.005		0.0006	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	84-I										84-II					
			Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20
Alkalinity	mg/L	30-500 *	128	134	128	124	130	129	127	130	130	136	227	202	200	200	197	196
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.2	0.2	0.2	0.3	0.4	0.3	0.4	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Anion sum	meq/L		5.69	6.1	5.98	5.89	6.54	6.22	6.09	6.12	5.90	6.47	5.91	5.35	5.18	5.11	5.04	4.99
Arsenic	mg/L	0.010 **	0.0006	<0.005	0.0005	0.0007	<0.0005	0.0007	<0.0005	0.0005	<0.0005	0.0005	0.0014	<0.005	0.0018	<0.005	0.0018	0.0023
Barium	mg/L	1 **	0.096		0.092		0.098		0.096		0.098		0.213		0.185		0.189	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005	
Bicarbonate	mg/L		127	133	127	123	129	128	126	128	129	135	226	200	199	198	195	195
Boron	mg/L	5 **	0.449		0.455		0.485		0.536		0.493		0.0353		0.0473		0.0522	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		22	22.8	21.8	23.1	18.8	23.0	22.6	23.6	22.8	23.0	59.5	51.7	57.8	63.4	49.4	52.2
Carbonate	mg/L		<1	1	<1	<1	<1	1	<1	1	1	1	1	2	1	2	2	1
Cation sum	meq/L		6.28	6.27	6.22	6.47	5.47	5.84	6.44	6.49	6.52	6.54	5.9	5.3	5.63	5.71	5.24	5.28
Chemical Oxygen Demand	mg/L		30	20	30	20	<10	<10	<10	10	20	20	40	<10	<10	<10	40	<10
Chloride	mg/L	250 *	114	124	124	124	143	132	129	128	120	136	8.6	8.1	6.7	7.4	6.9	6.7
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005	
Conductivity	µS/cm		677	683	689	691	694	707	716	713	663	717	1.1	524	515	497	486	490
Conductivity - field	µS/cm		667	686	699	699	686	699	684	706	742	653	516	513	483	472	487	503
Copper	mg/L	1 *	<0.0005		<0.0005		<0.0005		0.0009		<0.0005		<0.0005		0.0011		0.0008	
Dissolved Organic Carbon	mg/L	5 *	4.7	5.3	5.9	5.4	4.1	4.1	2.7	2.2	3.0	3.8	1.3	<1.0	2.6	1.5	2.3	1.3
Dissolved Oxygen - field	mg/L		2.65	1.4	1.47	0.55	9.67	1.93	1.80	1.63	2.52	1.75	1.88	2	2.94	2.19	5.19	1.47
Hardness	mg/L	80-100 *	105	105	103	107	88.9	106	104	108	108	104	265	233	252	260	231	232
Ion Percentage	%		4.98	1.38	1.95	4.66	8.89	3.13	2.81	2.94	5.02	0.56	0.1	0.54	4.16	5.59	1.88	2.85
Iron	mg/L	0.3 *	0.037	0.28	0.038	0.188	0.021	0.111	0.072	0.097	0.068	0.168	0.225	0.28	0.241	0.31	0.076	0.301
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		12.2	11.6	11.9	11.9	10.2	11.7	11.6	12.0	12.4	11.4	28.3	25.2	26.2	24.7	26.1	24.8
Manganese	mg/L	0.05 *	0.0049	0.005	0.0047	0.0057	0.0045	0.0043	0.0051	0.0060	0.0047	0.0209	0.0179	0.017	0.0195	0.017	0.0134	0.0185
Molybdenum	mg/L		0.0071		0.0065		0.0075		0.0083		0.0071		0.0009		0.0011		0.001	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-23.9	-112.2	-122.9	-143	-27.7	-146.6	-76.0	26.3	-14.1	-130.8	-104.6	-97.2	-13.3	-51.3	-29.9	-68.7
pH	units		7.86	7.96	7.81	7.88	7.81	7.98	7.84	8.09	8.04	7.91	7.78	8.03	7.88	7.97	7.93	7.88
pH - field	units		7.85	7.31	7.98	8.05	8.01	7.70	7.78	7.36	7.77	7.70	7.6	7.68	7.71	7.73	7.72	7.81
Phenols	µg/L		<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	0.03	0.04	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.06	<0.02	<0.02	0.01	0.03	0.01	<0.02	0.03	<0.02	0.04	0.02	<0.02	<0.02	<0.02	<0.02	0.02
Potassium	mg/L		2.2	2.1	2.1	2.3	1.8	2.0	2.3	2.2	2.2	3.2	1.2	1.2	1.4	1.4	1.2	1.3
Sodium	mg/L	200 *	94.2	94.1	93.6	97.7	83.2	83.7	98.1	97.2	98.3	99.8	12	13	11.7	10	12.6	12.8
Sulphate	mg/L	500 *	<2	0.5	0.6	<2	<2	0.4	<0.2	<0.2	<0.2	0.4	61.4	58.4	54	49.5	49.9	48.4
Temperature - field	°C		6.5	12	8.1	13.6	7.7	11.4	8.3	13.4	7.8	11.8	9.2	12	8.5	11.7	7.8	12.1
Total Dissolved Solids	mg/L	500 *	350	380	370	380	310	360	350	370	390	330	310	370	310	300	290	300
Total Kjeldahl Nitrogen	mg/L		0.2	0.2	0.2	<1.0	0.3	0.4	0.3	3.0	<0.3	0.4	<0.1	<2.0	<0.1	0.2	<0.1	<1.0
Zinc	mg/L	5 *	0.0013		0.0023		<0.0005		0.0018		0.0007		0.0006		0.002		0.0006	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	84-II					85-I										
			Mar-21	Oct-21	Mar-22	Sep-22	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23
Alkalinity	mg/L	30-500 *	215	211	208	311	262	234	227	67	237	234	217	234	233	225	227	230
Aluminum	mg/L	0.1 *	<0.025		0.050			<0.025		<0.025		<0.025		0.051		<0.025		<0.025
Ammonia (as N)	mg/L		0.2	0.2	0.3	0.2	0.3	0.1	0.1	<0.1	0.1	<0.1	0.4	0.1	0.2	0.2	0.2	0.1
Anion sum	meq/L		5.39	5.41	5.57	7.37	6.57	9.76	10.7	7.84	12.6	12.7	13.2	13.4	15.3	16.1	16.8	17.2
Arsenic	mg/L	0.010 **	0.0021	0.0022	0.0021	0.0012	0.0013	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.191		0.194			0.187		0.18		0.225		0.226		0.258		0.291
Beryllium	mg/L		<0.0005		<0.0005			<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		213	210	207	309	261	233	226	67	236	233	216	233	232	224	226	230
Boron	mg/L	5 **	0.0514		0.0508			0.0126		0.0137		0.0135		0.0132		0.0172		0.012
Cadmium	mg/L	0.005 **	<0.0001		<0.0001			<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		43.0	59.1	54.4	68.6	66.9	152	152	156	172	169	185	180	197	196	216	228
Carbonate	mg/L		2	1	1	2	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		4.45	5.45	5.40	6.49	6.32	11	11.1	11.4	13	12.7	14.7	13.5	15.8	15.7	18.4	19.5
Chemical Oxygen Demand	mg/L		20	<10	<10	<10	<10	<10	30	<10	<10	10	<10	20	<10	<10	<10	<10
Chloride	mg/L	250 *	6.4	6.6	16.1	10.5	9.7	126	167	169	223	226	256	253	317	349	373	385
Chromium	mg/L	0.05 **	<0.0005		<0.0005			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L		<0.0005		<0.0005			<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Conductivity	µS/cm		500	520	514	572	617	1010	1120	1070	1320	1310	1450	1440	1630	1680	1820	1770
Conductivity - field	µS/cm		518	513	491	594	553	1070	1120	1140	1250	1340	1420	1340	1560	1610	1980	1850
Copper	mg/L	1 *	0.0018		<0.0005			<0.0005		0.0013		0.0008		0.0007		0.0005		0.0007
Dissolved Organic Carbon	mg/L	5 *	1.7	2.0	<1.0	1.3	2.6	1.4	<1.0	3.1	3.2	2.5	1	3.0	1.4	<1.0	1.1	1.2
Dissolved Oxygen - field	mg/L		8.07	3.84	1.23	2.51	1.79	2.71	0.83	1.58	1.36	0.88	1.32	1.01	3.52	1.91	2.30	2.03
Hardness	mg/L	80-100 *	196	250	242	302	298	471	466	482	531	518	563	551	598	599	665	709
Ion Percentage	%		9.55	0.38	1.52	6.37	1.93	6.14	1.61	18.3	1.62	0.14	5.43	0.51	1.69	1.09	4.70	6.39
Iron	mg/L	0.3 *	0.253	0.300	0.240	0.011	1.1	0.002	<0.05	0.001	<0.05	0.009	0.005	0.059	0.013	<0.005	<0.005	<0.005
Lead	mg/L	0.01 **	<0.0005		<0.0005			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		21.5	24.9	25.8	31.9	31.7	22.3	20.9	22.5	24.6	23.3	24.5	24.6	25.7	26.6	30.6	34.0
Manganese	mg/L	0.05 *	0.0174	0.0170	0.0151	0.0105	0.0828	0.0131	0.007	0.0108	0.008	0.0033	0.0063	0.0149	0.0103	0.0115	0.0080	0.0123
Molybdenum	mg/L		0.0011		0.0011			<0.0005		0.0007		<0.0005		<0.0005		<0.0005		<0.0005
Nickel	mg/L		<0.002		<0.002			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	2.76	2.01	3.96	4	3.55	4.1	3.8	3.8	3.5	3.8	3.6	3.7	3.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.05	0.14	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
Oxidation Reduction Potential	mV		0.6	-83.9	-76.8	202.9	-52.6	70	202.5	184.8	105	203.1	56.2	50.2	55.3	42.7	87.1	302.3
pH	units		7.90	7.87	7.78	7.85	7.53	7.56	7.72	7.35	7.58	7.44	7.53	7.53	7.50	7.39	7.55	7.30
pH - field	units		7.82	7.45	7.51	7.41	7.19	7.23	7.23	7.29	7.31	7.27	7.54	7.28	7.27	7.16	7.39	7.16
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.02	0.01	<0.02	0.06	<0.02	0.03	0.07	0.03	<0.02	<0.02	<0.01	0.01	<0.03	<0.02	<0.02	<0.02
Potassium	mg/L		1.1	1.2	1.2	1.6	1.8	6.9	6.7	7	8	8.3	10.7	7.0	8.2	9.2	9.6	9.8
Sodium	mg/L	200 *	10.7	8.6	11.0	7.9	6.1	32.2	35.9	34.8	49.1	47.9	71.2	52.7	82.7	79.1	111.0	115.0
Sulphate	mg/L	500 *	50.4	54.7	52.3	41.3	51.5	67.5	64.8	73.6	68.3	74.8	71.8	71.4	75.7	77.4	77.7	77.3
Temperature - field	°C		8.3	12.7	9.4	11.7	11.0	8.6	10.6	8.5	10.3	10.9	10.8	9.2	11.3	9.6	10.8	9.6
Total Dissolved Solids	mg/L	500 *	240	320	280	410	350	590	880	540	1080	850	970	740	1280	1220	1520	1250
Total Kjeldahl Nitrogen	mg/L		<0.1	0.2	0.2	2.3	<0.3	<0.1	<2.0	<0.1	0.2	<0.5	<1.0	<0.5	<0.1	<0.1	2.2	<0.3
Zinc	mg/L	5 *	0.0011		<0.0005			0.0005		0.0011		0.0007		<0.0005		<0.0005		<0.005

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	85-I	85-II												86-I		
			Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Apr-19
Alkalinity	mg/L	30-500 *	229	234	235	256	229	298	301	257	245	245	217	279	222	260	238	243
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		<0.1	0.4	0.4	0.1	0.2	0.2	0.4	0.4	0.3	0.3	0.3	0.4	0.2	1.7	1.8	1.6
Anion sum	meq/L		19.7	32.5	13.2	19.4	13	21.3	21.8	15.6	17.8	17.8	20.1	19.3	22.2	18	18	16.5
Arsenic	mg/L	0.010 **	<0.0005	0.0006	<0.005	<0.0005	<0.005	0.0006	0.0008	0.0008	0.0007	0.0006	0.0005	0.0008	0.0009	<0.0005	<0.005	<0.0005
Barium	mg/L	1 **		0.154		0.084		0.088		0.071		0.078		0.089		0.02		0.019
Beryllium	mg/L			<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005
Bicarbonate	mg/L		229	234	234	255	228	297	300	256	244	245	216	279	222	259	237	242
Boron	mg/L	5 **		0.244		0.316		0.358		0.240		0.205		0.228		0.38		0.357
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		232	319	172	199	173	197	230	185	218	202	239	213	289	82	73.3	68.7
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	1
Cation sum	meq/L		20.4	32.6	14.2	19.8	14.2	20.4	21.1	15.5	18.6	17.2	20.2	19.0	24.4	17.9	17.7	15.4
Chemical Oxygen Demand	mg/L		20	30	20	20	<10	30	<10	20	<10	<10	10	20	20	40	40	30
Chloride	mg/L	250 *	471	783	236	296	233	386	304	259	376	384	508	388	582	424	445	378
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			0.0007		0.0008		0.0008		0.0006		0.0007		0.0007		<0.0001		<0.0005
Conductivity	µS/cm		1980	3260	1340	1980	1390	2260	2160	1640	1850	1900	2390	1930	2530	2070	2010	1800
Conductivity - field	µS/cm		1880	3240	1390	1970	1320	2040	2120	1650	1990	1830	2110	2020	2120	3550	3690	-
Copper	mg/L	1 *		<0.0005		0.0034		0.0015		0.0009		0.0006		<0.0005		<0.0005		<0.0005
Dissolved Organic Carbon	mg/L	5 *	2.4	2.9	2.2	7.2	6.2	5.6	7.5	6.6	2.3	2.4	1.4	3.6	2.8	<1.0	<1.0	<1.0
Dissolved Oxygen - field	mg/L		2.96	1.61	0.82	1.26	2.11	1.17	1.67	1.18	1.68	4.18	9.16	1.71	6.75	1.02	0.79	-
Hardness	mg/L	80-100 *	710	895	523	564	543	567	661	560	685	636	783	663	928	417	377	358
Ion Percentage	%		1.81	0.29	3.51	1.1	4.55	2.21	1.83	0.27	2.04	1.53	0.38	0.85	4.66	0.14	0.98	3.47
Iron	mg/L	0.3 *	<0.005	1.27	0.99	0.389	0.72	1.64	1.38	2.11	1.86	0.51	0.67	1.60	1.45	0.026	<0.05	0.016
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		31.8	24	22.7	16.3	26.9	18.2	21	23.7	34.1	32.0	45.2	31.8	50.1	51.6	47.2	45.3
Manganese	mg/L	0.05 *	0.0076	0.455	0.23	0.269	0.205	0.335	0.378	0.338	0.291	0.243	0.273	0.318	0.225	0.0022	0.003	0.0021
Molybdenum	mg/L			0.0006		0.0007		0.0007		0.0009		0.0009		0.001		<0.0005		<0.0005
Nickel	mg/L			<0.002		0.002		0.003		<0.002		<0.002		0.003		<0.002		<0.002
Nitrate	mg/L	10.0 **	3.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.73	<0.05	1.04	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.11	<0.05	0.1	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		208.1	-15.7	-109.5	-27.2	-63.1	-21.5	-104.2	-52.8	-79.2	-17.6	-58.9	28.2	-19.3	-132.1	-134.2	-
pH	units		7.34	7.3	7.61	7.45	7.47	7.26	7.25	7.40	7.39	7.31	7.42	7.17	7.34	7.6	7.73	7.65
pH - field	units		6.99	6.95	7.14	7.16	7.26	7.08	7.18	7.00	7.13	7.06	7.18	6.98	6.99	7.34	7.57	-
Phenols	µg/L		<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	0.02	<0.02	<0.02	0.03	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	0.04	0.14	0.09	<0.02	<0.02	0.02	0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.65	<0.02	<0.02
Potassium	mg/L		10.0	15.8	7.4	11.5	7.7	10.3	11.8	8.0	7.0	6.8	6.4	8.4	6.6	9.9	10.7	9.7
Sodium	mg/L	200 *	135.0	328	79.6	189	71.6	201	172	92.4	106	99	100	125	128	210	223	179
Sulphate	mg/L	500 *	82.3	282	96.8	293	95.3	224	358	158	119	107	73	143	69	47.1	43.6	53.4
Temperature - field	°C		10.6	7.5	12.7	6.9	12.2	8.3	13.2	7.1	13.4	7.8	12.4	7.5	12.4	7	11	-
Total Dissolved Solids	mg/L	500 *	1480	1890	1020	1230	1100	1260	1450	830	1430	1370	1890	1350	1180	1010	1080	960
Total Kjeldahl Nitrogen	mg/L		<0.3	0.4	<2.0	0.5	0.3	0.4	<1.0	0.7	0.6	0.6	2.3	0.5	<0.3	3.4	1.6	4.5
Zinc	mg/L	5 *		0.0026		0.0053		0.0012		0.0019		0.0016		<0.005		0.0006		<0.0005

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	86-I									86-II						
			Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Apr-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Apr-19	Sep-19	Mar-20	Sep-20	Mar-21
Alkalinity	mg/L	30-500 *	252	242	239	259	252	271	250	245	253	199	182	185	191	187	182	193
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		0.132		<0.025		<0.025
Ammonia (as N)	mg/L		1.7	1.6	1.9	2	2.2	1.8	1.8	1.4	1.5	0.2	0.3	0.2	0.2	0.1	0.1	0.2
Anion sum	meq/L		20.8	16.8	18.1	16.2	16.7	23.8	14.7	11.3	13.1	4.46	4.09	4.14	4.23	4.22	4.06	4.29
Arsenic	mg/L	0.010 **	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	0.008	0.0022	0.006	0.0023	0.005	0.0025
Barium	mg/L	1 **		0.018		0.018		0.024		0.012		0.275		0.221		0.232		0.252
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		251	241	238	258	250	270	249	244	252	197	180	183	189	185	180	192
Boron	mg/L	5 **		0.415		0.446		0.526		0.249		0.0591		0.0647		0.0616		0.0654
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		79.4	71.6	80.7	72.2	81.6	89.5	72.9	59.7	72.7	25.5	24.8	23.7	24.8	24	25.1	25.4
Carbonate	mg/L		<1	1	1	<1	2	1	1	1	<1	2	1	2	2	2	2	1
Cation sum	meq/L		20.7	16.3	18.4	17.2	15.8	25.5	15.2	10.6	13.8	4.49	4.38	4.19	4.48	4.44	4.54	4.65
Chemical Oxygen Demand	mg/L		30	20	10	20	<10	<10	<10	<10	10	<10	30	<10	<10	30	<10	10
Chloride	mg/L	250 *	537	394	447	361	383	636	312	189	252	15.6	15.9	14.3	15.7	16.5	15.6	15.3
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		0.0002		<0.0005		<0.0005		<0.0005
Conductivity	µS/cm		2420	1800	2090	3630	1860	2640	1640	1320	1410	426	424	419	421	420	418	425
Conductivity - field	µS/cm		3650	3800	2350	3490	3280	3850	3040	2570	1470	420	421	417	434	422	411	466
Copper	mg/L	1 *		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0006		0.0005
Dissolved Organic Carbon	mg/L	5 *	1.2	1.8	1	1.1	1.2	1.0	<1.0	1.3	<1.0	1.7	2.4	1.4	1.5	3.3	2.2	1.7
Dissolved Oxygen - field	mg/L		1.61	1.96	0.86	0.88	1.74	0.32	5.81	1.76	1.37	2.3	0.86	2.38	2.15	2.41	1.1	2.12
Hardness	mg/L	80-100 *	417	377	421	376	415	473	378	308	372	186	182	170	183	181	184	188
Ion Percentage	%		0.29	1.49	1.05	3.21	2.79	3.29	1.60	3.42	2.53	0.36	3.49	0.54	2.95	2.61	5.67	3.97
Iron	mg/L	0.3 *	<0.05	0.016	0.048	0.024	0.026	0.037	0.023	0.006	0.026	0.192	0.45	0.057	0.11	0.008	0.358	0.013
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		53	48.1	53.2	47.6	51.4	60.5	47.6	38.7	46.2	29.8	29.1	27	29.4	29.3	29.5	30.3
Manganese	mg/L	0.05 *	0.002	0.0019	0.0027	0.002	0.0022	0.0022	0.0020	0.0020	0.0018	0.014	0.013	0.0115	0.015	0.0008	0.0154	0.0007
Molybdenum	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		0.0016		0.0013		0.0012		0.0014
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-178.5	-123.6	-107.1	-208.9	-110.4	-55.1	-179.3	-163.4	-141.4	178.1	-187.6	115.8	-169.7	60.7	-129.2	29.2
pH	units		7.59	7.75	7.66	7.6	7.81	7.60	7.71	7.69	7.62	7.99	7.94	7.94	7.95	8.01	7.95	7.88
pH - field	units		7.59	7.36	7.51	7.36	7.28	7.23	7.51	7.25	7.22	7.67	8.01	7.8	7.94	7.82	7.77	8.03
Phenols	µg/L		<1	<1	1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	2
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L									<0.03								
Phosphorus	mg/L		<0.02	<0.02	<0.01	0.02	<0.01	<0.02	<0.02	<0.01	<0.02	0.03	0.02	<0.02	0.03	<0.02	0.04	0.02
Potassium	mg/L		11.3	9.5	10.7	10.1	9.5	14.9	9.1	7.1	8.2	2.1	1.8	1.8	1.9	1.9	2.1	2.2
Sodium	mg/L	200 *	274	193	220	213	162	355	166	94	138	15.2	14.9	15.9	16.8	17.1	17.7	18
Sulphate	mg/L	500 *	39.8	50.5	40.5	47.4	50.5	32.8	52.2	60.3	54.2	8	5.6	7.7	4.3	6.4	4.6	6.2
Temperature - field	°C		12.5	8	11	10.1	11.2	8.2	11.5	8.9	13.9	9.4	10.8	7.3	12.4	6.9	10.7	9.4
Total Dissolved Solids	mg/L	500 *	1310	970	1060	960	990	1410	890	600	760	240	240	240	220	240	240	240
Total Kjeldahl Nitrogen	mg/L		0.8	1.2	2.9	1.4	1.7	3.7	3.5	2.2	3.1	0.2	<1.0	0.1	0.1	<0.1	<1.0	<0.1
Zinc	mg/L	5 *		0.0008		<0.0005		0.0008		<0.005		0.0007		0.0028		0.0052		0.0025

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	86-II					86-III										
			Sep-21	Apr-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Apr-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Apr-22	Sep-22	Mar-23
Alkalinity	mg/L	30-500 *	193	187	188	195	194	297	277	272	271	290	320	298	312	266	333	325
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		0.3	0.1	0.3	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.2
Anion sum	meq/L		4.27	4.15	4.15	4.31	4.27	9.09	9.43	9.66	8.96	10.2	15.5	12.1	12.5	8.5	16.3	19.6
Arsenic	mg/L	0.010 **	0.0038	0.0020	0.0032	0.0022	0.0024	0.0006	0.007	0.0008	<0.005	0.0005	0.0013	<0.0005	0.0007	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.242		0.234		0.303		0.388		0.329		0.436		0.352		0.662
Beryllium	mg/L			<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		191	185	186	193	193	296	276	271	270	289	319	297	311	265	332	324
Boron	mg/L	5 **		0.0506		0.063		0.12		0.147		0.199		0.163		0.24		0.157
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		23.5	27.2	24.6	20.8	25.6	61.2	67.6	68.7	63.2	64.6	116	83.6	83.5	74.6	124.0	142.0
Carbonate	mg/L		2	2	2	2	1	1	1	1	<1	1	<1	<1	1	1	<1	<1
Cation sum	meq/L		4.26	4.94	4.43	3.96	4.69	8.78	9.83	9.92	9.13	9.3	15.8	12.2	11.7	10.4	17.1	20.9
Chemical Oxygen Demand	mg/L		<10	<10	<10	10	<10	20	10	<10	<10	30	<10	20	<10	<10	<10	<10
Chloride	mg/L	250 *	16.7	15.2	15.4	15.6	15.7	105	129	143	120	147	312	212	217	107	333	456
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Conductivity	µS/cm		421	419	416	412	428	905	993	998	947	1050	1610	1270	1280	895	1730	2070
Conductivity - field	µS/cm		446	402	445	454	449	827	999	1100	967	966	1600	1210	1330	843	1510	2110
Copper	mg/L	1 *		<0.0005		0.0005		<0.0005		<0.0005		<0.0005		0.0017		<0.0005		<0.0005
Dissolved Organic Carbon	mg/L	5 *	2.7	1.4	1.1	1.5	<1.0	<1.0	<1.0	<1.0	3.1	2.6	1.8	1.5	1.4	1.5	1.1	1.1
Dissolved Oxygen - field	mg/L		2.06	1.67	3.92	8.76	2.56	3.94	1.39	2.25	1.62	2.55	1.55	1.75	3.28	2.18	2.74	1.98
Hardness	mg/L	80-100 *	172	203	182	162	194	322	352	345	329	331	509	408	379	358	538	658
Ion Percentage	%		0.04	8.67	3.28	4.25	4.61	1.73	2.07	1.37	0.93	4.37	1.03	0.13	3.54	10.00	2.50	3.10
Iron	mg/L	0.3 *	0.053	0.050	0.313	0.071	0.078	0.018	0.11	0.015	<0.05	0.022	0.359	0.012	0.030	0.033	0.051	0.021
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		27.6	32.7	29.3	26.8	31.5	41.2	44.4	42.2	41.5	41.1	53.3	48.3	41.4	41.6	55.4	73.8
Manganese	mg/L	0.05 *	0.0158	<0.0005	0.0131	0.0012	0.0007	0.011	0.052	0.0366	0.038	0.0214	0.0441	0.0143	0.0266	0.0175	0.0254	0.0072
Molybdenum	mg/L			0.0012		0.0012		0.0007		0.0007		0.0006		0.0006		0.0007		<0.0005
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.05	0.08	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.25
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.25
Oxidation Reduction Potential	mV		-197.1	154.9	-86.4	84.4	-111.6	-4.3	-62.8	117.7	-37.5	79.3	2.6	89.2	22.4	67.6	-26.0	187.1
pH	units		8.06	7.95	8.02	8.04	7.89	7.58	7.68	7.62	7.58	7.71	7.41	7.44	7.62	7.61	7.38	7.23
pH - field	units		7.90	7.77	7.72	8.04	7.56	7.4	7.44	7.32	7.47	7.39	7.22	7.41	7.18	7.33	7.28	7.04
Phenols	µg/L		1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	0.03		<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L					<0.03												
Phosphorus	mg/L		0.04	<0.02	<0.02	<0.01	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.01	0.03	0.01	<0.02	<0.02	<0.02
Potassium	mg/L		1.9	2.3	2.0	1.9	2.1	2.2	2.5	2.3	2.5	2.1	3.3	2.5	2.7	2.4	3.2	3.3
Sodium	mg/L	200 *	16.5	18.2	15.7	14.5	16.6	51	61.4	66.7	56.1	59.5	125	89.3	91.6	71.0	143	173
Sulphate	mg/L	500 *	3.0	5.2	3.6	4.5	3.8	18.6	21	17.6	16.2	19.3	22.8	19.1	19.2	14.9	22.7	23.3
Temperature - field	°C		11.3	7.6	11.0	7.2	12.9	5	13.2	5	12.7	5.3	12.4	5.7	13.3	5.4	13.4	5.4
Total Dissolved Solids	mg/L	500 *	240	250	240	210	260	480	550	540	560	580	880	600	670	480	990	1250
Total Kjeldahl Nitrogen	mg/L		0.3	0.4	2.2	<0.3	<0.3	0.3	<1.0	<0.1	<0.1	<0.1	<1.0	<0.1	0.2	<0.2	2.1	<0.3
Zinc	mg/L	5 *		0.0013		<0.005		0.0013		<0.0005		<0.0005		0.002		<0.0005		<0.005

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	86-III	87-I												87-II		
			Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19
Alkalinity	mg/L	30-500 *	291	177	171	179	190	182	175	187	195	184	191	193	205	198	239	221
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		0.1	0.4	0.3	0.4	0.4	0.5	0.4	0.4	0.5	0.5	0.6	0.4	0.4	0.2	0.2	0.2
Anion sum	meq/L		11.5	4.22	4.26	4.2	4.35	4.2	4.31	4.30	5.25	4.28	4.67	4.42	5.30	5.07	6	5.53
Arsenic	mg/L	0.010 **	<0.0005	0.003	<0.005	<0.0005	<0.005	<0.0005	0.0007	<0.0005	0.0013	<0.0005	0.0007	<0.0005	<0.0005	0.0006	0.006	0.0007
Barium	mg/L	1 **		0.091		0.153		0.167		0.162		0.155		0.166		0.138		0.133
Beryllium	mg/L			<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005
Bicarbonate	mg/L		290	175	169	177	188	180	173	185	193	182	189	191	204	197	238	220
Boron	mg/L	5 **		0.178		0.0599		0.0634		0.0646		0.0523		0.0586		0.0421		0.0322
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		105.0	20.4	30.3	30.8	29.6	28.2	32.6	28.4	32.2	31.4	34.8	32.3	36.3	56	72.3	66.1
Carbonate	mg/L		<1	2	2	2	2	2	2	2	2	2	2	2	1	<1	<1	1
Cation sum	meq/L		13.7	5.71	4.58	4.69	4.84	4.38	4.83	4.30	4.92	4.64	4.95	4.70	5.58	5.62	6.34	6.06
Chemical Oxygen Demand	mg/L		20	<10	30	<10	10	30	<10	<10	<10	<10	<10	10	<10	20	20	<10
Chloride	mg/L	250 *	195	6.4	7.4	5.4	6.5	5.3	8.8	5.6	20.6	5.2	8.2	4.8	23.6	9.7	12.8	9.5
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0002		<0.0005
Conductivity	µS/cm		1220	419	427	420	426	416	443	422	507	429	456	382	533	502	587	542
Conductivity - field	µS/cm		1080	411	418	418	427	416	442	419	528	416	458	419	474	492	564	552
Copper	mg/L	1 *		<0.0005		<0.0005		0.0016		<0.0005		<0.0005		<0.0005		<0.0005		0.0013
Dissolved Organic Carbon	mg/L	5 *	<1.0	2.1	1.7	3	1	<1.0	<1.0	2.3	1.5	1.4	1.5	1.6	1.0	2.1	1.7	3.2
Dissolved Oxygen - field	mg/L		3.63	2.69	0.76	1.28	1.04	1.74	1.26	1.77	0.12	2.97	2.46	1.82	2.18	1.97	1.24	1.93
Hardness	mg/L	80-100 *	454	130	198	200	211	191	208	184	193	203	217	206	240	256	296	280
Ion Percentage	%		8.75	15	3.64	5.53	5.36	2.13	5.71	0.04	3.30	4.01	2.99	3.11	2.55	5.07	2.78	4.51
Iron	mg/L	0.3 *	0.015	0.045	0.07	0.085	<0.05	0.021	0.088	0.065	0.120	0.040	0.118	0.065	0.129	0.124	0.33	0.29
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		46.7	19.1	29.7	29.8	33.4	29.3	30.7	27.4	27.3	30.3	31.6	30.4	36.3	28.3	28	28
Manganese	mg/L	0.05 *	0.0086	0.0042	0.005	0.0051	0.006	0.0052	0.0067	0.0056	0.0073	0.0062	0.0064	0.0055	0.0075	0.0171	0.021	0.0207
Molybdenum	mg/L			0.0009		0.0013		0.0016		0.0014		0.0008		0.0013		0.0007		0.0008
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	0.12	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5
Oxidation Reduction Potential	mV		14.9	29.4	-71	-113.6	-93.6	-30.4	-137.4	-53.3	-140.9	-111.0	-97.1	173.9	-33.9	50.8	-70.9	-71.3
pH	units		7.47	7.97	8.07	8.05	8.06	8.07	8.07	7.99	8.02	7.98	7.99	8.02	7.82	7.73	7.65	7.75
pH - field	units		7.08	7.77	8.05	7.95	7.92	7.93	8.08	7.87	7.81	7.71	7.57	7.62	7.36	7.53	7.57	7.54
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	2
Phosphate	mg/L		<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	0.06	0.05	<0.02	<0.02	<0.02	<0.01	0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.03	0.03	<0.02
Potassium	mg/L		2.8	3.8	1.2	1.8	1.9	1.9	1.7	1.8	1.8	1.9	1.6	2.0	1.9	1.7	1.8	1.8
Sodium	mg/L	200 *	103	68.3	12.3	13.6	11.5	10.3	13.1	12.0	21.9	10.5	11.4	10.9	15.2	9.2	7.6	8.2
Sulphate	mg/L	500 *	17.5	29.4	35.5	28	23.5	25.5	32.4	25.0	43.3	27.5	35.5	26.4	32.2	46.6	48.6	47.5
Temperature - field	°C		14.2	8.1	11.6	8.7	9.9	7.8	11.1	9.1	10.9	8.6	9.8	8.7	10.6	8.4	11.6	8.6
Total Dissolved Solids	mg/L	500 *	680	240	250	230	260	210	270	160	310	260	260	230	350	290	350	300
Total Kjeldahl Nitrogen	mg/L		<0.3	0.3	<2.0	0.1	<0.1	0.3	<1.0	0.3	0.4	0.4	2.4	<0.3	<0.3	0.1	<2.0	0.1
Zinc	mg/L	5 *		<0.0005		0.0005		0.0012		<0.0005		<0.0005		<0.0005		0.0045		0.0016

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	87-II									87-III						
			Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21
Alkalinity	mg/L	30-500 *	213	206	235	240	258	235	255	250	262	373	385	384	370	292	361	354
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1
Anion sum	meq/L		5.33	5.24	5.83	5.88	6.32	5.78	6.29	6.06	6.34	8.54	8.88	8.51	8.63	6.11	8.29	7.59
Arsenic	mg/L	0.010 **	<0.005	0.0008	0.0005	0.0006	0.0006	0.0005	0.0006	0.0006	0.0007	<0.0005	<0.005	0.0025	<0.005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.132		0.131		0.112		0.124		0.111		0.092		0.066		0.084
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		212	205	234	239	257	234	254	249	261	372	384	383	369	291	360	353
Boron	mg/L	5 **		0.0428		0.0318		0.0279		0.0291		0.0087		0.0076		0.0069		0.0076
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		58.6	52	70.8	66.0	80.8	70.6	70.4	68.2	79.8	146	147	145	147	106	145	116
Carbonate	mg/L		1	1	1	1	1	<1	1	1	<1	<1	<1	<1	<1	1	<1	<1
Cation sum	meq/L		5.74	5.38	6.43	5.77	6.39	6.58	6.30	6.30	6.89	9.36	9.42	9.31	9.5	6.55	9.29	7.28
Chemical Oxygen Demand	mg/L		<10	40	<10	30	<10	<10	<10	<10	<10	<10	30	<10	<10	30	<10	20
Chloride	mg/L	250 *	9.8	10	10.7	9.9	11.4	8.7	10.6	9.5	9.1	20.8	24.6	18.8	20.8	9.3	21.6	13.5
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		0.0007		<0.0005		<0.0005		<0.0001		0.0008		<0.0005		<0.0005
Conductivity	µS/cm		517	510	568	557	606	566	564	550	607	832	869	830	840	599	823	661
Conductivity - field	µS/cm		494	508	560	540	583	549	589	576	553	814	855	839	840	652	831	725
Copper	mg/L	1 *		<0.0005		<0.0005		<0.0005		<0.0005		0.0007		0.0024		0.0012		<0.0005
Dissolved Organic Carbon	mg/L	5 *	1.8	<1.0	1.4	2.2	1.7	1.4	1.5	3.3	1.2	3.1	3	3.9	3.1	1.9	2.6	2.9
Dissolved Oxygen - field	mg/L		1.42	1.15	0.73	1.59	0.95	1.12	1.25	2.03	1.29	2.3	1.79	2.32	1.41	3.16	1.85	2.39
Hardness	mg/L	80-100 *	265	247	299	269	301	306	295	295	324	453	453	447	457	311	443	347
Ion Percentage	%		3.69	1.27	4.88	0.87	0.52	6.46	0.11	1.95	4.13	4.62	2.94	4.47	4.78	3.52	5.65	2.13
Iron	mg/L	0.3 *	0.4	0.23	0.348	0.182	0.350	0.218	0.407	0.441	0.494	0.003	<0.05	3.16	0.07	0.005	<0.005	0.142
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		28.7	28.4	29.6	25.4	24.2	31.6	29.0	30.3	30.4	21.5	20.9	20.6	21.8	11.3	19.6	13.9
Manganese	mg/L	0.05 *	0.018	0.0177	0.0179	0.0252	0.0223	0.0189	0.0192	0.0164	0.0176	0.0043	0.016	0.126	0.073	0.0048	0.0054	0.0221
Molybdenum	mg/L			0.0008		0.0008		0.0006		0.0006		0.0008		<0.0005		<0.0005		<0.0005
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	0.16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	1.89	2.52	1.5	1.04	<0.5	1.6	0.8
Nitrite	mg/L	1.0 **	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	1.08	<0.05	<0.05	<0.5	0.08	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-87.9	-28.5	-89.1	-17.6	-67.5	-41.3	-72.7	46.3	-41.5	113.6	50	-47.9	27.1	79.4	35.7	65.5
pH	units		7.78	7.86	7.67	7.66	7.65	7.64	7.63	7.66	7.52	7.3	7.28	7.32	7.31	7.62	7.32	7.34
pH - field	units		7.59	7.58	7.63	7.46	7.36	7.32	7.34	7.22	7.05	6.99	7.32	7.13	7.03	7.17	7.34	7.11
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.01	0.01	<0.03	<0.02	<0.02	<0.02	0.03	0.03	0.1	<0.02	<0.02	<0.02	<0.01	0.01
Potassium	mg/L		1.5	1.6	1.9	1.7	1.6	1.8	1.6	1.7	1.7	0.8	1.1	0.9	1.1	0.6	1.2	0.6
Sodium	mg/L	200 *	8.5	8	8.2	6.9	6.3	8.1	7.0	7.1	7.0	5.6	6.7	7.1	6.9	6.5	8.4	6.8
Sulphate	mg/L	500 *	44.5	46.8	47.4	45.8	48.4	47.4	47.1	45.9	48.7	28.8	26.6	21.3	39.2	9.5	28.2	14.8
Temperature - field	°C		11	8.9	10.6	9.0	10.8	8.7	10.1	8.9	10.8	4.6	15.4	4.6	14.3	4.8	14.2	5.5
Total Dissolved Solids	mg/L	500 *	340	280	390	360	400	340	360	380	370	480	530	470	520	330	530	420
Total Kjeldahl Nitrogen	mg/L		<0.1	0.1	<1.0	0.1	0.2	0.1	2.3	<0.3	0.4	<0.1	<2.0	0.2	0.1	0.1	<1.0	0.8
Zinc	mg/L	5 *		0.0018		<0.0005		0.0007		<0.0005		0.0019		0.0037		0.0012		0.0009

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	87-III					88-I										
			Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23
Alkalinity	mg/L	30-500 *	401	321	398	312	480	221	237	208	205	210	198	211	205	210	211	215
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		0.193			<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.2	0.2	0.1	0.1	<0.1	0.2	0.3	0.1	0.3	0.2	0.4	0.1	0.2	0.3	0.3
Anion sum	meq/L		8.97	6.64	8.80	6.86	10.00	4.63	4.96	4.39	4.34	4.5	4.24	4.49	4.40	4.55	4.64	4.80
Arsenic	mg/L	0.010 **	0.0029	<0.0005	<0.0005	<0.0005	0.0015	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.07		0.071		0.142		0.142		0.157			0.152		0.163	
Beryllium	mg/L			<0.0005		<0.0005		<0.0001		<0.0005		<0.0005			<0.0005		<0.0005	
Bicarbonate	mg/L		400	320	397	311	479	219	235	206	204	209	196	209	203	209	208	214
Boron	mg/L	5 **		0.0061		0.0073		0.117		0.126		0.113			0.0997		0.115	
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001			<0.0001		<0.0001	
Calcium	mg/L		141	130	144	119	160	39.4	39.7	41	40.8	42.2	39.9	42.2	45.3	40.6	43.4	51.1
Carbonate	mg/L		<1	<1	<1	<1	<1	2	2	2	1	1	2	2	2	1	3	1
Cation sum	meq/L		9.05	7.83	9.29	7.22	10.20	4.67	4.66	4.82	4.94	4.63	4.63	4.85	5.33	4.92	5.03	5.61
Chemical Oxygen Demand	mg/L		<10	<10	<10	10	10	50	<10	<10	20	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	25.5	10.1	16.7	17.6	11.1	2.5	2.7	2	2.9	3	3.2	2.6	2.7	3.7	3.9	4.7
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005			<0.0005		<0.0005	
Cobalt	mg/L			<0.0005		<0.0005		<0.0001		<0.0005		<0.0005			<0.0005		<0.0005	
Conductivity	µS/cm		791	651	699	580	889	418	428	436	430	435	435	436	440	443	405	472
Conductivity - field	µS/cm		842	657	836	666	822	411	426	439	421	434	430	430	421	446	447	430
Copper	mg/L	1 *		<0.0005		0.0013		<0.0005		<0.0005		0.0013			<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	3.4	1.9	2.4	2.8	2.1	1.8	1.1	1.4	4.1	2.3	1.2	1.4	1.9	1.2	1.2	<1.0
Dissolved Oxygen - field	mg/L		0.43	3.44	8.21	3.69	2.28	5.81	1.37	1.17	1.3	1.86	2.53	0.52	4.96	1.44	6.27	3.64
Hardness	mg/L	80-100 *	428	372	438	342	483	196	194	200	198	195	191	201	221	207	215	237
Ion Percentage	%		0.46	8.22	2.68	2.60	0.60	0.46	3.1	4.68	6.45	1.42	4.47	3.90	9.62	3.97	4.07	7.74
Iron	mg/L	0.3 *	0.856	0.065	0.030	0.022	0.836	0.05	<0.05	0.161	0.22	0.342	0.039	0.130	0.288	0.061	0.020	0.223
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005			<0.0005		<0.0005	
Magnesium	mg/L		18.5	11.5	19.0	10.8	20.2	23.6	23.1	23.6	23.3	21.7	22.3	23.2	26.2	25.7	25.8	26.6
Manganese	mg/L	0.05 *	0.0632	0.0240	0.0019	0.0091	0.0721	0.0039	0.002	0.0095	0.01	0.0128	0.0025	0.0066	0.0100	0.0025	0.0010	0.0080
Molybdenum	mg/L			<0.0005		<0.0005		<0.0005		0.0007		<0.0005			<0.0005		<0.0005	
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002			0.003		<0.002	
Nitrate	mg/L	10.0 **	0.7	<0.5	1.1	0.3	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.25	0.27
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
Oxidation Reduction Potential	mV		-121.1	29.1	78.8	202.0	-71.8	18.2	-20.1	-103.8	-66.1	-9.5	-31.4	-1.3	135.3	5.3	46.4	140.0
pH	units		7.26	7.42	7.26	7.43	7.19	7.97	7.84	8.05	7.84	7.84	7.94	7.99	8.02	7.83	8.11	7.80
pH - field	units		6.98	7.05	7.04	7.04	6.68	7.72	7.62	7.67	7.78	7.8	7.96	7.68	7.77	7.52	7.68	7.39
Phenols	µg/L		<1	2	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.01	0.01	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		1.0	<0.5	1.0	0.5	1.2	2.8	3	3	3.4	2.7	3.4	3.4	3.4	3.0	3.1	3.3
Sodium	mg/L	200 *	9.6	8.2	10.7	8.1	10.1	15.3	15.2	16.3	19.8	14.2	15.6	16.0	18.2	15.2	14.0	16.8
Sulphate	mg/L	500 *	21.2	7.0	26.8	14.5	18.5	13.7	14.4	15	14	16.8	15.2	16.1	17.1	18.3	20.5	23.6
Temperature - field	°C		15.2	4.0	14.0	4.9	14.9	8.7	9.2	8.1	9.7	8.7	9.9	10.0	8.1	9.8	8.4	9.8
Total Dissolved Solids	mg/L	500 *	530	380	510	420	530	230	230	240	250	250	260	190	210	250	280	280
Total Kjeldahl Nitrogen	mg/L		0.3	0.1	2.2	<0.3	<0.3	<0.1	<1.0	0.3	0.2	<0.1	<1.0	0.3	<0.2	2.8	0.3	0.3
Zinc	mg/L	5 *		0.0006		0.001		0.0015		0.0015		0.0016			<0.0005		0.0012	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	88-II												88-III			
			Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19
Alkalinity	mg/L	30-500 *	228	227	225	226	237	231	245	251	238	246	257	241	230	221	230	218
Aluminum	mg/L	0.1 *	<0.025		<0.025		0.110		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.1	0.2	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1
Anion sum	meq/L		5.67	5.54	5.51	5.54	5.79	5.65	6.14	7.47	6.37	7.55	8.60	7.21	5.91	5.76	6.45	5.64
Arsenic	mg/L	0.010 **	0.0008	<0.005	<0.0005	<0.005	0.0009	0.0009	0.0007	0.0010	0.0009	0.0009	0.0007	0.0012	0.0011	<0.005	0.0006	<0.005
Barium	mg/L	1 **	0.07		0.071		0.078		0.083		0.082		0.07		0.07		0.075	
Beryllium	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005	
Bicarbonate	mg/L		227	226	223	225	236	230	244	250	237	245	256	240	229	220	228	217
Boron	mg/L	5 **	0.289		0.23		0.198		0.208		0.2		0.182		0.0313		0.0579	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		62.1	65.5	68.1	65.4	67.5	66.3	68.2	94.5	82.0	86.6	103.0	91.4	63.3	63.9	69.4	64.2
Carbonate	mg/L		<1	<1	2	1	<1	1	1	1	<1	<1	1	<1	1	1	2	1
Cation sum	meq/L		5.69	5.95	6.14	6.12	5.99	5.94	6.24	8.16	7.48	7.98	9.04	8.06	6.09	6.14	6.96	6.13
Chemical Oxygen Demand	mg/L		40	<10	<10	<10	<10	<10	<10	<10	<10	10	<10	<10	20	<10	<10	10
Chloride	mg/L	250 *	9.2	7.2	5.2	6.8	6.2	5.3	4.9	4.0	5.3	5.2	4.6	6.0	10.9	8.6	4.2	7.7
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0002		<0.0005	
Conductivity	µS/cm		530	540	551	543	549	565	582	685	625	707	715	686	542	559	614	543
Conductivity - field	µS/cm		522	539	549	534	545	564	587	671	569	698	767	630	539	554	609	519
Copper	mg/L	1 *	<0.0005		0.0024		<0.0005		<0.0005		0.0021		<0.0005		<0.0005		0.0026	
Dissolved Organic Carbon	mg/L	5 *	1.8	1.2	4.1	3.7	2.2	1.2	1.4	1.8	1.5	1.4	1.1	<1.0	1.8	1.4	2.7	1.4
Dissolved Oxygen - field	mg/L		1.51	1.48	2.27	1.17	1.84	0.65	1.92	<0.05	2.87	1.56	3.35	1.32	1.7	2.44	4.73	2.02
Hardness	mg/L	80-100 *	256	272	280	272	272	269	282	378	339	368	423	369	288	287	323	288
Ion Percentage	%		0.23	3.62	5.42	4.93	1.66	2.52	0.83	4.45	8.02	2.76	2.48	5.59	1.54	3.22	3.81	4.18
Iron	mg/L	0.3 *	0.671	1.15	0.324	1.08	0.577	0.75	0.135	1.68	0.85	1.80	1.62	1.81	0.034	<0.05	0.008	<0.05
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		24.6	26.3	26.7	26.4	25.2	25.1	27.1	34.5	32.5	36.8	40.2	34.2	31.5	30.9	36.3	31
Manganese	mg/L	0.05 *	0.0187	0.019	0.0152	0.026	0.0236	0.0215	0.0128	0.0239	0.0237	0.0231	0.0264	0.0273	0.0101	0.013	0.0011	0.009
Molybdenum	mg/L		0.0012		0.0011		0.001		0.001		0.001		0.0006		0.0007		0.0009	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-38	-93.8	-87	-95.8	-8.3	-72.1	-4.6	-82.4	15.6	-95.3	-16.1	-27.5	8.3	22.1	58.1	-8.3
pH	units		7.62	7.66	7.88	7.68	7.64	7.73	7.67	7.63	7.46	7.51	7.69	7.56	7.69	7.7	7.89	7.71
pH - field	units		7.39	7.45	7.53	7.54	7.65	7.69	7.44	7.36	7.37	7.20	7.25	7.07	7.43	7.52	7.59	7.57
Phenols	µg/L		<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1
Phosphate	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	0.02	<0.02	<0.02	<0.02	<0.01	0.01	0.01	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02
Potassium	mg/L		2.5	2.5	2.6	3	2.5	2.9	2.7	3.3	3.3	2.9	3.0	3.0	2.4	2.8	2.4	2.7
Sodium	mg/L	200 *	10.7	9.4	10.1	13	10.1	10.3	11.5	10.7	13.2	11.2	10.3	12.6	5.4	6.8	9.1	6.1
Sulphate	mg/L	500 *	47.8	45.3	48.6	47.1	49.5	49.6	60.7	120	78	127	168	114	55.3	59.7	90.3	58
Temperature - field	°C		8.5	10	7.1	9.6	8.4	9.3	8.8	10.7	7.3	10.4	8.2	9.9	6.6	11.6	5.6	11.3
Total Dissolved Solids	mg/L	500 *	320	330	350	330	320	390	370	390	370	490	520	440	330	340	380	350
Total Kjeldahl Nitrogen	mg/L		<0.1	<1.0	<0.1	<0.1	<0.1	<1.0	<0.5	0.1	<0.2	2.9	0.2	<0.3	<0.1	<1.0	0.1	<0.1
Zinc	mg/L	5 *	0.001		0.0028		0.0014		<0.0005		0.0016		<0.0005		0.0017		0.003	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	88-III								89-I							
			Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21
Alkalinity	mg/L	30-500 *	224	218	229	240	226	235	219	232	370	298	298	294	283	277	297	296
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.1	0.2	0.1	0.1	0.2	0.3	0.1	<0.1	1.2	1	0.9	0.9	1.2	1.2	1.1	1.3
Anion sum	meq/L		5.82	5.6	5.95	6.83	5.88	6.49	12.60	9.16	16.2	13.2	14.3	13.2	13.3	14.7	12.9	13.3
Arsenic	mg/L	0.010 **	0.0008	0.001	0.0008	0.0010	0.0010	0.0013	0.0008	0.0010	0.0025	<0.005	0.0021	0.006	0.002	0.0022	0.0019	0.0022
Barium	mg/L	1 **	0.052		0.058		0.045		0.054		0.1		0.085		0.083		0.079	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		223	217	228	239	225	234	218	231	367	296	295	292	281	275	294	293
Boron	mg/L	5 **	0.0357		0.0221		0.0291		0.0474		0.84		0.88		0.82		0.803	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		65.3	64	65.6	73.2	73.9	72.3	140.0	91.5	29.7	21.1	25.5	21.3	22.2	22.3	20.0	21.7
Carbonate	mg/L		1	1	1	1	<1	<1	<1	<1	3	2	3	2	2	2	3	3
Cation sum	meq/L		5.95	5.88	6.15	6.91	6.75	6.78	13.50	9.91	14.7	13.5	15.5	12.7	13.4	13	12.3	11.4
Chemical Oxygen Demand	mg/L		20	<10	50	<10	<10	<10	<10	<10	50	60	40	40	40	20	50	40
Chloride	mg/L	250 *	7	5.9	4.9	2.8	5.2	5.5	7.9	5.5	321	261	304	267	274	249	254	267
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		547	555	563	643	571	610	1120	831	1670	1470	1660	1440	1410	1390	1400	1410
Conductivity - field	µS/cm		546	550	570	629	544	602	1100	752	2130	1620	2170	1470	1400	1430	1460	1440
Copper	mg/L	1 *	0.0007		0.0005		0.001		0.0009		<0.0005		<0.0005		0.0006		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	2.2	1.2	19.9	1.7	1.0	1.4	1.5	<1.0	6.3	12.1	10.8	11.4	9.3	10.8	9.6	9.1
Dissolved Oxygen - field	mg/L		1.59	1.16	0.98	1.24	4.56	2.91	3.55	1.71	0.95	0.68	1.96	1.89	1.29	0.7	0.92	1.42
Hardness	mg/L	80-100 *	281	275	290	322	318	320	642	468	139	103	128	104	108	108	97.3	104
Ion Percentage	%		1.12	2.46	1.69	0.60	6.95	2.17	3.59	3.89	4.97	1.3	3.92	2.02	0.41	6.06	2.71	7.37
Iron	mg/L	0.3 *	0.008	0.027	0.009	0.018	0.020	0.086	0.011	<0.005	0.179	0.36	0.069	0.19	0.036	0.241	0.253	0.234
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		28.6	28	30.7	33.9	32.5	33.8	71.1	50.0	15.7	12.1	15.5	12.3	12.7	12.7	11.5	12.1
Manganese	mg/L	0.05 *	0.0105	0.0114	0.0181	0.0013	0.0198	0.0182	<0.0005	0.0062	0.0118	0.011	0.0119	0.011	0.0118	0.0105	0.0091	0.0099
Molybdenum	mg/L		0.0006		0.0006		0.0005		0.0006		0.004		0.003		0.0025		0.0027	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.21	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		52.5	-13.7	37.2	38.7	101.8	-9.2	85.9	67.5	-147.7	-160.8	-52.9	-160.1	-50	-115	-140.5	-167.6
pH	units		7.69	7.8	7.72	7.75	7.65	7.61	7.63	7.56	7.93	7.82	7.96	7.91	7.81	7.9	8.04	8.00
pH - field	units		7.56	7.73	7.41	7.50	7.48	7.33	7.28	7.11	7.59	7.9	7.59	8.04	7.76	7.93	7.80	7.59
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	48	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	0.01	0.04	0.02	<0.02	<0.02	<0.02	<0.02	0.05	0.03	0.16	0.03	0.03	0.03	0.03	0.03
Potassium	mg/L		2.3	2.8	2.5	3.0	2.6	2.7	3.3	3.8	7.7	7.6	8.4	7	7.7	7.8	7.1	6.8
Sodium	mg/L	200 *	5.4	6.1	5.6	7.8	6.2	5.9	12.0	9.0	267	257	291	239	251	243	231	209
Sulphate	mg/L	500 *	61.8	58.5	66.3	101	65	86	390	217	1.1	1.9	<2	2	3	112	2.2	1.1
Temperature - field	°C		6.6	12	6.8	12.6	5.8	12.4	6.4	12.4	7.5	9.2	6	11	6.8	11	7.8	10.5
Total Dissolved Solids	mg/L	500 *	330	320	380	420	350	410	840	540	870	770	890	790	770	760	440	750
Total Kjeldahl Nitrogen	mg/L		<0.1	<1.0	<0.5	0.1	<0.2	3.1	0.1	<0.3	2.1	0.9	1.1	<1	1.2	1.1	1.1	1.3
Zinc	mg/L	5 *	<0.0005		<0.0005		<0.0005		0.0007		0.0019		0.001		0.0034		0.0009	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
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Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	89-I				89-II											
			Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23
Alkalinity	mg/L	30-500 *	289	299	305	304	105	102	97.5	101	99.6	97	103	103	101	100	103	102
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		0.027		<0.025	
Ammonia (as N)	mg/L		1.1	1.1	1.0	1.0	0.1	0.2	<0.1	0.1	<0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.1
Anion sum	meq/L		12.1	12.4	12.9	12.3	2.26	2.21	2.08	2.19	2.18	2.11	2.21	2.21	2.17	2.18	2.23	2.21
Arsenic	mg/L	0.010 **	0.0019	0.0015	0.0017	0.0021	0.0022	<0.005	0.0024	<0.005	0.0027	0.0024	0.0022	0.0025	0.0022	0.0024	0.0028	0.0031
Barium	mg/L	1 **	0.077		0.081		0.038		0.039		0.043		0.042		0.041		0.038	
Beryllium	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		288	297	303	303	104	101	96	100	98	96	102	101	100	99	101	101
Boron	mg/L	5 **	0.983		0.8		0.1		0.106		0.0866		0.104		0.106		0.105	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		21.2	21.0	21.7	29.4	10.3	8.8	8.7	8.4	8.8	9.1	8.6	8.9	9.0	8.5	8.6	9.2
Carbonate	mg/L		1	2	2	1	<1	<1	1	1	1	1	1	2	<1	1	1	1
Cation sum	meq/L		12.6	12.9	12.6	14.9	2.45	2.39	2.34	2.24	2.36	2.41	2.28	2.13	2.34	2.40	2.30	2.50
Chemical Oxygen Demand	mg/L		30	40	40	30	30	20	<10	<10	10	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	229	234	247	228	8.1	8.4	7	8	8	7.7	7.8	7.8	7.7	8.5	8.3	8.3
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		1380	1340	1300	1320	229	229	228	227	226	227	225	227	229	224	203	223
Conductivity - field	µS/cm		1360	1360	1870	1250	224	254	232	231	233	223	234	234	224	232	236	234
Copper	mg/L	1 *	<0.0005		<0.0005		<0.0005		<0.0005		0.0006		<0.0005		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	7.0	6.0	6.5	1.1	2.2	2.7	2.7	3.6	3.5	3.1	3.2	2.1	1.0	1.4	2.0	1.1
Dissolved Oxygen - field	mg/L		1.09	1.23	1.79	1.48	2.92	1.09	3.6	1.92	2.01	0.6	1.80	1.78	3.12	1.25	2.73	2.13
Hardness	mg/L	80-100 *	102	107	108	129	42.3	39.4	39.1	37.7	38.9	39.4	37.5	38.4	38.2	38.5	37.8	40.6
Ion Percentage	%		1.90	2.15	1.28	9.46	4.02	3.98	5.78	1.06	4.09	6.63	1.40	1.97	3.85	4.84	1.52	6.09
Iron	mg/L	0.3 *	0.167	0.108	0.113	0.090	0.007	0.05	0.005	0.07	0.019	0.103	<0.005	0.065	0.024	0.038	0.035	0.052
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		12.0	13.3	13.0	13.4	4.02	4.22	4.22	4.05	4.11	4.06	3.90	3.94	3.83	4.17	3.97	4.28
Manganese	mg/L	0.05 *	0.0086	0.0079	0.0086	0.0098	<0.0005	0.002	<0.0005	0.003	0.008	0.003	<0.0005	0.0027	<0.0005	0.0018	0.0028	0.0035
Molybdenum	mg/L		0.0027		0.0027		0.0035		0.0033		0.0039		0.0035		0.0032		0.0036	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05
Oxidation Reduction Potential	mV		-116.2	-123.6	-63.4	-134.1	-34.9	-146.1	53.1	-156	7.1	-53	-16.3	-162.7	28.0	-114.7	-18.6	-97.6
pH	units		7.71	7.80	7.92	7.64	7.96	8.01	8.06	8.16	8.08	8.12	8.11	8.21	7.83	8.13	8.19	8.05
pH - field	units		7.74	7.58	7.41	7.40	7.9	8.48	8.23	8.43	8.23	8.39	8.07	8.05	8.06	8.05	8.04	7.91
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	2	<1	2	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	0.05	0.04	0.04	0.02	<0.02	<0.02	0.02	<0.02	0.01	0.03	0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		7.4	7.1	7.2	7.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	0.6
Sodium	mg/L	200 *	235	242	233	277	36.6	36.5	35.7	33.9	35.8	36.6	34.8	30.8	35.9	37.2	35.1	38.2
Sulphate	mg/L	500 *	1.8	1.0	1.1	0.8	<2.0	<2	<2	0.6	1.1	0.7	<2	<0.2	<0.2	0.4	0.3	0.3
Temperature - field	°C		7.3	10.9	7.1	10.1	6.7	8.8	6.8	10.6	6.7	10.1	7.3	9.7	7.3	10.0	6.4	9.4
Total Dissolved Solids	mg/L	500 *	700	790	840	690	150	140	140	140	110	140	110	150	80	210	70	140
Total Kjeldahl Nitrogen	mg/L		1.3	3.4	1.1	1.3	<0.1	<0.1	<0.1	<0.1	<0.1	<1.0	<0.1	0.2	<0.1	2.5	<0.3	<0.3
Zinc	mg/L	5 *	<0.0005		<0.005		0.0016		0.0017		0.0028		0.0006		0.0016		<0.005	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	89-III												90-I			
			Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-11	Sep-11	Apr-12	Sep-12
Alkalinity	mg/L	30-500 *	273	287	291	274	232	232	285	361	294	282	320	300	140	132	131	119
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.02		<0.02	
Ammonia (as N)	mg/L		0.1	0.1	<0.1	<0.1	<0.1	0.1	0.1	0.2	0.2	0.2	0.2	<0.1	0.3	<0.1	<0.1	0.2
Anion sum	meq/L		5.84	6.22	6.23	5.93	5.09	5.13	6.20	7.91	6.49	6.56	6.97	6.83	2.99	2.88	2.89	2.75
Arsenic	mg/L	0.010 **	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.01	<0.01
Barium	mg/L	1 **	0.031		0.043		0.025		0.038		0.032		0.037		0.08		0.041	
Beryllium	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.001		<0.001	
Bicarbonate	mg/L		272	286	290	273	231	231	284	360	294	281	319	299	138	131	130	118
Boron	mg/L	5 **	0.0107		0.0146		0.0061		0.0105		0.0082		0.006		0.19		0.21	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.001		<0.0003	
Calcium	mg/L		107	116	121	106	100	111	117	150	126	118	124	138	13.1	14.9	15.8	14.7
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	2	<1	<1	<1
Cation sum	meq/L		5.9	6.64	6.85	5.98	5.43	6.2	6.49	8.23	6.80	6.76	6.79	7.76	2.46	2.73	2.87	2.96
Chemical Oxygen Demand	mg/L		20	10	<10	<10	30	<10	<10	<10	<10	<10	<10	<10	<20	<20	<20	<20
Chloride	mg/L	250 *	6.9	7	6.6	5.1	4.6	5.3	6.1	6.6	7.2	7.7	9.2	8.8	1.1	1.6	1.7	1.8
Chromium	mg/L	0.05 **	<0.0005		0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.002		<0.002	
Cobalt	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005					
Conductivity	µS/cm		543	609	631	582	503	553	596	738	567	649	581	597	274	288	293	293
Conductivity - field	µS/cm		543	601	612	581	530	546	608	713	616	651	660	606	273	280	256	273
Copper	mg/L	1 *	0.0006		0.0034		0.0016		0.0019		0.0007		<0.0005		<0.005		<0.005	
Dissolved Organic Carbon	mg/L	5 *	1.9	1.3	4.2	4.1	2.8	1.8	3.2	2.3	1.6	1.8	2.4	1.4	2.6	1.2	1.6	1.6
Dissolved Oxygen - field	mg/L		8.63	5.76	8.24	5.38	7.74	5.7	5.97	9.10	4.51	5.81	8.58	7.33			3.5	6.1
Hardness	mg/L	80-100 *	284	322	333	290	264	301	316	400	330	328	330	377	62.8	67.5	69.9	68.1
Ion Percentage	%		0.53	3.25	4.69	0.44	3.29	9.4	2.29	1.98	2.33	1.51	1.29	6.33	9.65	2.69	0.22	3.65
Iron	mg/L	0.3 *	0.005	<0.05	0.004	<0.05	<0.005	<0.005	0.008	<0.005	0.005	0.008	<0.005	<0.005	<0.05	<0.05	<0.05	0.0018
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.02		<0.0015	
Magnesium	mg/L		3.98	7.77	7.5	6.25	3.47	5.67	5.70	6.06	3.80	7.94	4.85	7.87	7.3	7.35	7.4	7.63
Manganese	mg/L	0.05 *	<0.0005	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.005	0.005	0.008	0.007
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.005		0.012	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.005		<0.005	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	0.6	0.7	0.8	1.4	3.6	6.3	2.4	5.3	<0.05	<0.05	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Oxidation Reduction Potential	mV		86.8	24.3	101.3	49.5	82.6	171.3	64.3	73	146	90	260	85			88.6	-163.5
pH	units		7.57	7.49	7.5	7.55	7.47	7.52	7.61	7.25	7.14	7.30	7.34	7.29	8.23	7.82	7.91	7.84
pH - field	units		7.03	7.32	7.16	7.36	7.3	7.49	7.20	6.88	7.08	7.15	6.91	6.87	8.15	8.1	8.04	7.64
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.09	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.04	0.04	<0.01	<0.01
Potassium	mg/L		<0.5	0.7	0.8	0.6	<0.5	0.7	0.6	0.6	<0.5	0.7	0.5	0.9	1.46	1.51	1.58	1.36
Sodium	mg/L	200 *	4.8	3.9	3.5	3.4	3	3.4	3.3	4.4	3.8	3.8	3.7	4.1	26.2	30.7	32.8	35.5
Sulphate	mg/L	500 *	17.3	22.8	20.1	23.4	20.5	21.3	22.0	30.6	16.3	20.9	16.7	19.4	11.9	13.6	14.6	19.3
Temperature - field	°C		5	9.6	6.8	10	3.9	9	6.6	11.7	5.3	9.2	5.8	9.9	7.7	11.2	9	12.7
Total Dissolved Solids	mg/L	500 *	330	360	360	350	290	330	230	440	350	440	400	390	170	180	160	170
Total Kjeldahl Nitrogen	mg/L		<0.1	<0.1	<0.1	0.2	<0.1	<1.0	<0.5	<2.0	<0.5	2.7	<0.3	<0.3	0.2	0.1	<0.1	0.1
Zinc	mg/L	5 *	0.0018		0.0044		<0.0005		0.0008		<0.0005		<0.005		<0.03		<0.03	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	90-I					90-II									90-III	
			Mar-13	Sep-13	Mar-14	Sep-14	Mar-15	Mar-11	Sep-11	Apr-12	Sep-12	Mar-13	Sep-13	Mar-14	Sep-14	Mar-15	Mar-11	Sep-11
Alkalinity	mg/L	30-500 *	127	118	118	117	119	177	157	167	154	167	148	156	146	161	269	244
Aluminum	mg/L	0.1 *	<0.02		<0.02		<0.025	0.12		<0.02		<0.02		<0.02		<0.025	<0.02	
Ammonia (as N)	mg/L		0.2	0.1	<0.1	0.1	<0.1	0.8	<0.1	<0.1	0.2	0.2	0.2	<0.1	0.1	<0.1	0.1	<0.1
Anion sum	meq/L		2.94	2.82	2.91	2.86	2.95	3.77	3.36	3.51	3.31	3.57	3.23	3.4	3.21	3.52	6.51	6.13
Arsenic	mg/L	0.010 **	<0.01	<0.01	<0.01	<0.01	0.0022	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0035	<0.01	<0.01
Barium	mg/L	1 **	0.033		0.045		0.032	0.122		0.121		0.124		0.122		0.113	0.061	
Beryllium	mg/L		<0.001		<0.001		<0.0001	<0.001		<0.001		<0.001		<0.001		<0.0001	<0.001	
Bicarbonate	mg/L		126	117	117	116	118	174	156	166	152	165	146	153	144	159	267	242
Boron	mg/L	5 **	0.18		0.2		0.164	0.06		0.07		0.05		0.07		0.0504	<0.03	
Cadmium	mg/L	0.005 **	<0.001		<0.001		<0.0001	<0.001		<0.0003		<0.001		<0.001		<0.0001	<0.001	
Calcium	mg/L		14.6	14.3	13.6	12.7	12.4	20.6	18.9	18.8	18.1	19	18.4	19	17.2	28.6	50	57.9
Carbonate	mg/L		1	<1	<1	<1	<1	2	1	1	2	2	2	3	2	2	2	2
Cation sum	meq/L		2.95	3.1	2.89	2.95	2.8	3.53	3.63	3.63	3.7	3.78	3.71	3.7	3.75	3.97	6.12	6.83
Chemical Oxygen Demand	mg/L		30	40	20	10	30	<20	<20	<20	<20	<20	<20	<10	<10	<10	<20	<20
Chloride	mg/L	250 *	2.5	3	2.7	3.2	3.4	0.6	0.7	0.6	0.8	0.8	1.2	0.7	1.4	1.8	7.4	9.9
Chromium	mg/L	0.05 **	<0.002		<0.002		<0.0005	<0.002		<0.002		<0.002		<0.002		<0.0005	<0.002	
Cobalt	mg/L		<0.002		<0.002		<0.0001					<0.002		<0.002		<0.0001		
Conductivity	µS/cm		297	299	290	301	303	335	339	345	340	342	342	332	340	346	566	623
Conductivity - field	µS/cm		276	294	297	268	298	333	340	303	323	315	336	316	299	335	576	629
Copper	mg/L	1 *	<0.005		<0.005		<0.0005	<0.005		<0.005		<0.005		<0.005		<0.0005	<0.005	
Dissolved Organic Carbon	mg/L	5 *	4.5	5	4.3	4.6	9.6	2.8	<1.0	1.3	<1.0	3.5	1.7	1.2	2.2	5	2.3	<1.0
Dissolved Oxygen - field	mg/L		5.48	4.09	1.79	1.75	2.1			7.4	5.83	7.16	3.83	4.98	4.35	2.44		
Hardness	mg/L	80-100 *	66.6	65.5	60.8	61.3	54.8	145	148	147	149	150	147	147	151	163	258	277
Ion Percentage	%		0.27	4.8	0.3	1.63	2.58	3.27	3.86	1.67	5.57	2.88	6.89	4.32	7.73	5.91	3.13	5.43
Iron	mg/L	0.3 *	<0.05	0.09	0.09	0.1	0.035	0.13	<0.05	<0.05	<0.0004	<0.05	0.07	<0.05	<0.05	0.002	<0.05	<0.05
Lead	mg/L	0.01 **	<0.01		<0.01		<0.0005	<0.02		<0.0015		<0.01		<0.01		<0.0005	<0.02	
Magnesium	mg/L		7.33	7.23	6.52	7.19	5.78	22.7	24.4	24.2	25.3	25	24.6	24.2	26.2	22.2	32.3	32.2
Manganese	mg/L	0.05 *	0.008	0.011	0.007	0.012	0.0042	0.006	0.002	<0.001	0.004	<0.001	0.032	<0.001	0.003	<0.0005	0.003	<0.001
Molybdenum	mg/L		0.01		0.012		0.009	0.006		<0.005		<0.005		<0.005		0.002	0.011	
Nickel	mg/L		<0.005		<0.005		<0.002	<0.005		<0.005		<0.005		<0.005		<0.002	<0.005	
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	0.12	0.07	<0.05	0.08	<0.05	<0.05	0.08	0.05	0.21	1.35
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Oxidation Reduction Potential	mV		-161.3	-162	-170.4	-99.2	-167.5			115.3	-10.8	-7.2	-126.5	47.3	-44.1	65.6		
pH	units		7.99	7.88	7.81	7.77	7.66	8.18	7.92	7.92	8.07	8.19	8.21	8.24	8.1	8.04	7.89	7.85
pH - field	units		7.84	7.57	7.21	7.41	7.9	8.07	8.15	8.26	7.59	7.83	7.53	7	7.4	8.04	7.82	7.54
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	0.03		0.03	<0.02	0.03	<0.02	<0.02	0.03	<0.02	0.02		<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.03	0.02	0.01	0.03	<0.02	<0.02	<0.02	<0.02	0.02	0.03
Potassium	mg/L		1.3	1.3	1.3	1.2	1.09	1.17	1.37	1.42	1.3	1.29	1.3	1.3	1.2	1.14	2.67	3.23
Sodium	mg/L	200 *	36	40.1	37.6	38.6	38.5	12.1	14.1	14.7	14.7	16.1	16	16.2	15.3	15.1	19.6	26.9
Sulphate	mg/L	500 *	19.7	21.6	26.4	24.1	26.6	15.7	14	12.5	14.8	14.9	16.2	17.3	16.3	17	52.2	49.5
Temperature - field	°C		8.7	13.4	7.3	13.6	7.7	6.2	12.5	8.3	12.5	9.2	13.1	6.4	14	7.5	6.5	13.7
Total Dissolved Solids	mg/L	500 *	170	320	160	190	180	198	190	160	200	190	190	190	170	190	348	360
Total Kjeldahl Nitrogen	mg/L		0.1	0.1	0.2	0.2	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	<0.1	0.1	<0.1
Zinc	mg/L	5 *	<0.01		<0.03		0.0014	<0.03		<0.03		<0.01		<0.03		0.002	<0.03	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	90-III							91-I								
			Apr-12	Sep-12	Mar-13	Sep-13	Mar-14	Sep-14	Mar-15	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22
Alkalinity	mg/L	30-500 *	243	239	258	232	238	238	247	181	167	167	169	177	160	177	173	173
Aluminum	mg/L	0.1 *	<0.02		<0.02		<0.02		<0.025	<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		<0.1	0.1	0.2	0.1	<0.1	0.1	<0.1	0.2	0.1	0.1	<0.1	<0.1	0.1	<0.1	0.2	0.1
Anion sum	meq/L		5.83	5.99	6.27	5.85	5.9	5.88	6.11	4.88	4.69	4.64	4.58	4.88	4.61	4.78	4.96	4.75
Arsenic	mg/L	0.010 **	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.0005	0.0008	<0.005	0.001	<0.005	0.0008	0.0012	0.0008	0.0006	0.0010
Barium	mg/L	1 **	0.067		0.066		0.066		0.06	0.085		0.081		0.083		0.085		0.085
Beryllium	mg/L		<0.001		<0.001		<0.001		<0.0001	<0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		241	237	256	230	236	237	246	180	166	165	167	176	159	175	171	172
Boron	mg/L	5 **	<0.03		<0.02		<0.03		0.0175	0.0154		0.0266		0.0247		0.0238		0.0302
Cadmium	mg/L	0.005 **	<0.0003		<0.001		<0.001		<0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		54.6	54.5	57.7	60.1	55.5	52.5	45.4	52	49.7	51	52.3	50.9	50	52.1	51.2	49.4
Carbonate	mg/L		2	2	2	2	2	1	1	1	1	2	2	1	<1	2	1	1
Cation sum	meq/L		6.55	6.75	6.59	6.91	6.51	6.29	5.65	5.12	4.88	5.08	5.08	4.79	5.03	5.19	5.03	4.82
Chemical Oxygen Demand	mg/L		<20	<20	<20	<20	<10	<10	<10	30	20	<10	20	20	<10	<10	<10	<10
Chloride	mg/L	250 *	10.1	9.8	10.1	11.4	10.2	11.3	12.2	11.9	13.6	12.4	14.5	14	15.6	13.1	18.0	13.3
Chromium	mg/L	0.05 **	<0.002		<0.002		<0.002		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L				<0.002		<0.002		<0.0001	<0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Conductivity	µS/cm		593	603	578	601	558	589	579	470	475	474	475	472	478	472	487	482
Conductivity - field	µS/cm		555	639	571	638	589	562	564	461	470	470	480	479	471	489	485	477
Copper	mg/L	1 *	<0.005		<0.005		<0.005		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Dissolved Organic Carbon	mg/L	5 *	1.4	<1.0	3.4	2	1.4	1.8	1.6	1.4	1.1	2	1.5	2.7	1.2	1.4	1.8	<1.0
Dissolved Oxygen - field	mg/L		10.1	6.29	6.67	5.93	6.97	4.98	6.92	2.41	1.15	4.88	1.18	2.03	NR	2.07	1.93	2.27
Hardness	mg/L	80-100 *	280	276	282	292	281	271	243	231	220	229	229	217	227	235	227	219
Ion Percentage	%		5.84	6.03	2.44	8.27	4.98	3.37	3.96	2.38	1.98	4.51	5.2	0.95	4.36	4.04	0.77	0.80
Iron	mg/L	0.3 *	<0.05	<0.0004	<0.05	<0.05	<0.05	<0.05	0.002	0.031	<0.05	0.012	0.06	0.025	0.143	0.055	0.014	0.177
Lead	mg/L	0.01 **	<0.0015		<0.01		<0.01		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		34.8	34	33.5	34.4	34.5	34	31.5	24.5	23.4	24.7	23.9	21.9	24.9	25.4	24.1	23.2
Manganese	mg/L	0.05 *	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	<0.0005	0.0016	0.022	0.0006	0.044	0.0045	0.0244	0.0062	0.0122	0.0091
Molybdenum	mg/L		0.011		0.009		0.008		0.0061	0.0011		0.0012		0.0011		0.0012		0.0011
Nickel	mg/L		<0.005		<0.005		<0.005		<0.002	<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	0.55	1.52	0.59	1.38	0.67	1.04	0.9	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		81.4	54.9	56.3	7.9	112.4	13.2	137.3	162.4	-48.3	185.8	-41.6	75.1	27.9	75.1	75.3	170.1
pH	units		7.88	7.83	7.94	7.98	7.9	7.7	7.8	7.79	7.89	8	8.03	7.83	7.82	8.01	7.96	7.82
pH - field	units		7.81	7.16	7.53	7.1	6.72	7.07	7.76	7.55	7.79	7.72	7.77	7.88	7.47	7.75	7.70	7.60
Phenols	µg/L		<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		0.04	0.08	0.02	<0.02	0.03	0.04		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.04	0.07	0.04	0.02	0.02	<0.02	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.01	<0.01	<0.02
Potassium	mg/L		2.99	3.15	2.73	3.1	2.8	2.8	2.46	1.5	1.4	1.6	1.6	1.4	1.5	1.7	1.6	1.5
Sodium	mg/L	200 *	19.5	25.5	19	21.8	18.2	17.2	15.8	9.7	9.2	9.7	10	8.9	9.4	9.7	9.4	8.6
Sulphate	mg/L	500 *	38.7	47	45.9	45.3	45.9	42.2	44.4	50	51.6	50.9	43.3	51.2	51.6	47.6	52.9	49.2
Temperature - field	°C		7.8	14.5	7.9	14.7	6.1	14.5	5.8	7.9	11.6	7.5	12.5	10.8	13	6.9	12.9	10.4
Total Dissolved Solids	mg/L	500 *	310	350	320	360	320	330	310	280	290	270	340	290	320	300	330	300
Total Kjeldahl Nitrogen	mg/L		<0.1	1.7	<0.1	0.1	<0.1	<0.1	0.8	<0.1	<1.0	<0.1	<0.1	<0.1	<1.0	<0.5	0.1	<0.1
Zinc	mg/L	5 *	<0.03		<0.01		<0.03		<0.0005	0.0016		0.0018		0.0022		0.0013		0.0007

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	91-I			91-II											91-III	
			Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Mar-23	Sep-23	Mar-20	Apr-21
Alkalinity	mg/L	30-500 *	171	179	176	238	286	320	386	407	341	452	460	430	444	420	222	235
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	<0.025		<0.025	0.06
Ammonia (as N)	mg/L		0.2	0.2	<0.1	0.1	0.1	0.1	<0.1	<0.1	0.1	0.1	0.2	0.1	0.2	0.1	<0.1	0.7
Anion sum	meq/L		4.86	4.97	5.02	5.53	7.01	7.28	8.75	9.64	9.33	11.9	12.6	10.6	11.8	10.2	5.22	5.4
Arsenic	mg/L	0.010 **	0.0008	0.0014	0.0006	<0.0005	<0.005	<0.0005	<0.005	0.001	0.0009	0.0006	<0.0005	<0.0005	0.0005	0.0015	<0.0005	<0.0005
Barium	mg/L	1 **		0.082		0.06		0.079		0.104		0.131		0.12	0.119		0.026	0.036
Beryllium	mg/L			<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005		<0.0005	<0.0005
Bicarbonate	mg/L		170	178	175	237	285	319	385	406	340	451	459	429	443	419	221	234
Boron	mg/L	5 **		0.023		0.0088		0.0224		0.0176		0.0318		0.0517	0.066		0.004	0.0092
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	<0.0001		<0.0001	<0.0001
Calcium	mg/L		48.6	54.7	53.3	98.7	124	128	157	163	158	195	189	166	190	164	100	103
Carbonate	mg/L		1	1	1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		4.83	5.37	5.22	6.2	7.85	8.06	9.72	10	10.5	12.6	12.6	10.8	12.7	10.8	5.41	5.7
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	50	<10	<10	20	<10	<10	<10	<10	<10	20	30	<10
Chloride	mg/L	250 *	16.2	15.0	17.2	11.4	30.7	20.1	21.8	31.2	44.2	53.8	61.1	34.6	53.4	36.1	2.9	1.9
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005		0.0005	0.0005
Cobalt	mg/L			<0.0005		<0.0001		<0.0005		0.0006		0.0012		0.0011	0.0059		<0.0005	<0.0005
Conductivity	µS/cm		510	488	489	456	673	735	723	928	791	958	1180	950	990	861	507	524
Conductivity - field	µS/cm		499	504	450	563	NV	741	857	1030	861	1260	1180	1210	1020	-	501	526
Copper	mg/L	1 *		<0.0005		0.0023		0.001		0.0011		0.001		0.0012	0.0014		0.0011	0.0015
Dissolved Organic Carbon	mg/L	5 *	1.5	1.2	2.4	1.2	3.9	1.9	2.8	4	2.1	2.6	4.1	1.2	2.8	4.4	3.4	2
Dissolved Oxygen - field	mg/L		2.77	1.75	3.13	6.47	NV	3.39	2.79	1.61	4.15	1.4	2.61	2.77	2.95	-	9.42	8.99
Hardness	mg/L	80-100 *	219	244	237	289	364	382	459	479	483	583	567	497	577	493	260	275
Ion Percentage	%		0.34	3.84	1.97	5.72	5.66	5.1	5.24	2.08	6.02	2.86	0.27	0.74	3.81	2.59	1.85	2.75
Iron	mg/L	0.3 *	0.087	0.233	0.006	0.007	<0.05	0.033	0.1	0.007	0.065	0.013	0.019	<0.005	0.159	0.320	0.009	0.057
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005		<0.0005	<0.0005
Magnesium	mg/L		23.6	26.2	25.2	10.4	13.2	15.2	16.2	17.4	21.4	23.3	23.2	20.1	24.8	20.2	2.42	4.34
Manganese	mg/L	0.05 *	0.0059	0.0153	0.0020	<0.0005	0.003	0.0022	0.008	0.0758	0.0463	0.12	0.188	0.145	0.458	0.523	<0.0005	0.0014
Molybdenum	mg/L			0.0012		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	0.0006		<0.0005	<0.0005
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	0.002		0.002	<0.002
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.05	2.63	1.3	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5	<0.5
Oxidation Reduction Potential	mV		139.0	104.6	172.7	174.7	NV	200.3	60.7	99.7	41.6	120.6	80.2	240.9	141.9	-	138.7	131
pH	units		7.93	7.80	7.81	7.5	7.53	7.42	7.61	7.21	7.42	7.27	7.24	7.15	7.23	7.36	7.65	7.58
pH - field	units		7.44	7.24	7.40	7.47	NV	7.19	7.42	7.05	7.22	6.88	6.86	6.80	6.92	-	7.53	7.55
Phenols	µg/L		<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		0.03	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.03	0.01	<0.02	<0.02	<0.02	<0.02	<0.01
Potassium	mg/L		1.4	1.6	1.7	0.7	0.8	1	1.1	0.9	1.2	1.2	1.2	1.1	1.3	1.3	<0.5	<0.5
Sodium	mg/L	200 *	8.8	9.1	9.4	8.6	12	8.4	11.3	9.9	18.4	21.2	25.7	17.5	25.3	19.2	4.9	3.2
Sulphate	mg/L	500 *	52.7	52.2	54.1	20	24.9	25.2	26.7	42.8	71.3	81	95.7	63.4	81.0	51.5	40.4	38.2
Temperature - field	°C		12.7	7.2	11.5	7.7	NV	6.5	11.5	10.8	14.7	7.5	12.4	10.1	8.3	-	8.1	7.9
Total Dissolved Solids	mg/L	500 *	290	340	240	330	430	390	560	540	460	700	700	600	660	500	310	300
Total Kjeldahl Nitrogen	mg/L		2.6	<0.3	<0.3	<0.1	<1.0	<0.1	<0.2	<0.1	<1.0	<0.5	0.2	0.2	<0.3	<0.3	<0.1	<0.1
Zinc	mg/L	5 *		<0.005		0.0011		0.0025		0.0028		0.0016		0.003	<0.005		0.0039	0.0019

NOTES:
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	91-III			92-I												92-II
			Sep-21	Mar-22	Mar-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18
Alkalinity	mg/L	30-500 *	241	212	225	206	193	187	196	247	281	223	303	238	225	255	246	216
Aluminum	mg/L	0.1 *		0.037	<0.025	<0.025		<0.025		<0.025		<0.025		0.087		0.039		<0.025
Ammonia (as N)	mg/L		0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.3	0.2	0.2	3.5	0.1	0.5	0.1
Anion sum	meq/L		5.04	4.47	4.88	6.16	4.63	4.4	4.68	6.1	6.54	5.41	9.19	5.88	5.4	6.44	6.08	5.1
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	0.0007	<0.005	0.0012	0.007	<0.0005	0.0007	0.0018	<0.0005	0.0007	0.0051	<0.0005	0.0035	0.0012
Barium	mg/L	1 **		0.023	0.027	0.095		0.096		0.028		0.101		0.057		0.046		0.121
Beryllium	mg/L			<0.0005	<0.0005	<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Bicarbonate	mg/L		240	211	224	205	192	185	194	246	280	221	303	237	224	254	245	215
Boron	mg/L	5 **		0.0063	<0.005	0.0365		0.0378		0.0392		0.0408		0.0402		0.0642		0.433
Cadmium	mg/L	0.005 **		<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		85.8	80.3	90.8	57.3	46.9	43	51.6	96.4	114	64.3	154	97.2	63.7	109	96.2	46
Carbonate	mg/L		1	<1	<1	1	1	2	1	<1	<1	2	<1	<1	<1	1	<1	1
Cation sum	meq/L		5.26	4.51	4.90	6.36	5.01	4.87	5.18	6.31	7.55	5.51	9.16	6.24	5.81	6.86	7.08	5.25
Chemical Oxygen Demand	mg/L		<10	<10	<10	10	<10	<10	<10	40	<10	20	<10	<10	40	<10	10	<10
Chloride	mg/L	250 *	4.8	7.0	9.8	48.2	5.7	3.9	6.1	39.3	17.8	12.1	108	20.2	11.7	19.2	12.8	10.4
Chromium	mg/L	0.05 **		<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005	<0.0005	<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Conductivity	µS/cm		495	441	439	611	455	444	464	617	669	526	935	603	539	555	582	482
Conductivity - field	µS/cm		505	460	483	610	458	444	469	694	657	534	936	355	583	627	603	472
Copper	mg/L	1 *		<0.0005	<0.0005	<0.0005		<0.0005		0.0013		<0.0005		0.0011		0.001		<0.0005
Dissolved Organic Carbon	mg/L	5 *	2.1	1.0	2.0	2.5	1.1	1.5	1.2	4.3	5.3	3.8	5.8	2.3	9	3	2.5	1.4
Dissolved Oxygen - field	mg/L		8.03	9.45	11.80	1.94	1.38	1.89	1.77	6.06	3.19	2.08	5.48	6.24	1.09	6.04	1.53	1.73
Hardness	mg/L	80-100 *	221	207	237	240	227	219	235	262	323	244	419	284	250	303	320	222
Ion Percentage	%		2.17	0.52	0.23	1.6	3.87	5.09	5.07	1.71	7.15	0.88	0.19	2.98	3.65	3.15	7.59	1.44
Iron	mg/L	0.3 *	<0.005	0.044	<0.005	0.067	0.19	0.012	0.25	0.014	0.006	<0.005	0.03	0.116	0.238	0.081	0.23	0.079
Lead	mg/L	0.01 **		<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		1.69	1.62	2.52	23.5	26.8	27	25.7	5.09	9.39	20.3	8.39	10	22.2	7.46	19.3	26
Manganese	mg/L	0.05 *	<0.0005	0.0008	<0.0005	0.0088	0.02	0.0036	0.101	0.0021	0.0013	0.0011	0.0152	0.0177	0.113	0.0027	0.161	0.0016
Molybdenum	mg/L			0.0008	<0.0005	0.0008		0.001		<0.0005		0.0009		<0.0005		<0.0005		0.0024
Nickel	mg/L			<0.002	<0.002	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	<0.5	0.06	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3	<0.05	<0.05	<0.05	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Oxidation Reduction Potential	mV		97.5	238.1	251.1	33.7	-152.6	114.7	-135.2	193.4	-28	163.8	65.3	193.7	-214.8	327.5	-182.5	52.9
pH	units		7.72	7.64	7.65	7.75	7.81	8.05	7.91	7.51	7.45	7.90	7.21	7.48	7.58	7.78	7.39	7.77
pH - field	units		7.30	7.39	7.20	7.63	7.81	7.87	7.68	7.26	7.32	7.59	6.69	7.39	7.29	7.28	7	7.64
Phenols	µg/L		<1	<1	<1	<1	<1	1	<1	<1	<1	<1	2	2	75	<1	11	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.35	<0.02	<0.02	<0.01
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.05	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.01	0.01	0.01	<0.02	0.34	<0.02	0.04	0.03
Potassium	mg/L		0.6	<0.5	<0.5	2.4	1.9	2	1.9	0.5	1.7	1.8	1	1	2.6	0.7	2.2	2.2
Sodium	mg/L	200 *	18.5	8.2	3.2	33.7	8.4	9.4	9.2	24.1	23.4	12.3	16.5	11.7	10.5	17.5	13	16.5
Sulphate	mg/L	500 *	11.7	8.1	11.9	39.1	35.5	32.1	34.3	10.3	29.1	36.4	13.8	23.7	34.4	46.3	46	30.1
Temperature - field	°C		14.8	7.6	6.5	9.4	12.1	8.7	15.3	8.4	14.3	11.2	14.7	10.6	15.8	10.2	15.1	8.6
Total Dissolved Solids	mg/L	500 *	270	260	240	350	260	70	290	350	400	160	720	330	350	350	350	280
Total Kjeldahl Nitrogen	mg/L		0.2	0.2	<0.3	<0.1	<1.0	<0.1	0.1	0.2	<1.0	0.6	0.6	<0.1	5.8	<0.3	0.5	<0.1
Zinc	mg/L	5 *		<0.0005	<0.005	0.0012		0.0011		0.0045		<0.0005		0.0028		0.0015		0.0011

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1

Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	92-II											92-III				
			Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20
Alkalinity	mg/L	30-500 *	205	202	202	203	198	210	209	208	210	213	216	491	468	385	426	403
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.2	0.2	0.2	<0.1	1.3	1.8	1.2	1.1	0.7
Anion sum	meq/L		4.88	4.8	4.75	5	4.83	5.05	5.04	5.09	5.13	5.17	5.32	22.5	14.6	14.4	12.9	13.6
Arsenic	mg/L	0.010 **	<0.005	0.0014	0.006	0.0012	0.0028	0.0015	0.0024	0.0017	0.0028	0.0012	0.0023	0.003	0.006	0.0026	<0.005	0.0019
Barium	mg/L	1 **		0.124		0.117		0.128		0.138		0.125		0.211		0.106		0.088
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005
Bicarbonate	mg/L		204	200	200	201	197	208	208	207	209	211	215	491	468	384	425	402
Boron	mg/L	5 **		0.436		0.667		0.629		0.851		0.81		0.274		0.23		0.292
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		46.1	45.9	48.1	45.9	48.6	45.6	49.6	47.8	47.3	48.7	52.5	263	191	170	170	172
Carbonate	mg/L		1	2	2	2	1	2	1	1	1	2	1	<1	<1	<1	<1	<1
Cation sum	meq/L		5.32	5.3	5.35	5.29	5.52	5.11	5.44	5.52	5.49	5.69	5.94	22.8	15.3	15.4	13.4	14.2
Chemical Oxygen Demand	mg/L		20	<10	<10	20	<10	10	<10	<10	<10	<10	<10	40	30	<10	20	40
Chloride	mg/L	250 *	10.9	9.8	11.8	14.6	13.4	13.0	13.2	14.5	14.3	14.7	16.4	133	70.6	93.2	41.5	42.3
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0017		<0.0005		<0.0005
Conductivity	µS/cm		483	485	486	499	497	496	508	511	499	475	508	1950	1340	1410	1180	1270
Conductivity - field	µS/cm		482	478	490	510	496	504	508	490	514	509	487	1930	1370	1430	1220	1300
Copper	mg/L	1 *		<0.0005		<0.0005		<0.0005		<0.0005		0.0007		0.0011		<0.0005		<0.0005
Dissolved Organic Carbon	mg/L	5 *	<1.0	1.6	<1.0	2.9	1.7	2.7	1	<1.0	1.1	<1.0	1	19.2	11	10.2	8.1	12.1
Dissolved Oxygen - field	mg/L		1.52	2.88	1.05	2.16	0.64	1.14	2.71	2.47	1.5	2.54	1.21	1.96	1.05	1.27	1.31	1.6
Hardness	mg/L	80-100 *	226	227	229	223	233	217	232	231	232	239	252	885	622	590	556	95.6
Ion Percentage	%		4.32	4.97	5.96	2.73	6.63	0.60	3.75	3.99	3.42	4.73	5.47	0.68	2.4	3.3	1.92	2.06
Iron	mg/L	0.3 *	0.09	0.066	<0.05	0.019	0.171	0.057	0.16	0.121	0.152	0.011	0.031	10.7	12.1	8.37	8.16	5.42
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		27	27.2	26.4	26.2	27	25.0	26.3	27	27.6	28.4	29.3	55.5	35.2	40.2	32	36.8
Manganese	mg/L	0.05 *	0.013	0.0035	0.039	0.0045	0.0863	0.0009	0.0304	0.0014	0.0297	0.0009	0.0187	2.03	1.72	1.062	0.962	0.675
Molybdenum	mg/L			0.0025		0.0024		0.0026		0.0026		0.0025		<0.0005		<0.0005		<0.0005
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		0.005		0.003		0.002
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-101.2	152.4	-127.6	189.3	-132.1	167.1	-93.6	197.1	-84.2	320.2	-79.1	-66	-98.6	-55.1	-92.1	-64.6
pH	units		7.84	8.02	7.95	7.92	7.86	7.98	7.81	7.75	7.73	7.99	7.74	7	6.96	7.32	7.18	7.2
pH - field	units		7.75	7.87	7.69	7.69	7.91	7.68	7.51	7.59	7.52	7.58	7.31	6.85	6.84	6.96	6.95	6.93
Phenols	µg/L		<1	1	<1	<1	1	<1	2	<1	<1	<1	<1	<1	<1	2	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	<0.02	<0.01	0.01	<0.01	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	0.05	<0.02	<0.02
Potassium	mg/L		2.3	2.3	2.4	2.4	2.6	2.3	2.4	2.5	2.5	2.7	2.7	17.8	16.9	21.5	24.3	23.4
Sodium	mg/L	200 *	16	15.4	15.5	17	17.6	15.7	15.7	18.4	17.2	18.4	18.5	104	51.4	67.8	35.1	43
Sulphate	mg/L	500 *	29	29.4	24.3	32	30	29.9	30.2	31.8	31.8	30.6	32.8	446	169	210	167	222
Temperature - field	°C		13.6	9.5	16.2	11.5	15.1	13.6	18	12.4	17	10.6	16.4	8.4	19.3	9.4	19.3	8.5
Total Dissolved Solids	mg/L	500 *	280	200	300	300	300	250	320	270	310	320	300	1320	850	890	800	830
Total Kjeldahl Nitrogen	mg/L		<0.1	<0.1	0.1	<0.1	<1.0	<0.1	0.1	<0.1	2.4	<0.3	<0.3	5.2	2	1.3	9.4	0.9
Zinc	mg/L	5 *		0.0015		0.0013		<0.0005		<0.0005		<0.0005		0.0011		0.002		0.0006

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	92-III							93-I								
			Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22
Alkalinity	mg/L	30-500 *	370	345	420	350	406	400	459	197	183	191	192	180	182	196	188	190
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		1.2	0.3	0.6	0.2	0.5	0.2	0.6	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2
Anion sum	meq/L		18.7	16.8	18.8	12.1	13.8	14.4	14.3	4.99	4.72	4.83	4.89	4.67	4.71	4.96	4.93	4.88
Arsenic	mg/L	0.010 **	0.0042	0.0012	0.0034	0.0008	0.0023	0.0022	0.0066	0.0009	0.005	0.0008	<0.005	0.0009	0.0009	0.0007	0.0009	0.0009
Barium	mg/L	1 **		0.099		0.096		0.084		0.247		0.225		0.227		0.244		0.23
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		370	344	420	349	406	399	459	196	181	190	191	179	181	195	187	189
Boron	mg/L	5 **		0.239		0.254		0.339		0.0265		0.0265		0.0243		0.0252		0.0221
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		273	195	253	154	172	190	194	60.3	60.2	60.6	63.3	61.8	61.3	60.7	61.6	69.1
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	1	1	1	1	1	<1	1	1	1
Cation sum	meq/L		20.7	15.6	18.7	12.8	14	15.4	15.5	5.05	4.98	5.01	5.27	5.1	5.09	4.97	5.04	5.75
Chemical Oxygen Demand	mg/L		20	20	40	<10	20	40	30	20	10	10	20	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	64	70.6	80.5	53.6	62.7	76.3	58.6	10	10.4	8.9	9.7	10.2	9.6	9.2	11.4	9.4
Chromium	mg/L	0.05 **		<0.0005		<0.0005		0.0007		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			0.0010		0.0029		0.0037		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Conductivity	µS/cm		1680	1440	1640	1170	1240	1120	1310	448	470	472	475	470	455	475	456	483
Conductivity - field	µS/cm		1660	1460	1640	1120	1270	1360	1250	463	465	473	465	487	466	482	468	456
Copper	mg/L	1 *		<0.0005		0.0007		<0.0005		<0.0005		<0.0005		0.0005		0.0006		<0.0005
Dissolved Organic Carbon	mg/L	5 *	15.8	12.0	14.6	8.6	8.1	12.3	6.7	1.4	1	1.6	2.4	2.3	1.4	1.6	1.5	<1.0
Dissolved Oxygen - field	mg/L		0.57	1.11	2.02	2.21	1.06	1.57	1.27	1.6	1.18	1.09	7.73	1.89	0.73	1.19	2.16	1.01
Hardness	mg/L	80-100 *	865	635	790	499	564	617	613	231	228	229	242	234	234	228	231	263
Ion Percentage	%		5.02	3.96	0.21	2.88	0.61	3.41	3.99	0.59	2.61	1.78	3.79	4.32	3.95	0.08	1.13	8.12
Iron	mg/L	0.3 *	8.49	1.94	6.5	0.871	4.55	2.73	4.93	0.491	0.56	0.407	0.63	0.503	0.628	0.289	0.634	0.534
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		44.4	36.0	38.5	27.9	32.8	34.5	31.2	19.5	18.8	18.8	20.4	19.3	19.7	18.6	18.8	22
Manganese	mg/L	0.05 *	1.15	0.569	0.804	0.368	0.454	0.844	0.882	0.0122	0.012	0.0122	0.012	0.0117	0.012	0.0119	0.0119	0.0124
Molybdenum	mg/L			0.0009		0.0015		0.0009		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Nickel	mg/L			0.006		0.005		0.006		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	0.7	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-70.8	-109.9	-71.8	-4.3	-109.7	-18	-98.3	-59.5	-89.1	-64.4	-103.4	-10.4	-60.2	-12.3	-65.6	-89.4
pH	units		7.09	7.32	7.07	7.2	7.06	7.25	6.99	7.81	7.94	7.85	7.82	7.82	7.71	7.80	7.89	7.89
pH - field	units		6.87	7.01	6.74	6.96	6.8	6.86	6.57	7.5	7.79	7.59	7.65	7.62	7.55	7.56	7.59	7.51
Phenols	µg/L		1	<1	<1	1	<1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.01	0.02	0.01	<0.02	<0.02	<0.02	<0.02	0.02	0.05	<0.02	<0.02	<0.02	<0.01	0.01	0.01	<0.02
Potassium	mg/L		31.5	20.3	24.6	18.3	20.8	20	25.9	1.1	1.1	1.2	1.2	1.2	1.2	1.2	1.1	1.4
Sodium	mg/L	200 *	55.7	51.9	49.6	52.1	48.7	58	58.1	8.4	8.2	8.6	8.5	8.1	8	7.8	8.1	9.4
Sulphate	mg/L	500 *	467	392	402	179	203	217	183	43	42.7	42.6	43.2	43.4	43.9	43.7	46.6	45.3
Temperature - field	°C		19.6	10.8	20.6	9.6	20.2	9.4	20.2	7	9.1	7.8	8.3	7.6	9.1	7.5	8.8	7.3
Total Dissolved Solids	mg/L	500 *	1270	410	1160	680	790	830	800	280	280	210	310	290	270	270	250	290
Total Kjeldahl Nitrogen	mg/L		1.3	0.7	1.3	4.8	3.1	1	3.6	<0.1	<2.0	<0.1	<0.1	<0.1	<1.0	<0.1	0.1	<0.2
Zinc	mg/L	5 *		0.0005		0.0011		<0.0005		0.0009		<0.0005		<0.0005		<0.0005		<0.0005

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	93-I			93-II												94-I
			Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18
Alkalinity	mg/L	30-500 *	194	199	196	321	274	317	319	279	332	339	374	332	258	291	413	185
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		0.061		<0.025		<0.025		0.036		<0.025
Ammonia (as N)	mg/L		0.2	0.2	0.2	0.1	0.2	<0.1	0.1	0.2	<0.1	0.1	0.1	0.2	0.1	0.1	<0.1	0.2
Anion sum	meq/L		4.97	5.07	5.05	7.04	6.19	6.89	7	6.33	7.53	7.69	8.65	7.47	10.2	7.53	10.3	5.68
Arsenic	mg/L	0.010 **	0.0009	0.0008	0.001	<0.0005	0.008	<0.0005	<0.005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0018
Barium	mg/L	1 **		0.238		0.053		0.063		0.073		0.055		0.075		0.064		0.062
Beryllium	mg/L			<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Bicarbonate	mg/L		193	197	195	320	273	316	318	278	331	338	373	331	257	290	412	184
Boron	mg/L	5 **		0.0264		0.0057		0.0056		0.0064		0.0027		0.0057		0.0046		0.0246
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		60.9	62.4	60.2	115	103	122	113	106	137	138	151	144	170	128	178	62.9
Carbonate	mg/L		<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	1
Cation sum	meq/L		5.02	5.18	5.22	7.15	6.68	7.51	7.57	6.94	8.23	8.07	8.97	8.92	10.1	7.71	10.8	5.49
Chemical Oxygen Demand	mg/L		<10	<10	<10	30	20	<10	<10	<10	<10	<10	<10	<10	20	<10	10	<10
Chloride	mg/L	250 *	9.6	9.9	9.7	5.6	5.6	5	6	6.8	8.4	10.6	9.5	9.2	19.7	12.4	29.6	14.4
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Conductivity	µS/cm		482	446	479	633	602	666	665	618	746	735	817	723	912	674	866	510
Conductivity - field	µS/cm		480	478	434	644	597	671	651	639	725	748	797	684	916	723	863	496
Copper	mg/L	1 *		<0.0005		0.0008		0.0006		0.001		0.0009		0.0008		0.0013		<0.0005
Dissolved Organic Carbon	mg/L	5 *	1.3	<1.0	2.9	2.4	2.9	2.6	14.5	2.9	3.9	2.8	3.7	2	4.3	2.5	5.4	1.2
Dissolved Oxygen - field	mg/L		1.4	1.4	2.17	5.94	6.2	5.39	5.86	5.1	3.98	6.39	5.09	7.51	6.45	5.89	4.96	1.78
Hardness	mg/L	80-100 *	231	238	238	338	311	358	356	329	393	391	431	429	485	371	519	252
Ion Percentage	%		0.56	1.07	1.71	0.78	3.79	4.31	3.88	4.55	4.43	2.41	1.83	8.84	0.74	1.21	2.1	1.75
Iron	mg/L	0.3 *	0.629	0.365	0.757	0.002	<0.05	0.005	<0.05	0.042	0.01	0.006	0.06	<0.005	0.014	0.019	<0.005	0.353
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		19.1	20	21.3	12.4	13.1	13	18	15.7	12.4	11.2	13	16.9	14.8	12.5	18.1	23.1
Manganese	mg/L	0.05 *	0.0116	0.0128	0.0127	<0.0005	<0.001	<0.0005	0.009	0.0028	0.0096	0.0012	0.0031	<0.0005	0.0009	0.002	<0.0005	0.0105
Molybdenum	mg/L			<0.0005		<0.0005		<0.0005		0.0007		<0.0005		<0.0005		<0.0005		0.0011
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.05	<0.5	0.19	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.19	0.64	0.13	3.97
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Oxidation Reduction Potential	mV		-7	-18.1	36.4	23.5	51.2	203.2	58.2	91.5	35.3	81.7	105.4	104.9	156.8	102.9	103.9	-46.7
pH	units		7.45	7.97	7.66	7.42	7.48	7.5	7.5	7.48	7.24	7.33	7.35	7.46	7.51	7.65	7.11	7.85
pH - field	units		7.44	7.47	7.22	7.1	7.4	7.12	7.3	7.35	7.25	7.05	7.05	7.09	7.13	7.11	6.69	7.54
Phenols	µg/L		<1	<1	<1	<1	<1	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.01	0.02	0.01	<0.02	<0.02	<0.02	<0.02	0.02
Potassium	mg/L		1.1	1.2	1.3	0.6	1.2	0.9	1.6	1.1	1.4	0.9	1.8	1.4	1.9	1.3	2.3	1.3
Sodium	mg/L	200 *	7.9	8	9	8	9	7	8.5	6.6	7.1	4.8	6.5	5.9	6.6	5.3	7.1	8.5
Sulphate	mg/L	500 *	45.3	45.2	47.2	32.4	34.5	29.6	31.8	35.8	41.8	40.1	54.9	37.7	224	72.2	72	67.9
Temperature - field	°C		8.7	7.8	8.5	3	14	3.5	12.1	3.6	13.5	3.1	13.4	3.6	13.6	3.4	13.2	7.7
Total Dissolved Solids	mg/L	500 *	250	320	180	380	350	390	400	370	500	270	420	410	580	500	390	300
Total Kjeldahl Nitrogen	mg/L		<2.0	<0.3	<0.3	0.2	<2.0	0.2	<0.1	0.1	<1.0	0.2	0.3	<0.2	3.4	<0.3	<0.3	<0.1
Zinc	mg/L	5 *		<0.0005		0.0019		0.0023		0.0007		0.0014		<0.0005		0.0024		0.0008

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	94-I											94-II				
			Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20
Alkalinity	mg/L	30-500 *	185	185	187	186	183	189	194	191	189	195	196	289	299	297	325	304
Aluminum	mg/L	0.1 *		<0.025		0.082		<0.025		<0.025		<0.025		<0.025		<0.025		0.105
Ammonia (as N)	mg/L		0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1	0.2	0.1
Anion sum	meq/L		5.15	5.1	5.14	5.23	5.07	5.19	5.40	5.24	5.20	5.21	5.33	8.28	8.56	8.62	8.72	8.43
Arsenic	mg/L	0.010 **	<0.005	0.002	<0.005	0.0019	0.002	0.0016	0.0022	<0.0005	0.0021	0.0018	0.0022	<0.0005	0.006	<0.0005	<0.005	<0.0005
Barium	mg/L	1 **		0.06		0.059		0.06		0.214		0.058		0.14		0.152		0.122
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005
Bicarbonate	mg/L		184	184	186	185	182	187	192	190	188	193	195	288	298	296	324	303
Boron	mg/L	5 **		0.027		0.0249		0.0272		0.0225		0.0424		0.0094		0.0131		0.0104
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		60.2	59.6	61.3	62.9	64.7	60.1	60.3	64.3	59.8	61.9	64.0	141	139	139	145	127
Carbonate	mg/L		1	1	1	1	<1	2	2	1	1	2	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		5.35	5.33	5.54	5.55	5.66	5.42	5.33	5.72	5.34	5.56	5.60	9.14	9	9.09	9.5	8.35
Chemical Oxygen Demand	mg/L		10	20	<10	40	<10	20	<10	<10	<10	<10	<10	20	<10	<10	<10	<10
Chloride	mg/L	250 *	13.1	11.5	12.3	13.7	12.6	12.1	13.7	12.1	11.7	10.7	12.2	17.8	27.3	22.9	22.3	19
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005
Conductivity	µS/cm		504	501	504	512	503	506	510	517	505	482	498	798	828	808	831	794
Conductivity - field	µS/cm		498	501	493	511	492	516	499	490	504	503	457	790	810	830	813	796
Copper	mg/L	1 *		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0011		<0.0005		<0.0005
Dissolved Organic Carbon	mg/L	5 *	1	1.1	3.4	2.2	1.4	<1.0	1.5	<1.0	1.2	1.5	2.5	1.2	1.8	2.2	2.3	2.5
Dissolved Oxygen - field	mg/L		0.7	1.65	0.94	1.31	0.57	1.11	2.00	1.89	1.75	2.39	2.24	2.96	3.26	3.26	5.88	3.55
Hardness	mg/L	80-100 *	247	245	256	257	262	251	246	264	247	257	259	441	432	436	455	401
Ion Percentage	%		1.85	2.17	3.77	2.99	5.49	2.2	0.66	4.42	1.38	3.22	2.50	4.94	2.53	2.66	4.3	0.5
Iron	mg/L	0.3 *	0.48	0.362	0.48	0.484	0.416	0.227	0.523	0.019	0.476	0.350	0.517	0.053	0.58	0.061	0.37	0.087
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		23.4	23.4	25	24.3	24.4	24.4	23.1	25.1	23.6	24.8	24.0	21.5	20.6	21.6	22.5	20.4
Manganese	mg/L	0.05 *	0.011	0.0107	0.012	0.0138	0.0178	0.0105	0.0114	0.0017	0.0108	0.0103	0.0105	0.0034	0.013	0.0044	0.038	0.0026
Molybdenum	mg/L			0.001		0.001		0.0012		<0.0005		0.001		<0.0005		<0.0005		<0.0005
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	0.6	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-87.1	-60.1	-102.7	-56.6	-76.1	-6.1	-77.8	-84.1	-22.8	-34.7	-60.0	15.7	-22.1	73.2	-23.1	92
pH	units		7.87	7.87	7.83	7.89	7.74	7.93	7.92	7.89	7.89	7.98	7.65	7.51	7.49	7.51	7.44	7.53
pH - field	units		7.73	7.7	7.64	7.59	7.67	7.57	7.55	7.50	7.55	7.50	7.41	7.11	7.26	7.31	7.26	7.16
Phenols	µg/L		<1	<1	<1	<1	1	1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	<0.02	<0.01	0.01	<0.01	<0.02	<0.02	<0.02	<0.02	0.03	0.12	0.03	<0.02	<0.02
Potassium	mg/L		1.2	1.3	1.4	1.3	1.4	1.3	1.3	1.4	1.3	1.4	1.3	1	1.3	1.1	1.4	1
Sodium	mg/L	200 *	7.9	8.3	8.1	7.9	8	7.9	7.8	8.4	7.8	7.9	8.1	6.1	6.6	7	7.5	6.1
Sulphate	mg/L	500 *	57.9	57.7	56.5	59.9	56.4	57.2	60.4	57.7	58.2	54.5	57.2	105	94.1	107	86.5	96.8
Temperature - field	°C		9	7.5	8.5	7.7	8.4	7.2	8.8	7.8	9.1	7.6	8.9	3.7	13.7	3.3	11.9	3.7
Total Dissolved Solids	mg/L	500 *	300	290	350	320	330	330	180	310	310	300	260	500	500	460	550	510
Total Kjeldahl Nitrogen	mg/L		<2.0	<0.1	<0.1	<0.1	<1.0	<0.5	0.1	<0.2	2.1	<0.3	<0.3	<0.3	<2.0	0.2	0.4	0.3
Zinc	mg/L	5 *		<0.0005		<0.0005		<0.0005		<0.0005		0.0009		0.0017		0.0008		0.0011

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1

Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	94-II							95-I								
			Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Apr-22
Alkalinity	mg/L	30-500 *	297	293	337	334	351	327	330	213	201	199	207	196	196	205	204	199
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		0.1	<0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1	<0.1	0.1	0.1	0.2	0.1
Anion sum	meq/L		8.12	7.88	9.72	8.59	8.97	8.56	8.87	6.22	6.09	5.98	6.15	5.91	5.89	6.08	6.15	5.96
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.121		0.142		0.142		0.054		0.056		0.06		0.059		0.055
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		296	292	336	333	350	326	329	212	200	198	206	195	195	204	203	198
Boron	mg/L	5 **		0.0099		0.0125		0.0228		0.0161		0.011		0.0124		0.0187		0.0092
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		133	122	146	148	140	140	140	89.5	88	89.2	91.4	87.3	88.3	84.7	82.9	95.5
Carbonate	mg/L		<1	<1	<1	<1	1	1	<1	<1	<1	1	<1	1	<1	1	1	<1
Cation sum	meq/L		8.82	7.95	9.60	9.86	9.39	9.51	9.41	6.35	6.27	6.39	6.57	6.24	6.45	6.13	5.95	6.87
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	<10	<10	<10	<10	<10	20	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	22.6	18.6	40.7	18.9	21.1	22.7	23.7	16.4	18.3	16	18.1	17.1	17.4	16.9	18.9	17.5
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0005		<0.0005		0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Conductivity	µS/cm		750	749	916	786	900	757	767	583	589	563	600	583	587	586	552	595
Conductivity - field	µS/cm		777	773	891	802	851	807	751	568	591	589	588	575	578	593	578	563
Copper	mg/L	1 *		0.0011		0.0007		0.0009		0.0009		0.0005		0.0016		0.0011		0.0006
Dissolved Organic Carbon	mg/L	5 *	2	1.9	2.2	1.4	2.0	1.5	2.9	<1.0	<1.0	2	2.6	<1.0	<1.0	1.6	1.4	1.6
Dissolved Oxygen - field	mg/L		1.73	3.64	3.60	1.77	6.77	2.14	6.06	1.34	1.82	1.26	1.45	1.45	0.59	1.05	2.62	1.60
Hardness	mg/L	80-100 *	421	382	458	471	445	451	446	303	300	305	314	298	307	293	283	327
Ion Percentage	%		4.15	0.46	0.64	6.84	2.29	5.25	2.92	1.04	1.45	3.31	3.32	2.67	4.53	0.41	1.68	7.10
Iron	mg/L	0.3 *	0.139	0.040	0.234	0.054	0.306	<0.005	0.031	0.196	0.16	0.189	0.16	0.249	0.223	0.269	0.255	0.261
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		21.5	18.7	22.6	24.6	22.9	24.6	23.3	19.4	19.4	20	20.8	19.5	21	19.7	18.5	21.6
Manganese	mg/L	0.05 *	0.0122	0.0029	0.0153	0.0078	0.0186	0.0006	0.0100	0.0176	0.021	0.0191	0.024	0.0192	0.021	0.0198	0.0213	0.0197
Molybdenum	mg/L			<0.0005		<0.0005		<0.0005		0.0006		0.0005		0.0007		0.0007		0.0006
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	0.5	<0.5	<0.5	<0.5	0.78	0.47	0.67	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		26.5	113	95.8	67.6	39.4	75.8	56.8	-40.1	118.5	-22	-32.4	44.3	-25	-24.5	-10.6	-7.1
pH	units		7.36	7.51	7.39	7.46	7.52	7.58	7.33	7.57	7.71	7.75	7.63	7.76	7.65	7.72	7.73	7.69
pH - field	units		7.26	7.19	7.10	7.04	7.16	7.04	6.93	7.36	7.49	7.54	7.51	7.5	7.6	7.43	7.39	7.41
Phenols	µg/L		2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.01	0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.12	0.02	<0.02	<0.02	<0.01	0.01	0.02	<0.02
Potassium	mg/L		1.2	1.0	1.3	1.2	1.4	1.2	1.4	1.5	1.5	1.8	1.7	1.6	1.7	1.6	1.6	1.9
Sodium	mg/L	200 *	7.8	6.1	8.4	8.3	9.9	9.7	9.7	4.7	4.7	4.9	5	4.8	5.3	4.7	4.8	5.5
Sulphate	mg/L	500 *	81.5	80.9	98.6	76.8	73.4	75.0	85.1	78.5	80.8	80.8	78.5	78.8	77.1	78.6	80.4	77.6
Temperature - field	°C		12.7	3.1	12.7	3.3	13.6	4.0	13.0	8.3	9	8.4	9.4	8.5	8.8	9	8.8	8.6
Total Dissolved Solids	mg/L	500 *	520	230	500	490	520	490	380	350	350	370	400	390	360	350	240	390
Total Kjeldahl Nitrogen	mg/L		<1.0	0.2	0.3	<0.2	<2.0	<0.3	<0.3	<0.1	<2.0	<0.1	<0.1	<0.1	<1.0	<0.1	0.2	<0.2
Zinc	mg/L	5 *		0.0011		0.0009		0.0009		0.0016		0.0014		0.002		0.0018		0.0011

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	95-I			95-II												101-I
			Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Apr-22	Sep-22	Mar-23	Sep-23	Mar-18
Alkalinity	mg/L	30-500 *	206	207	215	247	218	227	222	269	231	258	293	268	230	270	239	168
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		
Ammonia (as N)	mg/L		0.2	0.2	0.1	0.3	0.2	<0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2
Anion sum	meq/L		6.13	6.03	6.36	7.32	6.68	7.38	6.48	8.62	8.09	7.95	8.44	7.93	6.71	8.45	7.20	4.55
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	0.0007	0.006	0.0008	<0.005	0.0008	<0.0005	<0.0005	0.0013	0.0010	0.0015	<0.0005	0.0014	<0.005
Barium	mg/L	1 **		0.056		0.092		0.11		0.121		0.111		0.131		0.107		
Beryllium	mg/L			<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		
Bicarbonate	mg/L		205	206	214	246	217	226	221	268	230	257	292	267	229	269	238	167
Boron	mg/L	5 **		0.012		0.0111		0.0079		0.0233		0.0131		0.005		0.008		
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		
Calcium	mg/L		87.9	89.0	83.6	104	98.7	97.8	98.1	119	125	112	118	127	98	119	107	16
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		6.33	6.48	6.19	7.39	6.93	7.4	6.98	9.24	9.04	7.96	8.39	9.20	6.93	8.63	7.53	4.42
Chemical Oxygen Demand	mg/L		<10	10	30	20	30	20	<10	40	<10	20	<10	<10	<10	10	<10	<10
Chloride	mg/L	250 *	19.2	17.1	20.5	45.3	26.1	71.2	21.5	89.2	68	63.1	59.5	66.5	25.0	75.8	40.9	5.5
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		
Cobalt	mg/L			<0.0005		0.0002		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		
Conductivity	µS/cm		601	548	605	703	652	753	637	881	819	788	827	820	659	841	700	447
Conductivity - field	µS/cm		597	590	547	691	652	714	626	767	812	804	762	779	652	847	637	447
Copper	mg/L	1 *		0.0005		<0.0005		0.0013		0.0006		0.0006		0.0011		<0.0005		
Dissolved Organic Carbon	mg/L	5 *	1.2	1.1	2.6	2.1	1.2	4	5.4	5.9	2.7	2.5	3.8	3.6	1.7	2.0	3.1	5.4
Dissolved Oxygen - field	mg/L		1.20	2.24	2.36	2.3	5.22	1.42	2.43	1.91	1.53	2.29	4.98	2.42	6.54	2.69	4.18	3.73
Hardness	mg/L	80-100 *	301	308	294	342	326	318	328	369	413	364	380	409	325	387	354	70.4
Ion Percentage	%		1.68	3.62	1.34	0.44	1.81	0.18	3.66	3.47	5.53	0.02	0.34	7.39	1.62	1.02	2.22	1.55
Iron	mg/L	0.3 *	0.262	0.257	0.247	0.234	0.36	0.137	0.86	0.637	0.077	0.186	0.452	2.110	0.339	0.046	0.508	<0.05
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		
Magnesium	mg/L		19.9	20.9	20.6	20.1	19.3	18	20.2	17.4	24.5	20.6	20.8	22.3	19.6	21.9	21.1	7.39
Manganese	mg/L	0.05 *	0.0232	0.0216	0.0229	0.193	0.116	0.198	0.155	0.496	0.0734	0.216	0.187	0.287	0.117	0.196	0.134	0.013
Molybdenum	mg/L			0.0006		0.0007		0.0007		0.0006		0.0006		<0.0005		0.0007		
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		0.008		
Nitrate	mg/L	10.0 **	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Nitrite	mg/L	1.0 **	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Oxidation Reduction Potential	mV		-42.3	68.4	-10.1	-28.1	76.3	-2.8	-77.8	21.7	18.8	-1.6	-48.7	-69.7	-54.4	120.6	-24.1	-22.5
pH	units		7.70	7.55	7.55	7.48	7.66	7.65	7.6	7.49	7.46	7.57	7.50	7.45	7.65	7.29	7.53	7.8
pH - field	units		7.42	7.29	7.23	7.24	7.43	7.02	7.42	7.29	7.36	7	7.22	7.15	7.35	7.10	7.19	7.72
Phenols	µg/L		<1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	0.05	0.11	0.05	<0.02	0.03	0.01	0.01	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		1.6	1.8	1.7	1.5	1.9	1.4	2	2.4	2.1	1.4	2.0	1.8	2.0	1.5	2.2	3.5
Sodium	mg/L	200 *	5.2	5.2	5.6	10.4	7.4	22.5	7.4	40.8	15.7	13.7	15.8	21.4	7.8	18.4	8.0	66.6
Sulphate	mg/L	500 *	76.8	73.9	77.9	60.9	83	47.1	76	43.5	81.8	56.8	52.8	42.0	74.6	52.6	68.4	55.2
Temperature - field	°C		9.1	8.4	9.5	3.3	14.3	2	13.3	5.4	13.9	4.1	13.3	4.4	14.5	3.0	13.5	8.7
Total Dissolved Solids	mg/L	500 *	380	380	320	400	390	450	400	470	500	450	360	470	380	470	370	270
Total Kjeldahl Nitrogen	mg/L		<2.0	<0.3	<0.3	<0.1	<2.0	0.2	<0.1	0.1	<1.0	<0.1	0.3	<0.2	<2.0	<0.3	<0.3	0.2
Zinc	mg/L	5 *		<0.005		0.0013		0.0031		0.0015		0.0011		0.0007		<0.005		

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	101-I					101-II						101-III				
			Mar-19	Apr-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Apr-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Apr-20	Mar-21	Mar-22
Alkalinity	mg/L	30-500 *	158	150	171	163	166	131	122	117	126	126	131	444	405	362	414	450
Aluminum	mg/L	0.1 *																
Ammonia (as N)	mg/L		0.2	0.2	0.2	0.1	0.7	0.2	0.1	0.1	0.1	0.1	0.1	0.2	<0.1	0.2	0.1	0.2
Anion sum	meq/L		4.54	4.34	4.67		4.57	3.48	3.28	3.17	3.33	3.35	3.46	9.36	8.43	7.42	8.45	9.28
Arsenic	mg/L	0.010 **	0.0012	0.0008	0.0014	<0.0005	0.0012	<0.005	0.0007	0.0007	0.0008	0.0011	0.0008	<0.005	<0.0005	<0.0005	<0.0005	0.0007
Barium	mg/L	1 **																
Beryllium	mg/L																	
Bicarbonate	mg/L		157	149	169		165	129	120	115	124	124	130	443	404	361	413	449
Boron	mg/L	5 **																
Cadmium	mg/L	0.005 **																
Calcium	mg/L		19.3	19.4	22.5	148	23.6	13	13.2	13	13.7	21.3	13.5	141	138	129	144	12.7
Carbonate	mg/L		<1	<1	2		1	2	2	2	2	2	1	<1	<1	1	1	<1
Cation sum	meq/L		4.89	4.65	5.11		4.84	3.49	3.55	3.55	3.72	4.52	3.67	9.19	9.11	8.31	9.28	3.39
Chemical Oxygen Demand	mg/L		20	<10	<10	<10	10	<10	20	30	<10	<10	20	<10	30	<10	<10	<10
Chloride	mg/L	250 *	4.1	3.8	4	3.3	2.7	12	11.2	11.3	10.8	11.3	10.3	2.6	<2.5	1	1	7.2
Chromium	mg/L	0.05 **																
Cobalt	mg/L																	
Conductivity	µS/cm		463	463	469	464	452	350	347	346	344	352	348	841	755	736	707	668
Conductivity - field	µS/cm		473	453	484	466	476	335	350	342	352	340	353	807	816	724	792	831
Copper	mg/L	1 *																
Dissolved Organic Carbon	mg/L	5 *	5.3	6.8	2.3	2	3.3	2.6	3.1	3.3	<1.0	1.1	2.1	2	2.1	2.2	<1.0	1
Dissolved Oxygen - field	mg/L		1.86	1.6	2.63	4.48	2.45	4.4	5.01	3.65	3.05	1.74	2.52	4.67	5.47	5.88	4.28	3.26
Hardness	mg/L	80-100 *	85.7	88	101		103	81.1	84.4	83.1	86.9	94.8	83.5	430	427	390	439	79.1
Ion Percentage	%		3.73	3.46	4.43		2.94	0.18	3.93	5.66	5.57	14.8	2.96	0.9	3.84	5.71	4.67	46.5
Iron	mg/L	0.3 *	0.054	0.013	0.033	0.076	0.049	<0.05	0.004	<0.005	<0.005	0.016	0.012	<0.05	0.033	0.039	0.005	0.014
Lead	mg/L	0.01 **																
Magnesium	mg/L		9.11	9.61	10.9	18.4	10.6	11.8	12.5	12.3	12.8	10.1	12.1	18.9	20.1	16.5	19.4	11.5
Manganese	mg/L	0.05 *	0.0061	0.0095	0.0068	0.0027	0.0111	<0.001	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	0.002	0.0031	0.0024	0.0012	0.0014
Molybdenum	mg/L																	
Nickel	mg/L																	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	0.29	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-40.3	33.9	-83.5	-48.8	-54.2	93	48.9	30.6	-16.1	-31.4	-5.3	154.3	91.2	52.1	58.5	93.4
pH	units		7.69	7.74	7.98	7.74	7.9	8.2	8.24	8.24	8.21	8.15	8.04	7.34	7.3	7.54	7.47	7.13
pH - field	units		7.94	7.83	7.79	7.83	7.95	7.94	8.24	8.11	8.15	8.03	7.91	6.95	7.27	7.26	7.05	6.86
Phenols	µg/L		1	<1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.03
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.01	0.06	0.03	0.03	0.02	<0.02	0.02	0.02	0.02	0.03	0.02	<0.02	<0.01	0.06	<0.02
Potassium	mg/L		4.3	4.6	4.4	2.2	4.2	1.6	1.6	1.5	1.7	4.2	1.6	2.3	2.2	1.9	2.3	1.6
Sodium	mg/L	200 *	69.9	63.2	67.8	8	60.3	41.5	41.3	42	44.1	57.4	44.5	11.3	10.9	9.8	9.1	40.1
Sulphate	mg/L	500 *	65.5	63.9	60.2	62.1	61.4	29.2	28.9	28.1	28.1	28.5	29.3	33.3	28.7	18.5	19.9	17.8
Temperature - field	°C		7.9	9.5	6	7.7	7.7	8.5	7.9	9.1	6.3	7.8	8.2	6.9	6.7	7.2	5.3	6.7
Total Dissolved Solids	mg/L	500 *	290	280	300	300	290	190	160	170	210	210	250	480	470	400	470	500
Total Kjeldahl Nitrogen	mg/L		0.2	0.6	2.8	0.1	<0.3	<0.1	0.1	0.6	<0.1	0.2	<0.3	<0.1	<0.1	0.5	<0.5	<0.1
Zinc	mg/L	5 *																

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	101-III	104-I											104-II			
			Mar-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19
Alkalinity	mg/L	30-500 *	410	310	288	286	296	283	277	299	282	285	290	286	290	277	271	282
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025	<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.1	<0.1	0.1	0.1	<0.1	<0.1
Anion sum	meq/L		8.27	6.82	6.43	6.46	6.73	6.47	6.39	6.73	6.74	7.01	7.40	7.52	7.37	7.15	6.89	7.12
Arsenic	mg/L	0.010 **	<0.0005	0.0035	<0.005	0.0012	<0.005	0.0017	0.0015	0.0015	0.0037	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005
Barium	mg/L	1 **		0.152		0.183		0.155		0.168	0.089		0.199		0.048		0.05	
Beryllium	mg/L			<0.0001		<0.0005		<0.0005		<0.0005	<0.0005		<0.0005		<0.0001		<0.0005	
Bicarbonate	mg/L		409	309	286	284	294	282	276	298	281	284	289	285	289	276	269	281
Boron	mg/L	5 **		0.716		0.6		0.553		0.452	0.067		0.276		0.0106		0.0104	
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001	<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		140	60.8	57.1	67.6	70.5	69.9	75.5	65.3	82.1	85.2	90.6	97.3	93.7	90.4	91.9	97.5
Carbonate	mg/L		<1	1	2	2	2	1	1	1	<1	1	1	<1	1	1	2	1
Cation sum	meq/L		8.64	7.02	6.74	7.29	7.25	7.11	7.31	6.46	7.30	7.57	7.71	8.12	7.49	7.29	7.54	7.81
Chemical Oxygen Demand	mg/L		<10	40	70	20	10	70	20	40	<10	10	<10	10	<10	50	<10	<10
Chloride	mg/L	250 *	0.8	27.2	28.5	22.1	25	20.8	18.8	17.8	14.6	13.7	12.9	13.3	8.5	8.4	6.5	7.6
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L			<0.0001		<0.0005		0.0006		<0.0005	<0.0005		<0.0005		<0.0001		<0.0005	
Conductivity	µS/cm		687	648	649	665	653	645	653	652	672	685	626	730	661	687	681	689
Conductivity - field	µS/cm		709	629	640	652	670	656	642	650	645	692	700	668	662	672	665	690
Copper	mg/L	1 *		<0.0005		0.0008		0.0006		<0.0005	0.0006		0.0006		<0.0005		0.0013	
Dissolved Organic Carbon	mg/L	5 *	2.4	7.6	9.7	7.4	6.8	7.7	6.8	6.1	3.2	2.4	2.4	1.6	2.9	3.5	3.4	3.7
Dissolved Oxygen - field	mg/L		3.51	1.28	0.79	2.05	1.69	0.92	0.92	1.84	3.03	1.49	3.03	2.01	6	1.66	5.16	1.27
Hardness	mg/L	80-100 *	410	263	251	290	292	285	298	261	312	327	335	353	354	347	358	371
Ion Percentage	%		2.19	1.46	2.35	6.03	3.72	4.68	6.76	2.06	3.94	3.85	2.08	3.85	0.81	1	4.52	4.57
Iron	mg/L	0.3 *	0.027	0.195	0.23	0.043	0.71	0.385	0.831	0.184	0.027	0.075	0.060	0.019	0.002	<0.05	0.031	<0.05
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		14.7	27	26.4	29.4	28.2	26.9	26.7	23.9	26.1	27.7	26.3	26.7	29.2	29.4	31.3	30.9
Manganese	mg/L	0.05 *	0.0011	0.0258	0.025	0.02	0.032	0.0976	0.0485	0.0538	0.0047	0.0840	0.0108	0.0015	<0.0005	0.003	<0.0005	0.011
Molybdenum	mg/L			0.0007		0.0022		0.0011		0.0008	0.0020		0.0009		0.0018		0.002	
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002	<0.002		<0.002		<0.002		0.003	
Nitrate	mg/L	10.0 **	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	0.1	0.3	1.75	2.2	2	1.5
Nitrite	mg/L	1.0 **	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		68	-38.4	-167.6	-39.1	-162.8	-106.1	-94.7	-143.8	155.8	51.2	129.2	97.4	90.3	-43.3	28.6	14.7
pH	units		7.37	7.66	7.82	7.78	7.76	7.62	7.65	7.63	7.39	7.65	7.69	7.57	7.71	7.59	7.78	7.64
pH - field	units		6.97	7.6	7.69	7.54	7.75	7.39	7.39	7.60	7.28	7.06	7.12	7.12	7.63	7.49	7.56	7.51
Phenols	µg/L		<1	<1	<1	<1	<1	3	<1	<1	2	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	0.05	<0.02	0.04	0.03	<0.02	0.02	0.05	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Potassium	mg/L		2	5.5	5.2	5	4.6	4.7	4.9	4.3	4.1	4.1	4.3	4.2	2.9	2.6	3	2.9
Sodium	mg/L	200 *	8.1	36.2	35.1	30.3	28.6	28.3	27	24.6	20.6	20.4	20.1	21.2	6.7	5.7	6	6.5
Sulphate	mg/L	500 *	15	2.6	2.5	14.7	14.4	19.8	24	21.3	42.0	53.5	68.1	76.3	67	67	63.4	64.7
Temperature - field	°C		6.6	7.2	11.1	6.3	12.2	7.3	12.2	8.4	7.3	12.8	7.1	12.6	6.3	12.3	5.8	12.6
Total Dissolved Solids	mg/L	500 *	500	360	370	380	390	370	410	340	370	390	420	490	400	410	410	450
Total Kjeldahl Nitrogen	mg/L		<0.3	0.1	1.5	0.2	0.2	0.4	<1.0	0.2	0.1	2.7	<0.3	<0.3	<0.1	<1.0	<0.1	<0.2
Zinc	mg/L	5 *		0.0011		0.003		0.004		<0.0005	0.0008		0.0028		0.0021		0.0052	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	104-II								104-III							
			Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21
Alkalinity	mg/L	30-500 *	275	274	289	293	283	295	292	298	318	382	294	419	281	371	319	380
Aluminum	mg/L	0.1 *	<0.025		<0.025		0.644		0.034		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.1	0.1	0.2	0.2	0.2	<0.1	<0.1	0.1	0.2	0.1	0.3	0.2	0.1	0.1	0.2
Anion sum	meq/L		7.02	6.8	7.12	7.15	7.11	7.24	7.32	7.63	7.65	9.31	6.91	9.02	8.7	10.7	9.16	9.89
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.009	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	0.0008
Barium	mg/L	1 **	0.052		0.052		0.056		0.058		0.084		0.075		0.076		0.085	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		273	273	287	292	282	294	290	297	318	381	293	418	280	371	318	379
Boron	mg/L	5 **	0.0109		0.0114		0.0106		0.0122		0.0584		0.0433		0.0816		0.0478	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		92.1	95	85.0	94.0	99.5	95.1	92.6	102.0	133	163	128	167	138	205	153	174
Carbonate	mg/L		2	<1	2	1	1	1	2	1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		7.53	7.59	6.92	7.50	7.92	7.71	7.71	8.20	7.9	9.54	7.43	9.77	8.08	11.9	8.82	10.2
Chemical Oxygen Demand	mg/L		20	<10	<10	<10	<10	<10	<10	10	<10	20	<10	10	50	<10	20	10
Chloride	mg/L	250 *	8.2	6.9	6.9	6.3	7.9	7.5	8.9	9.5	11.4	4.3	5.1	3.1	9.6	3.2	4.2	6.0
Chromium	mg/L	0.05 **	<0.0005		<0.0005		0.001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		0.0004		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		672	684	672	676	679	700	615	713	704	874	680	870	725	1020	848	925
Conductivity - field	µS/cm		674	672	630	669	648	707	687	666	692	879	665	882	695	1020	840	903
Copper	mg/L	1 *	0.0011		0.0009		0.0013		0.0012		0.0018		0.0014		0.0021		0.0021	
Dissolved Organic Carbon	mg/L	5 *	2.4	2.2	1.9	2.3	1.2	1.3	1.2	1.1	6.3	6.1	4.3	7.1	6.3	6.7	5.6	10.8
Dissolved Oxygen - field	mg/L		5.21	0.59	5.93	4.37	5.42	1.97	8.66	3.08	1.78	1.38	1.91	1.61	2.52	1.39	2.31	1.26
Hardness	mg/L	80-100 *	357	362	330	358	375	369	359	387	371	452	355	462	384	565	423	480
Ion Percentage	%		3.51	5.46	1.39	2.35	5.41	3.19	2.61	3.59	1.65	1.22	3.64	4.02	3.64	5.37	1.86	1.38
Iron	mg/L	0.3 *	0.051	<0.005	0.007	0.007	0.470	0.038	0.019	0.019	0.162	<0.05	0.043	0.82	0.01	0.171	0.125	0.069
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		30.9	30.2	28.5	29.9	30.7	31.9	31.1	32.2	9.4	11	8.62	10.9	9.54	12.9	9.88	11.1
Manganese	mg/L	0.05 *	0.0018	0.0037	0.0006	0.0018	0.0115	0.0014	0.0011	0.0011	0.288	0.641	0.0979	0.894	0.0169	0.194	0.0526	0.0678
Molybdenum	mg/L		0.0018		0.0018		0.0017		0.0016		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		0.004		<0.002		0.002		<0.002		<0.002		0.003		<0.002		<0.002	
Nitrate	mg/L	10.0 **	2.5	2.4	2.3	2.9	3.3	4.1	3.1	3.0	<0.5	<0.5	<0.5	<0.5	1.6	2.1	1.1	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-12.1	36.1	35.3	30.3	187.9	117.3	151.0	98.1	66.6	23.3	58.4	4.3	188.6	76.2	49.6	47.9
pH	units		7.84	7.57	7.82	7.58	7.62	7.61	7.95	7.57	7.2	7.19	7.37	7.25	7.31	7.14	7.27	7.21
pH - field	units		7.54	7.48	7.71	7.40	7.47	7.10	7.34	7.08	7.03	7.03	7.06	6.96	7.05	7	7.07	6.90
Phenols	µg/L		<1	1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.01	0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	0.02	0.02	0.04
Potassium	mg/L		2.9	2.9	2.7	2.8	3.1	2.5	2.9	3.0	9.6	9.8	6.2	11.7	8	11.8	6.3	11.1
Sodium	mg/L	200 *	6	5.5	5.1	5.0	6.8	5.1	9.5	7.7	5	4.7	3.3	4.4	3.9	5.6	4.2	5.7
Sulphate	mg/L	500 *	61.9	54.5	56.1	52.7	56.5	49.4	57.6	66.2	56.4	86.2	51.6	39.5	138	156	134	114
Temperature - field	°C		7	12.5	8.0	13.4	7.3	12.1	6.6	14.3	5.4	14	3.9	13.8	5.2	14.3	5.6	15.4
Total Dissolved Solids	mg/L	500 *	430	420	370	310	410	460	400	460	420	550	410	550	470	700	520	570
Total Kjeldahl Nitrogen	mg/L		<0.1	<1.0	<0.1	3.2	<0.1	2.9	<0.3	<0.3	0.2	<1.0	0.2	0.5	0.2	<1.0	<0.5	0.9
Zinc	mg/L	5 *	0.0066		0.0016		0.0096		0.0027		0.0007		0.0007		0.0005		<0.0005	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	104-III				106-I											
			Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23
Alkalinity	mg/L	30-500 *	291	393	240	477	159	214	155	219	156	213	173	224	149	226	170	242
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Anion sum	meq/L		10.40	12.10	12.70	16.50	4.02	8.69	4.15	9.19	4.05	9.08	4.60	10.3	3.9	10.8	4.5	10.7
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	0.0007	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.101		0.111		0.061		0.09		0.074		0.052		0.041		0.053	
Beryllium	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		291	392	239	477	158	213	154	218	154	212	172	223	148	225	169	241
Boron	mg/L	5 **	0.048		0.0466		0.0769		0.051		0.0685		0.0667		0.0694		0.0397	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		184	207	222	306	45	118	74.9	123	68.4	126	50.2	125	45	132	61	169
Carbonate	mg/L		<1	<1	<1	<1	1	<1	1	<1	2	<1	1	<1	1	<1	1	<1
Cation sum	meq/L		10.5	12.0	12.8	17.7	4.3	9.07	6.08	9.78	5.66	9.88	4.33	9.96	4.26	11.20	5.19	12.90
Chemical Oxygen Demand	mg/L		<10	10	20	20	<10	<10	<10	<10	10	<10	<10	<10	<10	<10	50	<10
Chloride	mg/L	250 *	12.4	5.2	6.6	2.6	13.2	102	18.3	120	12.2	121	20.3	154	16	172	26	156
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		960	1070	1020	1430	420	900	437	953	416	958	471	1070	412	1140	420	1110
Conductivity - field	µS/cm		909	1070	1110	1300	393	873	445	955	420	954	504	1000	398	1140	453	1020
Copper	mg/L	1 *	0.0013		0.0017		0.0006		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	4.7	5.5	5.3	6.0	2.6	1.6	1.3	<1.0	1.4	1.2	1.8	1.3	1.2	1.5	1.3	<1.0
Dissolved Oxygen - field	mg/L		1.39	2.52	2.98	1.80	1.13	0.7	0.9	0.77	0.49	0.89	2.06	3.15	0.60	1.17	1.23	1.20
Hardness	mg/L	80-100 *	505	571	616	844	172	400	260	424	239	423	174	418	163	449	209	532
Ion Percentage	%		0.80	0.59	0.32	3.42	3.36	2.18	18.9	3.14	16.6	4.26	2.99	1.53	4.54	1.58	7.32	9.14
Iron	mg/L	0.3 *	0.026	0.049	0.016	0.604	0.022	0.05	1.36	<0.05	0.27	0.106	0.067	0.142	0.060	0.907	0.174	0.542
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		11.0	13.4	15.0	19.4	14.5	25.7	17.6	28.5	16.6	26.2	11.9	25.8	12.4	28.9	13.6	26.7
Manganese	mg/L	0.05 *	0.0482	0.1260	0.0076	0.4440	0.0311	0.012	0.0256	0.013	0.0108	0.0192	0.0118	0.0202	0.0149	0.0262	0.0112	0.0177
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	1.2	1.81	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05
Oxidation Reduction Potential	mV		153.8	70.9	195.9	-15.5	-155.5	-46.2	-225.3	-26.2	-192.3	3	-212.4	-12.5	-241.7	-45.6	-40.5	-28.2
pH	units		7.10	7.19	7.41	6.99	7.97	7.64	7.86	7.51	8.03	7.6	7.86	7.58	7.96	7.53	7.86	7.52
pH - field	units		6.92	6.69	6.99	6.49	7.76	7.43	7.36	7.36	7.72	7.51	7.61	7.41	7.66	7.27	7.49	7.04
Phenols	µg/L		2	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	2	2	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	0.02	<0.02	0.03	0.1	0.09	<0.02	<0.02	<0.01	0.02	0.03	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		6.3	8.0	6.9	12.0	1.4	2	2	2.1	1.7	2.7	1.5	2.3	1.5	2.7	1.7	2.7
Sodium	mg/L	200 *	5.8	6.9	5.8	10.1	18.3	22.2	18.2	27.4	18.4	30.3	17.8	34.1	21.3	47.4	21.5	49.3
Sulphate	mg/L	500 *	207	204	378	346	27.7	80.3	30.3	75.5	33	74.3	32.5	76.5	27.5	76.3	21.9	79.6
Temperature - field	°C		4.3	14.3	4.4	14.6	9.4	11.5	9.5	10.9	9.1	12.8	9.8	12.8	8.8	10.7	9.7	11.2
Total Dissolved Solids	mg/L	500 *	610	740	700	990	240	580	240	710	250	720	280	710	250	850	250	600
Total Kjeldahl Nitrogen	mg/L		<0.1	3.1	<0.3	0.4	<0.1	<2.0	0.4	<0.1	<0.1	<1.0	<0.1	0.2	<0.1	<2.0	<0.3	<0.3
Zinc	mg/L	5 *	<0.0005		<0.0005		0.0027		0.0008		0.0005		<0.0005		<0.0005		<0.0005	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	106-II												106-III			
			Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19
Alkalinity	mg/L	30-500 *	204	207	229	211	242	235	257	253	261	251	280	253	220	259	272	234
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Anion sum	meq/L		20.1	19.1	20	18.8	19.4	18.9	20.6	20.9	20.6	19.8	20.6	20.5	26.2	18.2	18.2	21
Arsenic	mg/L	0.010 **	<0.0005	<0.005	<0.0005	<0.005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.007	<0.0005	<0.005
Barium	mg/L	1 **	0.138		0.122		0.118		0.119		0.104		0.123		0.318		0.207	
Beryllium	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005	
Bicarbonate	mg/L		204	206	228	210	241	234	256	252	260	250	279	252	220	258	271	234
Boron	mg/L	5 **	0.0326		0.029		0.0292		0.0253		0.0243		0.0257		0.0193		0.0201	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		225	196	202	195	178	187	160	170	174	164	170	186	277	180	206	230
Carbonate	mg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		19.8	17.9	21	19.8	20.4	20.4	18.6	18.9	20.7	19.4	21.2	21.2	26.4	18.3	20.8	22.7
Chemical Oxygen Demand	mg/L		<10	<10	<10	10	<10	<10	<10	<10	<10	<10	10	<10	20	<10	<10	<10
Chloride	mg/L	250 *	523	485	504	472	472	461	465	514	499	478	487	500	747	418	431	548
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		0.0002		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		0.0005	
Conductivity	µS/cm		2080	2000	2220	2110	2160	2180	2170	2180	2170	2250	2460	2370	2820	1930	2040	2320
Conductivity - field	µS/cm		2030	1960	2210	2070	2140	2100	2150	2110	2100	2120	2230	2040	2810	2120	2140	2440
Copper	mg/L	1 *	<0.0005		0.0024		0.0005		0.0016		0.0008		0.0009		0.0009		0.0009	
Dissolved Organic Carbon	mg/L	5 *	2.1	1.2	1.6	2.2	1.6	<1.0	1.9	<1.0	<1.0	1	1.7	<1.0	1	2	1.7	2.8
Dissolved Oxygen - field	mg/L		3.32	0.96	4.07	1.83	3.06	1.13	1.70	0.49	2.07	4.26	4.49	3.35	2.16	1.35	1.6	1.49
Hardness	mg/L	80-100 *	749	655	678	667	601	620	536	555	581	550	573	623	823	538	628	727
Ion Percentage	%		0.68	3.2	2.43	2.73	2.36	3.96	5.09	4.93	0.11	1.19	1.58	1.65	0.34	0.24	6.55	3.95
Iron	mg/L	0.3 *	0.439	0.42	0.235	0.35	1.09	0.295	0.540	1.09	0.26	0.78	0.55	0.24	0.004	0.96	0.412	0.85
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		45.5	40.3	42.1	43.8	37.9	37.2	33.1	31.7	35.6	34.1	36.1	38.4	32	21.4	27.7	37
Manganese	mg/L	0.05 *	0.0401	0.017	0.0196	0.015	0.0307	0.0337	0.0264	0.0304	0.0218	0.0261	0.0228	0.0121	0.0013	0.141	0.0229	0.044
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	0.95	0.46	0.6	1.36
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05
Oxidation Reduction Potential	mV		-49.5	-53.6	-3.8	14.1	-3.4	-36.6	-32.1	-33.7	-36.9	-32.2	56.1	-13.8	-17.7	-39.3	-37.3	-37.3
pH	units		7.4	7.49	7.38	7.43	7.53	7.43	7.42	7.49	7.36	7.44	7.51	7.48	7.29	7.38	7.36	7.32
pH - field	units		7.07	7.23	7.19	7.17	7.17	7.36	7.22	7.33	7.12	7.26	7.09	7.01	6.99	7.24	7.12	7.05
Phenols	µg/L		<1	<1	1	1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	0.08	0.06	<0.02	<0.02	<0.01	0.02	<0.03	<0.02	<0.02	<0.02	<0.02	0.04	0.1	0.06	<0.02
Potassium	mg/L		3.4	3.4	3.6	3.4	3.5	4	3.3	3.2	3.6	3.5	3.7	3.5	2	2.3	1.9	3.3
Sodium	mg/L	200 *	108	107	167	146	189	181	179	177	205	189	221	197	226	171	186	185
Sulphate	mg/L	500 *	68.8	68.2	64.6	67.6	70.3	64.6	123	73.2	73.7	72.4	68.4	71.8	41.2	66.2	36.3	44.7
Temperature - field	°C		7.2	13.7	8.2	13.8	8	12.7	8.4	13.9	8.7	12.2	8.4	12.7	4.1	18.5	3.4	17.3
Total Dissolved Solids	mg/L	500 *	1160	1350	1110	1820	1580	1770	1260	1410	1310	1420	1310	1400	1470	1270	1170	1930
Total Kjeldahl Nitrogen	mg/L		<0.1	<2.0	<0.1	<0.1	<0.1	<1.0	<0.1	0.1	<0.1	2.1	0.1	<0.3	<0.1	<2.0	0.4	<0.1
Zinc	mg/L	5 *	0.0024		0.0027		0.0012		0.0011		0.0012		0.0015		0.0022		0.0017	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	106-III								107-I							
			Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21
Alkalinity	mg/L	30-500 *	201	280	262	307	208	253	221	374	281	258	269	256	252	235	275	256
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		0.035		0.052		<0.025		0.175	
Ammonia (as N)	mg/L		0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	1.7	0.9	1.3	0.7	0.8	0.3	0.2	0.6
Anion sum	meq/L		28	8.82	18.6	10.7	21.1	27.2	38.9	25.3	13.9	10.2	13.1	9.8	9.53	7.24	10.2	8.18
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	<0.005	<0.0005	<0.005	0.0006	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.329		0.363		0.237		0.449		0.148		0.161		0.119		0.108	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		201	279	261	306	208	253	220	373	279	256	267	254	250	234	274	255
Boron	mg/L	5 **	0.0208		0.0212		0.0182		0.014		1.33		1.37		0.572		0.524	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		280	58.3	240	102	210	250	327	197	69.3	76.2	63.7	88.2	79.6	99.7	86.2	97.8
Carbonate	mg/L		<1	1	<1	<1	<1	<1	<1	<1	2	2	2	1	2	<1	1	1
Cation sum	meq/L		26.4	9.73	24.3	11.3	22.0	27.7	38.1	26.0	13.7	10.9	12.9	10.2	10.2	8.2	9.87	8.48
Chemical Oxygen Demand	mg/L		20	20	<10	<10	<10	<10	20	20	20	30	10	20	30	<10	20	<10
Chloride	mg/L	250 *	825	104	462	158	576	743	1200	596	292	159	266	138	135	48.8	136	70.1
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		3220	947	1960	1120	2370	3110	4570	2570	1500	1120	1400	1030	1020	742	1010	812
Conductivity - field	µS/cm		2950	899	2190	1280	2380	2800	4520	2500	1740	1240	1760	1020	1150	729	1170	1050
Copper	mg/L	1 *	0.0012		0.0014		0.0009		0.0015		<0.0005		<0.0005		<0.0005		0.0005	
Dissolved Organic Carbon	mg/L	5 *	1.6	7.4	1.7	3.4	1.4	1.1	1.6	1.7	3.1	1.9	2.6	1.7	<1.0	2.1	1.3	1.9
Dissolved Oxygen - field	mg/L		4.26	3.1	4.75	1.78	7.09	2.24	7.11	3.01	0.58	1.03	0.96	1.86	1.51	0.67	1.23	1.43
Hardness	mg/L	80-100 *	842	162	764	293	640	793	919	586	284	285	263	314	292	334	312	333
Ion Percentage	%		2.98	4.92	13.4	2.57	1.90	0.77	1.12	1.55	0.72	3.38	0.69	2.12	3.28	6.19	1.66	1.84
Iron	mg/L	0.3 *	0.016	0.029	0.012	0.141	0.008	0.012	0.010	0.944	0.134	0.25	0.155	0.13	0.042	0.057	0.214	0.314
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		34.6	4.1	39.9	9.33	28.20	41.10	24.80	22.90	27	22.9	25.2	22.8	22.7	20.6	23.4	21.5
Manganese	mg/L	0.05 *	0.0009	0.0025	0.0097	0.0111	0.0007	0.0203	0.0007	0.0760	0.0113	0.011	0.01	0.021	0.0134	0.0178	0.0119	0.0143
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	1.1	<0.5	0.6	<0.5	1.4	2.43	<0.5	0.71	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	0.06	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		53.4	5.5	41.4	25.5	38.9	-10.4	177.7	-42.4	-135.4	-172.2	-139.4	-125.9	25.6	-37.5	-171.6	-170.4
pH	units		7.41	7.68	7.48	7.51	7.35	7.31	7.38	7.33	7.9	7.8	7.9	7.79	7.82	7.65	7.74	7.76
pH - field	units		7.14	7.66	7.28	7.26	7.13	7.05	7.04	6.90	7.27	7.63	7.54	7.57	7.52	7.42	7.56	7.35
Phenols	µg/L		<1	<1	<1	<1	2	<1	<1	<1	<1	<1	1	<1	<1	2	49	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	0.07	0.02	0.08	0.02	0.02	<0.02	<0.02	0.05	0.14	0.07	<0.02	0.02	<0.01	0.01	0.01
Potassium	mg/L		2.2	1	3.0	1.1	2.2	4.5	1.7	2.5	9.9	6.9	9.4	5.6	6.4	3.3	5.8	4.0
Sodium	mg/L	200 *	217	148	205	123	208	267	451	327	175	114	167	85.7	93.8	32	79.2	38.1
Sulphate	mg/L	500 *	38.6	22.7	22.3	15.1	37.9	59.5	41.2	56.6	11.3	35.2	17.4	46.3	40.7	63.5	50.3	60.0
Temperature - field	°C		5.1	19	4.6	18.3	4.5	16.8	4.8	18.0	7.5	13	7	13.4	8.1	10.6	10.5	11.8
Total Dissolved Solids	mg/L	500 *	2470	600	1080	610	1610	2140	2510	1470	770	590	750	590	570	460	560	480
Total Kjeldahl Nitrogen	mg/L		0.3	<1.0	<0.5	0.4	0.1	2.1	0.2	<0.3	1.6	<2.0	1.2	0.7	1.8	<1.0	<0.5	0.6
Zinc	mg/L	5 *	0.0017		0.0013		0.0009		0.002		0.0019		0.0017		0.0034		0.0021	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	107-I				107-II											
			Apr-22	Sep-22	Mar-23	Sep-23	Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Apr-22	Sep-22	Mar-23	Sep-23
Alkalinity	mg/L	30-500 *	255	278	288	292	247	235	239	244	236	238	260	264	267	279	292	302
Aluminum	mg/L	0.1 *	<0.025		0.089		<0.025		<0.025		0.426		0.058		<0.025		<0.025	
Ammonia (as N)	mg/L		0.8	1.1	0.6	1.0	0.2	0.1	0.1	0.1	<0.1	0.3	<0.1	0.2	0.1	0.2	0.1	<0.1
Anion sum	meq/L		8.57	9.44	8.86	9.60	7.72	7.53	7.12	7.24	7.05	6.94	7.26	7.54	7.39	7.56	7.85	8.74
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.083		0.099		0.077		0.072		0.078		0.078		0.077		0.082	
Beryllium	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		253	276	287	291	246	234	238	243	235	237	259	263	266	278	291	301
Boron	mg/L	5 **	0.303		0.336		0.022		0.0164		0.0168		0.0144		0.0105		0.016	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		64.9	83.4	91.9	71.9	122	120	106	115	121	116	111	128	121	118	122	135
Carbonate	mg/L		1	2	1	1	<1	1	1	1	1	1	1	1	1	1	<1	<1
Cation sum	meq/L		7.41	10.20	8.21	9.78	8.11	7.99	7.23	7.8	8.01	7.83	7.53	8.34	8.18	7.92	8.26	9.01
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	30	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	87.8	121.0	74.5	118.0	41.6	41.6	30.2	38.5	35.2	35.5	31.0	36.3	32.9	34.2	33.2	56.1
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		887	1000	826	972	696	752	669	709	706	661	705	731	732	648	733	733
Conductivity - field	µS/cm		1060	1270	837	937	731	750	703	701	696	693	710	717	703	744	760	753
Copper	mg/L	1 *	<0.0005		<0.0005		0.0006		0.0005		0.0011		0.0014		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	1.9	1.6	1.6	2.8	2.1	1.3	2	5.3	<1.0	1.4	<1.0	1.7	1.6	1.4	1.2	2.8
Dissolved Oxygen - field	mg/L		1.03	0.70	2.76	1.61	3.41	2.91	3.29	3.47	2.55	2.84	2.12	2.75	1.21	1.49	1.41	1.87
Hardness	mg/L	80-100 *	251	300	311	278	375	367	332	355	369	355	346	389	375	361	378	415
Ion Percentage	%		7.26	3.96	3.85	0.95	2.48	2.96	0.76	3.72	6.41	5.98	1.79	5.02	5.06	2.34	2.53	1.49
Iron	mg/L	0.3 *	<0.005	0.485	0.260	0.241	0.003	<0.05	0.002	<0.05	0.333	<0.005	0.048	0.391	0.007	0.163	<0.005	<0.005
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		21.5	22.3	19.9	23.9	17.2	16.3	16.3	16.4	16.2	15.9	16.6	16.8	17.7	16.0	17.9	18.8
Manganese	mg/L	0.05 *	0.0012	0.0353	0.0398	0.0213	<0.0005	<0.001	0.0006	<0.001	0.0114	0.0012	0.0023	0.0143	0.0009	0.0063	0.0017	0.0014
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.05	<0.05	<0.05	1.38	1.55	1.5	1.6	1.5	1.6	1.4	1.7	1.2	1.2	0.7	0.5
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.05	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05
Oxidation Reduction Potential	mV		-163.1	-209.8	-184.3	-140.7	53.5	-48	18	63.1	103.6	36.7	133.5	13.2	100.7	-10.9	253.3	19.3
pH	units		7.79	7.84	7.73	7.73	7.5	7.66	7.73	7.7	7.71	7.66	7.64	7.66	7.65	7.62	7.44	7.43
pH - field	units		7.44	7.58	7.43	7.47	7.3	7.44	7.44	7.42	7.41	7.5	7.33	7.20	7.25	7.30	7.18	7.10
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	0.07		<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L				<0.03													
Phosphorus	mg/L		<0.02	0.05	0.02	0.02	0.02	0.11	0.03	<0.02	<0.02	<0.01	0.02	<0.01	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		4.5	6.8	4.1	7.1	1.4	1.4	1.4	1.6	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.7
Sodium	mg/L	200 *	50.7	90.5	41.5	90.7	12.1	13.6	12.1	14.6	13.1	14.7	12.8	11.2	14.0	14.6	14.2	14.9
Sulphate	mg/L	500 *	56.1	31.3	57.3	30.1	80.1	81.8	73.8	63.4	66.3	58.8	60.5	62.1	58.4	53.6	58.2	61.7
Temperature - field	°C		8.9	12.6	8.2	12.0	7.7	9.8	7.9	9.9	8.2	9.1	8.2	10.0	8.4	11.0	8.3	9.9
Total Dissolved Solids	mg/L	500 *	500	560	500	520	440	430	420	450	430	410	250	440	400	450	450	470
Total Kjeldahl Nitrogen	mg/L		0.6	2.8	0.6	1.0	<0.1	<2.0	0.2	<0.1	0.4	<1.0	<0.5	3.9	<0.2	3.6	<0.3	<0.3
Zinc	mg/L	5 *	<0.0005		<0.005		0.0017		0.0009		0.0014		0.0010		<0.0005		<0.005	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	107-III												108-I			
			Apr-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Apr-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19
Alkalinity	mg/L	30-500 *	248	279	245	284	230	264	283	281	222	270	268	329	208	190	194	192
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.1	0.1	0.1	<0.1	0.3	0.1	0.2	0.1	0.2	0.2	<0.1	0.3	0.2	0.2	0.2
Anion sum	meq/L		7.32	9.2	8.42	8.31	6.86	7.63	8.01	7.87	6.30	8.19	9.17	9.23	4.73	4.46	4.52	4.51
Arsenic	mg/L	0.010 **	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.002	<0.005	0.0017	<0.005
Barium	mg/L	1 **	0.078		0.089		0.079		0.086		0.062		0.061		0.124		0.113	
Beryllium	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005	
Bicarbonate	mg/L		247	278	244	283	229	263	282	280	221	269	267	328	206	187	191	190
Boron	mg/L	5 **	0.0184		0.0134		0.0161		0.0129		0.0086		0.009		0.0628		0.0763	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		111	135	123	127	109	125	124	123	102	117	116	138	22	20.7	22.1	20.8
Carbonate	mg/L		<1	<1	<1	<1	1	<1	<1	<1	<1	1	<1	<1	2	3	3	2
Cation sum	meq/L		7.34	9.61	8.41	9.09	7.33	8.57	8.40	8.59	7.13	8.48	7.85	9.57	4.75	4.53	4.87	4.66
Chemical Oxygen Demand	mg/L		20	10	<10	<10	10	<10	<10	<10	<10	<10	<10	10	<10	30	<10	20
Chloride	mg/L	250 *	35.1	87.3	83.2	54	36.7	45.1	50.1	47.3	29.9	66.1	53.1	59.4	4.5	5.4	4.8	5.8
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005	
Conductivity	µS/cm		700	922	856	833	692	775	789	790	650	812	700	880	441	433	438	434
Conductivity - field	µS/cm		706	923	677	835	685	746	808	777	626	810	727	791	415	425	432	433
Copper	mg/L	1 *	<0.0005		0.0016		0.0009		0.0023		0.0007		0.0007		<0.0005		0.0009	
Dissolved Organic Carbon	mg/L	5 *	2.2	2.4	3	5.3	1	2.6	2.3	2.8	2.4	2.2	1.5	3.7	2	1.4	3.1	3.6
Dissolved Oxygen - field	mg/L		2.05	1.45	4.73	2.41	1.63	1.38	1.89	2.85	4.65	3.97	6.21	2.48	1.81	0.68	1.62	0.77
Hardness	mg/L	80-100 *	345	403	370	389	331	378	380	369	323	358	359	422	204	195	212	201
Ion Percentage	%		0.08	2.2	0.06	4.46	3.28	5.79	2.33	4.34	6.17	1.74	7.71	1.78	0.26	0.8	3.73	1.68
Iron	mg/L	0.3 *	0.019	0.09	0.009	0.25	0.024	0.032	0.377	0.025	0.028	0.031	0.040	0.229	0.068	0.08	0.083	0.06
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		16.5	16	15.2	17.4	14.2	15.9	17.1	15.1	16.5	16.0	16.8	18.7	36.2	34.8	38	36.3
Manganese	mg/L	0.05 *	0.0103	0.018	0.005	0.011	0.0194	0.0059	0.230	0.0090	0.0391	0.0084	0.0220	0.0116	0.0041	0.005	0.0045	0.004
Molybdenum	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0016		0.0016	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.05	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.05	0.1	<0.05	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		61.7	-38.4	49.6	-12.4	106.1	14.8	39.6	20.4	43.2	-9.3	269.7	-37.5	79	-102.3	83.1	-81.7
pH	units		7.4	7.4	7.56	7.4	7.68	7.52	7.44	7.40	7.65	7.61	7.41	7.28	8.08	8.2	8.18	8.11
pH - field	units		7.16	7.12	7.38	7.17	7.34	7.31	7.03	7.05	7.34	7.21	7.24	6.96	7.93	8.07	8	8.06
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.04	0.09	0.04	<0.02	<0.02	<0.01	0.02	0.01	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02
Potassium	mg/L		1.2	1.2	1	1.4	1.4	1.6	1.1	1.4	1.6	1.3	0.7	1.4	1.9	1.8	2	1.8
Sodium	mg/L	200 *	8.4	34.3	22.2	28.7	15.2	21.4	16.9	26.0	14.0	28.8	14.3	24.7	13	12.3	12.3	12.3
Sulphate	mg/L	500 *	73.8	64.4	64.4	62.4	66.3	58.4	54.1	53.1	56.0	53.2	119.0	57.4	27.7	30.3	30.4	30.2
Temperature - field	°C		3.7	14.7	3	13.9	4.4	14.3	2.5	13.6	4.2	14.3	3.6	14.1	10.3	11.1	10.6	11.8
Total Dissolved Solids	mg/L	500 *	410	510	500	510	410	460	390	450	360	440	430	510	230	250	240	260
Total Kjeldahl Nitrogen	mg/L		0.2	<2.0	0.4	<0.1	0.2	<1.0	0.2	0.4	<0.2	<2.0	<0.3	<0.3	<0.1	1.2	<0.1	<0.1
Zinc	mg/L	5 *	<0.0005		0.0017		0.001		0.0042		<0.0005		<0.005		<0.0005		0.001	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
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Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	108-I								108-II							
			Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21
Alkalinity	mg/L	30-500 *	187	190	204	201	198	197	205	210	165	155	157	170	169	167	177	179
Aluminum	mg/L	0.1 *	0.783		<0.025		0.060		0.053		<0.025		<0.025		0.068		0.038	
Ammonia (as N)	mg/L		0.3	0.3	0.3	0.3	0.3	0.4	0.2	0.2	0.1	0.2	0.1	0.1	0.2	0.3	0.1	0.2
Anion sum	meq/L		4.51	4.5	4.79	4.91	4.72	4.72	4.81	4.95	4.33	4.16	4.18	4.53	4.56	4.51	4.66	4.73
Arsenic	mg/L	0.010 **	0.0018	0.0017	0.0023	0.0016	0.0016	0.0017	0.0018	0.0016	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.12		0.141		0.112		0.119		0.07		0.069		0.072		0.080	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		184	187	202	198	196	195	202	208	164	154	155	169	167	165	175	177
Boron	mg/L	5 **	0.0756		0.0774		0.0684		0.0958		0.099		0.126		0.113		0.128	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		34.1	23.5	20.9	23.9	26	22.7	25.9	24.6	32	30.7	32.2	33.5	36.5	38.1	32.5	35.7
Carbonate	mg/L		3	3	2	3	2	2	3	2	1	1	2	1	2	2	2	2
Cation sum	meq/L		5.61	5	4.47	5.03	5.38	5.15	5.21	5.23	4.5	4.29	4.56	4.7	5.05	5.17	4.56	4.92
Chemical Oxygen Demand	mg/L		<10	<10	10	<10	<10	<10	<10	20	10	50	<10	10	<10	<10	20	<10
Chloride	mg/L	250 *	7.9	6.3	5.9	9.1	6.8	6.7	5.9	6.6	11.9	12.1	11	13.2	14	13.9	12.5	13.2
Chromium	mg/L	0.05 **	0.001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		434	440	447	464	459	455	403	464	424	426	429	457	453	463	459	469
Conductivity - field	µS/cm		438	430	441	451	439	448	449	422	407	420	424	457	451	451	447	460
Copper	mg/L	1 *	0.0009		0.0024		<0.0005		0.001		<0.0005		0.0009		0.001		0.0007	
Dissolved Organic Carbon	mg/L	5 *	3.3	<1.0	1.6	1.4	1.1	1.4	<1.0	<1.0	2.6	3.1	2.1	2.5	3.3	1.7	2.4	2.5
Dissolved Oxygen - field	mg/L		1.01	0.83	0.64	1.13	0.84	2.40	1.3	0.86	3.77	0.64	3.9	1.47	3.59	0.68	4.26	4.38
Hardness	mg/L	80-100 *	247	216	192	212	235	224	229	228	173	165	177	189	202	207	182	197
Ion Percentage	%		10.8	5.18	3.50	1.23	6.51	4.36	4	2.71	1.92	1.46	4.29	1.86	5.09	6.82	1.17	2.00
Iron	mg/L	0.3 *	0.54	0.064	0.092	0.056	0.145	0.113	0.143	0.109	0.004	0.08	0.014	<0.05	0.092	0.066	0.074	0.067
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		39.2	38.2	34.0	36.9	41.4	40.6	39.9	40.4	22.6	21.4	23.5	25.7	26.9	27.2	24.4	26.1
Manganese	mg/L	0.05 *	0.0221	0.0055	0.0069	0.0048	0.0092	0.0065	0.0085	0.0059	<0.0005	0.127	0.0006	0.14	0.0046	0.0927	0.0046	0.126
Molybdenum	mg/L		0.0016		0.0020		0.0015		0.0015		0.0044		0.0043		0.0037		0.0039	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-10.4	-64.2	-48.2	-46.8	56.5	223.0	173.4	-70.9	105.7	-131.4	116.6	-149.9	69.7	-46.5	57.9	5
pH	units		8.21	8.16	8.09	8.19	8.07	8.12	8.18	8.08	7.88	7.93	8.11	7.96	8.11	8.05	8.03	8.04
pH - field	units		7.99	8.11	8.09	7.84	7.86	7.90	7.79	7.76	7.92	8	7.98	7.94	7.98	8.04	8.04	7.94
Phenols	µg/L		<1	<1	<1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.01	0.02	0.01	0.09	<0.02	0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.02	0.01
Potassium	mg/L		2.4	2.2	1.9	2.0	2.1	2.0	2.1	2.1	2	1.8	2.1	1.9	2.2	2.3	2.0	2.1
Sodium	mg/L	200 *	12.7	12.9	11.9	15.9	12.8	12.6	12.1	12.9	22.1	20.9	21.3	19	21	21	19.3	20.6
Sulphate	mg/L	500 *	32.4	31.3	32.5	36.8	33.7	34.2	32.7	33.7	38.7	39.6	40	41.6	43.1	42.4	42.6	43.0
Temperature - field	°C		10.4	10.7	10.4	12.2	10.5	11.4	10.2	11.9	9.7	12.2	9	12.8	9.1	11.2	8.4	15.3
Total Dissolved Solids	mg/L	500 *	260	250	200	230	270	280	280	330	220	260	230	290	270	260	270	230
Total Kjeldahl Nitrogen	mg/L		0.1	<1.0	0.1	0.2	0.2	2.8	<0.3	<0.3	<0.1	<1.0	<0.1	<0.1	0.1	<1.0	<0.1	0.1
Zinc	mg/L	5 *	0.0039		0.0015		0.0007		0.0006		0.0015		0.0015		0.0036		<0.0005	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	108-II				108-III											
			Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23
Alkalinity	mg/L	30-500 *	172	178	181	185	478	433	447	453	519	413	532	502	486	483	492	439
Aluminum	mg/L	0.1 *	0.046		0.085		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.3	0.1	<0.1	0.1	0.2	0.1	<0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.1	<0.1
Anion sum	meq/L		3.39	4.72	4.68	4.83	11.3	10.2	10.4	10.5	12.1	9.73	12.0	11.5	11.4	11.4	11.4	10.8
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.006	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.075		0.081		0.129		0.117		0.139		0.132		0.121		0.131	
Beryllium	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		170	176	178	183	477	432	446	452	518	412	531	501	485	482	491	438
Boron	mg/L	5 **	0.106		0.15		0.0078		0.012		0.0121		0.0129		0.0121		0.0192	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		36.3	36.8	36.8	37.4	191	152	159	153	202	190	167	179	186	191	190	206
Carbonate	mg/L		2	2	3	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		5.11	5.25	5.12	5.25	12.2	10.6	11	10.8	12.9	12.5	10.9	11.8	12.1	12.2	12.5	13.2
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	10	20	<10	<10	40	<10	30	<10	<10	<10	<10	10
Chloride	mg/L	250 *	2.1	12.3	11.1	12.2	19.9	16.9	13.2	15.6	18.2	13.2	11.7	15.2	19.7	20.1	18.5	25.1
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		463	459	405	481	889	831	931	984	1110	900	1020	1080	975	1090	934	1110
Conductivity - field	µS/cm		442	469	459	442	1020	1010	961	998	1100	1040	1020	1030	1040	1070	1020	1010
Copper	mg/L	1 *	0.0016		0.0011		0.0006		0.0021		0.0016		0.0202		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	1.4	2.4	1.2	<1.0	3.5	2.1	3.6	4.6	3.8	2.3	2.9	3.2	2.0	3.1	2.5	1.5
Dissolved Oxygen - field	mg/L		4.60	1.84	5.20	1.90	1.88	1.32	2.03	1.51	2.94	1.08	3.31	<0.05	2.49	2.59	3.64	2.54
Hardness	mg/L	80-100 *	203	211	205	211	593	510	534	520	622	601	529	566	586	587	601	638
Ion Percentage	%		20.30	5.31	4.45	4.13	4.12	1.66	3.13	0.94	2.94	12.3	4.68	1.01	2.91	3.49	4.44	9.83
Iron	mg/L	0.3 *	0.070	0.074	0.089	0.044	0.002	<0.05	0.004	<0.05	0.009	0.012	0.028	<0.005	0.02	0.013	<0.005	<0.005
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		27.2	28.9	27.5	28.5	28.2	31.6	33.3	33.5	28.5	30.7	27.1	28.8	29.4	26.5	30.7	29.9
Manganese	mg/L	0.05 *	0.005	0.089	0.007	0.002	0.0089	0.014	0.0025	0.012	0.0109	0.0194	0.0086	0.0307	0.0096	0.0284	0.0102	0.0241
Molybdenum	mg/L		0.0035		0.0034		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		0.014		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.05	<0.05	<0.05	1.33	1.8	1.4	1.2	<0.5	0.5	<0.5	<0.5	0.5	0.85	0.66	0.71
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05
Oxidation Reduction Potential	mV		101	237	251	19	128.6	42.3	162	50	137.9	59.3	103.1	92.5	136.3	270.0	206.5	55.1
pH	units		7.99	8.02	8.19	7.94	7.08	7.13	7.31	7.19	7.16	7.26	7.16	7.13	7.06	7.11	7.24	7.12
pH - field	units		7.85	7.81	7.86	7.68	6.84	6.97	6.97	6.97	6.89	6.92	7.06	6.75	6.84	6.78	6.86	6.70
Phenols	µg/L		2	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.01	0.02	0.01	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		2.2	2.1	2.2	2.2	1	1.6	1.4	1.6	1.1	1.7	1.1	1.6	1.2	1.2	1.2	1.4
Sodium	mg/L	200 *	22.1	21.2	21.2	21.8	7.3	6.3	5.8	6.1	8.3	8.2	6.6	8.1	7.7	8.5	8.6	8.8
Sulphate	mg/L	500 *	<0.2	44.5	41.6	43.7	66.2	59.4	59.2	60.5	76.3	64.2	66.4	66.1	69.7	66.3	63.6	76.6
Temperature - field	°C		8.1	13.7	7.9	15.7	5.7	15.6	5.2	15.5	6.1	14.6	6.4	16.0	6.4	15.3	6.0	15.1
Total Dissolved Solids	mg/L	500 *	280	280	240	270	630	590	560	610	700	620	650	620	650	660	620	630
Total Kjeldahl Nitrogen	mg/L		<0.1	3.1	<0.3	<0.3	<0.1	<1.0	<0.1	<0.2	0.4	<1.0	0.5	0.2	0.1	2.9	<0.3	<0.3
Zinc	mg/L	5 *	0.0043		0.0012		0.0013		0.0026		0.0009		0.0058		<0.0005		<0.0005	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	109-I												109-II			
			Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19
Alkalinity	mg/L	30-500 *	144	142	144	141	142	138	150	149	144	140	150	148	225	217	216	218
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.1	0.1	0.3	0.1
Anion sum	meq/L		3.32	3.3	3.29	3.29	3.3	3.2	3.43	3.44	3.37	3.27	3.44	3.41	6.19	5.65	5.64	5.64
Arsenic	mg/L	0.010 **	0.0035	0.006	0.0039	<0.005	0.0043	0.0038	0.0038	0.0039	0.0038	0.0037	0.0040	0.0052	<0.0005	<0.005	<0.0005	<0.005
Barium	mg/L	1 **	0.097		0.091		0.099		0.093		0.095		0.084		0.117		0.108	
Beryllium	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005	
Bicarbonate	mg/L		142	140	141	138	140	136	147	146	143	137	148	146	224	216	215	217
Boron	mg/L	5 **	0.0537		0.0737		0.0668		0.0704		0.0816		0.076		0.0124		0.0189	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		18	18.7	19.4	16.4	20.4	20.6	18.9	19.9	19.1	18.5	20.1	23.8	89.3	75.9	79.6	69.7
Carbonate	mg/L		2	2	3	3	2	2	3	3	1	3	2	2	1	1	1	1
Cation sum	meq/L		3.27	3.45	3.53	3.16	3.5	3.49	3.51	3.39	3.45	3.47	3.72	3.92	6.61	5.84	6.08	5.45
Chemical Oxygen Demand	mg/L		<10	20	<10	<10	<10	<10	<10	<10	30	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	1.4	1.4	<1	1.9	1.6	1.2	1.1	1.2	1.8	1.2	1.1	1.4	11.9	10.2	9	9.8
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005	
Conductivity	µS/cm		326	319	323	318	322	318	321	324	326	358	304	329	531	545	547	544
Conductivity - field	µS/cm		313	315	325	311	337	316	326	316	314	322	309	303	581	541	548	533
Copper	mg/L	1 *	0.0015		0.0017		<0.0005		0.0043		0.0005		<0.0005		0.0006		<0.0005	
Dissolved Organic Carbon	mg/L	5 *	1.3	1.1	3.9	3.7	2.8	1.2	1.4	2.1	<1.0	1.5	1.2	<1.0	1.3	<1.0	4.6	2
Dissolved Oxygen - field	mg/L		2.61	0.81	1.24	1.05	2.08	0.71	1.89	2.02	1.92	2.74	3.54	7.23	1.62	1.06	1.18	1.03
Hardness	mg/L	80-100 *	122	127	132	118	131	128	131	130	128	128	138	147	314	276	286	258
Ion Percentage	%		0.83	2.21	3.53	1.95	2.95	4.35	1.08	0.77	1.21	3.08	3.88	6.97	3.3	1.64	3.77	1.79
Iron	mg/L	0.3 *	0.011	<0.05	0.006	<0.05	0.006	0.09	0.008	0.008	0.028	0.008	0.009	0.015	0.005	<0.05	0.002	<0.05
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		18.7	19.6	20.3	18.8	19.5	18.7	20.4	19.6	19.4	19.9	21.3	21.2	22.2	20.9	21.3	20.3
Manganese	mg/L	0.05 *	0.0036	0.003	0.0039	0.003	0.0035	0.0066	0.0036	0.0036	0.0048	0.0027	0.0043	0.0048	0.0014	0.002	0.0043	0.01
Molybdenum	mg/L		0.002		0.0021		0.0025		0.0022		0.0022		0.0023		0.0007		0.0008	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	0.65	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		6.5	-26.8	-21.8	149.6	117.5	113.4	63.6	27.6	266.5	266.6	154.4	13.2	41.9	19.5	31.6	163.2
pH	units		8.22	8.24	8.3	8.32	8.22	8.26	8.26	8.32	7.98	8.29	8.22	8.11	7.7	7.74	7.76	7.73
pH - field	units		8.08	8.31	8.24	8.12	8.18	8.36	8.19	7.95	8.02	8.08	8.04	7.89	7.34	7.6	7.53	7.52
Phenols	µg/L		<1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.02	0.01	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02
Potassium	mg/L		1.1	1.2	1.2	1.1	1.2	1.5	1.3	1.2	1.3	1.2	1.3	1.4	1.4	1.4	1.4	1.2
Sodium	mg/L	200 *	17.7	19.2	18.9	16.8	18.6	19.7	18.8	16.5	18.9	19.3	20.5	21.1	5.8	6	6.2	5.3
Sulphate	mg/L	500 *	24	24.6	24.1	24.2	24.3	23.8	24.1	25.3	25.4	25.2	24.4	24.5	69.8	56	58	55.2
Temperature - field	°C		10.3	11.9	11	13.3	10.8	13.3	12	13.2	11.5	13.1	11.7	13.1	11.2	13	11.8	14.4
Total Dissolved Solids	mg/L	500 *	190	190	200	200	170	190	210	190	160	200	190	200	370	330	330	350
Total Kjeldahl Nitrogen	mg/L		0.2	0.1	0.2	<0.1	<0.1	<1.0	<0.5	0.2	0.1	2.4	<0.3	<0.3	<0.1	3.3	<0.1	<0.1
Zinc	mg/L	5 *	0.0023		0.0021		<0.0005		0.0006		<0.0005		<0.005		0.0012		0.0007	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	109-II				109-III											
			Mar-20	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23
Alkalinity	mg/L	30-500 *	343	213	230	238	321	373	400	417	381	399	468	455	471	485	483	538
Aluminum	mg/L	0.1 *	0.131		<0.025		<0.025		<0.025	<0.025	<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.2	0.1	<0.1	0.1	0.1	<0.1	0.1	0.3	0.1	0.2	0.9	1.8	0.4	1.1	3.2
Anion sum	meq/L		12.5	6.22	6.6	6.59	10.8	11.1	11.1	10.7	12.2	12.3	14.2	14.1	14.8	14.5	18.7	17.3
Arsenic	mg/L	0.010 **	<0.0005	0.0005	0.0007	0.0007	<0.0005	<0.005	0.0007	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006
Barium	mg/L	1 **	0.094		0.072		0.115		0.12	0.129	0.133		0.171		0.219		0.151	
Beryllium	mg/L		<0.0005		<0.0005		<0.0001		<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		342	212	229	237	320	372	399	416	380	399	467	455	471	484	483	537
Boron	mg/L	5 **	0.0264		0.035		0.03		0.0508	0.0918	0.061		0.0993		0.223		0.173	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		189	79.4	86.4	92.7	182	183	185	155	196	194	216	219	223	210	290	258
Carbonate	mg/L		<1	1	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Cation sum	meq/L		12.8	6.33	7.11	7.19	11.7	11.8	11.7	10.3	12.6	12.9	14.6	14.5	15.4	14.4	20.1	18.8
Chemical Oxygen Demand	mg/L		<10	<10	<10	<10	<10	10	30	<10	<10	<10	10	<10	<10	10	20	20
Chloride	mg/L	250 *	27.7	18.1	17.2	17.3	20.5	13.2	22.8	22.2	56.2	49.5	41.1	24.8	35.5	44.6	67.0	62.9
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005		<0.0005		<0.0001		0.0039	0.0011	0.0019		0.0034		0.0048		0.0026	
Conductivity	µS/cm		971	638	602	635	896	1030	1040	1000	1120	1170	1270	1250	1370	1300	1510	1560
Conductivity - field	µS/cm		931	623	617	583	998	1020	1040	997	1180	1180	1280	1220	1290	1270	1630	1450
Copper	mg/L	1 *	0.0013		0.0005		0.0009		0.002	0.0028	0.0012		0.0018		0.0013		0.0016	
Dissolved Organic Carbon	mg/L	5 *	4.7	2.2	1.9	1	2.3	2.9	7.8	7.1	4.5	3.6	5	5.7	5.4	4.2	6.4	3.8
Dissolved Oxygen - field	mg/L		5.01	4.32	3.06	1.48	4.2	4.48	1.45	6.38	2.2	1.15	3.08	3.55	2.89	6.40	2.68	2.60
Hardness	mg/L	80-100 *	615	288	321	335	541	548	553	471	579	571	646	644	663	624	884	769
Ion Percentage	%		1.18	0.95	3.7	4.36	4.19	3.01	2.62	1.86	1.69	2.54	1.46	1.27	1.99	0.06	3.68	4.09
Iron	mg/L	0.3 *	0.112	0.082	0.034	0.173	0.008	<0.05	0.425	<0.05	0.024	0.157	0.334	0.179	0.197	0.074	0.012	2.130
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		34.7	21.7	25.5	25.2	20.9	22.2	22.1	20.5	21.8	21	25.8	23.7	25.8	24.1	38.8	30.2
Manganese	mg/L	0.05 *	0.0336	0.0185	0.0101	0.0179	0.0009	<0.001	0.668	0.018	0.396	0.468	0.678	0.870	0.850	0.436	0.811	0.974
Molybdenum	mg/L		<0.0005		0.0125		<0.0005		<0.0005	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005	
Nickel	mg/L		0.003		<0.002		0.002		0.005	0.005	0.008		0.005		0.008		0.009	
Nitrate	mg/L	10.0 **	<0.5	<0.05	<0.05	<0.05	0.51	<0.5	<0.5	<0.5	0.9	0.7	<0.5	0.8	0.9	0.9	3.5	0.8
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05
Oxidation Reduction Potential	mV		145.1	-113.7	163.9	-30.7	69.5	50.9	-22.1	165.6	143.1	51	55.7	49.9	64.5	246.2	188.8	-40.5
pH	units		7.44	7.82	7.71	7.68	7.4	7.28	7.33	7.31	7.14	7.07	7.24	7.01	6.88	7.04	6.98	7.00
pH - field	units		7.2	7.56	7.47	7.22	6.99	7.19	7.05	7.02	6.99	7	6.86	6.70	6.73	6.86	6.71	6.60
Phenols	µg/L		<1	<1	<1	<1	<1	<1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	<0.02	0.03	<0.02	0.07	<0.02	<0.02	<0.01	0.02	<0.01	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		1.4	4.7	3.2	2.4	0.8	1.2	0.9	1.1	1	1.9	1.5	3.0	3.5	2.9	3.7	4.9
Sodium	mg/L	200 *	9.8	9.7	13.3	9.1	19.7	18	12.6	19.5	21.1	32.7	37	33.1	43.3	41.9	50.2	70.1
Sulphate	mg/L	500 *	245	76.1	80.2	72	190	170	129	98	151	150	191	220	222	180	345	245
Temperature - field	°C		6.4	13.9	10.5	12.9	7.5	15.2	8	16.6	6.8	18	8.4	16.5	8.4	17.6	8.8	15.4
Total Dissolved Solids	mg/L	500 *	740	370	400	410	660	670	680	640	690	780	830	840	820	820	1110	1000
Total Kjeldahl Nitrogen	mg/L		0.4	2.4	<0.3	<0.3	0.3	<0.1	0.5	0.4	0.9	<1.0	<0.5	2.3	2.0	2.3	1.5	3.5
Zinc	mg/L	5 *	0.0025		<0.005		0.0011		0.0036	0.0024	<0.0005		0.0006		0.0007		<0.005	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	110-I												110-II			
			Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19
Alkalinity	mg/L	30-500 *	190	182	184	182	181	177	188	187	189	189	193	199	232	222	228	239
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025	
Ammonia (as N)	mg/L		0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.5	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Anion sum	meq/L		5.44	5.32	5.31	5.27	5.42	5.12	5.32	5.34	5.39	5.5	5.44	5.59	7.33	7.33	7.38	7.78
Arsenic	mg/L	0.010 **	0.0024	0.006	0.0023	<0.005	0.0023	0.0024	0.0017	0.0021	0.0027	0.0022	0.0027	0.0032	<0.0005	<0.005	<0.0005	<0.005
Barium	mg/L	1 **	0.079		0.077		0.069		0.073		0.071		0.066		0.044		0.046	
Beryllium	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005	
Bicarbonate	mg/L		189	181	182	180	179	176	186	186	188	188	192	198	231	221	227	238
Boron	mg/L	5 **	0.0229		0.0327		0.0296		0.0340		0.0309		0.028		0.008		0.0126	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		53.5	54.1	53.8	49.1	54.1	51.9	53.0	55.2	50.5	53.6	59.3	59.7	96.5	97.6	101	99.4
Carbonate	mg/L		1	1	2	2	2	1	2	1	1	1	1	<1	<1	<1	<1	1
Cation sum	meq/L		5.51	5.62	5.59	5.22	5.51	5.34	5.35	5.51	5.21	5.54	6.08	6.02	7.28	7.58	7.77	7.83
Chemical Oxygen Demand	mg/L		20	20	<10	20	30	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	250 *	13.3	13.3	11.9	12.8	13.6	11.8	12.0	11.7	12.1	13.9	11.7	12.4	46.5	51.2	46.9	54.4
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0002		<0.0005	
Conductivity	µS/cm		511	519	516	519	512	513	517	519	523	523	491	518	605	727	741	771
Conductivity - field	µS/cm		502	514	509	511	511	506	521	512	504	525	515	490	662	685	725	780
Copper	mg/L	1 *	<0.0005		<0.0005		0.0008		0.0017		<0.0005		<0.0005		<0.0005		0.0037	
Dissolved Organic Carbon	mg/L	5 *	2.2	1.6	1.2	3.4	2.2	<1.0	2.4	1	<1.0	1.4	1.3	2.4	2.1	<1.0	3.9	1.7
Dissolved Oxygen - field	mg/L		1.64	0.98	4.45	1.44	1.84	1.36	3.12	2.59	1.57	9.16	3.18	1.58	2	1.08	1.34	1.15
Hardness	mg/L	80-100 *	250	255	254	239	250	242	243	252	236	252	277	273	345	359	366	369
Ion Percentage	%		0.72	2.72	2.56	0.44	0.82	2.12	0.23	1.54	1.73	0.4	5.48	3.69	0.33	1.69	2.56	0.32
Iron	mg/L	0.3 *	0.327	0.42	0.217	0.28	0.218	0.336	0.058	0.312	0.385	0.302	0.44	0.393	0.036	0.14	0.022	0.1
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		28.2	29.2	29	28.3	27.8	27.2	26.8	27.7	26.7	28.6	31.4	30.2	25.3	28	27.7	29.4
Manganese	mg/L	0.05 *	0.0106	0.012	0.0108	0.01	0.0113	0.0104	0.0128	0.0094	0.0121	0.0088	0.012	0.0136	0.0157	0.024	0.014	0.075
Molybdenum	mg/L		0.0011		0.0011		0.001		0.0012		0.0011		0.0011		0.0006		0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-16.1	-85.7	44.3	-95.2	-11.8	-63.8	-46.1	-85.7	-5.6	129.7	110.2	-62.4	53.1	-33.7	80.6	-18
pH	units		7.84	7.85	8.04	8	8.02	7.85	8.06	7.88	7.79	7.87	7.82	7.73	7.57	7.58	7.66	7.66
pH - field	units		7.64	7.73	7.81	7.73	7.78	7.8	7.77	7.59	7.52	7.56	7.63	7.42	7.35	7.43	7.35	7.3
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1
Phosphate	mg/L		<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		0.03	<0.02	<0.02	<0.02	<0.02	<0.01	0.02	0.01	0.02	<0.02	<0.02	<0.02	0.03	<0.02	0.05	<0.02
Potassium	mg/L		1.4	1.5	1.6	1.4	1.5	1.5	1.5	1.4	1.4	1.4	1.6	1.7	1.9	2.1	2	2
Sodium	mg/L	200 *	10.1	9.6	9.8	8.3	9.9	9.9	9.5	8.5	9.3	9.8	10.1	10.5	6.7	7	8.1	8
Sulphate	mg/L	500 *	66.5	68.3	67.9	66.7	73.8	65.6	64.8	67	67.1	69.5	66.3	66.7	73.5	76.3	79.2	77.8
Temperature - field	°C		10.2	12	9.5	13.2	10.3	12.4	10.7	12.4	10.6	11.7	10.6	12.6	9.8	12.3	10.2	12.6
Total Dissolved Solids	mg/L	500 *	310	310	280	340	320	310	349	390	270	290	370	330	390	440	370	480
Total Kjeldahl Nitrogen	mg/L		<0.1	1.2	<0.1	0.1	0.2	<1.0	0.2	0.5	0.2	<2.0	<0.3	<0.3	<0.1	<1.0	<0.1	<0.1
Zinc	mg/L	5 *	0.0008		0.0018		0.0007		0.0012		<0.0005		<0.005		<0.0005		0.0046	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
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3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	110-II								110-III							
			Mar-20	Sep-20	Mar-21	Oct-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Oct-21
Alkalinity	mg/L	30-500 *	261	275	270	278	274	244	251	262	320	311	321	358	371	398	431	476
Aluminum	mg/L	0.1 *	<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		0.038		<0.025	
Ammonia (as N)	mg/L		0.2	0.1	0.1	0.3	0.2	0.2	0.1	<0.1	0.1	0.1	0.1	0.1	0.3	0.1	0.1	0.2
Anion sum	meq/L		8.34	8.84	8.57	9.05	8.86	8.76	8.97	8.97	8.89	8.72	9.39	10.6	11.1	12.2	13.5	15.2
Arsenic	mg/L	0.010 **	0.0014	0.0006	0.0011	0.001	0.0006	0.0009	0.0009	<0.0005	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **	0.056		0.051		0.056		0.049		0.098		0.104		0.108		0.145	
Beryllium	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		260	274	269	277	273	243	250	261	319	310	320	357	370	397	430	475
Boron	mg/L	5 **	0.0179		0.0185		0.0218		0.02		0.0072		0.0112		0.0121		0.0103	
Cadmium	mg/L	0.005 **	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		96.3	111	102	116	113	105	117	123	123	125	132	129	148	164	176	201
Carbonate	mg/L		1	<1	1	<1	<1	<1	<1	<1	<1	<1	1	<1	1	<1	1	<1
Cation sum	meq/L		7.88	8.78	8.13	9.06	8.71	8.07	9.34	9.21	9.1	9.26	9.96	10	11.5	12.8	13.7	15.6
Chemical Oxygen Demand	mg/L		30	<10	<10	<10	20	<10	<10	<10	30	<10	<10	<10	<10	20	<10	10
Chloride	mg/L	250 *	51.4	60.3	56.5	68.2	60.7	83.6	84.4	70.7	6.8	5.4	5.3	8.6	14.7	20.6	37.1	63
Chromium	mg/L	0.05 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0007		0.0008		0.0007	
Cobalt	mg/L		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		802	840	827	880	879	877	837	853	697	817	880	969	1020	1040	1210	1420
Conductivity - field	µS/cm		810	858	839	884	852	865	863	803	788	810	871	950	1030	1100	1220	1390
Copper	mg/L	1 *	0.0012		0.0006		<0.0005		<0.0005		<0.0005		<0.0005		0.002		0.0020	
Dissolved Organic Carbon	mg/L	5 *	2.7	<1.0	3.2	2.7	1.5	1.6	1.7	3	2.6	2.2	2.6	5.6	3.5	1.2	4.4	3.4
Dissolved Oxygen - field	mg/L		1.49	0.79	1.55	2.58	1.65	2.79	2.19	1.73	3.72	3.91	4.78	3.25	4.85	6.66	5.28	5.31
Hardness	mg/L	80-100 *	369	410	381	426	407	376	437	433	419	428	456	457	515	562	602	688
Ion Percentage	%		2.85	0.36	2.60	0.08	0.84	4.13	1.99	1.28	1.16	2.99	2.93	2.67	1.98	2.53	0.80	1.24
Iron	mg/L	0.3 *	0.22	0.297	0.320	0.429	0.361	0.574	0.451	0.228	0.002	<0.05	0.002	<0.05	0.031	0.137	0.017	<0.005
Lead	mg/L	0.01 **	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		31.1	32.2	30.6	33.2	30.4	27.5	35.1	30.5	27.2	28.2	30.7	32.8	35.3	37.1	39.4	45.2
Manganese	mg/L	0.05 *	0.0256	0.0267	0.0200	0.0221	0.0209	0.0159	0.0169	0.0219	0.0035	0.022	<0.0005	0.001	0.0015	0.0104	0.0006	0.0021
Molybdenum	mg/L		0.0008		0.0006		<0.0005		0.0007		0.0007		0.0007		0.0005		<0.0005	
Nickel	mg/L		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	3.93	2.2	3.4	2.6	2.4	1.4	1.0	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		22.5	-9.9	-25.3	-32.5	30.2	14.8	81	-4.9	80.4	47.3	97.8	39.4	71.9	44.3	80.7	73.1
pH	units		7.62	7.41	7.67	7.51	7.33	7.55	7.49	7.39	7.45	7.42	7.61	7.46	7.58	7.29	7.54	7.19
pH - field	units		7.24	7.3	7.28	7.11	7.08	7.19	7.19	6.99	7.36	7.23	7.23	7.19	7.14	7.12	7.20	6.85
Phenols	µg/L		<1	<1	<1	2	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1	2
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.01	0.02	<0.01	<0.02	<0.02	<0.02	<0.02	0.03	0.17	<0.02	<0.02	<0.02	<0.01	0.02	<0.01
Potassium	mg/L		2	2.2	2.0	2.1	2	2.2	2.2	2.1	1.8	2.2	1.8	2	2.1	2.5	2.1	2.4
Sodium	mg/L	200 *	9.4	11.1	9.8	9.7	10.6	10.5	11.5	10.6	14.5	13.7	17.2	17.7	25.4	33.1	35.6	39.6
Sulphate	mg/L	500 *	88.6	87.6	84.2	84	88.7	81.1	83.6	91.9	107	115	134	154	159	182	193	204
Temperature - field	°C		10.2	12.2	10.6	12.9	9.9	12	10.6	12.7	6.3	15	7	14.9	6.9	14.8	7.3	14.6
Total Dissolved Solids	mg/L	500 *	460	510	410	540	470	440	590	490	490	510	540	660	680	730	520	980
Total Kjeldahl Nitrogen	mg/L		0.2	<1.0	<0.1	0.2	<0.1	<2.0	<0.3	<0.3	<0.1	<1.0	<0.1	0.2	<0.1	<1.0	<0.5	<2.0
Zinc	mg/L	5 *	0.0009		<0.0005		<0.0005		<0.005		0.0012		0.0018		0.0018		0.0011	

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	110-III			111-I												111-II
			Mar-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18
Alkalinity	mg/L	30-500 *	500	494	528	240	218	213	218	203	186	211	211	208	203	209	204	174
Aluminum	mg/L	0.1 *	0.044	<0.025		0.239		<0.025		<0.025		<0.025		0.151		<0.025		<0.025
Ammonia (as N)	mg/L		0.1	0.1	<0.1	0.6	0.7	0.6	0.7	0.6	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.2
Anion sum	meq/L		17.7	18.1	20.3	5.83	5.34	5.09	5.23	4.87	4.5	4.90	4.93	4.73	4.95	4.82	4.88	4.08
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.005	<0.0005	0.0018	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.0026
Barium	mg/L	1 **	0.163	0.121		1.15		0.814		0.615		0.666		0.666		0.775		0.232
Beryllium	mg/L		<0.0005	<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Bicarbonate	mg/L		499	493	528	230	212	204	206	193	179	201	202	199	197	200	201	172
Boron	mg/L	5 **	0.0178	0.014		0.361		0.405		0.391		0.438		0.37		0.44		0.0604
Cadmium	mg/L	0.005 **	<0.0001	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		211	245	252	17.9	14	13	11.9	10.3	14.6	10.7	11.5	12.1	12.4	11.3	27.3	26.6
Carbonate	mg/L		<1	<1	<1	9	6	9	11	9	6	9	9	8	5	9	3	2
Cation sum	meq/L		17.2	20.2	20.4	6.23	5.46	5.15	5.1	4.51	5.11	4.55	4.97	4.81	5.06	4.71	5.74	4.12
Chemical Oxygen Demand	mg/L		<10	20	20	30	20	20	20	20	<10	<10	30	<10	20	20	20	10
Chloride	mg/L	250 *	93.1	109	124	36.2	29	22.4	22.2	19.2	21.7	19.8	19.7	16.0	23.3	17.4	18.5	4.6
Chromium	mg/L	0.05 **	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L		<0.0005	<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Conductivity	µS/cm		1560	1530	1620	587	540	515	494	459	482	475	476	448	485	411	481	377
Conductivity - field	µS/cm		1580	1630	1630	579	537	503	483	451	472	469	468	424	488	453	439	366
Copper	mg/L	1 *	0.001	0.0006		<0.0005		0.0012		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Dissolved Organic Carbon	mg/L	5 *	3.9	4.5	6.2	6.3	1.6	5.1	4	3	2	3.9	2.2	1.2	3.1	1.4	<1.0	2.3
Dissolved Oxygen - field	mg/L		8.08	10.8	6.87	0.98	0.91	0.72	1.04	1.62	4.89	0.86	<0.05	0.53	1.86	1.34	1.95	0.76
Hardness	mg/L	80-100 *	728	856	866	77	64.7	59.5	55	47.5	61.2	48.0	50.7	51.8	55.6	51.3	90.9	153
Ion Percentage	%		1.4	5.32	0.29	3.31	1.12	0.61	1.23	3.77	6.4	3.71	0.38	0.84	1.04	1.12	8.11	0.51
Iron	mg/L	0.3 *	0.037	0.005	0.007	0.178	<0.05	0.014	<0.05	0.016	0.467	0.008	0.007	0.100	0.042	0.014	0.025	0.134
Lead	mg/L	0.01 **	<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		48.8	59.3	57.5	7.84	7.23	6.56	6.15	5.29	6.01	5.18	5.35	5.24	6.00	5.61	5.52	21
Manganese	mg/L	0.05 *	0.0014	<0.0005	<0.0005	0.0076	0.004	0.0045	0.004	0.0046	0.0096	0.0051	0.0055	0.0079	0.0054	0.0048	0.0079	0.0065
Molybdenum	mg/L		<0.0005	<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		0.0021
Nickel	mg/L		<0.002	<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	0.46	0.83	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5
Oxidation Reduction Potential	mV		110.1	179.7	50.1	-299.4	-268.8	-270.5	-260.7	-225.5	-217.5	-261.4	-218.6	-245.4	-238.0	-154.4	-220.3	-212.4
pH	units		7.14	7.16	6.96	8.64	8.49	8.65	8.77	8.71	8.58	8.69	8.67	8.65	8.47	8.66	8.24	8.17
pH - field	units		6.88	7.12	6.7	8.08	8.33	8.31	8.31	8.46	8.57	8.40	8.13	8.40	8.09	8.14	7.92	8.09
Phenols	µg/L		<1	<1	<1	<1	<1	1	<1	<1	2	<1	<1	2	<1	<1	<1	<1
Phosphate	mg/L		0.03	<0.02	<0.02	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	0.04	0.03	0.18	0.04	0.03	0.03	0.04	0.08	0.03	0.02	0.04	0.02	0.03
Potassium	mg/L		2.2	2.4	2.8	4.4	3.8	3.6	3.8	3.3	4.5	3.3	4.0	3.5	3.6	3.6	3.6	1.2
Sodium	mg/L	200 *	58.5	67.1	67.2	104	92.2	87.8	88.4	78.9	85.5	79.3	87.1	83.4	87.1	81.4	86.8	22.9
Sulphate	mg/L	500 *	260	263	312	7.9	14.6	16.1	18.4	19.2	13.9	12.5	14.1	12.5	17.7	13.8	19.8	28
Temperature - field	°C		6.6	6.5	15	8.7	10.2	9.1	11.3	9.1	13.5	9.5	13.6	10.1	11.3	10.3	11.7	8.7
Total Dissolved Solids	mg/L	500 *	1010	1060	1190	340	300	310	300	260	290	210	230	290	340	310	300	220
Total Kjeldahl Nitrogen	mg/L		0.4	<0.3	<0.3	0.7	0.2	0.6	0.6	0.2	<1.0	0.5	0.6	0.6	2.6	0.7	0.6	0.2
Zinc	mg/L	5 *	0.0011	<0.005		0.0018		0.004		0.0009		<0.0005		0.0017		0.001		0.0006

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	111-II											111-III				
			Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20
Alkalinity	mg/L	30-500 *	162	162	169	171	166	170	169	169	167	168	169	376	365	351	359	399
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		0.2	0.1	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.1	<0.1	0.1	0.1
Anion sum	meq/L		3.85	3.86	4.04	4.17	4.04	4.10	4.09	4.08	4.05	4.02	4.10	10.4	11.2	10.6	11.5	12.7
Arsenic	mg/L	0.010 **	<0.005	0.002	<0.005	0.0029	0.002	0.0015	0.0017	0.0033	0.0013	0.0017	0.0018	<0.0005	<0.005	<0.0005	<0.005	<0.0005
Barium	mg/L	1 **		0.67		0.481		0.111		0.126		0.108		0.114		0.138		0.136
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005
Bicarbonate	mg/L		160	160	166	169	164	168	167	167	165	165	167	375	364	350	358	398
Boron	mg/L	5 **		0.0769		0.0722		0.0807		0.0706		0.0822		0.0104		0.0157		0.0239
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		25.5	27.9	30.4	30.1	31.1	29.0	37.6	28.7	27.9	28.4	33.1	196	191	190	203	194
Carbonate	mg/L		2	2	3	2	2	2	2	2	2	2	2	<1	<1	<1	<1	<1
Cation sum	meq/L		4.05	4.12	4.38	4.26	4.32	4.02	4.66	4.15	4.24	4.12	4.48	11.5	11.4	11.4	12.2	12
Chemical Oxygen Demand	mg/L		<10	<10	<10	10	<10	<10	20	<10	<10	<10	<10	20	<10	<10	10	30
Chloride	mg/L	250 *	4.8	4.2	5.2	6	5.9	5.2	5.1	5.4	5.8	5.4	6.0	27.7	16.8	14.4	16.3	24.6
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005
Conductivity	µS/cm		373	382	393	402	401	394	393	392	391	352	399	706	1010	824	1040	1120
Conductivity - field	µS/cm		368	380	386	401	396	395	382	376	391	384	365	986	996	987	1020	1160
Copper	mg/L	1 *		0.002		0.0009		<0.0005		0.0007		<0.0005		<0.0005		0.0005		0.001
Dissolved Organic Carbon	mg/L	5 *	1.6	4.7	2.1	2.4	1.1	3.1	2.3	<1.0	1.2	1.1	<1.0	2.9	2.2	2.3	5.4	3.5
Dissolved Oxygen - field	mg/L		0.89	3.21	0.95	3.42	0.26	11.2	0.42	1.70	1.52	4.20	1.90	2.57	2.72	3.14	2.33	3.86
Hardness	mg/L	80-100 *	151	155	171	169	170	159	185	161	165	162	177	562	550	550	583	562
Ion Percentage	%		2.52	3.18	4.01	1.08	3.39	0.94	6.51	0.90	2.30	1.21	4.41	5.22	1.31	3.69	3.24	2.54
Iron	mg/L	0.3 *	0.1	0.149	0.25	0.098	0.282	0.025	0.448	0.077	0.226	0.108	0.092	0.002	<0.05	0.001	<0.05	0.011
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		21.2	20.8	23	22.8	22.5	21.0	22.2	21.7	23.1	22.0	22.8	17.7	17.7	18.3	18.5	18.9
Manganese	mg/L	0.05 *	0.005	0.0094	0.009	0.0107	0.0084	0.0183	0.0174	0.0095	0.0069	0.0057	0.0061	0.0019	0.003	<0.0005	0.005	0.0024
Molybdenum	mg/L			0.0024		0.0025		0.0022		0.0022		0.0022		<0.0005		<0.0005		<0.0005
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.06	<0.05	<0.05	0.52	0.5	0.7	0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-185.1	-92.9	-129.7	-86.7	-142.4	-120.3	-100.3	-105.1	-107.7	-4.1	-114.8	-159.4	-43	13	15	15.7
pH	units		8.08	8.2	8.21	8.14	8.07	8.11	8.14	8.06	8.01	8.20	7.98	7.3	7.28	7.43	7.35	7.36
pH - field	units		8.16	8.1	7.97	7.94	8.09	8.08	7.88	7.83	7.80	7.79	7.64	7.01	7.15	7.18	7.07	7
Phenols	µg/L		<1	1	<1	<1	1	<1	<1	3	<1	<1	<1	<1	<1	2	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	<0.02	<0.01	0.02	0.05	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Potassium	mg/L		1.1	1.8	1.4	1.4	1.4	1.2	1.5	1.2	1.2	1.2	1.3	1	1.3	1.2	1.3	1.2
Sodium	mg/L	200 *	22.1	21.5	20.4	18.5	19.3	17.8	19.9	19.8	20.1	19.1	20.1	5	8.8	7.7	11.9	16.6
Sulphate	mg/L	500 *	27.7	29.3	30.1	33.2	31.6	31.7	32.3	31.4	31.2	29.8	31.7	110	172	160	194	204
Temperature - field	°C		10	9.1	11.8	9.4	11.5	9.6	13.0	10.4	11.7	10.2	11.7	7.1	12.6	7.4	12.8	7.5
Total Dissolved Solids	mg/L	500 *	210	230	240	240	260	220	220	220	280	240	260	620	490	530	720	760
Total Kjeldahl Nitrogen	mg/L		0.1	0.1	<0.1	0.1	<1.0	<0.1	0.2	<0.1	2.5	0.1	<0.3	0.2	<0.1	0.1	0.5	0.2
Zinc	mg/L	5 *		0.0034		0.0009		0.0016		0.0009		<0.0005		0.0005		0.0011		0.0006

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	111-III							112-I									
			Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22
Alkalinity	mg/L	30-500 *	404	424	398	383	392	409	438	180	176	193	211	196	204	217	214	203
Aluminum	mg/L	0.1 *		<0.025		0.063		<0.025		<0.025		<0.025		0.037		<0.025		<0.025
Ammonia (as N)	mg/L		0.1	0.1	0.1	0.2	0.2	0.1	<0.1	<0.1	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.2
Anion sum	meq/L		14.1	14.8	13.3	10.9	11.0	10.6	11.9	4.6	4.52	4.85	5.32	5.12	5.44	5.81	5.66	5.47
Arsenic	mg/L	0.010 **	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	0.005	0.0019	<0.005	0.0046	0.0038	0.0023	0.0041	0.0034
Barium	mg/L	1 **		0.142		0.122		0.127		0.11		0.143		0.155		0.132		0.115
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Bicarbonate	mg/L		403	423	397	382	391	408	437	179	175	191	209	194	202	216	212	201
Boron	mg/L	5 **		0.0333		0.0309		0.0325		0.0424		0.0393		0.0264		0.0228		0.0205
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		249	242	229	187	186	167	212	42.2	45.9	53.6	61	54.9	60.5	51.6	66.4	62.6
Carbonate	mg/L		<1	<1	<1	<1	<1	1	<1	1	1	2	2	2	1	1	2	1
Cation sum	meq/L		15.2	14.7	14.2	11.9	11.9	10.8	13.6	4.48	4.67	5.23	5.73	5.4	5.55	4.79	6.00	5.76
Chemical Oxygen Demand	mg/L		<10	20	<10	<10	<10	20	<10	<10	20	<10	<10	10	<10	<10	<10	<10
Chloride	mg/L	250 *	40	46.7	51.4	47.6	41.3	41.8	58.1	12	11.1	8.8	11.6	13.3	16.7	18.3	16.2	16.9
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		<0.0005		<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005
Conductivity	µS/cm		1220	1320	1030	937	1040	922	1140	435	452	483	509	501	548	541	521	529
Conductivity - field	µS/cm		1310	1320	1190	1040	1030	991	1040	423	449	488	497	499	515	557	529	527
Copper	mg/L	1 *		0.0014		0.0011		0.0006		<0.0005		0.0041		<0.0005		0.0010		<0.0005
Dissolved Organic Carbon	mg/L	5 *	2.7	5.3	3.0	1.7	2.1	1.7	1.4	1.6	1.5	3.8	4.5	3.8	2.2	2.3	2.6	1.9
Dissolved Oxygen - field	mg/L		0.59	2.69	1.02	1.51	6.78	2.30	1.50	4.43	2.19	0.69	0.75	3.41	2.97	1.36	0.85	2.39
Hardness	mg/L	80-100 *	706	687	649	528	528	475	595	191	204	236	264	249	254	221	278	267
Ion Percentage	%		3.49	0.48	3.16	4.20	3.88	0.90	6.80	1.39	1.62	3.85	3.7	2.65	0.93	9.58	2.98	2.58
Iron	mg/L	0.3 *	<0.005	<0.005	<0.005	0.066	0.434	<0.005	<0.005	0.172	0.11	0.211	0.72	0.047	0.351	0.122	0.472	0.303
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		20.5	20.1	18.7	14.8	15.3	14.2	16.0	20.9	21.8	24.7	27.1	27.2	25.1	22.4	27.3	26.9
Manganese	mg/L	0.05 *	0.0077	0.0017	0.0344	0.0125	0.0592	0.0033	0.0326	0.0042	0.005	0.005	0.011	0.0075	0.0081	0.0065	0.0108	0.0079
Molybdenum	mg/L			<0.0005		<0.0005		<0.0005		0.0034		0.002		0.0051		0.0012		0.0009
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	0.8	0.5	<0.5	<0.5	<0.05	<0.05	0.07	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Oxidation Reduction Potential	mV		-1.7	28.1	50.9	9.9	72.6	113.5	24.3	22.3	-87.3	-118.9	-119.5	41.4	-54.1	-69.5	-66	-60
pH	units		7.13	7.30	7.30	7.23	7.22	7.50	7.12	7.89	7.91	8.09	7.94	8.05	7.89	7.83	7.89	7.89
pH - field	units		7.03	6.98	7.07	6.93	7.00	6.93	6.70	7.56	7.83	7.73	7.6	7.8	7.94	7.62	7.62	7.53
Phenols	µg/L		1	<1	1	3	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02	<0.01	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.01	0.01	<0.03	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.01	0.01	0.04	<0.02
Potassium	mg/L		1.6	1.3	1.6	1.3	1.6	1.2	1.6	5.5	4.7	3.8	2.5	3.2	2.8	2.0	2.5	2.2
Sodium	mg/L	200 *	22.1	19.5	25.9	29.1	29.9	28.6	37.7	11.1	9.7	9	7.9	6.8	7.9	6.3	7.6	7.3
Sulphate	mg/L	500 *	247	252	200	105	110	74	85	37.5	38.5	41.5	43.8	46	49.3	52.6	50.9	51.2
Temperature - field	°C		13.2	8.0	13.8	8.4	13.1	8.6	12.7	8.9	10.8	9.3	11.7	9.6	11.8	9.5	12.7	10.4
Total Dissolved Solids	mg/L	500 *	880	840	710	610	640	590	670	260	280	290	350	310	330	260	320	340
Total Kjeldahl Nitrogen	mg/L		<1.0	<0.5	0.2	<0.1	3.1	0.1	<0.3	<0.1	<1.0	0.1	<0.1	0.2	<1.0	0.2	0.2	0.1
Zinc	mg/L	5 *		0.0010		0.0019		<0.0005		0.0018		0.0071		0.0031		<0.0005		<0.0005

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	112-I			112-II												112-III
			Sep-22	Mar-23	Sep-23	Mar-18	Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23	Mar-18
Alkalinity	mg/L	30-500 *	215	216	209	255	267	270	292	290	280	294	311	302	340	328	331	219
Aluminum	mg/L	0.1 *		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025		<0.025
Ammonia (as N)	mg/L		0.2	0.2	0.2	<0.1	0.3	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2	0.1	0.1	<0.1
Anion sum	meq/L		5.67	5.60	5.48	10.7	11.5	11.3	11.9	12.4	11.5	11.6	11.5	11.1	11.5	10.8	11.0	6.83
Arsenic	mg/L	0.010 **	0.0028	0.0042	0.0034	<0.0005	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.13		0.166		0.143		0.103		0.158		0.117		0.15		0.113
Beryllium	mg/L			<0.0005		<0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Bicarbonate	mg/L		213	214	207	254	266	269	291	289	279	293	310	301	339	327	330	218
Boron	mg/L	5 **		0.0286		0.0106		0.0161		0.0198		0.0241		0.0258		0.0518		0.0595
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001
Calcium	mg/L		60.1	63.3	62.9	180	189	196	208	192	191	146	193	180	175	173	187	73.4
Carbonate	mg/L		1	2	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	1
Cation sum	meq/L		5.84	5.91	5.88	11	11.6	12.1	12.8	12	11.9	9.26	12.1	11.5	11.3	11.1	11.6	6.9
Chemical Oxygen Demand	mg/L		<10	<10	<10	10	30	30	30	40	20	20	10	<10	20	20	20	20
Chloride	mg/L	250 *	16.9	15.3	15.9	95	105	96.6	99.2	97.9	80.7	72.6	65.5	56.1	48.8	43.4	45.4	33.9
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Cobalt	mg/L			<0.0005		0.0001		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0001
Conductivity	µS/cm		542	489	535	954	1060	1110	1180	1170	1110	1080	1010	974	1060	908	1040	652
Conductivity - field	µS/cm		543	521	490	991	1120	1160	1140	1160	1090	1110	1060	1020	1040	1000	965	641
Copper	mg/L	1 *		<0.0005		0.0012		0.0033		0.0021		0.0018		0.0011		0.0012		<0.0005
Dissolved Organic Carbon	mg/L	5 *	2.2	2.2	1.7	9.3	10.4	12.7	12.7	12.4	10.7	10.2	9.9	7.6	7.4	6.9	5.1	3.8
Dissolved Oxygen - field	mg/L		4.98	3.87	4.38	4.17	0.93	1.49	1.65	2.73	1.29	1.74	3.32	1.88	1.38	2.79	1.95	3.04
Hardness	mg/L	80-100 *	271	276	274	531	555	579	612	571	562	435	569	537	531	521	552	317
Ion Percentage	%		1.48	2.69	3.51	1.17	0.42	3.28	3.88	1.33	1.69	11.3	2.47	1.78	0.86	1.35	2.91	0.47
Iron	mg/L	0.3 *	0.169	0.500	0.228	0.002	<0.05	0.014	<0.05	<0.005	<0.005	<0.005	0.022	0.012	0.008	<0.005	0.018	0.001
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005
Magnesium	mg/L		29.4	28.6	28.5	19.7	20.2	21.8	22.5	22.2	20.7	17.1	21.1	21.3	22.8	21.6	20.7	32.4
Manganese	mg/L	0.05 *	0.0049	0.0099	0.0059	0.0019	0.007	0.0037	0.005	0.0075	0.0054	0.0021	0.0078	0.0063	0.0060	0.0036	0.0066	0.0011
Molybdenum	mg/L			0.0009		<0.0005		<0.0005		<0.0005		0.0006		<0.0005		<0.0005		0.0063
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002		<0.002
Nitrate	mg/L	10.0 **	<0.5	<0.05	0.09	5.23	6.2	4.8	4.6	5.6	5.5	5.3	4.8	5.1	4.8	4.1	4.4	<0.5
Nitrite	mg/L	1.0 **	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05	<0.5
Oxidation Reduction Potential	mV		-66	114	-59	78.1	30.9	50.8	27.6	103.4	33	96.1	66.3	90.1	84.7	168.5	22.2	81.5
pH	units		7.87	7.94	7.93	7.36	7.35	7.58	7.42	7.51	7.37	7.40	7.39	7.32	7.25	7.52	7.31	7.83
pH - field	units		7.54	7.54	7.58	7.1	7.18	7.2	7.09	7.1	7.34	7.09	7.32	7.05	6.84	7.02	6.96	7.48
Phenols	µg/L		<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.01
Phosphorus - Dissolved	mg/L																	
Phosphorus	mg/L		<0.02	<0.02	<0.02	0.04	0.08	0.05	<0.02	<0.02	<0.01	0.01	0.04	0.30	0.03	<0.02	<0.02	0.04
Potassium	mg/L		2.2	2.2	2.2	1.2	1.3	1.5	1.5	1.6	1.7	1.1	1.6	1.5	1.4	1.4	1.4	3.6
Sodium	mg/L	200 *	7.2	6.6	6.7	7.2	8.5	10.5	11.8	12	13.4	11.5	15.3	15.5	14.5	13.3	12.3	10
Sulphate	mg/L	500 *	49.6	47.4	47.3	132	139	147	149	172	165	168	160	159	155	140	144	78.8
Temperature - field	°C		11.6	10.2	13.2	8.7	11.1	9.4	12	9.8	12.1	9.5	13.3	10.0	13.4	10.8	12.9	6.6
Total Dissolved Solids	mg/L	500 *	380	320	320	660	800	830	970	780	930	700	710	700	670	610	610	390
Total Kjeldahl Nitrogen	mg/L		3.2	<0.3	<0.3	<0.1	<1.0	0.4	0.7	0.3	<1.0	<1	3.2	<0.1	2.7	0.5	<0.3	<0.1
Zinc	mg/L	5 *		<0.0005		0.0009		0.0032		0.0006		<0.0005		0.0006		0.0009		0.0007

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.1
Groundwater Chemical Results - General/Inorganics
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	112-III										
			Sep-18	Mar-19	Sep-19	Mar-20	Sep-20	Mar-21	Sep-21	Mar-22	Sep-22	Mar-23	Sep-23
Alkalinity	mg/L	30-500 *	196	208	224	224	223	230	232	238	265	244	257
Aluminum	mg/L	0.1 *		<0.025		0.048		<0.025		<0.025		0.069	
Ammonia (as N)	mg/L		0.2	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	<0.1
Anion sum	meq/L		6.42	7.53	7.98	8.55	8.28	8.60	8.77	9.02	9.12	8.61	8.79
Arsenic	mg/L	0.010 **	<0.005	<0.0005	<0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Barium	mg/L	1 **		0.112		0.106		0.091		0.08		0.073	
Beryllium	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Bicarbonate	mg/L		195	206	223	222	222	228	231	228	264	242	255
Boron	mg/L	5 **		0.0519		0.0552		0.0543		0.0422		0.077	
Cadmium	mg/L	0.005 **		<0.0001		<0.0001		<0.0001		<0.0001		<0.0001	
Calcium	mg/L		79.1	87.3	94	95.6	95.2	92.3	100	107	105	98	101
Carbonate	mg/L		1	2	1	2	1	1	1	10	<1	2	2
Cation sum	meq/L		7.2	8.09	8.55	8.75	8.5	8.30	8.90	9.46	9.58	8.91	9.26
Chemical Oxygen Demand	mg/L		<10	<10	20	20	<10	20	<10	<10	20	20	20
Chloride	mg/L	250 *	40.9	51.2	61.1	67	67	64.5	66.8	62.8	57.5	56.6	55.6
Chromium	mg/L	0.05 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Cobalt	mg/L			<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Conductivity	µS/cm		646	754	797	823	837	834	786	873	882	758	857
Conductivity - field	µS/cm		701	752	781	835	831	841	815	854	874	820	784
Copper	mg/L	1 *		0.0014		0.0012		0.0018		0.0014		0.0014	
Dissolved Organic Carbon	mg/L	5 *	5.3	6	15.4	7.2	5.8	5.8	6.2	5.0	5.5	5.2	3.2
Dissolved Oxygen - field	mg/L		2.22	6.16	7.68	4.15	6.45	6.40	2.15	6.94	3.79	8.31	6.28
Hardness	mg/L	80-100 *	332	375	399	410	395	388	416	444	450	416	432
Ion Percentage	%		5.7	3.56	3.46	1.15	1.3	1.74	0.78	2.40	2.47	1.76	2.62
Iron	mg/L	0.3 *	0.05	0.002	<0.05	0.04	<0.005	<0.005	<0.005	<0.005	<0.005	0.051	0.005
Lead	mg/L	0.01 **		<0.0005		<0.0005		<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		32.6	38.1	39.9	41.5	38.3	38.2	40.3	42.9	45.4	41.5	43.6
Manganese	mg/L	0.05 *	0.023	0.0015	0.004	0.0032	0.0023	0.0006	0.0011	0.0018	0.0050	0.0056	0.0030
Molybdenum	mg/L			0.0051		0.0033		0.0034		0.0023		0.0023	
Nickel	mg/L			<0.002		<0.002		<0.002		<0.002		<0.002	
Nitrate	mg/L	10.0 **	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
Nitrite	mg/L	1.0 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.05	<0.05
Oxidation Reduction Potential	mV		-68.1	69.4	25	82.3	40.9	104.7	68.1	100.6	94.6	198.4	20.1
pH	units		7.82	8.05	7.81	7.95	7.71	7.84	7.79	8.67	7.57	7.99	7.82
pH - field	units		7.65	7.71	7.46	7.55	7.75	7.66	7.57	7.39	7.24	7.42	7.39
Phenols	µg/L		<1	<1	<1	<1	<1	<1	<1	2	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphorus - Dissolved	mg/L												
Phosphorus	mg/L		0.06	0.05	<0.02	<0.02	<0.01	0.01	0.04	<0.02	0.02	<0.02	<0.02
Potassium	mg/L		3.7	3.6	3.6	3.4	3.7	3.2	3.6	3.2	3.1	3.1	3.2
Sodium	mg/L	200 *	9.6	10.4	9.8	9.5	10	9.6	10.1	10.3	10.5	10.8	11.4
Sulphate	mg/L	500 *	68.9	99.3	92.4	112	99.7	112	115	127	114	110	108
Temperature - field	°C		14	6.8	15.5	7.5	17	6.9	17.2	7.6	14.8	8.2	17.0
Total Dissolved Solids	mg/L	500 *	390	470	490	500	560	440	530	550	720	520	470
Total Kjeldahl Nitrogen	mg/L		<1.0	0.3	0.4	0.5	<1.0	0.4	0.3	0.3	2.5	<0.3	<0.3
Zinc	mg/L	5 *		0.0013		0.0011		0.0011		0.0013		0.0018	

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Operational Guideline or Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
5) meq/L - milliequivalents per litre, mV - millivolt

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	5-IV						18A						18B		
			Oct-18	Oct-19	Sep-20	Oct-21	Sep-22	Sep-23	Apr-18	Apr-19	Apr-20	Apr-21	Apr-22	Mar-23	Apr-18	Apr-19	Apr-20
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	0.7	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	0.8	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	0.6	<0.5	0.7	0.6	<0.5	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	0.8	0.6	0.9	0.8	<0.5	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	18B			19A						19B					
			Apr-21	Apr-22	Mar-23	Apr-18	Apr-19	May-20	Mar-21	Apr-22	Mar-23	Apr-18	Apr-19	May-20	Mar-21	Apr-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	0.8	0.6	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	0.7	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	1	0.6	<0.5	0.7	<0.5	0.9
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	20B		20B				48						50-III		
			Apr-18	Apr-19	Apr-20	Mar-21	Apr-22	Mar-23	Apr-18	Apr-19	Apr-20	Mar-21	Mar-22	Mar-23	Oct-18	Oct-19	Sep-20
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.6	1.2	2.5	2	1.6	0.6	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	13.9	9	11	8.4	6.2	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	50-III			63-I						63-II				63-II	
			Oct-21	Sep-22	Sep-23	Apr-18	Apr-19	Apr-20	Mar-21	Mar-22	Apr-23	Apr-18	Apr-19	Apr-20	Mar-21	Mar-22	Apr-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	63-III						66-III						74-III		
			Apr-18	Apr-19	Apr-20	Mar-21	Mar-22	Apr-23	Apr-18	Mar-19	Apr-20	Mar-21	Mar-22	Mar-23	Mar-18	Apr-19	May-20
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	1.3	<0.5	0.9	0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.5	4.9	2.7	3.7	4.4	1.8	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	0.7	1	<0.5	1.4	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	34	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	74-III			75-I					75-II						81-I
			Mar-21	Mar-22	Sep-23	Apr-18	May-20	Apr-21	Mar-22	Apr-23	Apr-18	Apr-19	May-20	Apr-21	Mar-22	Apr-23	Apr-18
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	48.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	81-I					81-II			81-II			81-III			
			Apr-19	Apr-20	Mar-21	Mar-22	Mar-23	Apr-18	Apr-19	Apr-20	Mar-21	Mar-22	Mar-23	Apr-18	Apr-19	Apr-20	Mar-21
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	1.1	1.2	1.3	1.2	0.9	0.6	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	11.6	13.3	6.7	12.4
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	6	1.1	4.7
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	4.7	1.5	3.3
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	1.6	1.8	2.3	1.8	1.4	1	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.7	4	<0.5	0.8
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.4	36.2	1.7	2.3
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	0.2	<0.2	<0.2	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	3.6	36.8	1.7	2.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	81-III		84-I						84-II			84-II	
			Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	6.6	6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	1.7	1.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	1.8	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	0.7	0.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	17.8	6.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	4.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	18	6.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	85-I						85-II						86-I	
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Apr-18	Apr-19
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	86-I				86-II						86-III			
			Mar-20	Mar-21	Apr-22	Mar-23	Apr-18	Apr-19	Mar-20	Mar-21	Apr-22	Mar-23	Apr-18	Apr-19	Mar-20	Mar-21
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	86-III		87-I						87-II					
			Apr-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	87-III						88-I					88-II			
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	88-II		88-III						89-I					
			Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Apr-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	89-II						89-III						90-I	
			Apr-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Apr-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-11	Apr-12
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	90-I			90-II					90-III					91-I	
			Mar-13	Mar-14	Mar-15	Mar-11	Apr-12	Mar-13	Mar-14	Mar-15	Mar-11	Apr-12	Mar-13	Mar-14	Mar-15	Mar-18	Mar-19
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L				<0.5					<0.5					<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.5	<0.2	<0.2	<0.2	<0.2	<0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	91-I				91-II						91-III			
			Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-20	Apr-21	Mar-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	92-I						92-II						92-III		
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	92-III			93-I						93-II					
			Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	94-I						94-II						95-I		
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Apr-18	Mar-19	Mar-20
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2

Groundwater Chemical Results - Volatile Organic Compounds

Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	95-I			95-II						104-I					
			Mar-21	Apr-22	Mar-23	Apr-18	Mar-19	Mar-20	Mar-21	Apr-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2

Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	104-II		104-II				104-III						106-I			
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<0.5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	106-I		106-II						106-III						107-I	
			Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Apr-18	Mar-19
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2

Groundwater Chemical Results - Volatile Organic Compounds

Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	107-I				107-II						107-III					
			Mar-20	Mar-21	Apr-22	Mar-23	Apr-18	Mar-19	Mar-20	Mar-21	Apr-22	Mar-23	Apr-18	Mar-19	Mar-20	Mar-21	Apr-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES:
1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	108-I						108-II						108-III			
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<0.5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2

Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	108-III		109-I						109-II				109-III			
			Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.1	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.8	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2

Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	109-III		110-I						110-II						110-III	
			Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2
Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	110-III				111-I						111-II					
			Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2

Groundwater Chemical Results - Volatile Organic Compounds

Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	ODWQS	111-III						112-I						112-II			
			Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

Table F.2

Groundwater Chemical Results - Volatile Organic Compounds
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

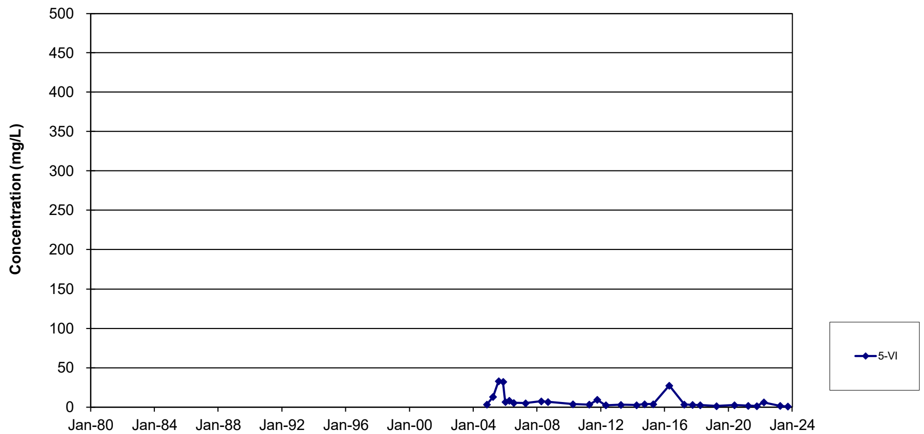
PARAMETER	UNITS	ODWQS	112-II		112-III					
			Mar-22	Mar-23	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
1,1,2,2-Tetrachlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	14 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	3 *, 200 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	1 *, 5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	1 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	2 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	30 *, 80 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5
Chloroform	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromochloromethane	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	50 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl Benzene	µg/L	1.6 *, 140 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene dibromide	µg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	30 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	24 *, 60 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	5 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L		<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	1 **	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	20 *, 90 **	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

NOTES: 1) ODWQS - Ontario Drinking Water Quality Standard (June 2006)
2) * = Aesthetic Objective (non-health related)
3) ** = Maximum Acceptable Concentration or Interim Maximum Acceptable Concentration (health related)
4) µg/L - micrograms per litre

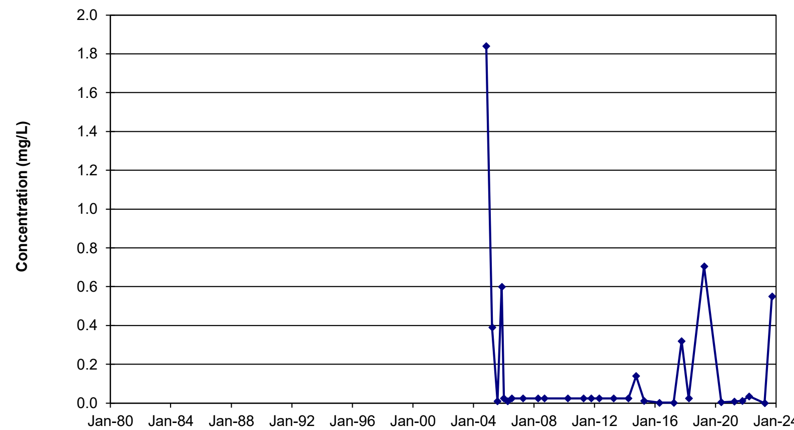
Figure F.1

Time Concentration Graphs - Groundwater: Overburden

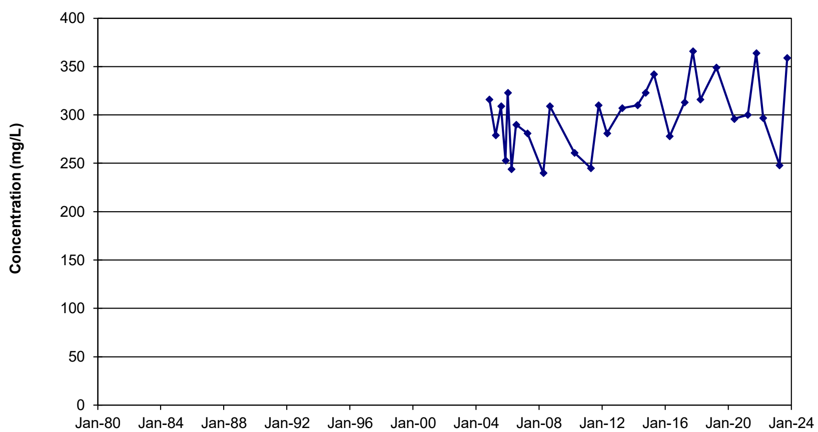
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

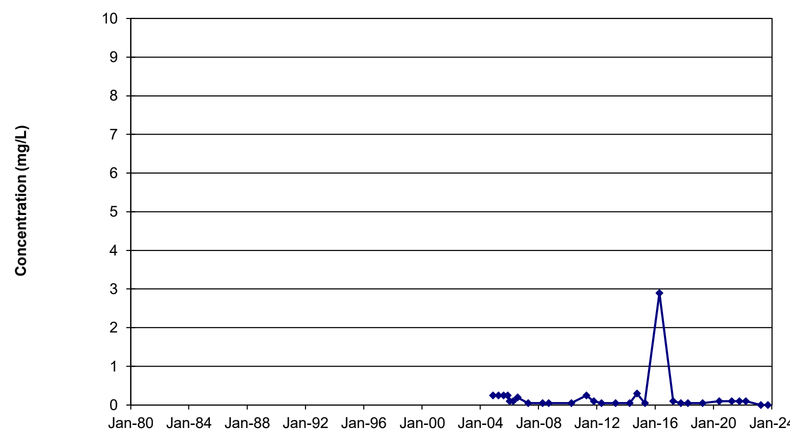
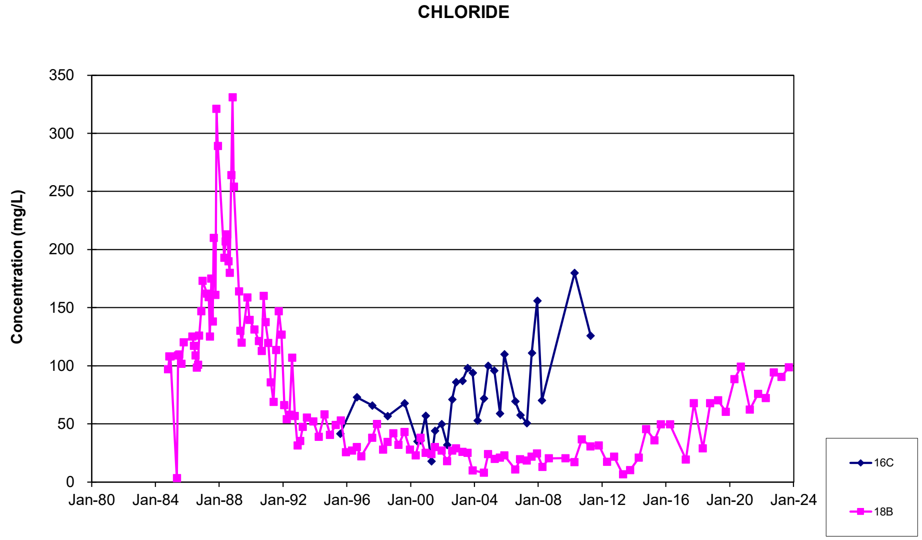
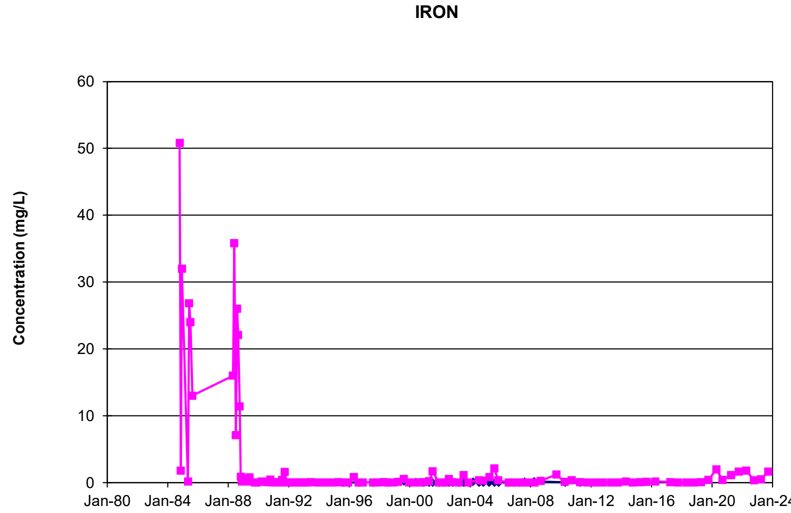
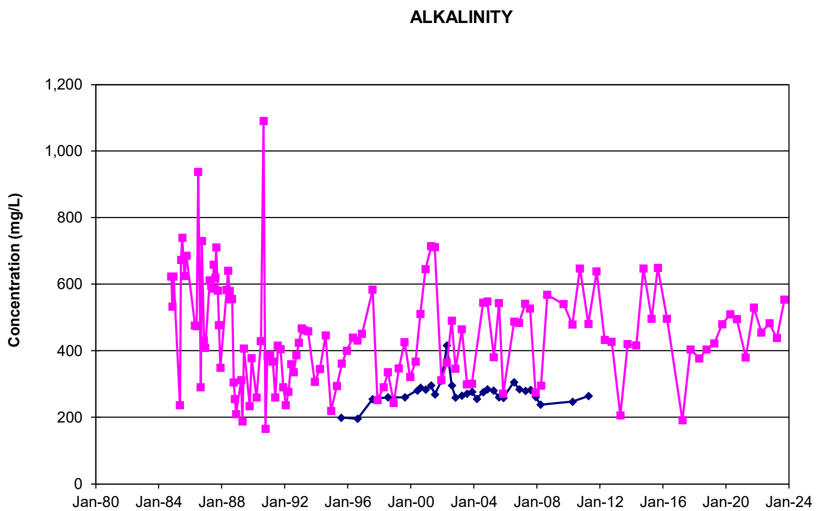


Figure F.2

Time Concentration Graphs - Groundwater: Overburden







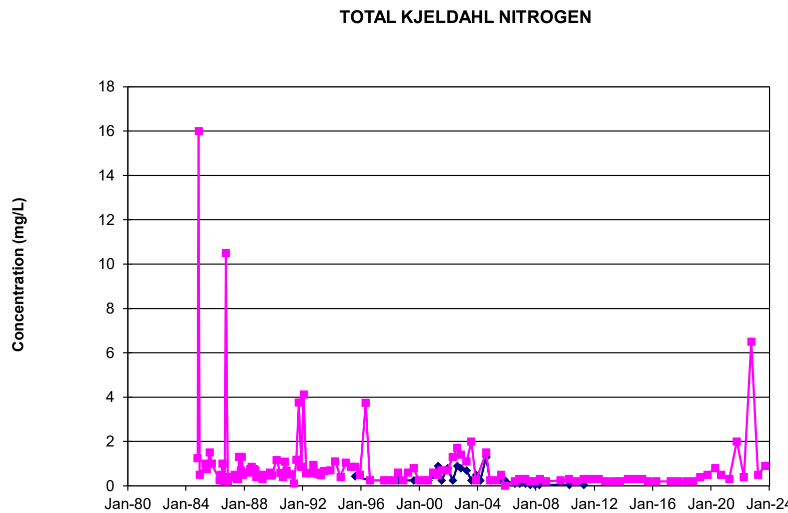
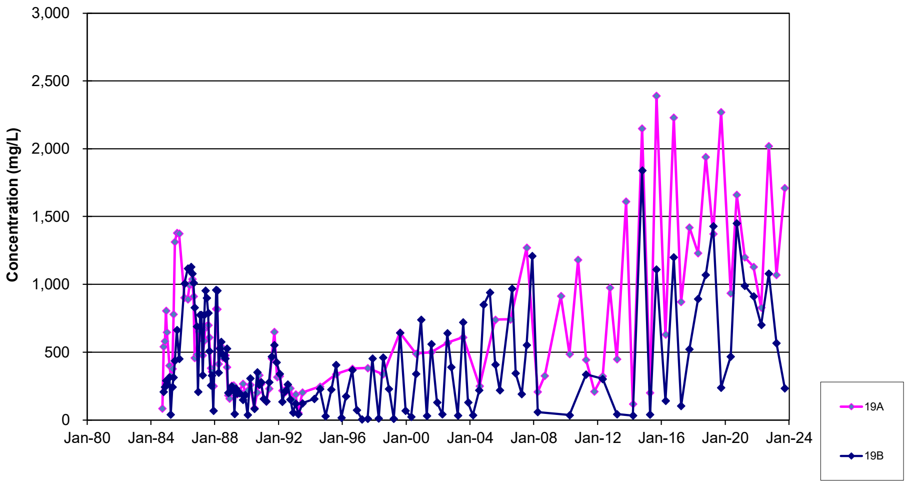


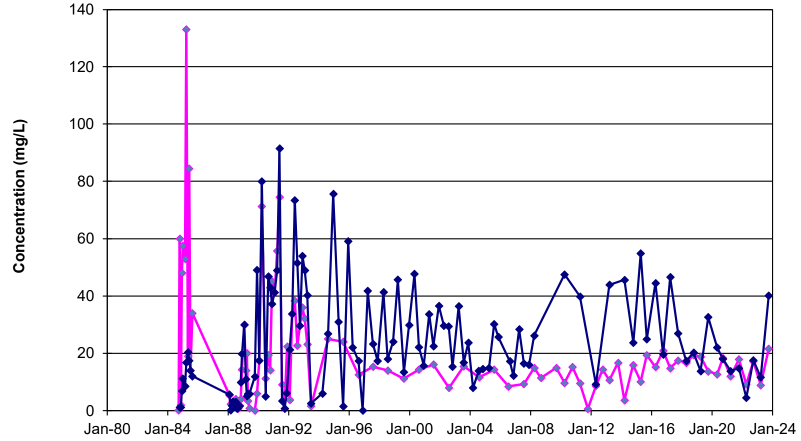
Figure F.3

Time Concentration Graphs - Groundwater: Overburden

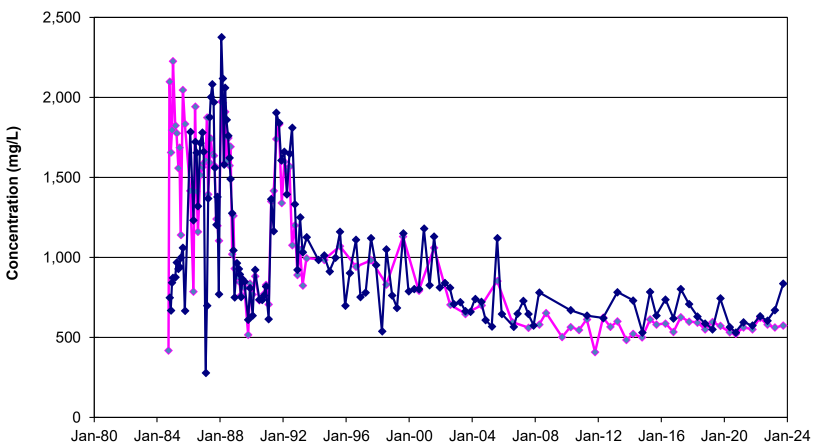
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

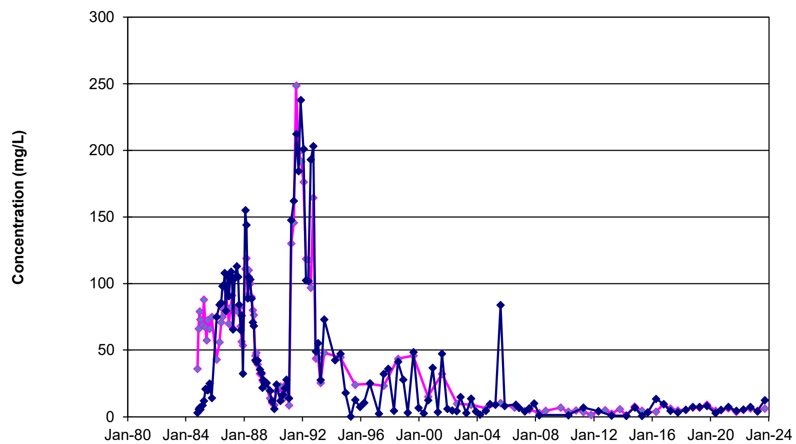
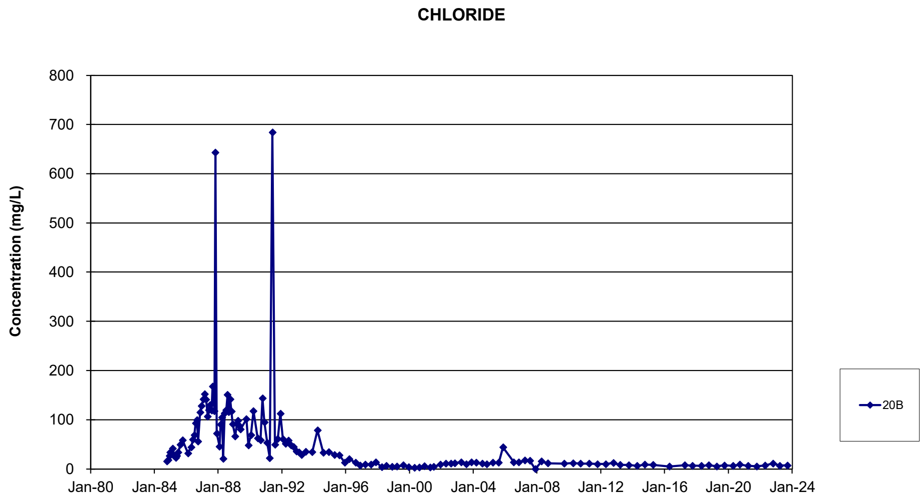
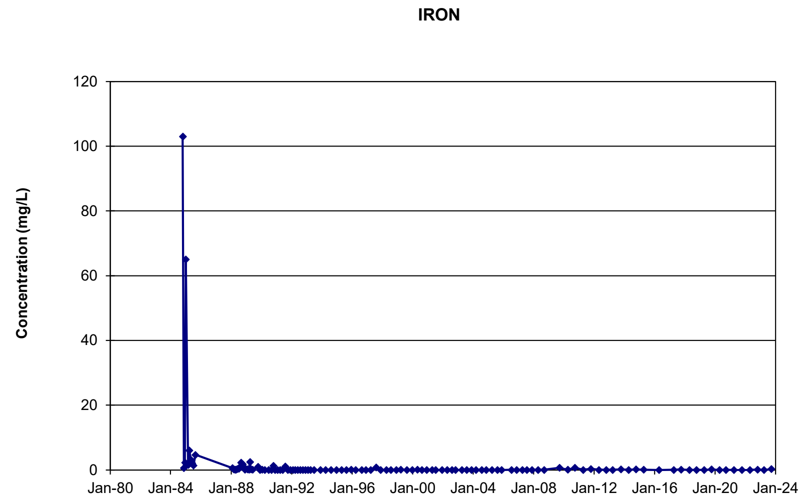
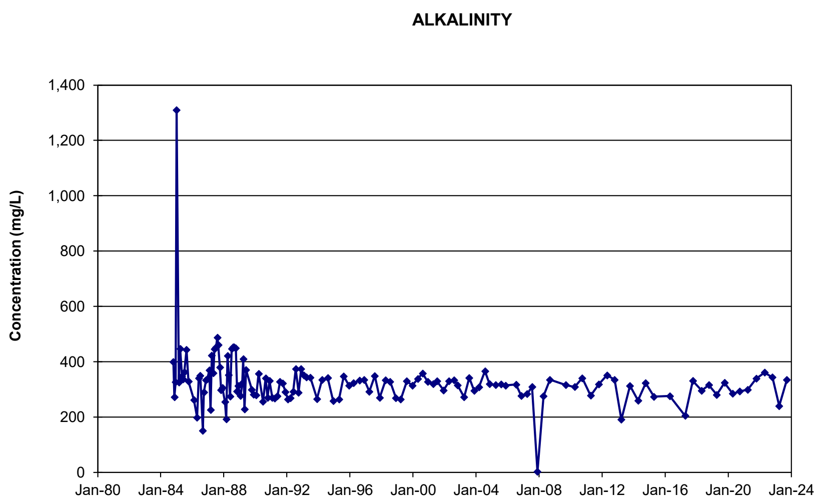


Figure F.4

Time Concentration Graphs - Groundwater: Overburden







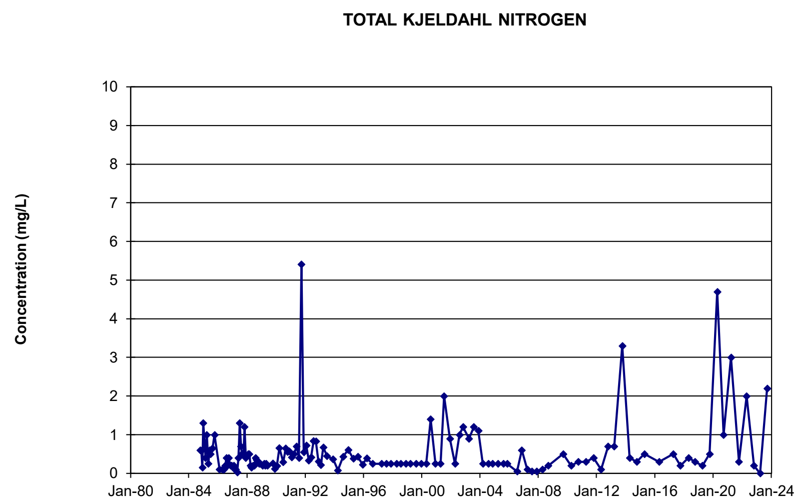
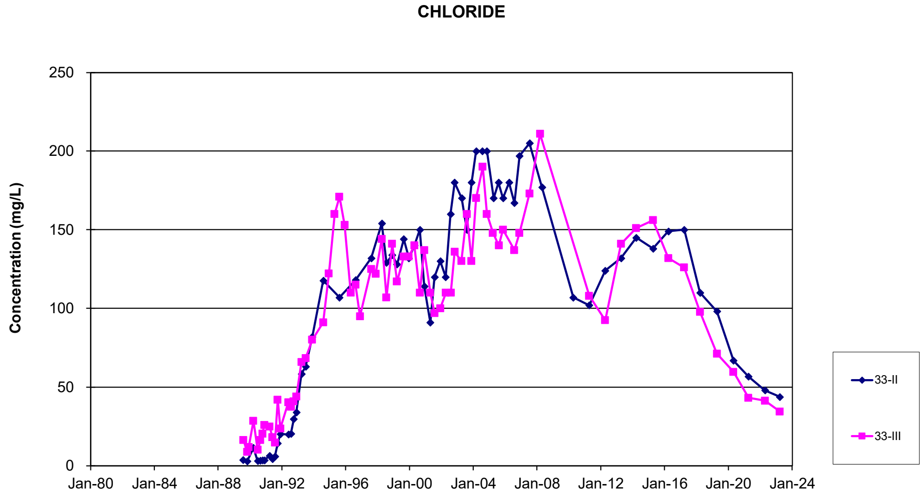
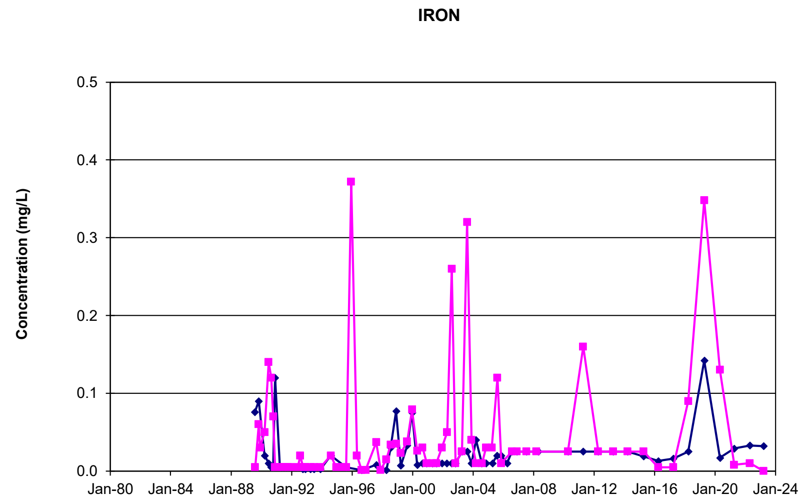
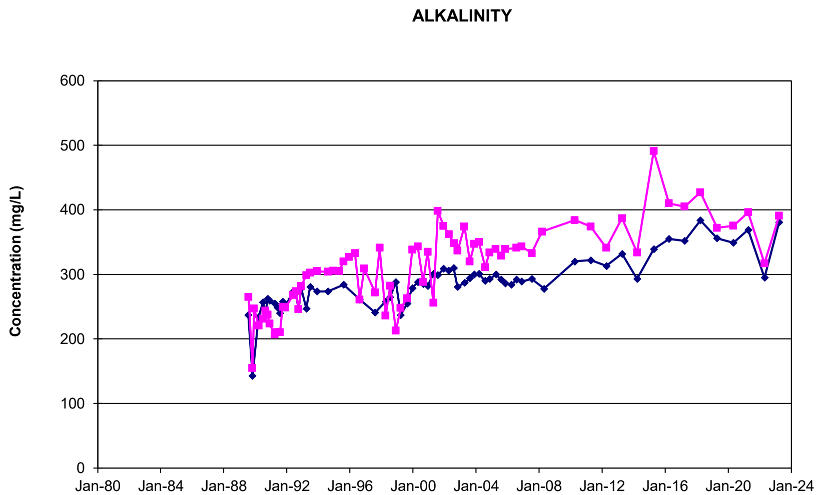


Figure F.5

Time Concentration Graphs - Groundwater: Overburden







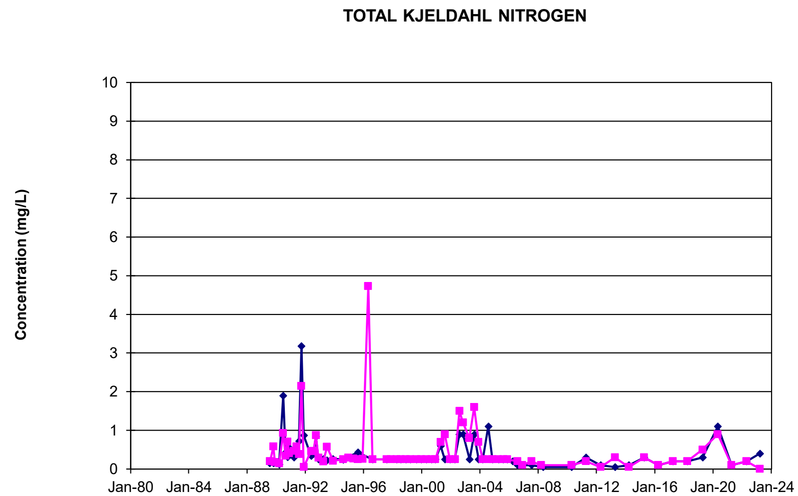
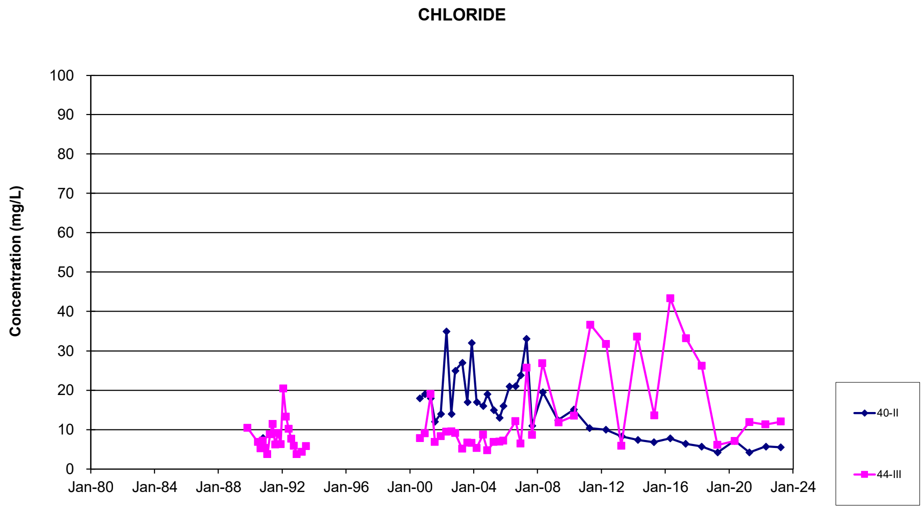
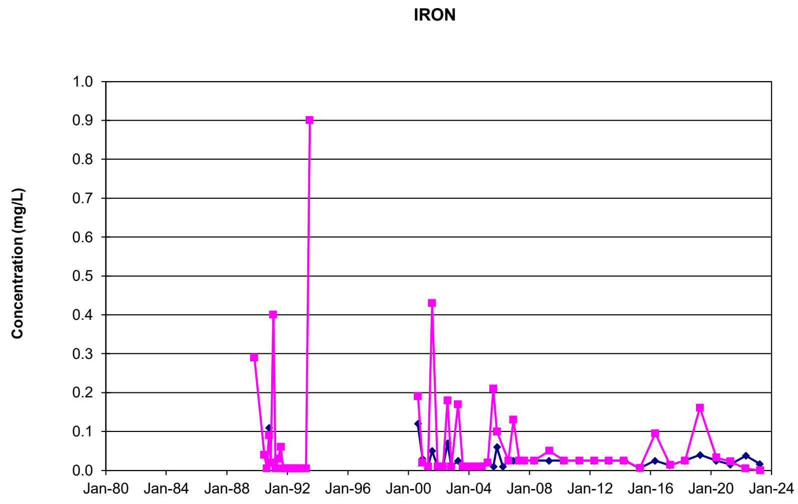
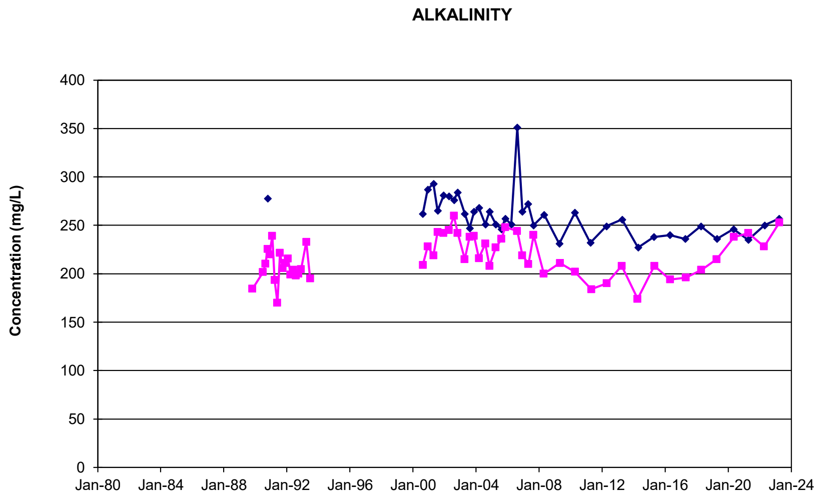


Figure F.6

Time Concentration Graphs - Groundwater: Overburden







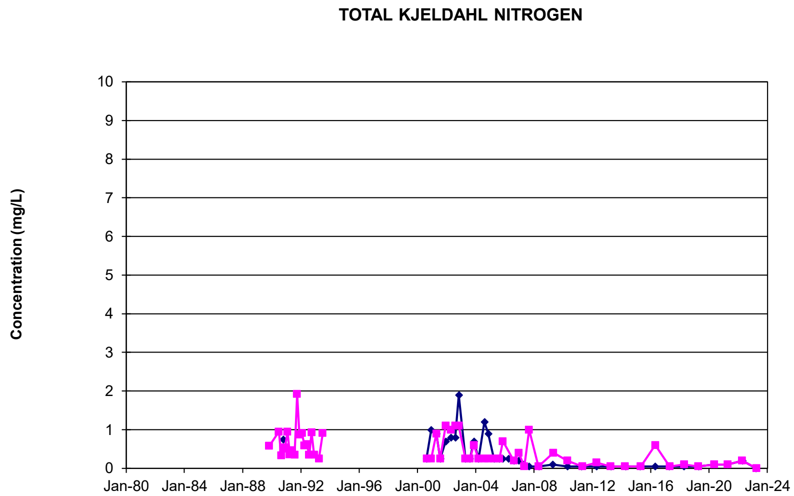
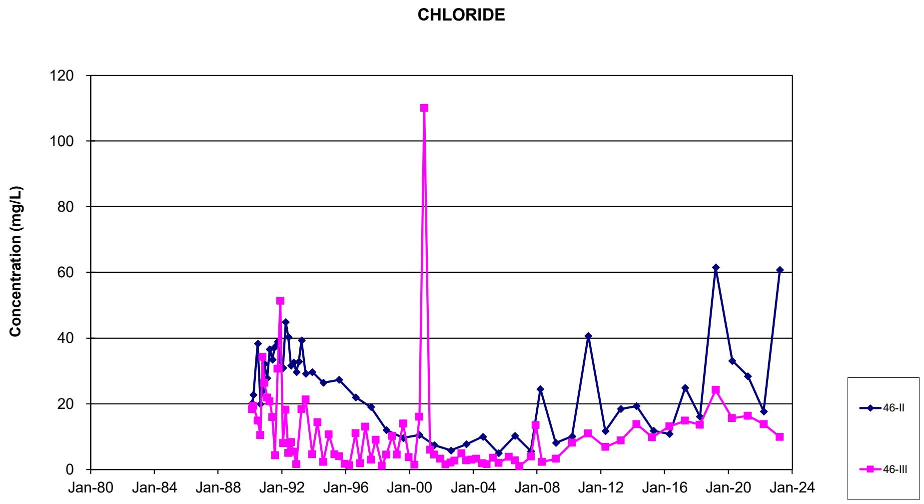
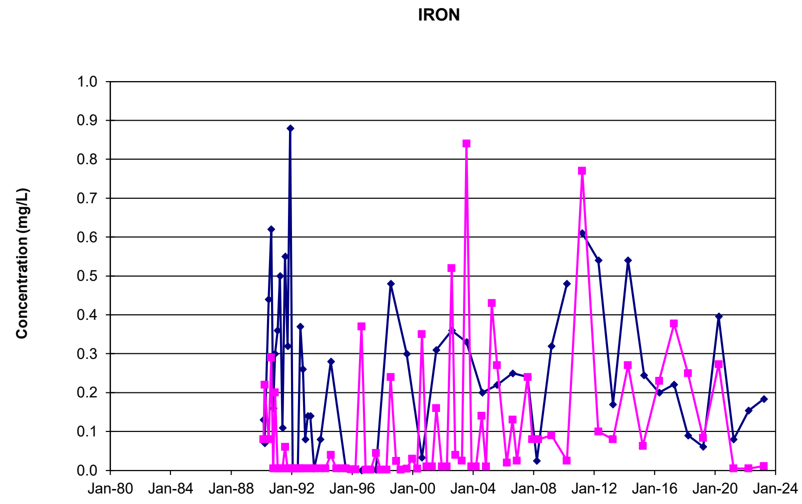
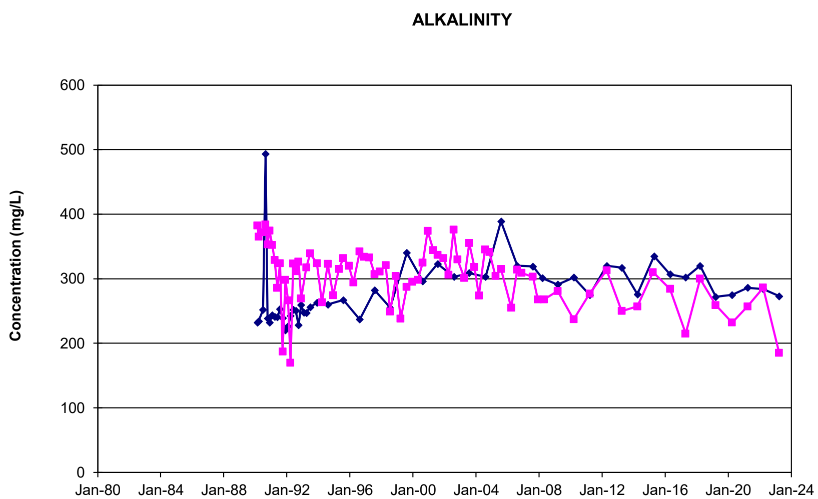


Figure F.7

Time Concentration Graphs - Groundwater: Overburden







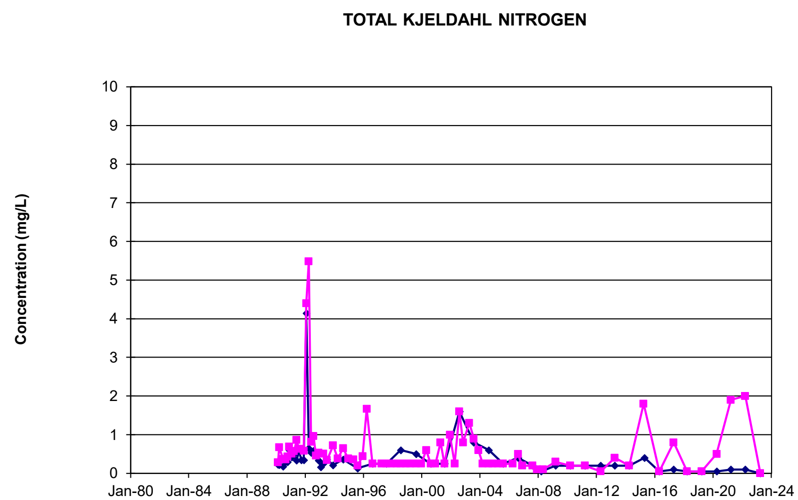
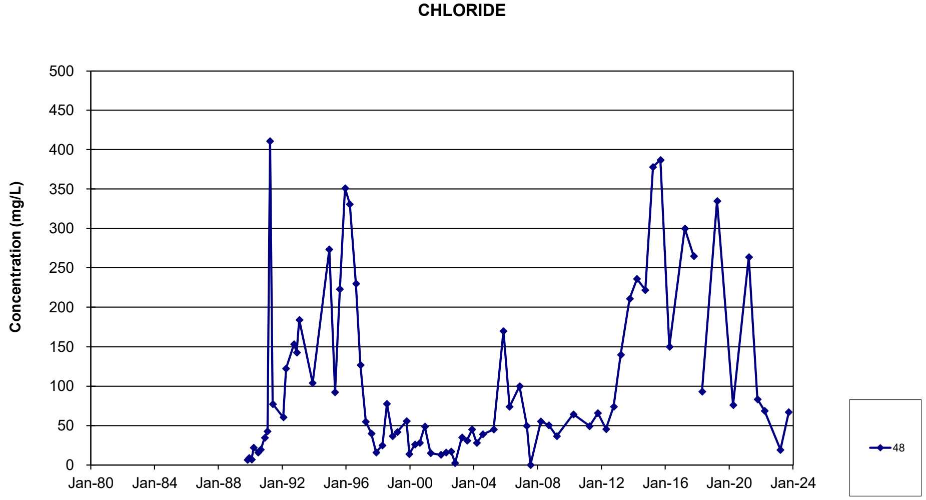
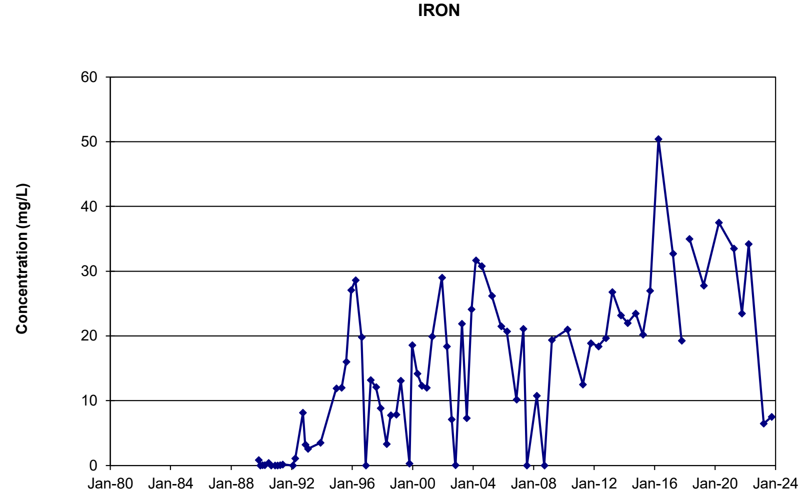
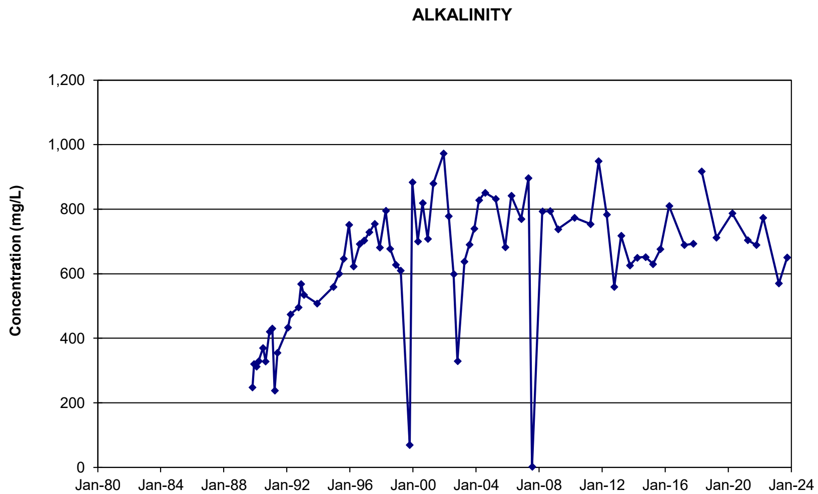


Figure F.8

Time Concentration Graphs - Groundwater: Overburden







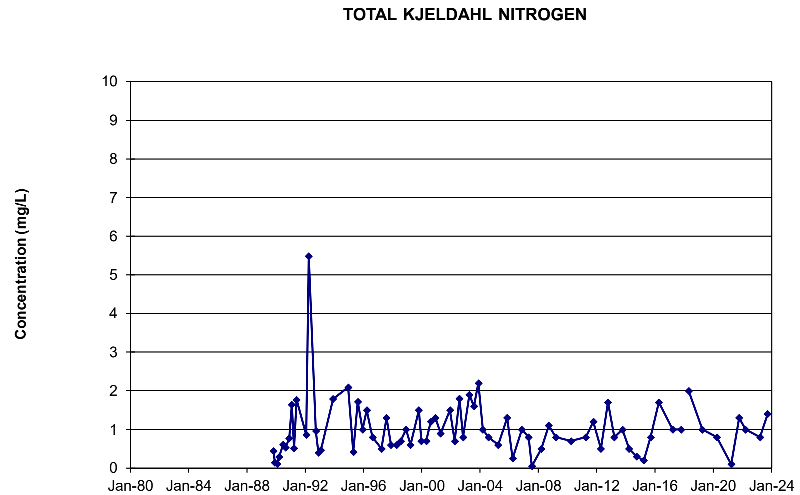
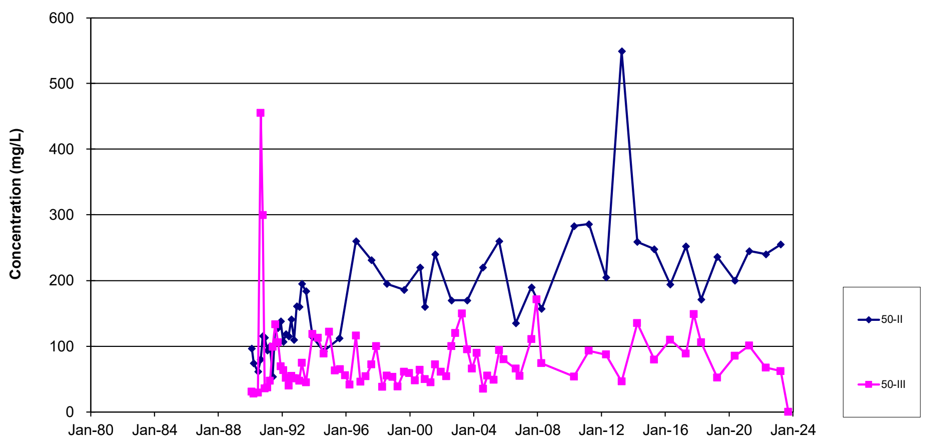


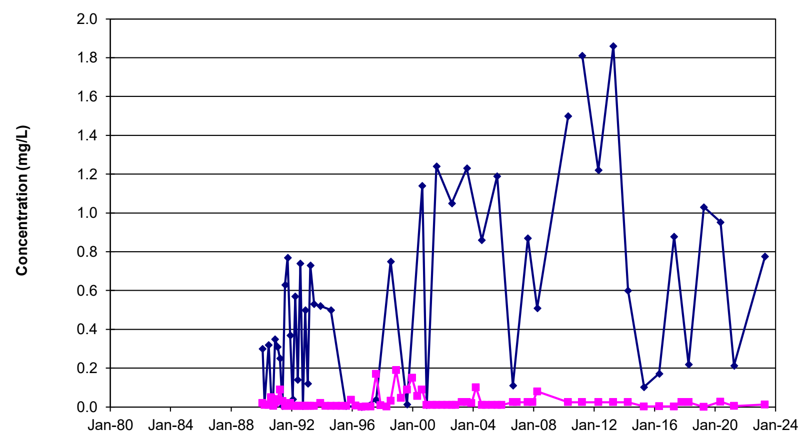
Figure F.9

Time Concentration Graphs - Groundwater: Overburden

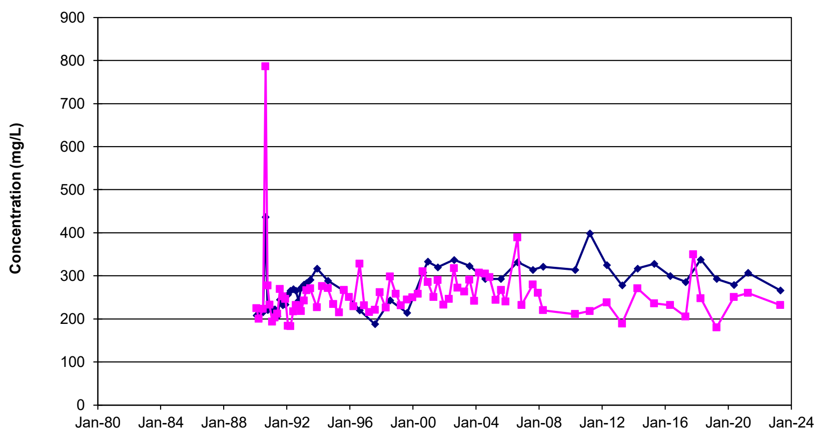
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

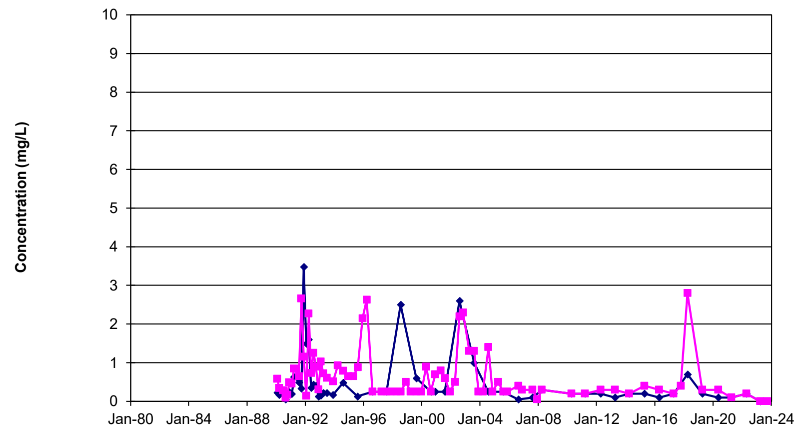
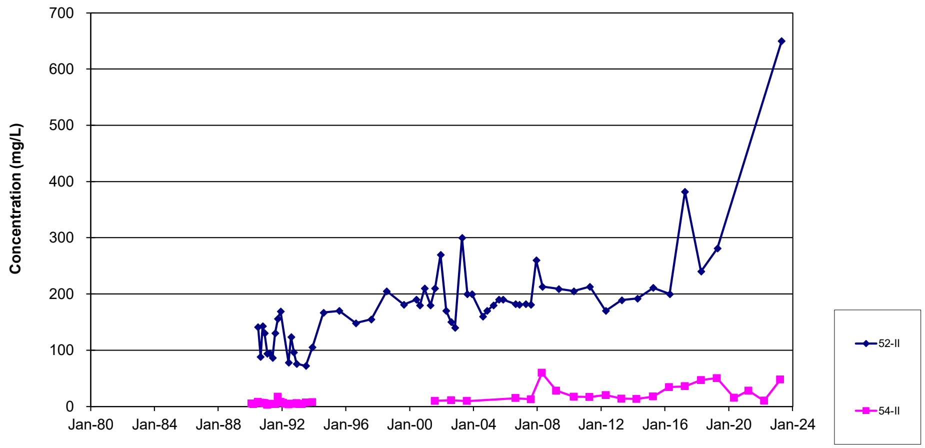


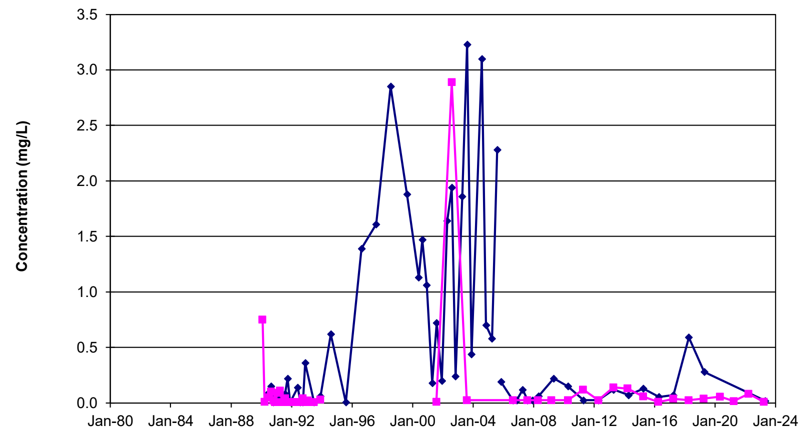
Figure F.10

Time Concentration Graphs - Groundwater: Overburden

CHLORIDE



IRON



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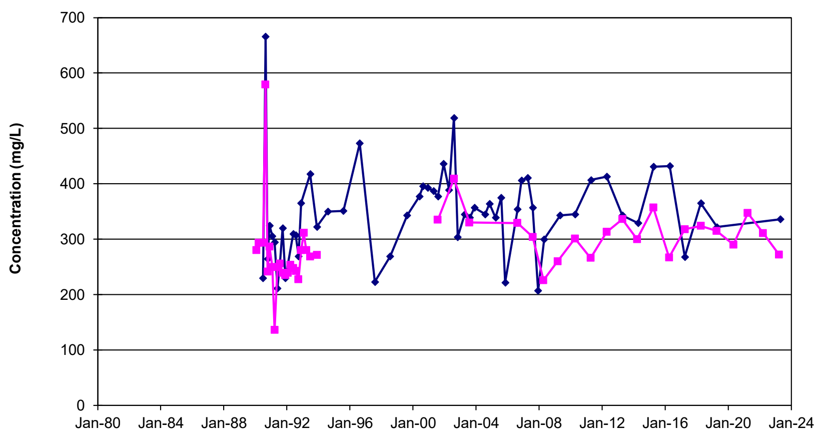


TOTAL KJELDAHL NITROGEN

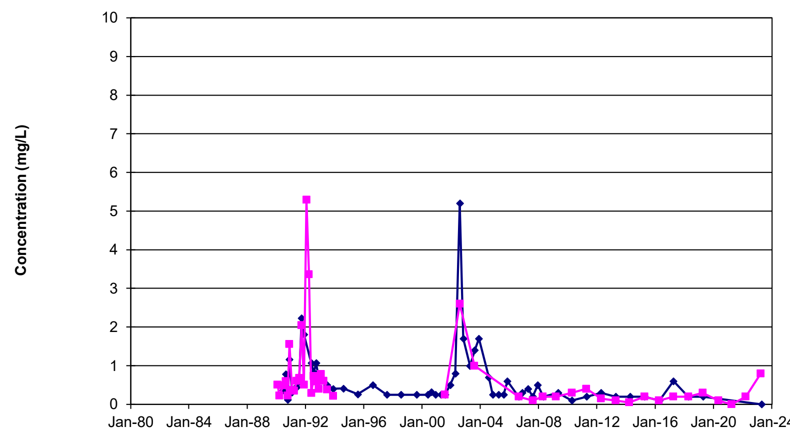
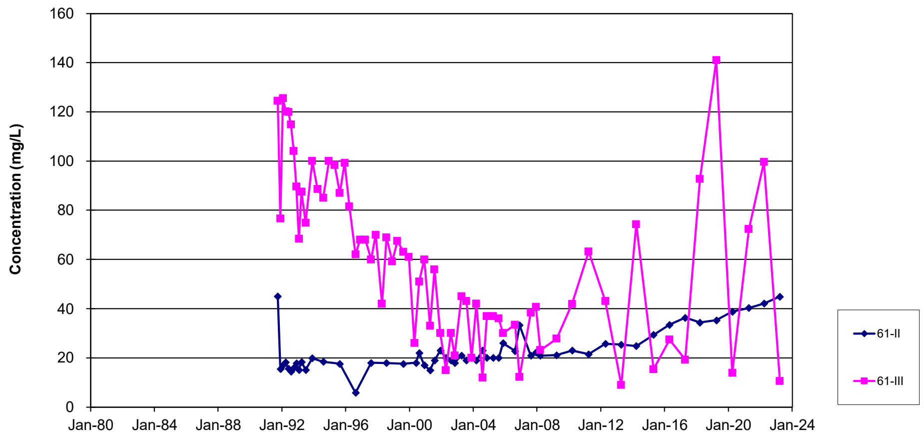


Figure F.11

Time Concentration Graphs - Groundwater: Overburden

CHLORIDE



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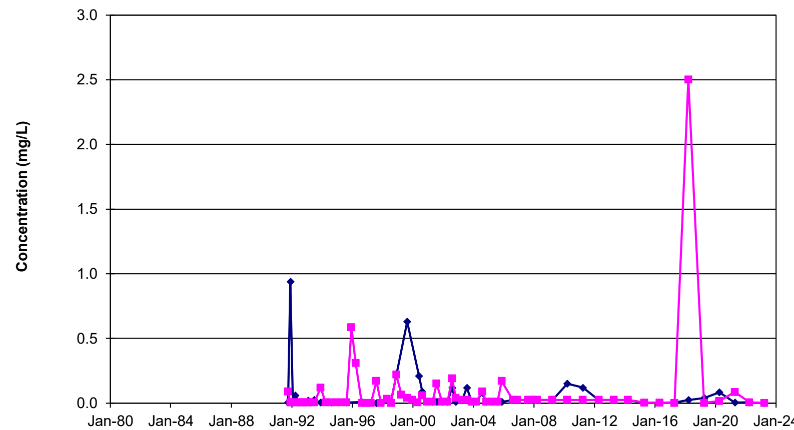

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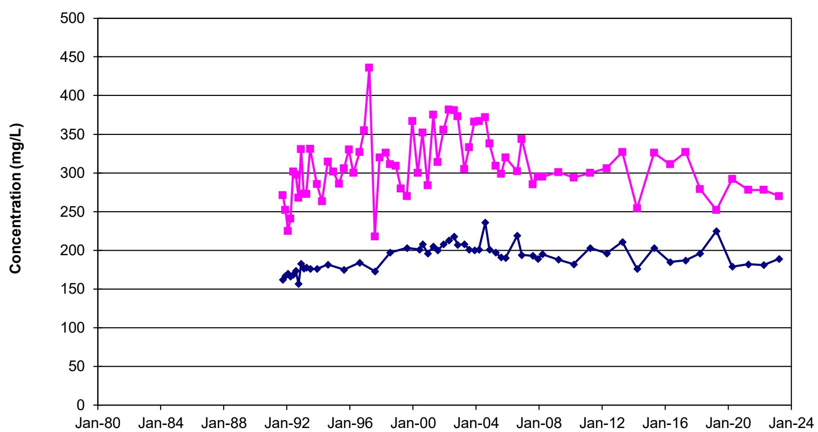


TOTAL KJELDAHL NITROGEN

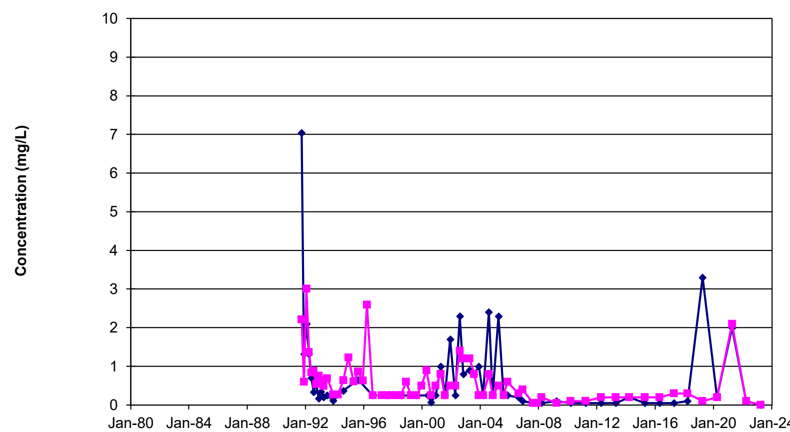
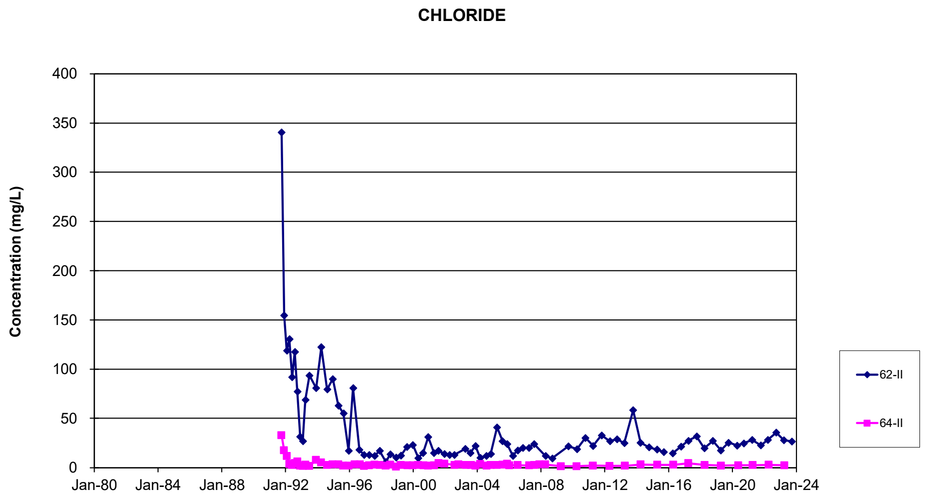
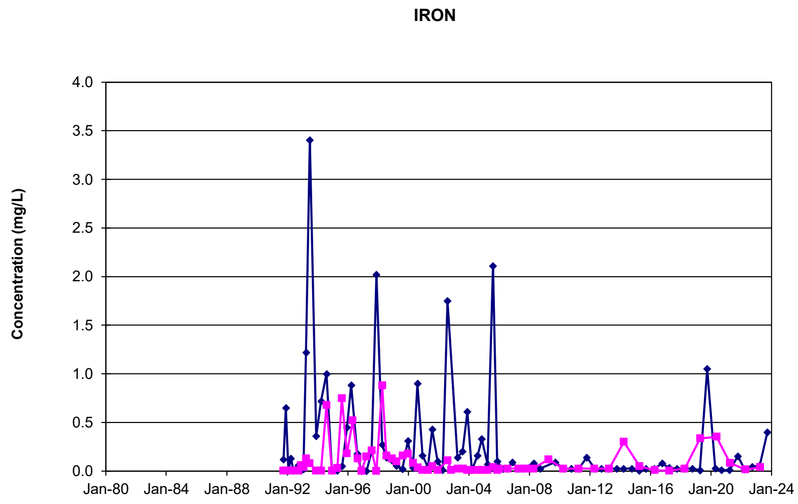
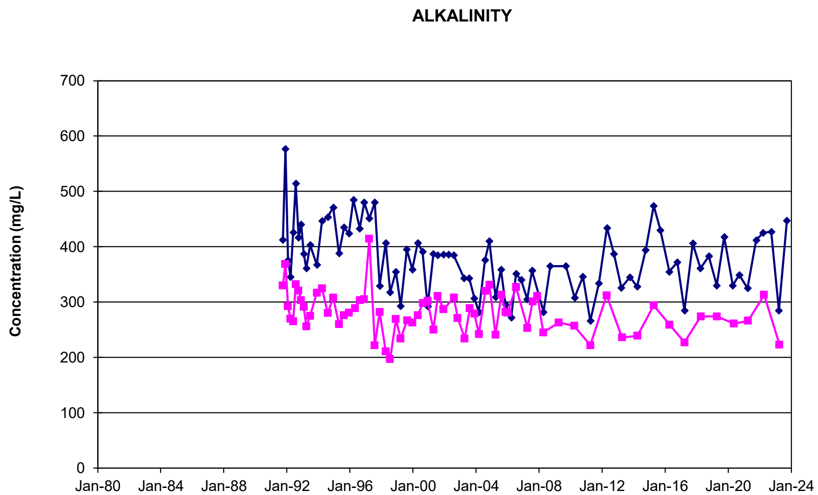


Figure F.12

Time Concentration Graphs - Groundwater: Overburden







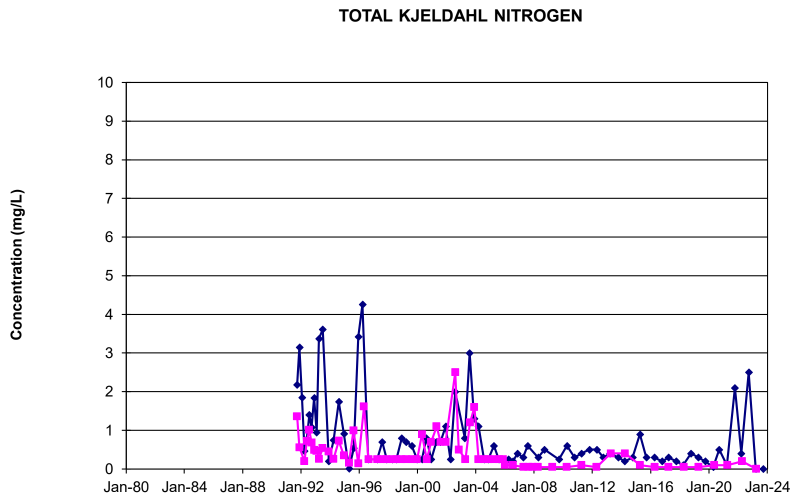
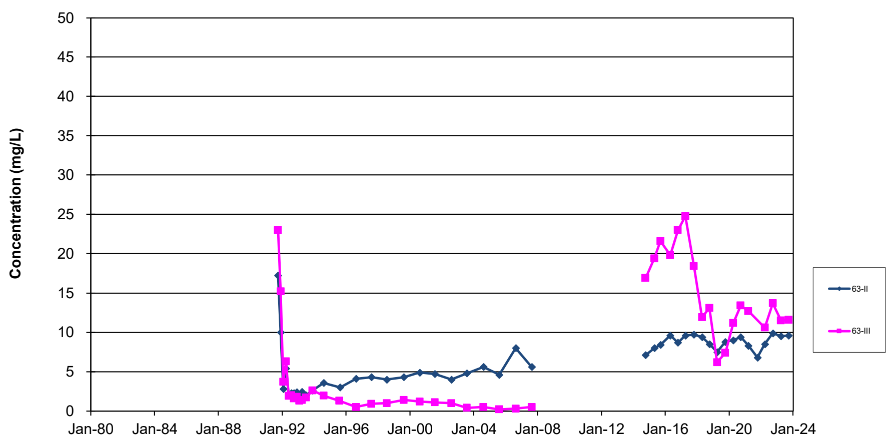


Figure F.13

Time Concentration Graphs - Groundwater: Overburden

CHLORIDE



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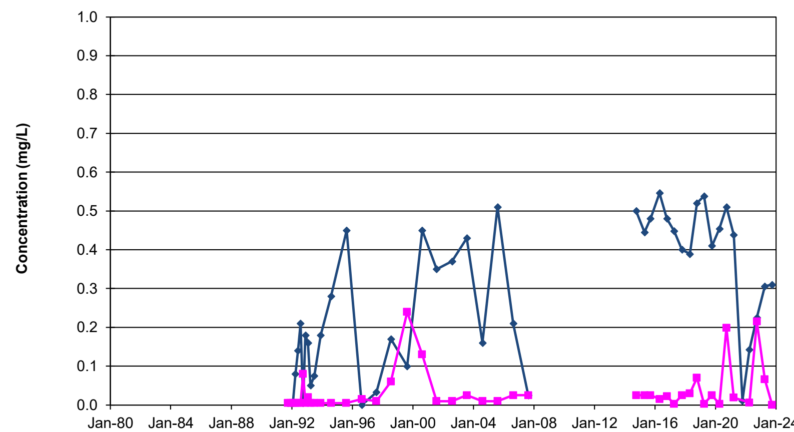

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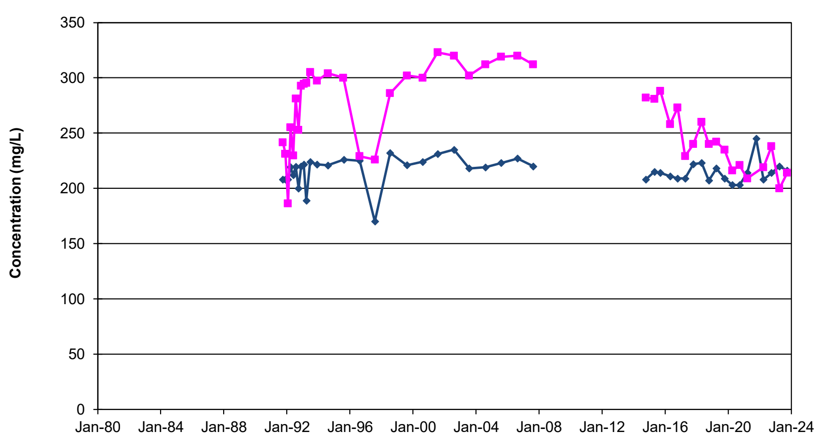


TOTAL KJELDAHL NITROGEN

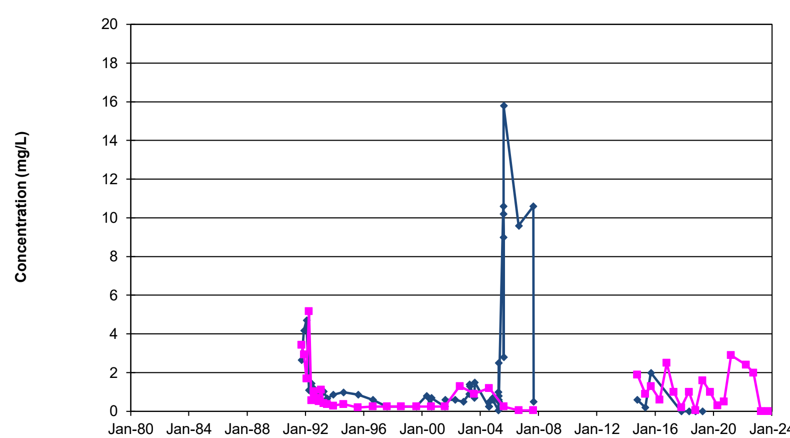
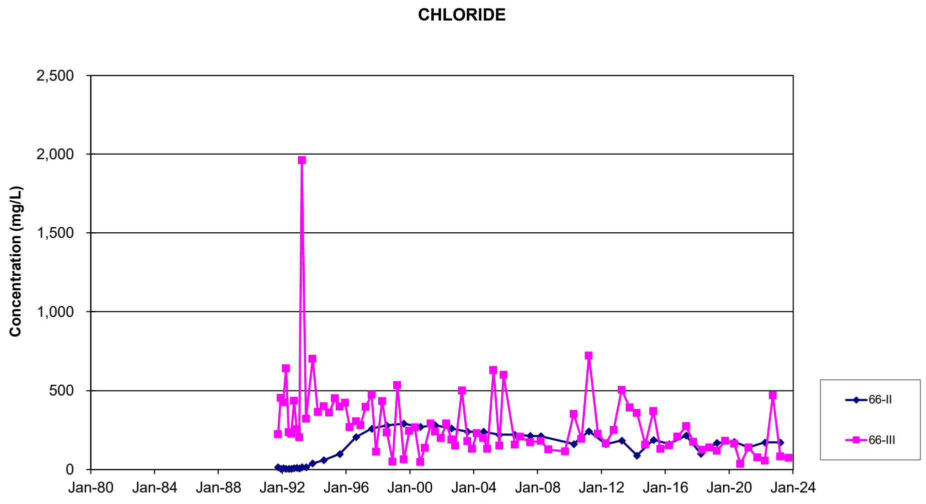
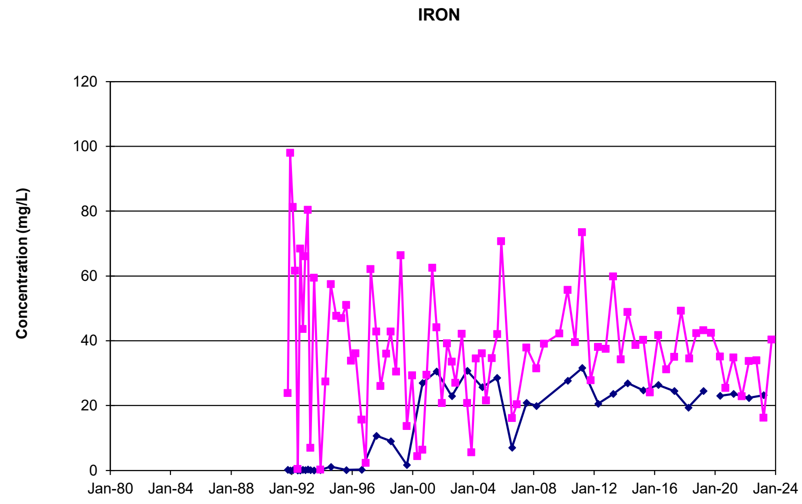
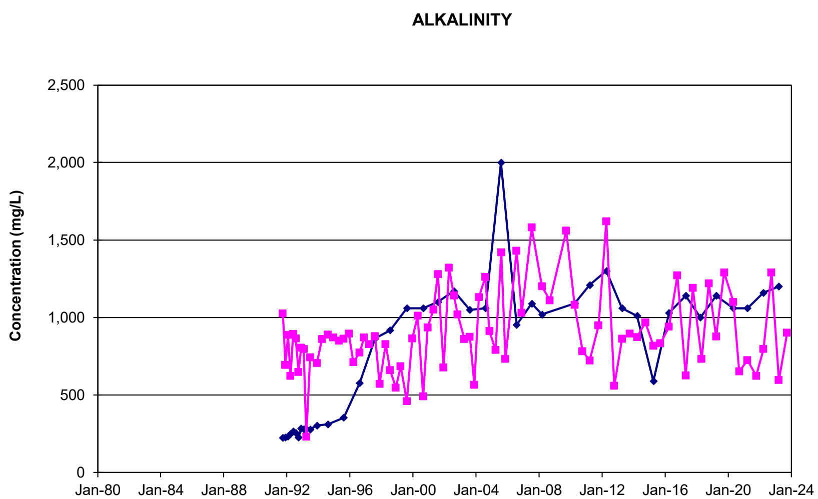


Figure F.14

Time Concentration Graphs - Groundwater: Overburden







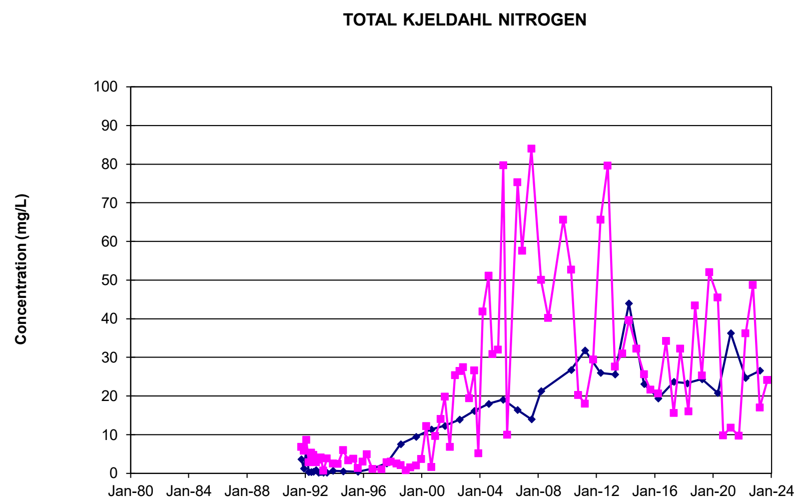
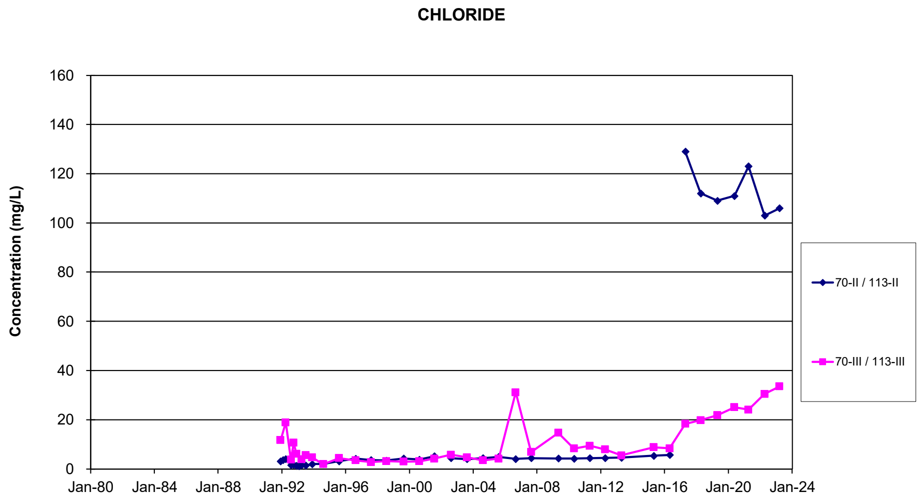
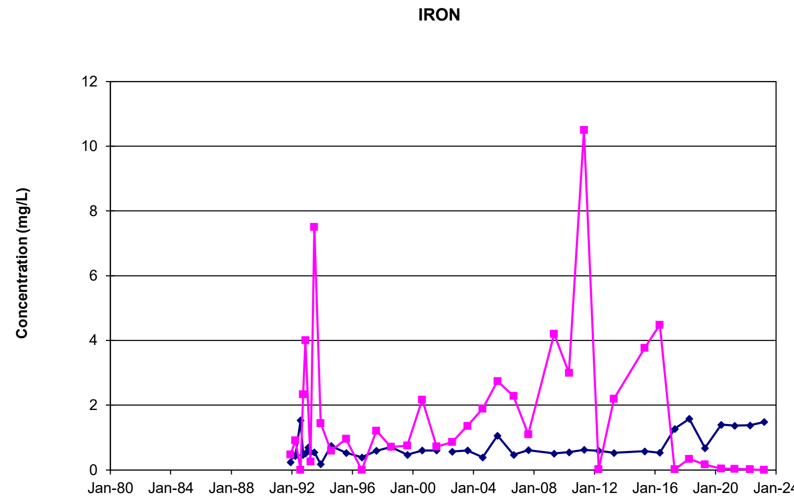
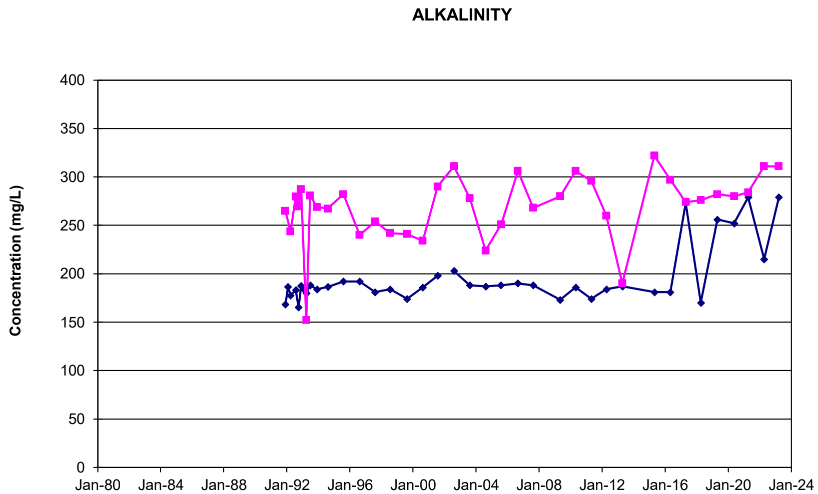


Figure F.15

Time Concentration Graphs - Groundwater: Overburden







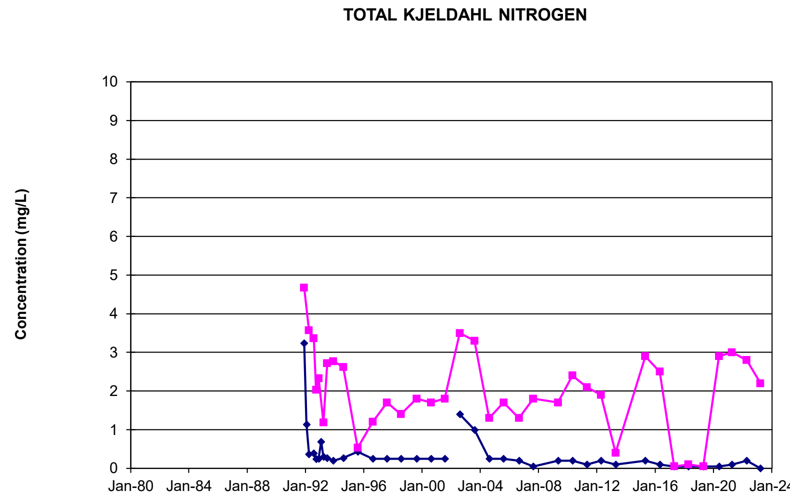
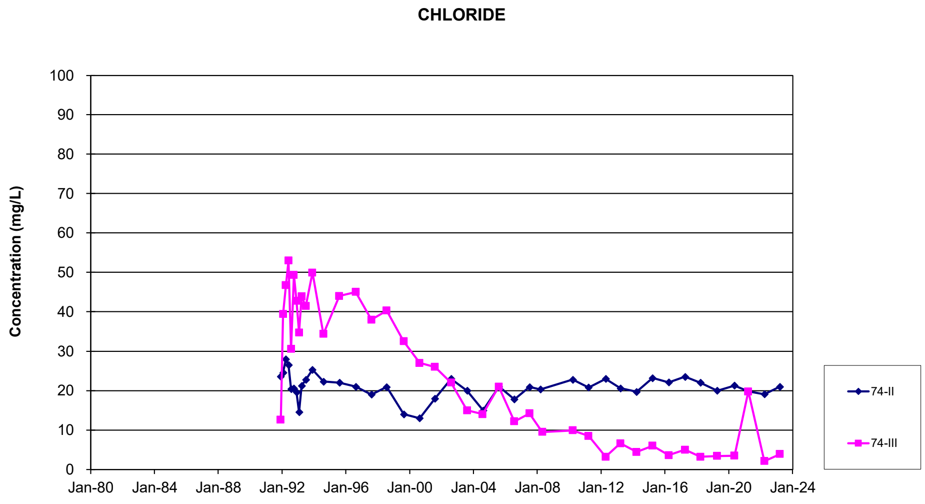
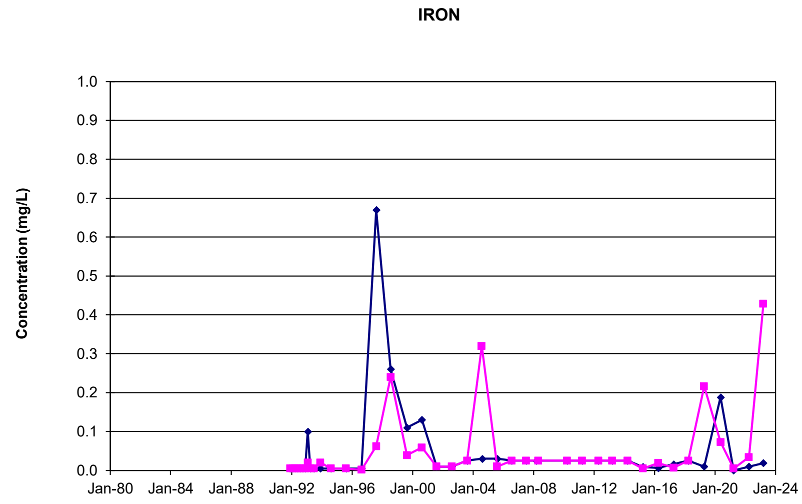
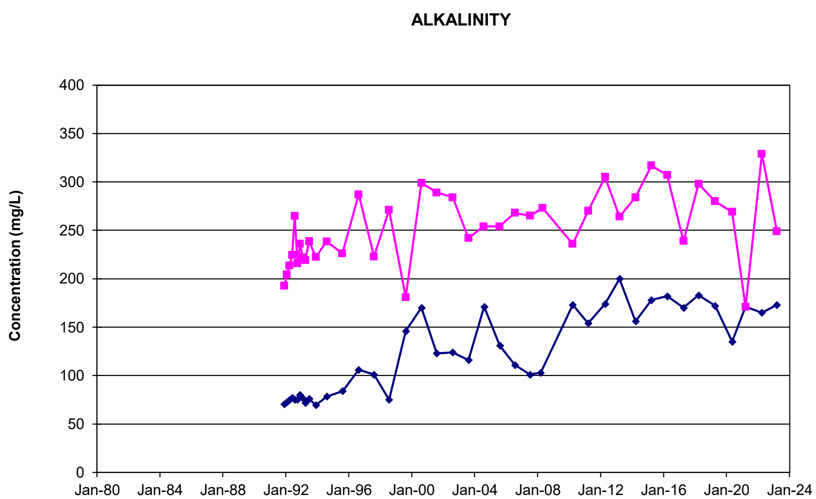


Figure F.16

Time Concentration Graphs - Groundwater: Overburden







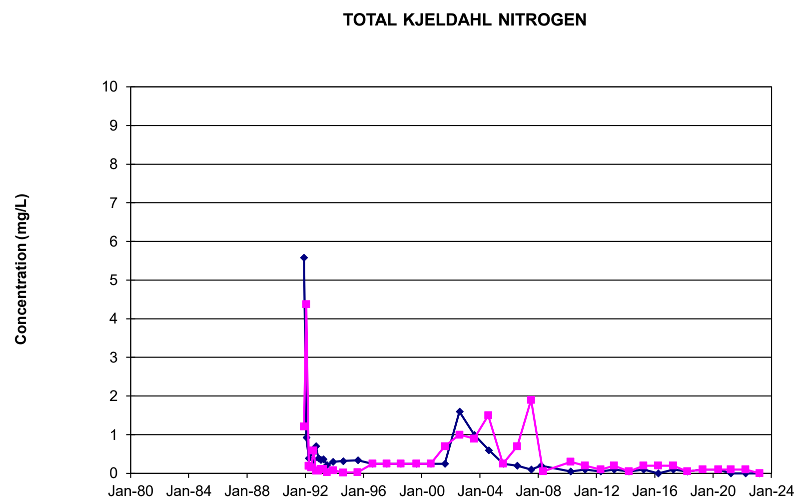
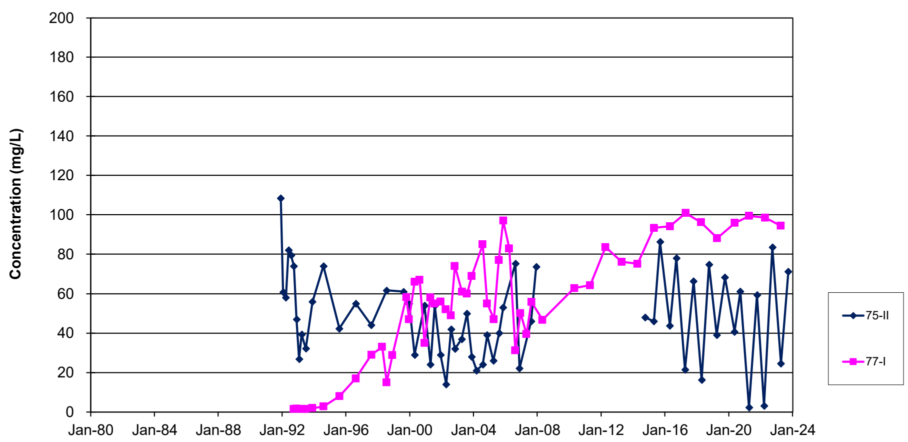


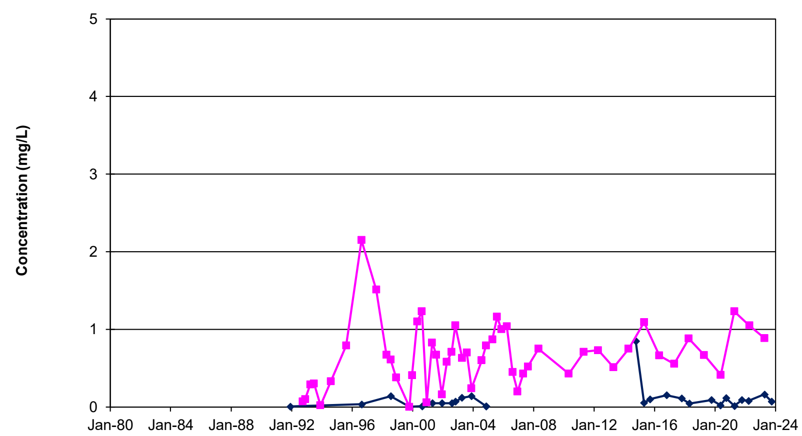
Figure F.17

Time Concentration Graphs - Groundwater: Overburden

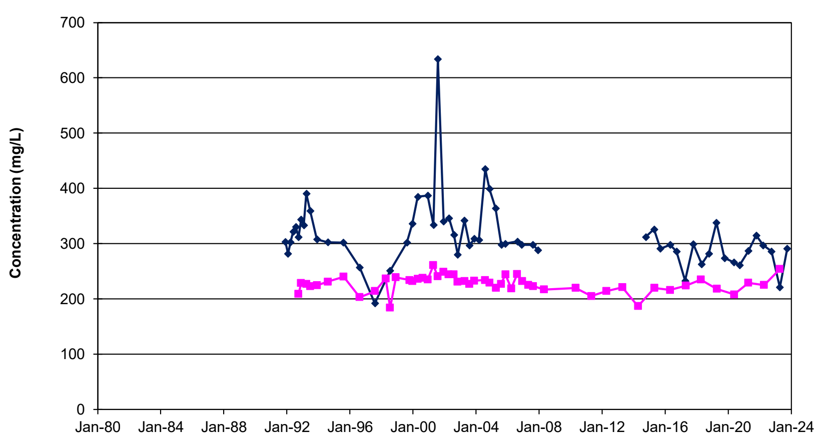
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

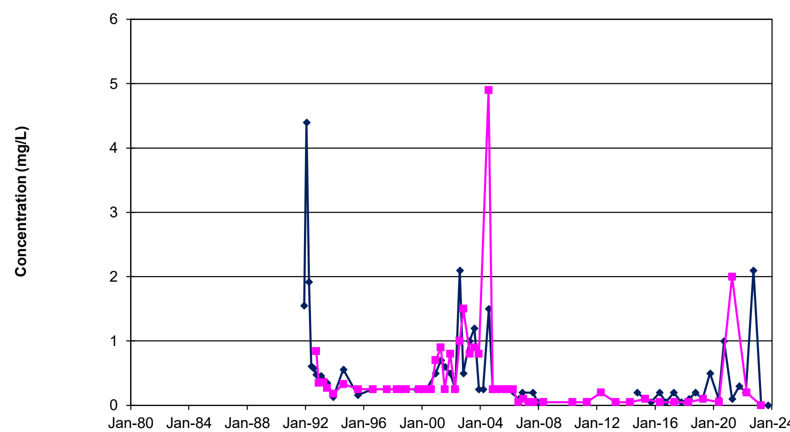
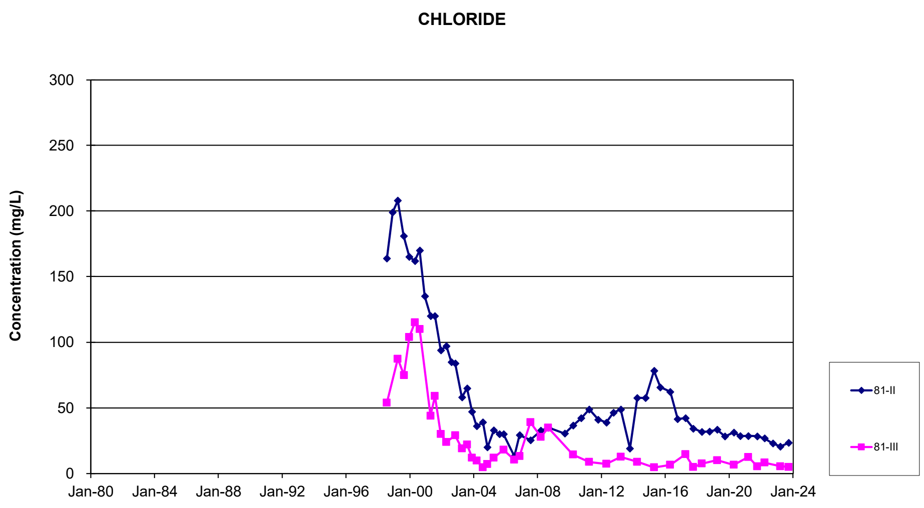
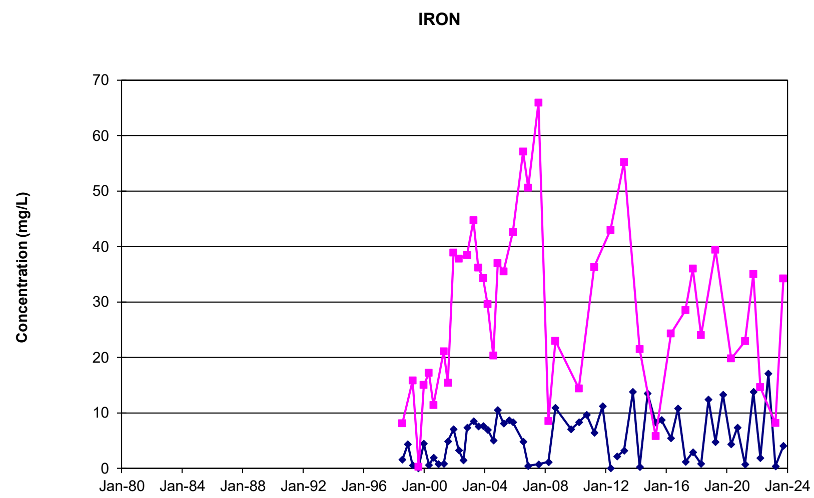
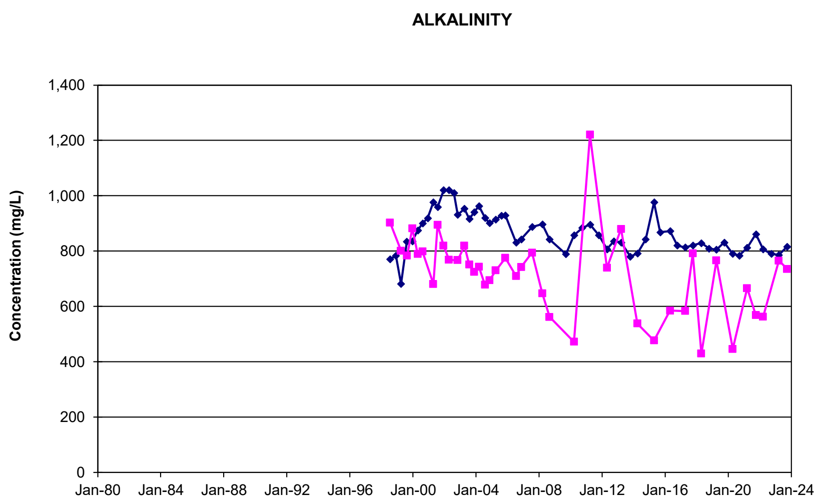


Figure F.18

Time Concentration Graphs - Groundwater: Overburden







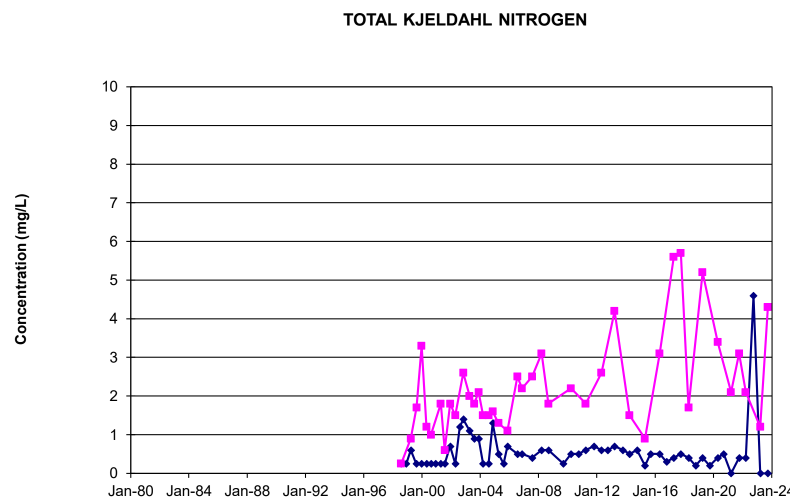
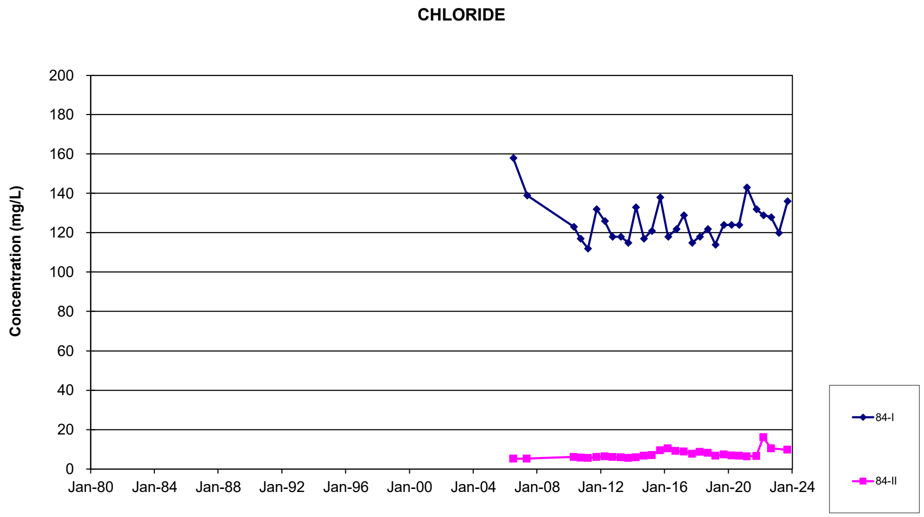
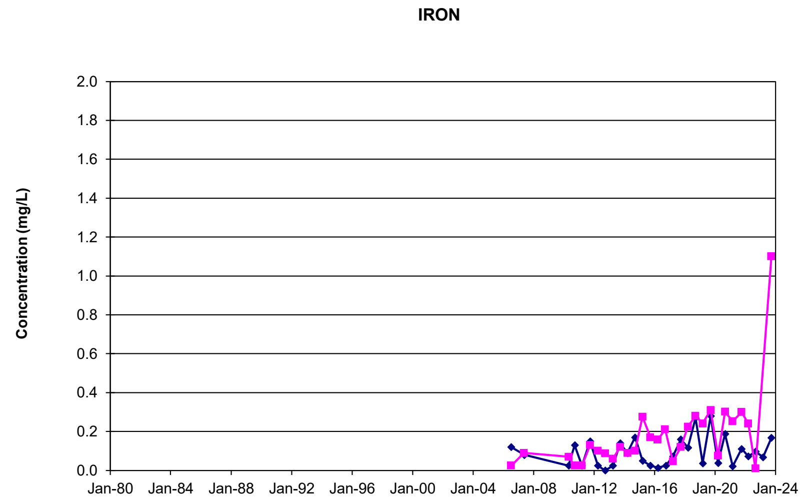
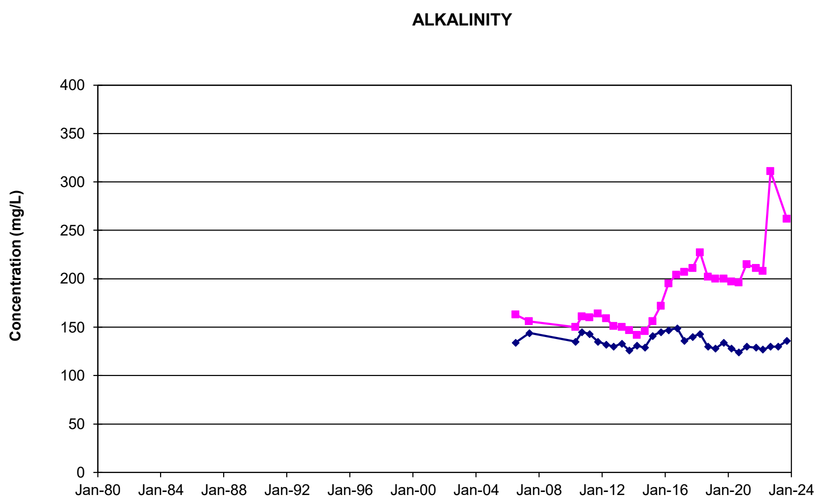


Figure F.19

Time Concentration Graphs - Groundwater: Overburden







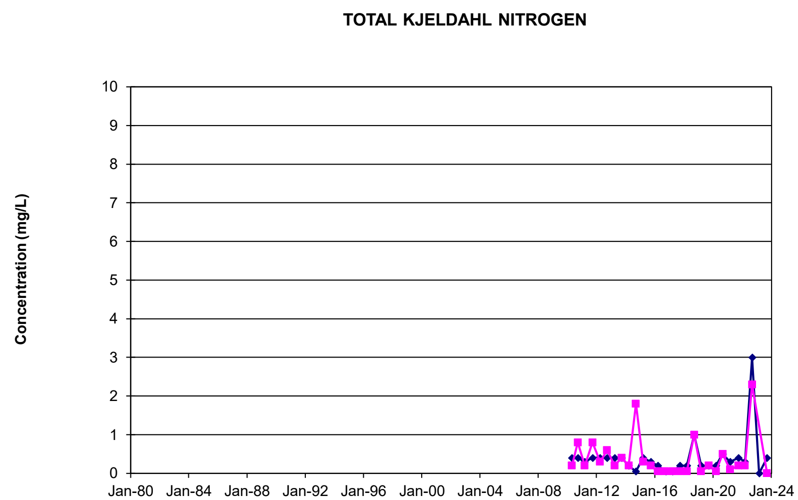
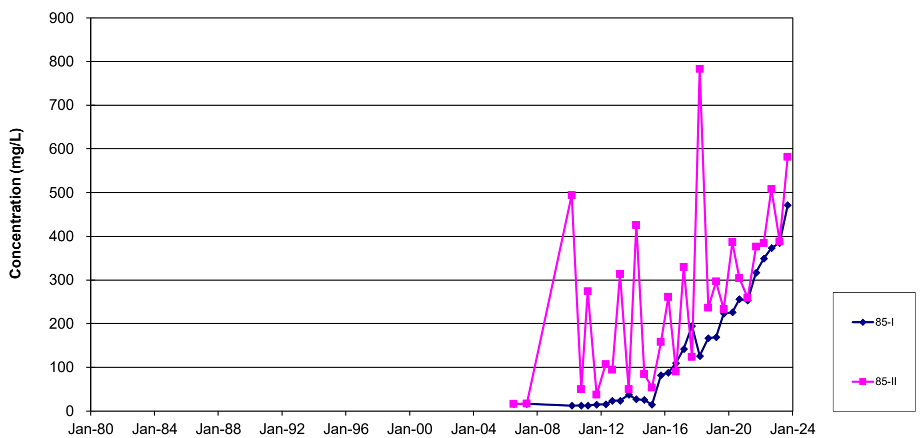


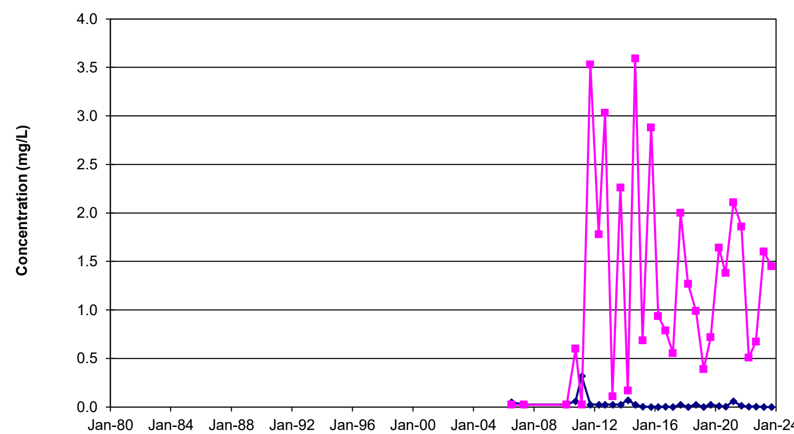
Figure F.20

Time Concentration Graphs - Groundwater: Overburden

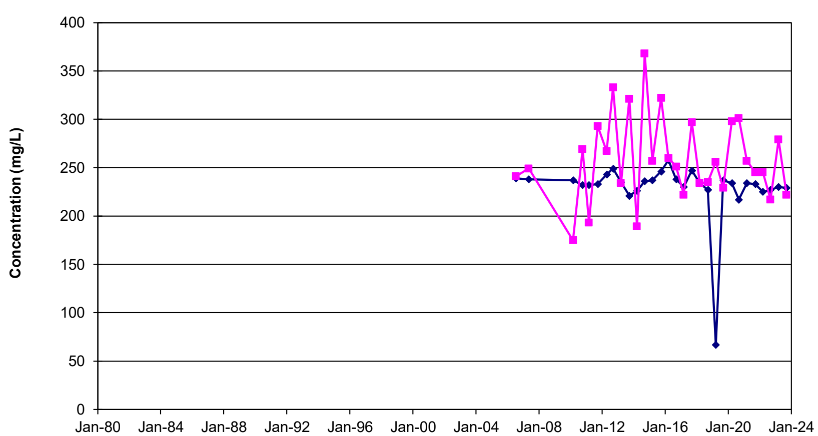
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

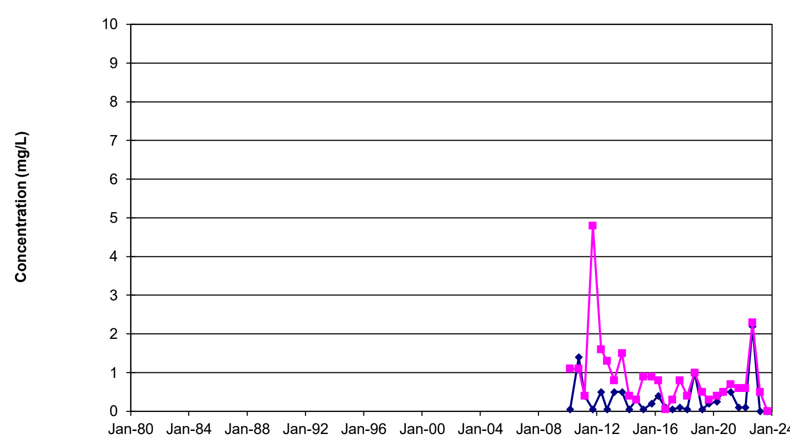
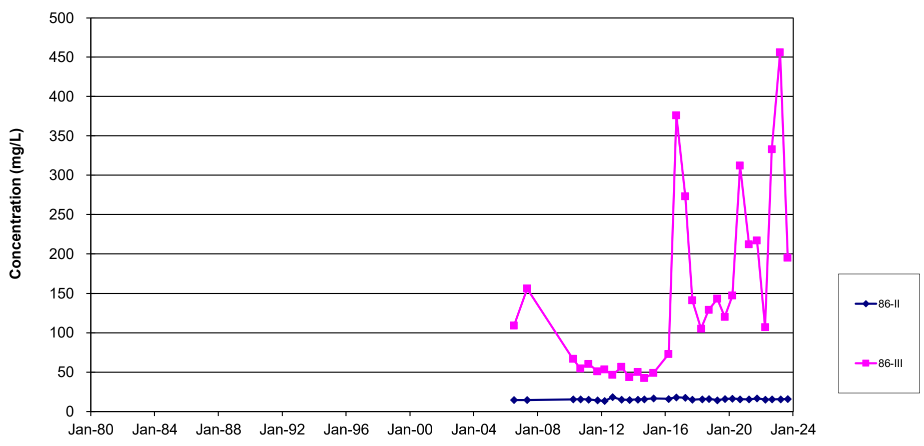


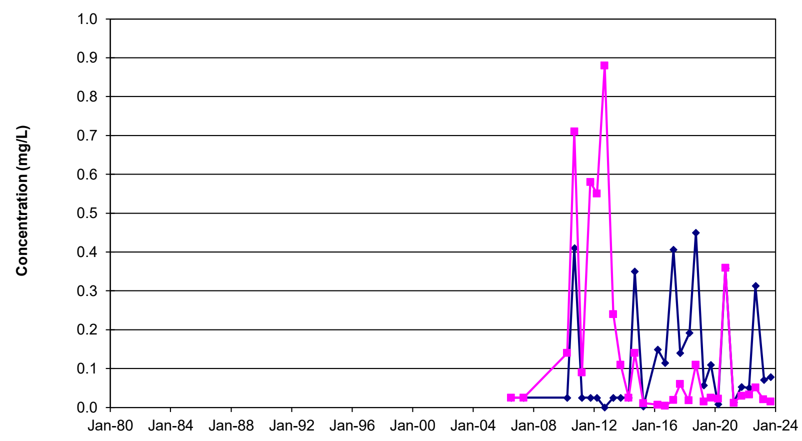
Figure F.21

Time Concentration Graphs - Groundwater: Overburden

CHLORIDE



IRON



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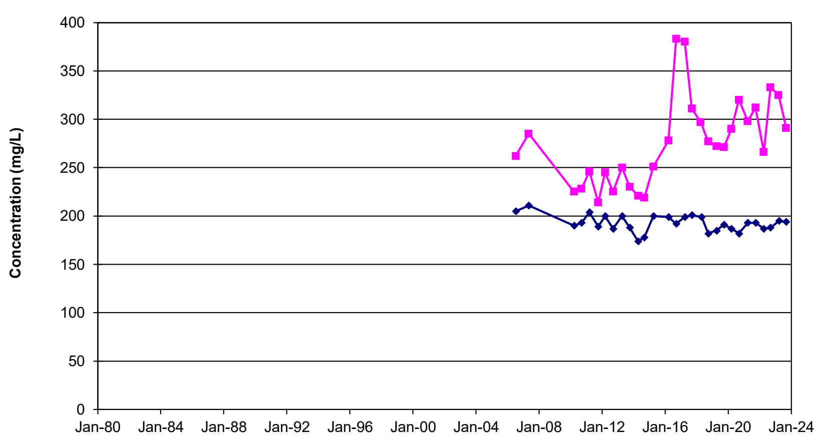


TOTAL KJELDAHL NITROGEN

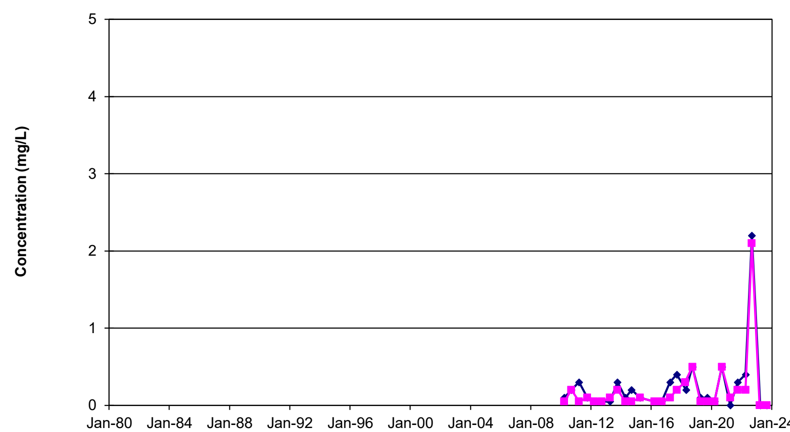


Figure F.22

Time Concentration Graphs - Groundwater: Overburden

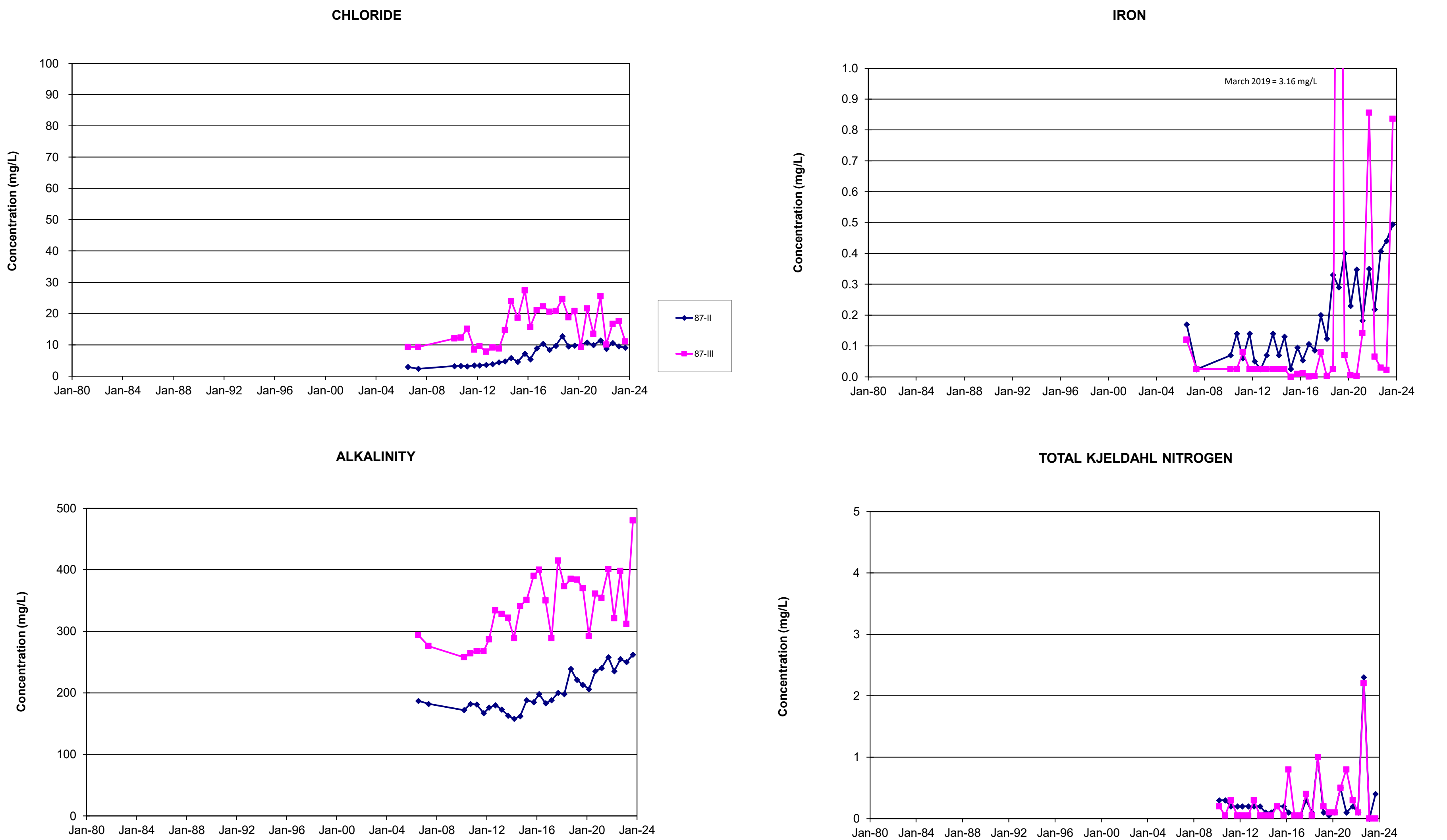
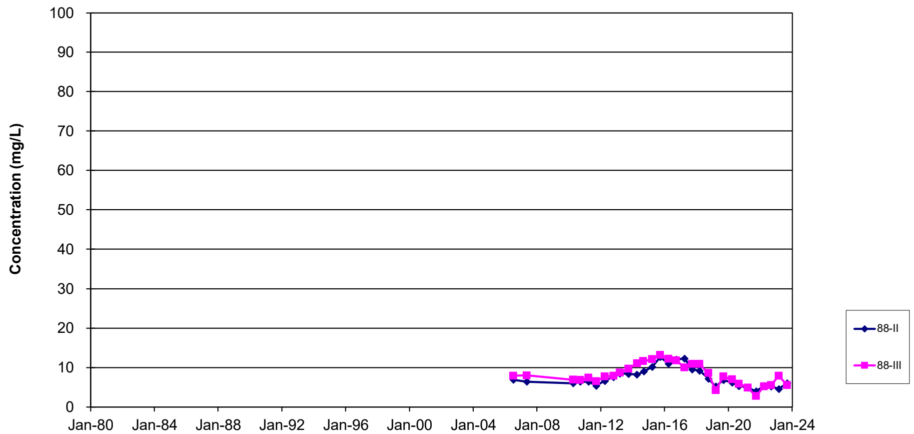


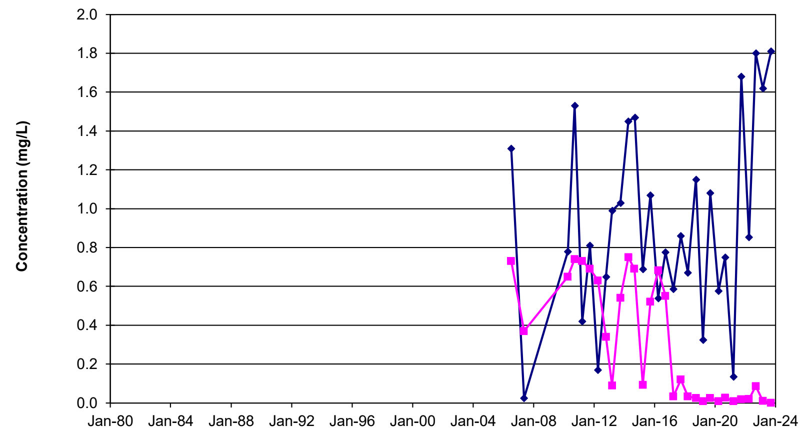
Figure F.23

Time Concentration Graphs - Groundwater: Overburden

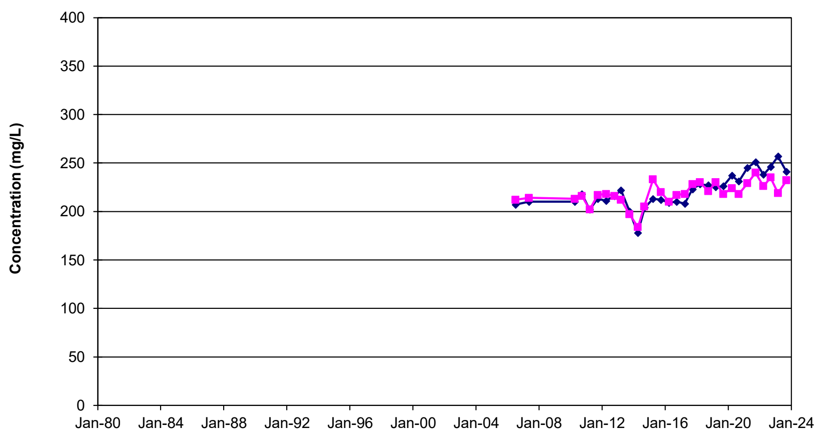
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

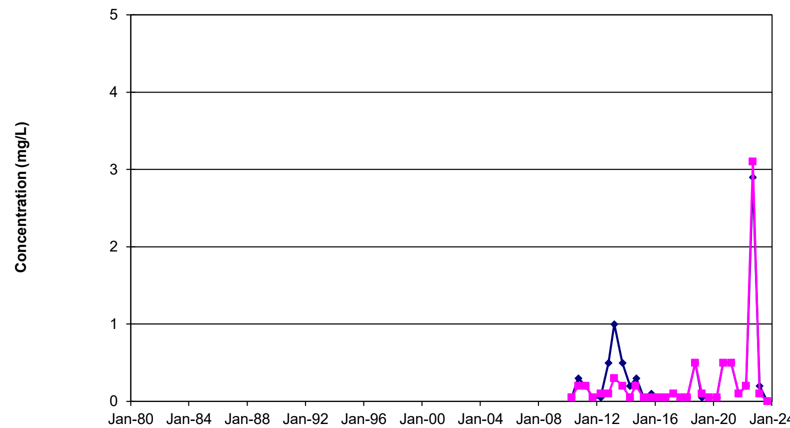
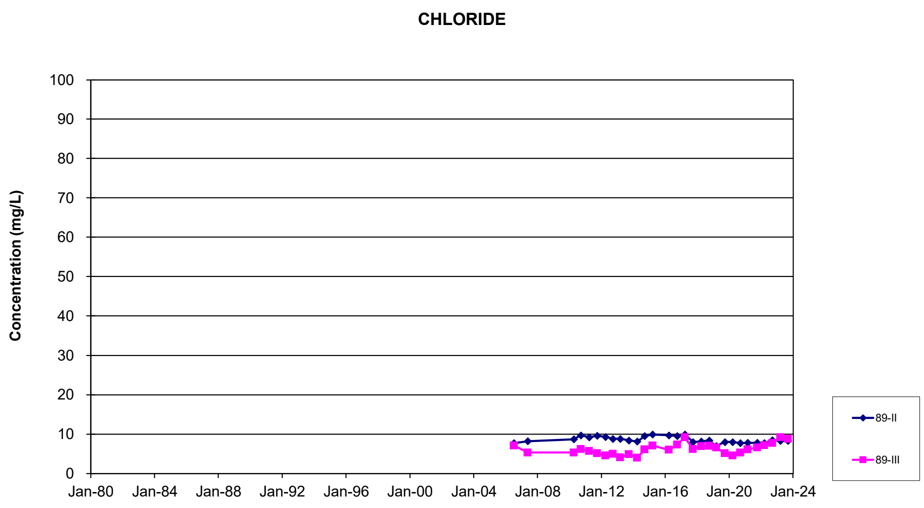
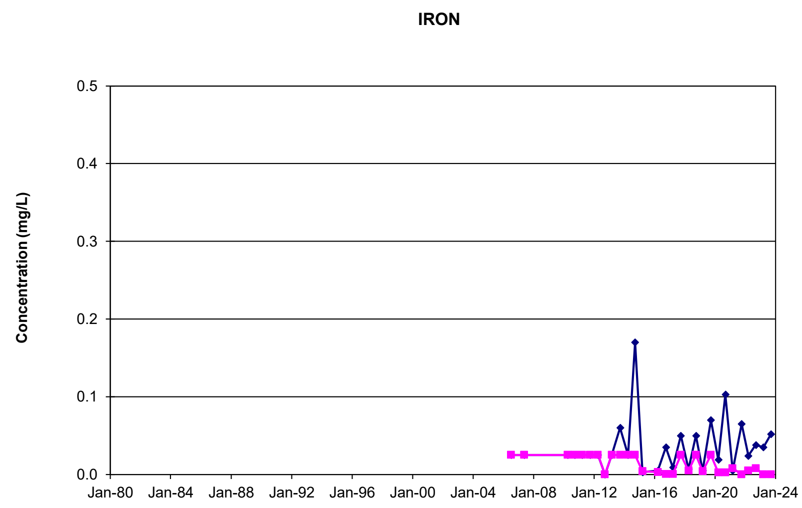
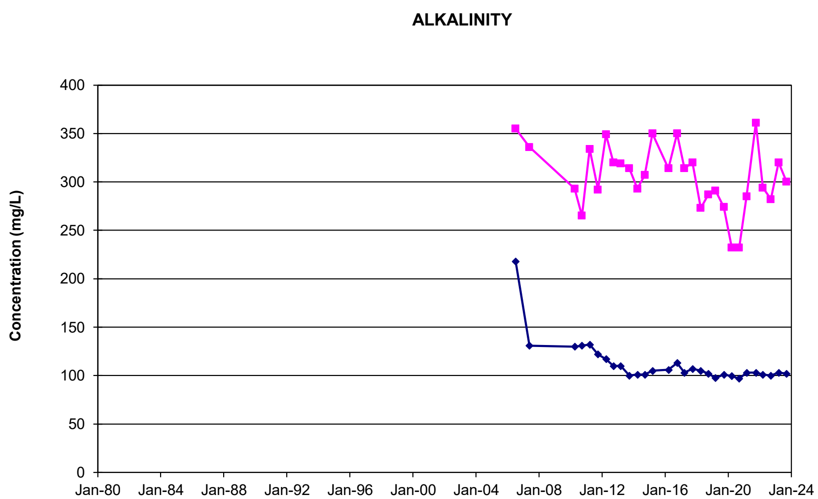


Figure F.24

Time Concentration Graphs - Groundwater: Overburden







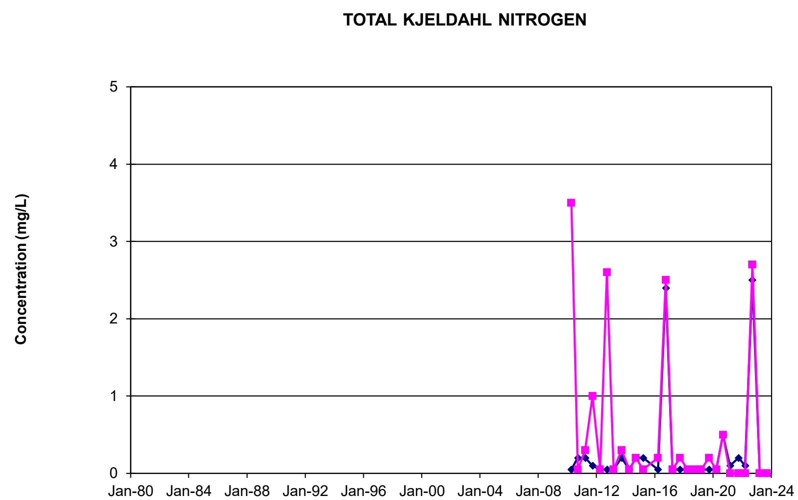
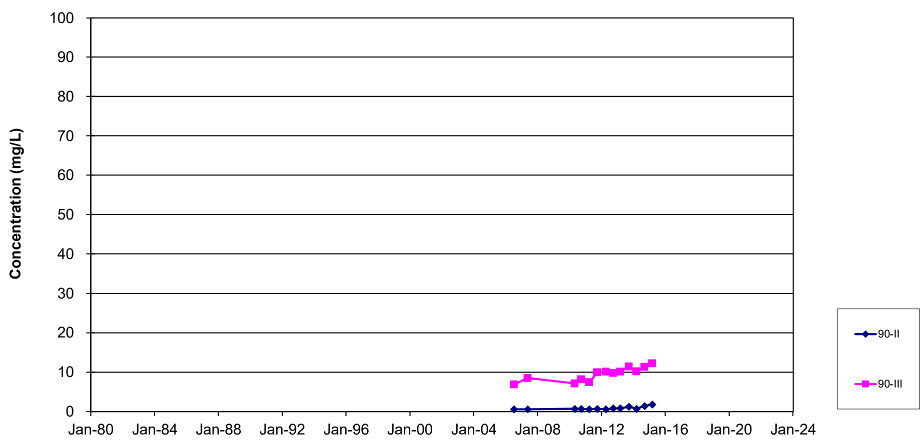


Figure F.25

Time Concentration Graphs - Groundwater: Overburden

CHLORIDE



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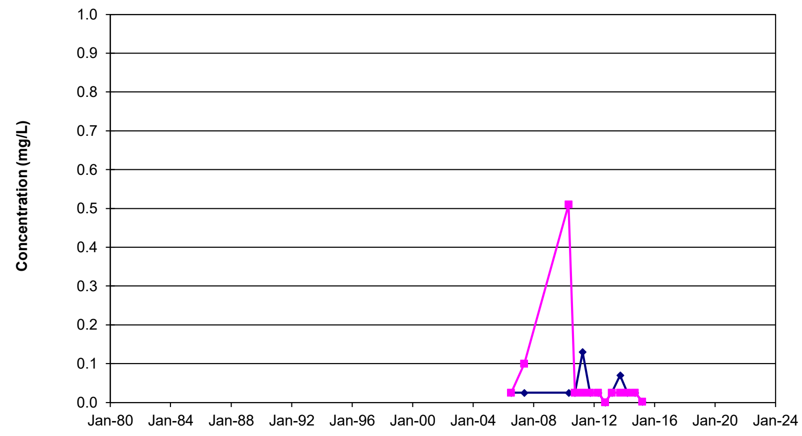

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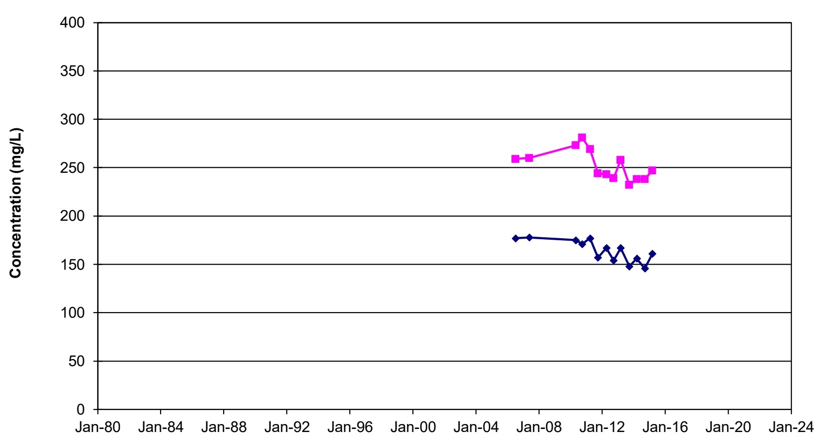

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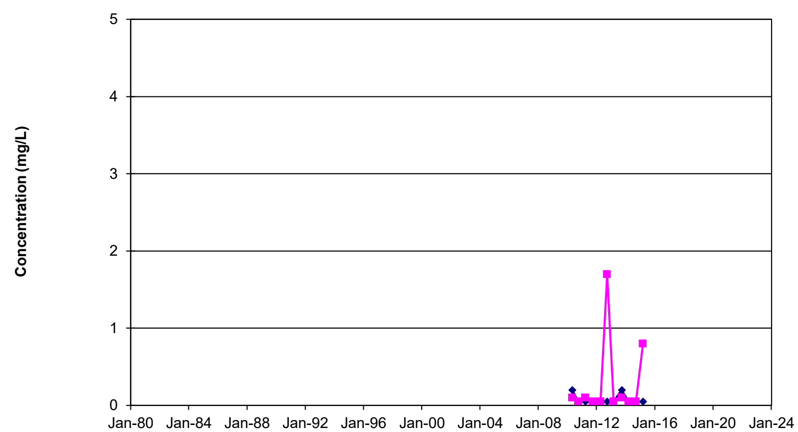
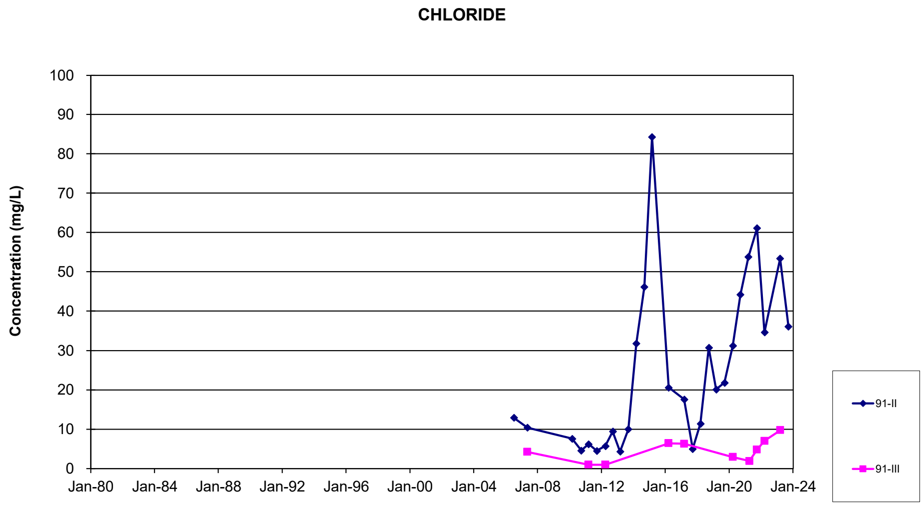
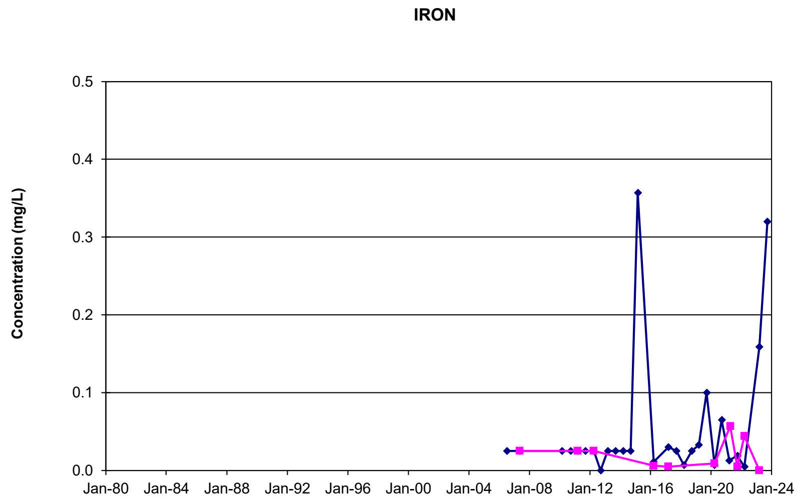
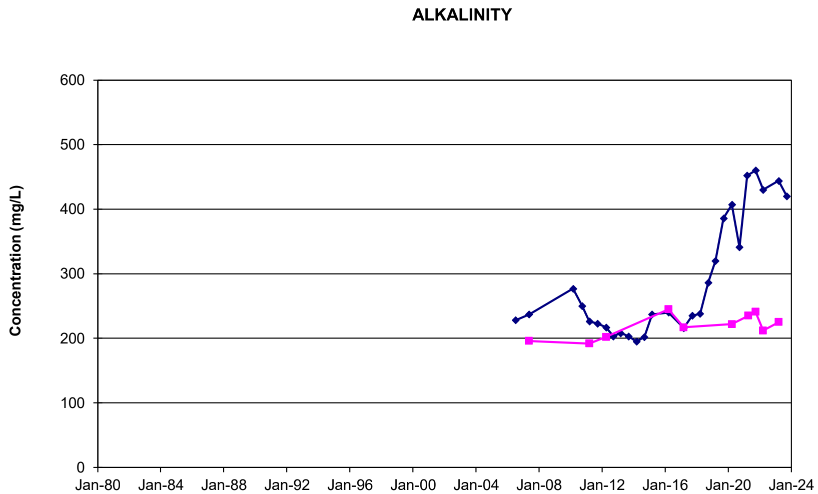


Figure F.26

Time Concentration Graphs - Groundwater: Overburden







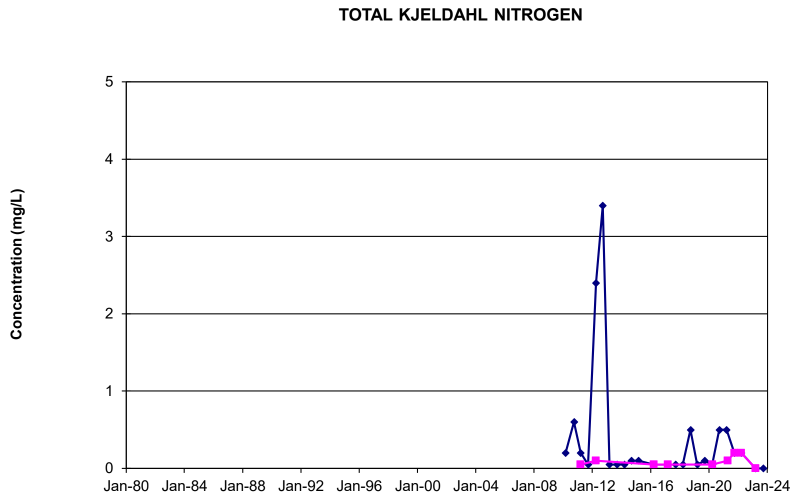
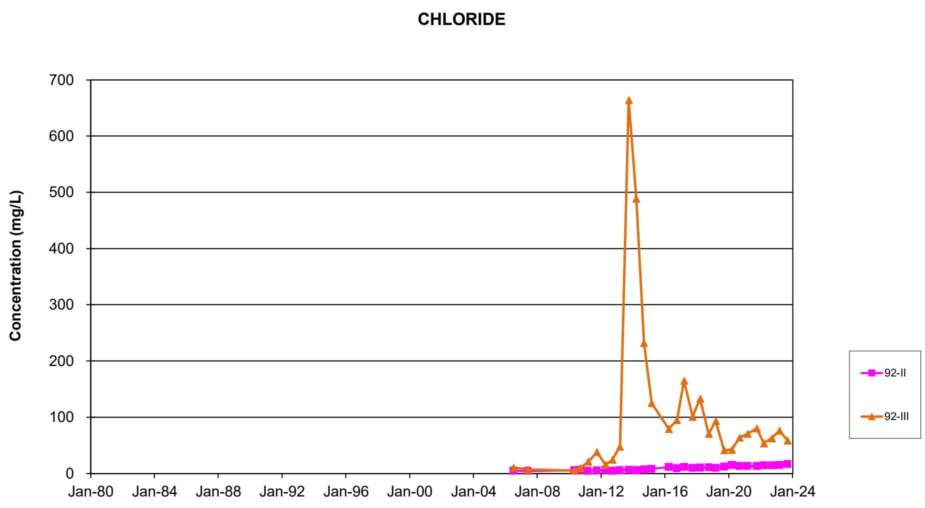
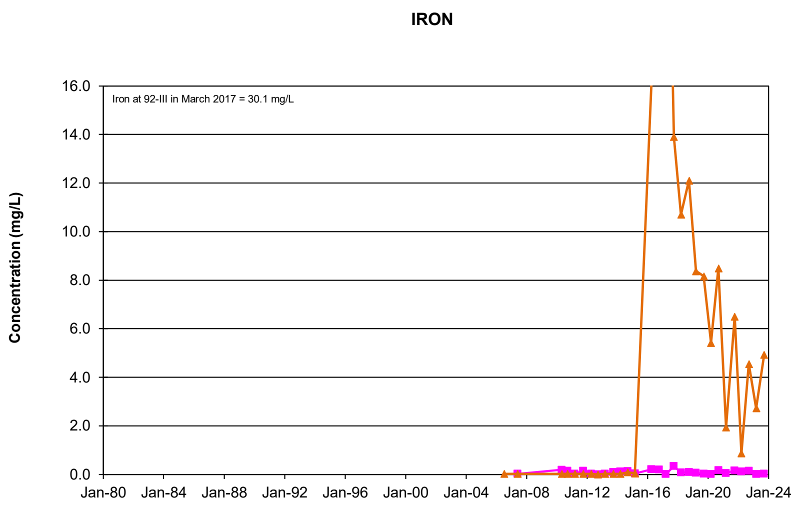
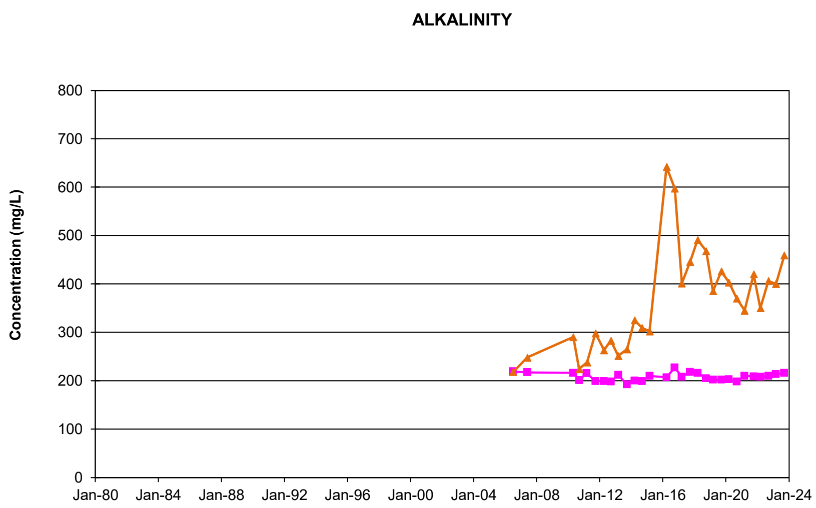


Figure F.27

Time Concentration Graphs - Groundwater: Overburden







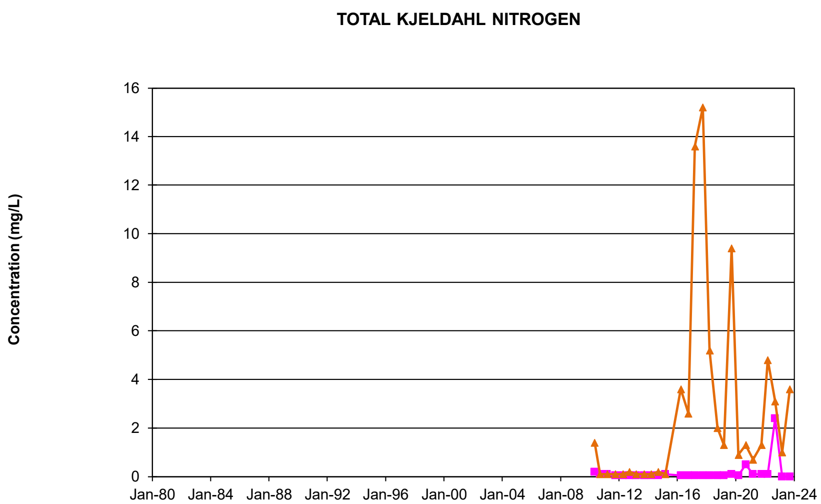
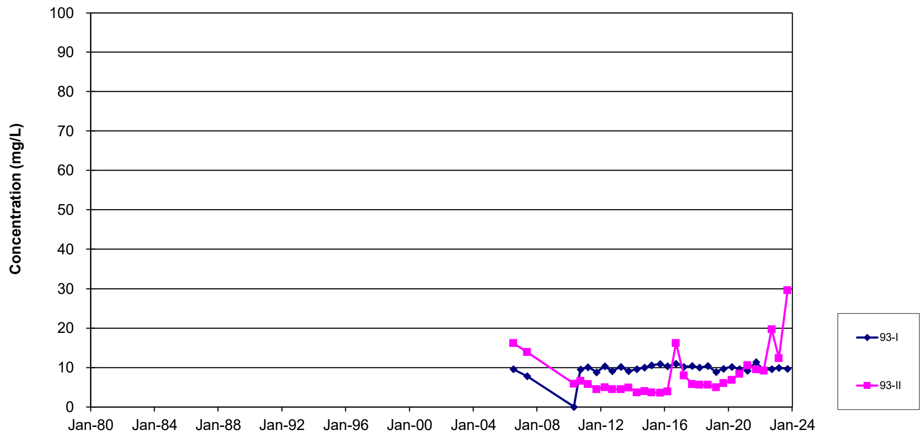


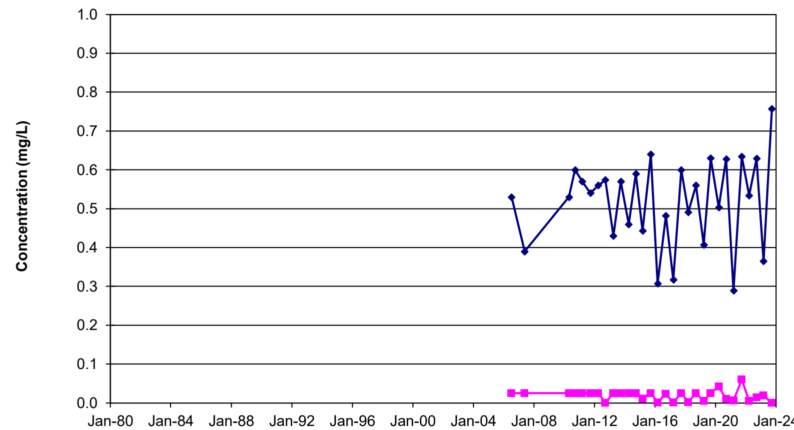
Figure F.28

Time Concentration Graphs - Groundwater: Overburden

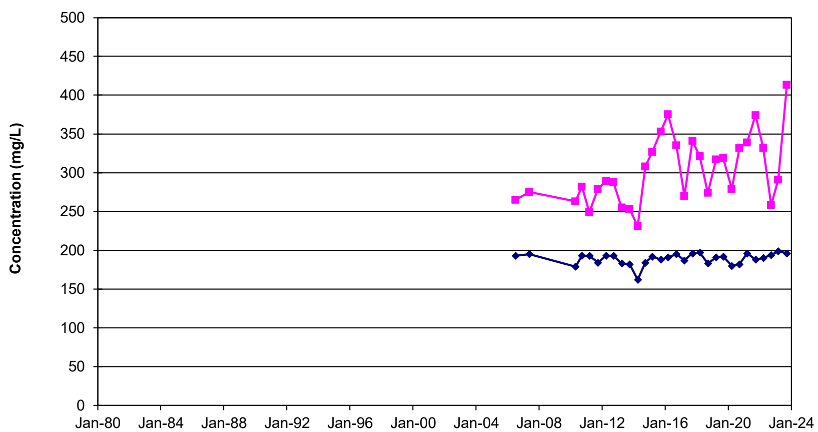
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

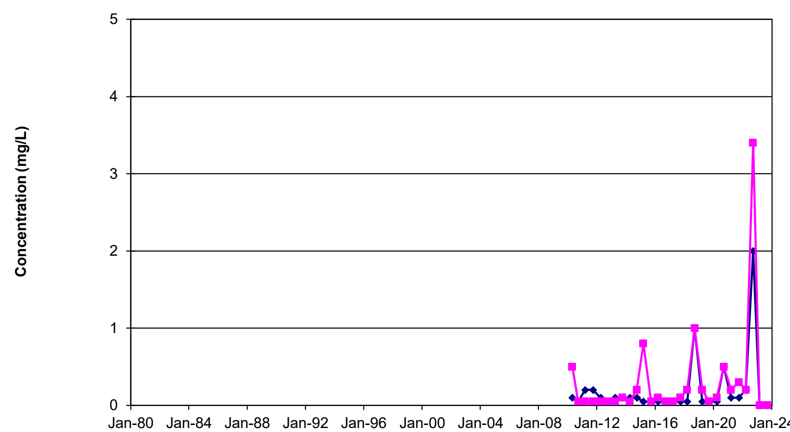
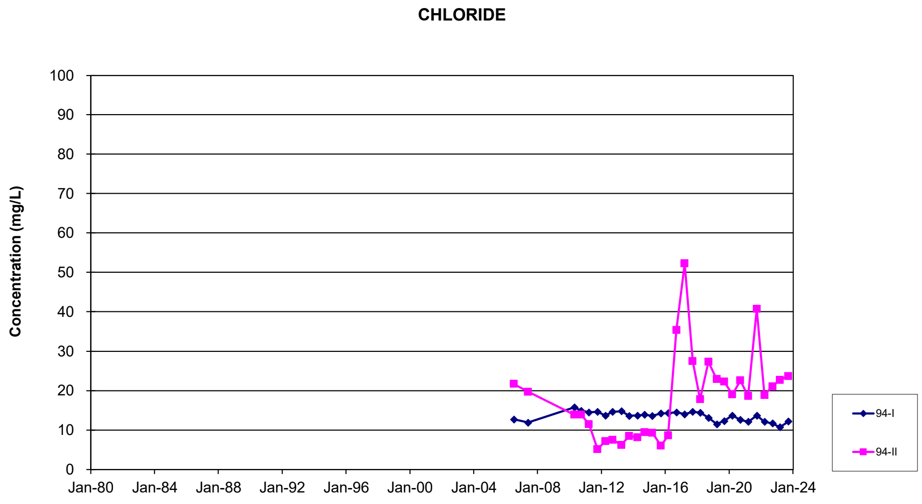
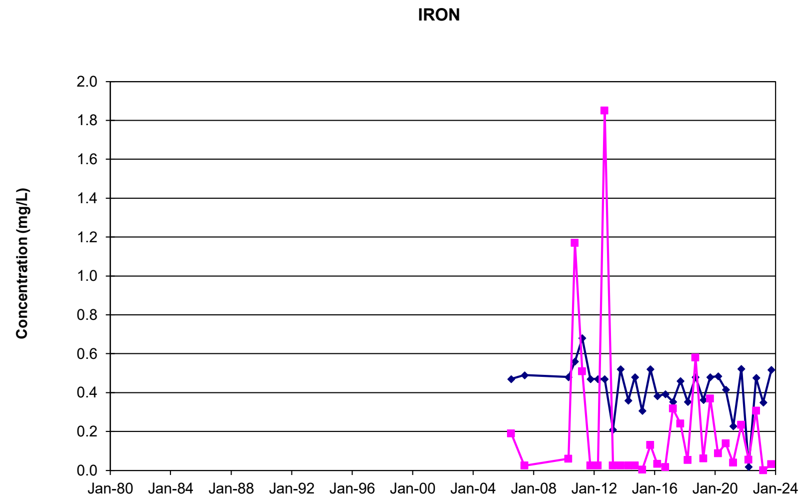
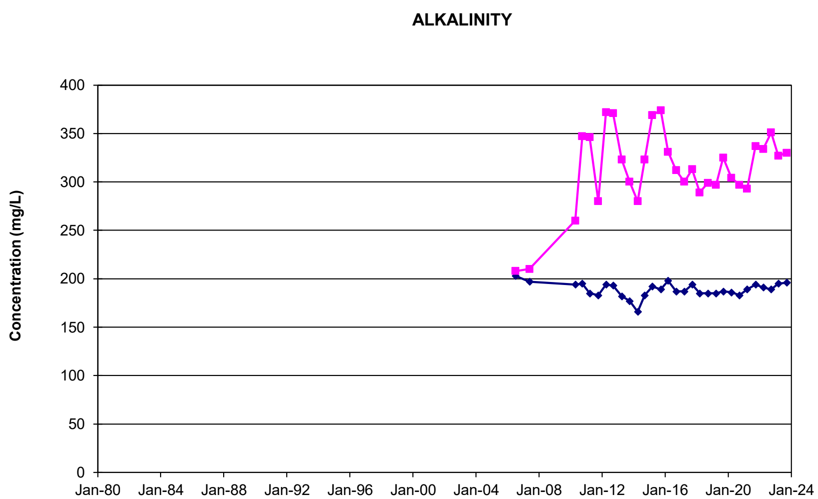


Figure F.29

Time Concentration Graphs - Groundwater: Overburden







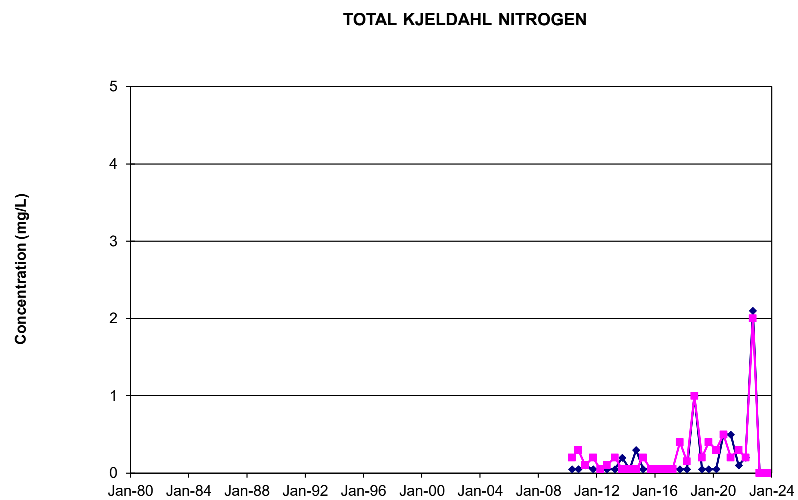
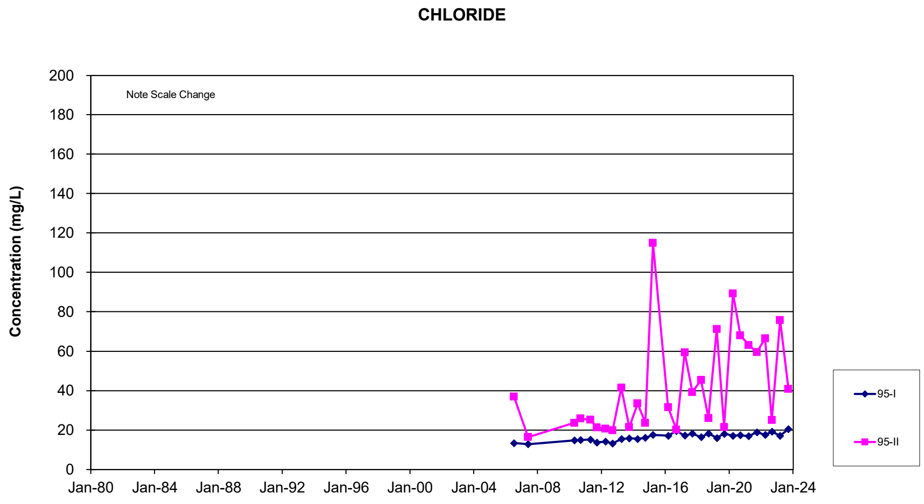
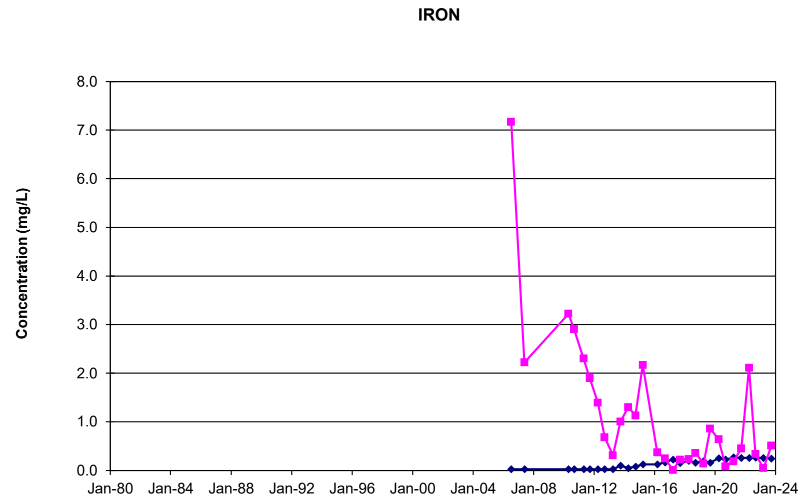
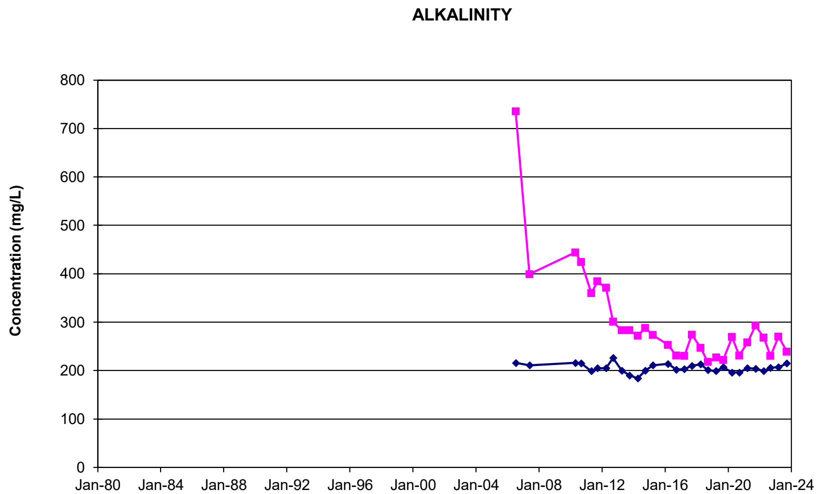


Figure F.30

Time Concentration Graphs - Groundwater: Overburden







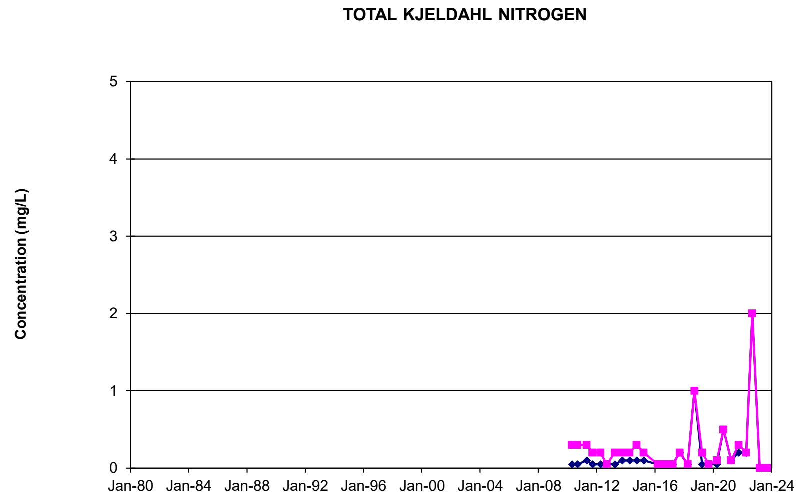
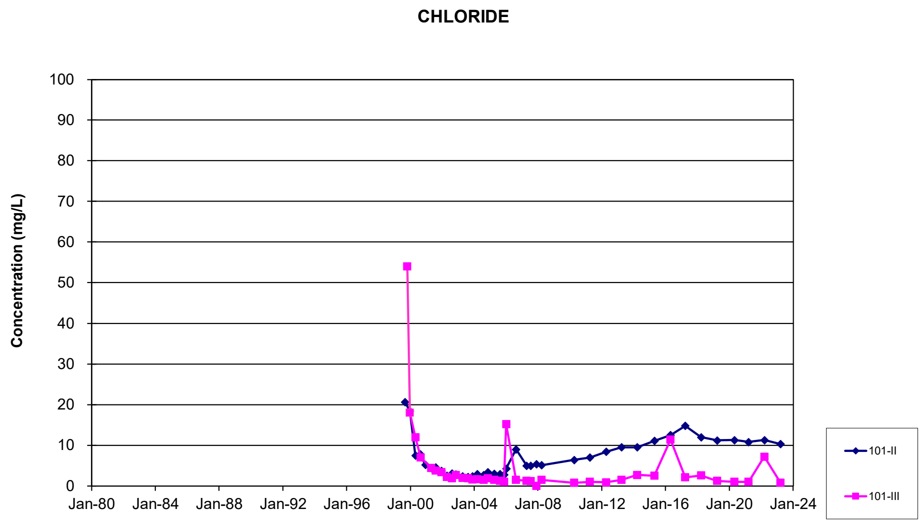
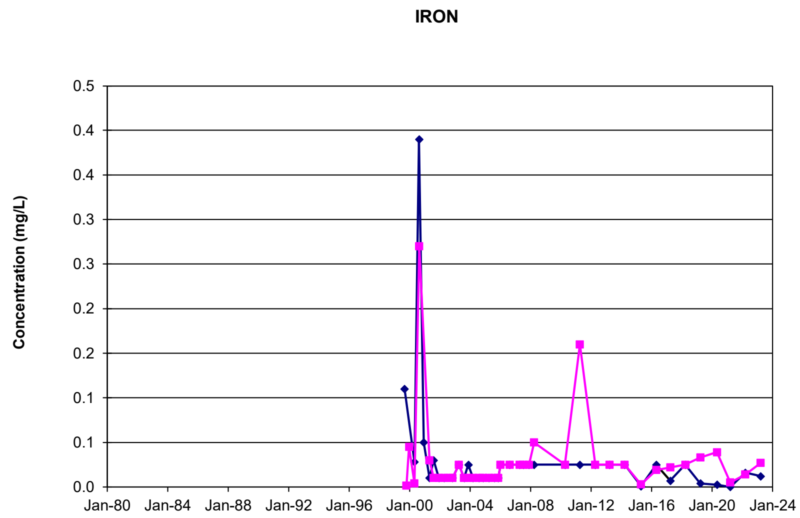
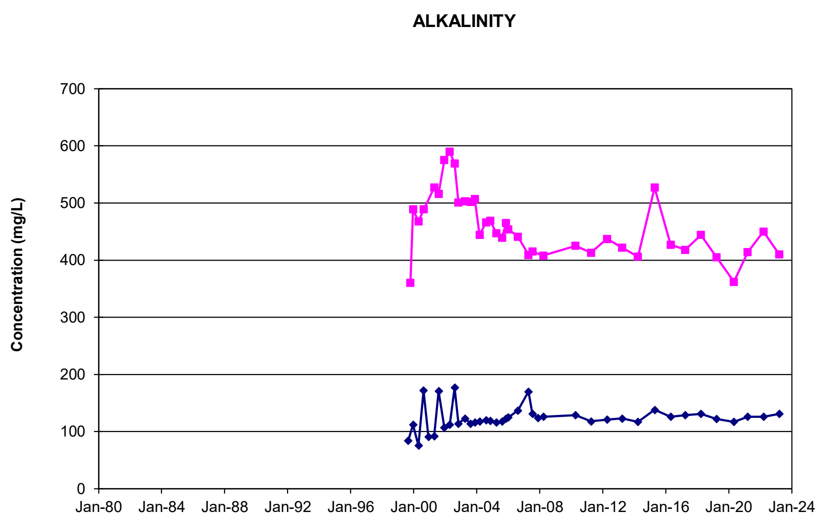


Figure F.31

Time Concentration Graphs - Groundwater: Overburden







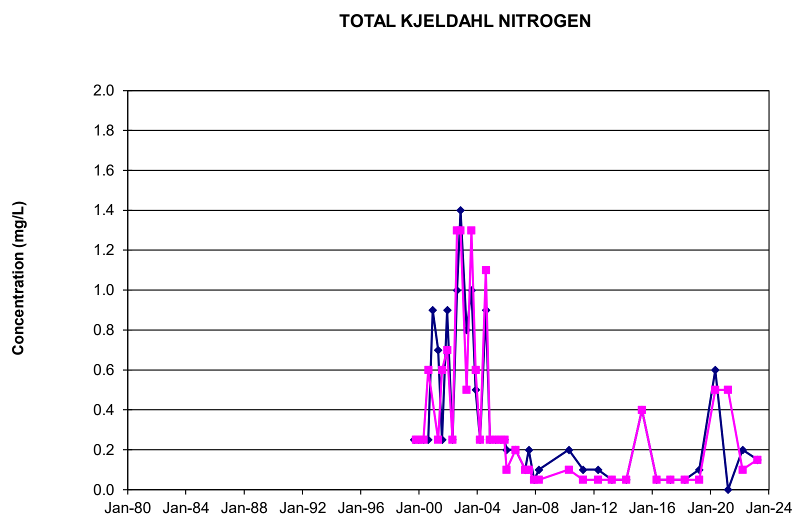
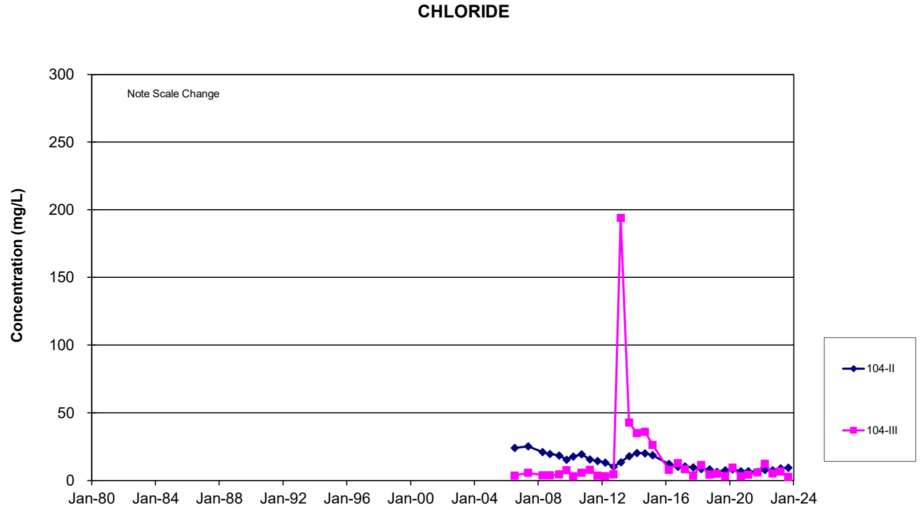
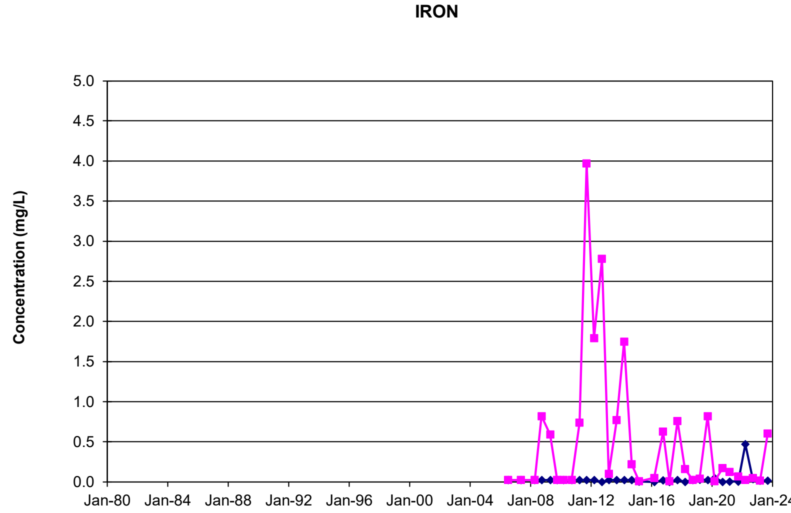
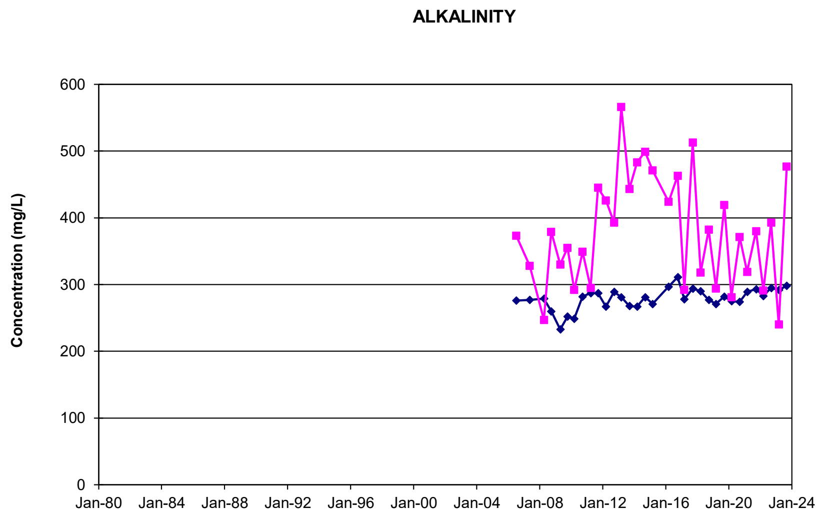


Figure F.32

Time Concentration Graphs - Groundwater: Overburden







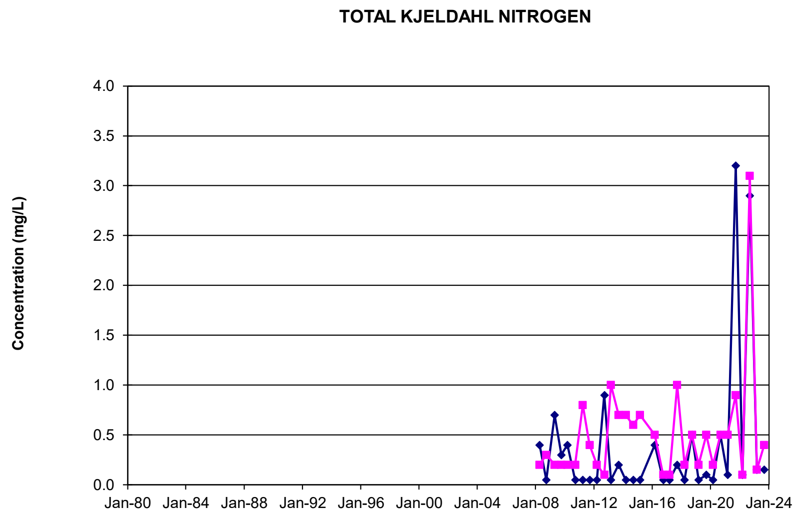
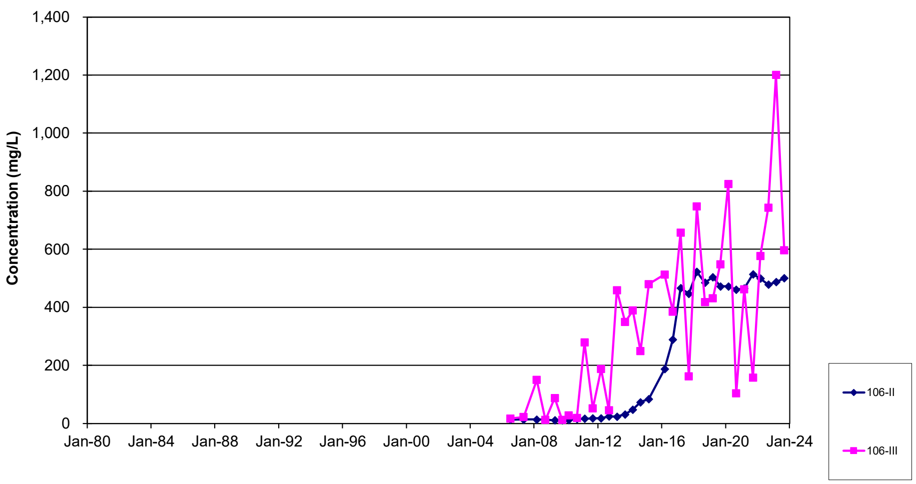


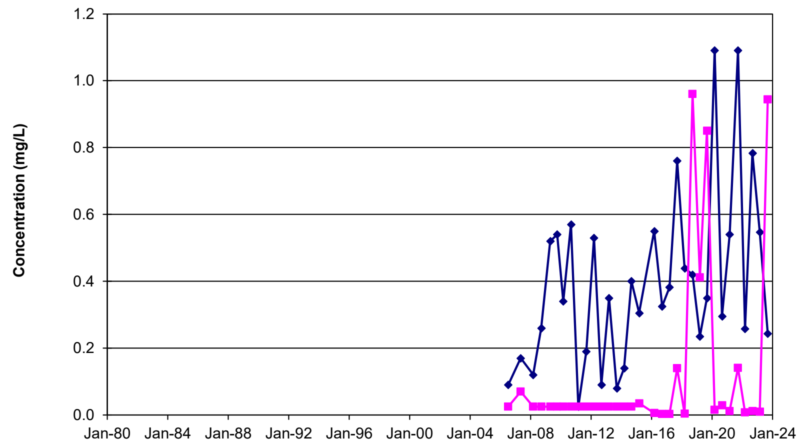
Figure F.33

Time Concentration Graphs - Groundwater: Overburden

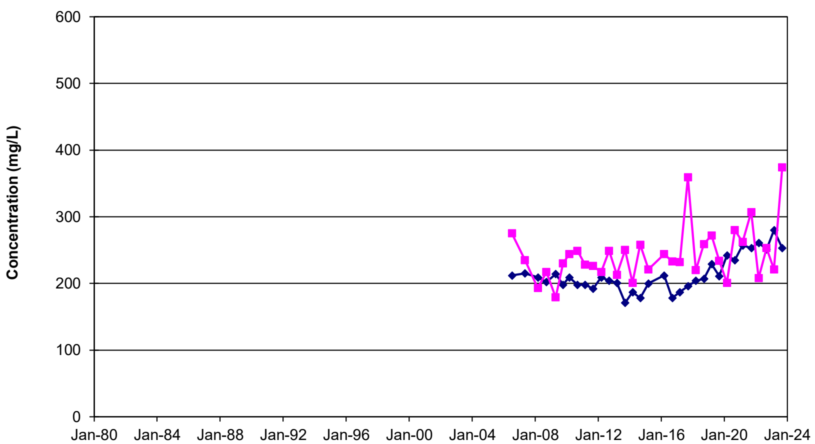
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

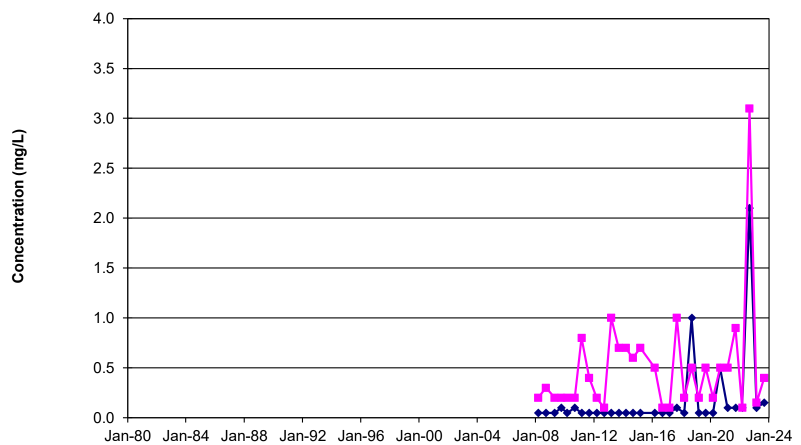
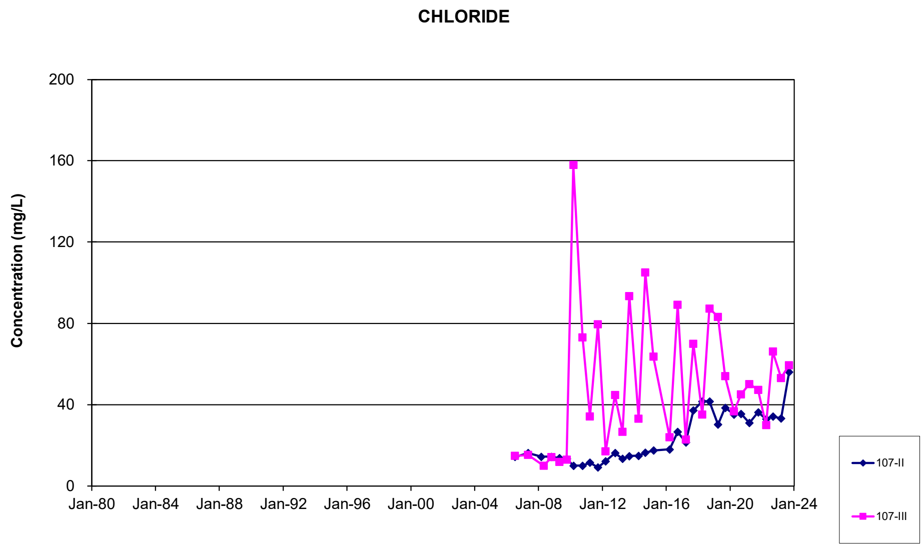
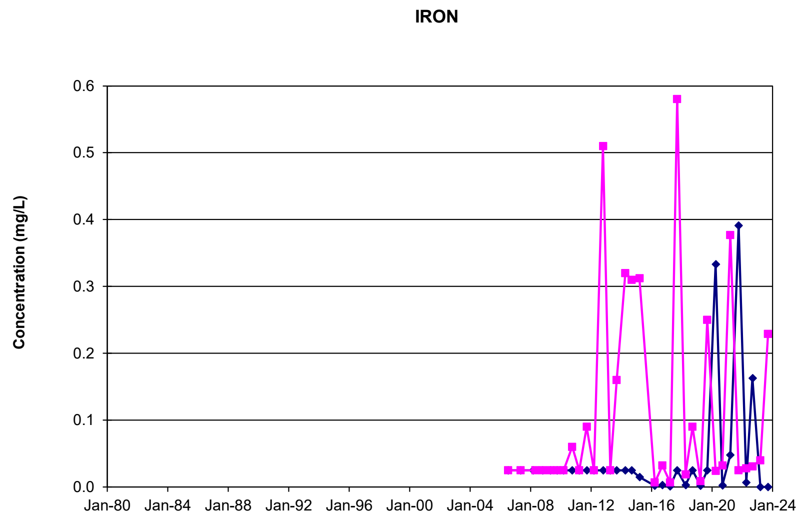
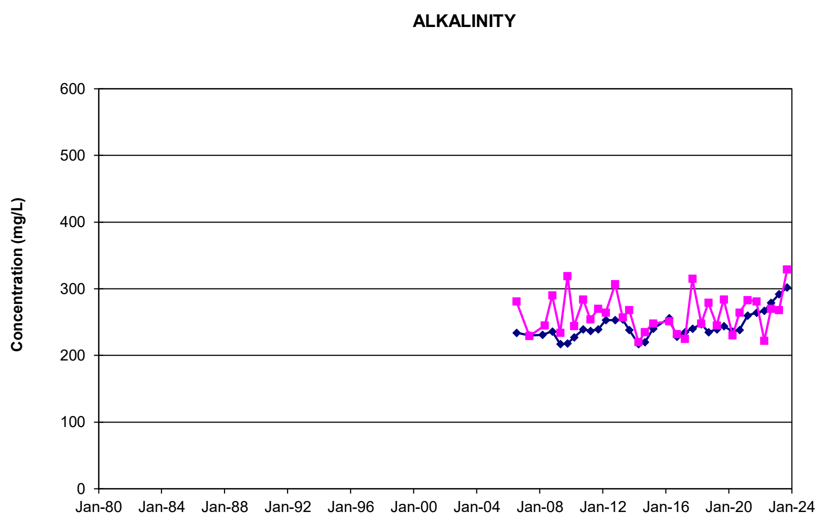


Figure F.34

Time Concentration Graphs - Groundwater: Overburden







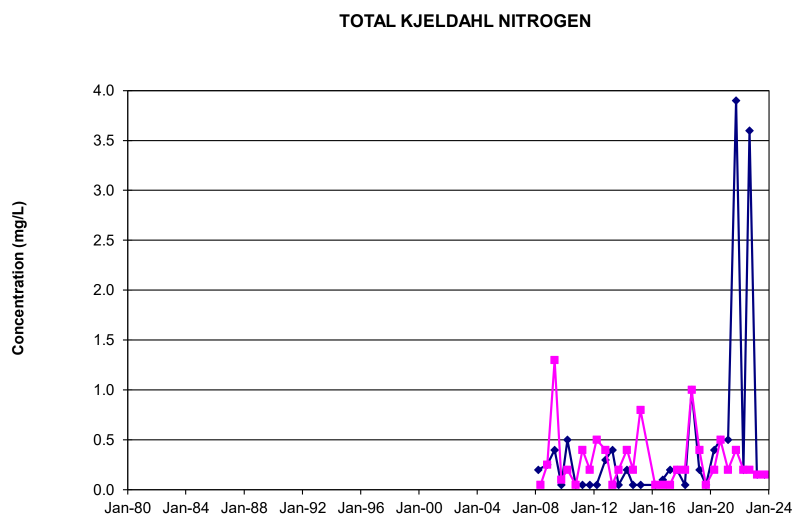
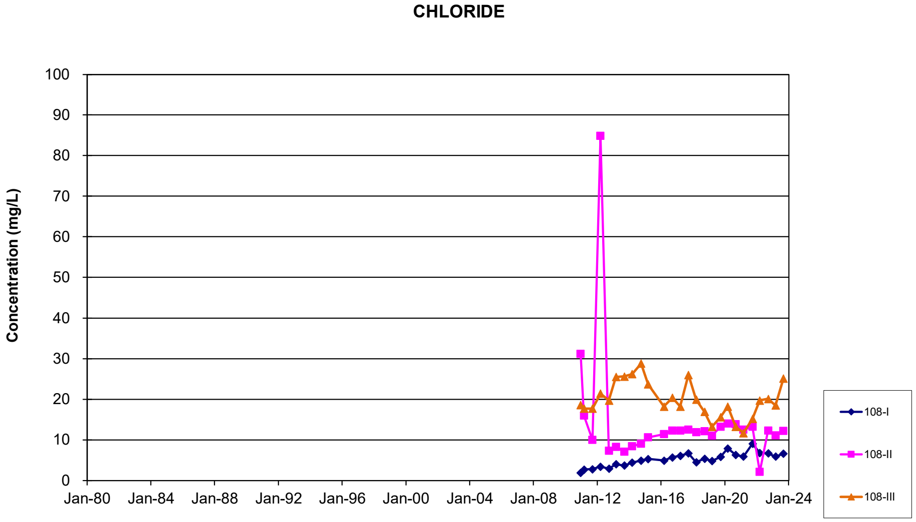
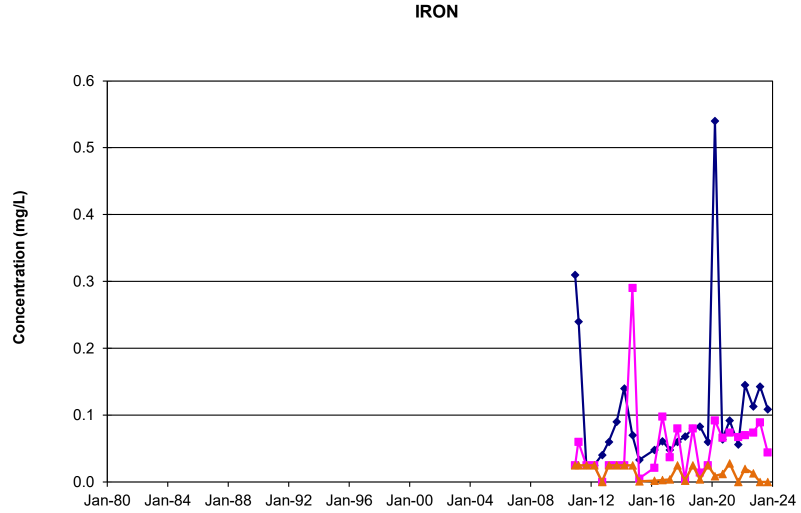
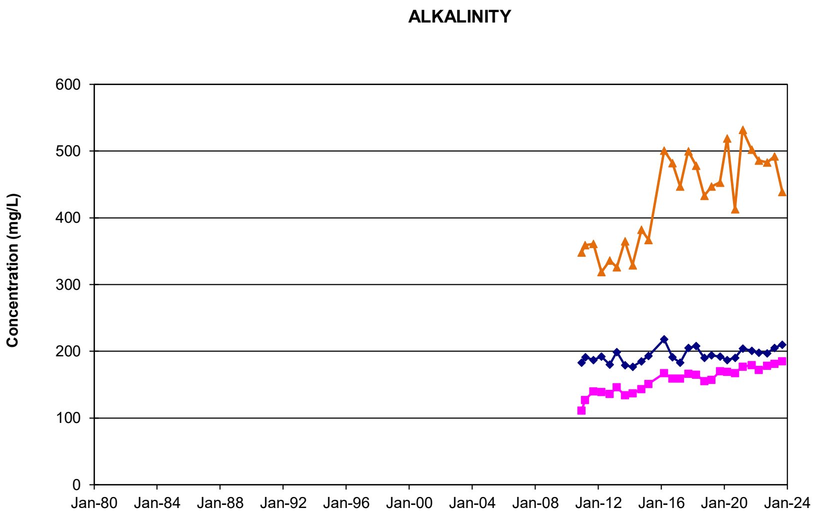


Figure F.35

Time Concentration Graphs - Groundwater: Overburden







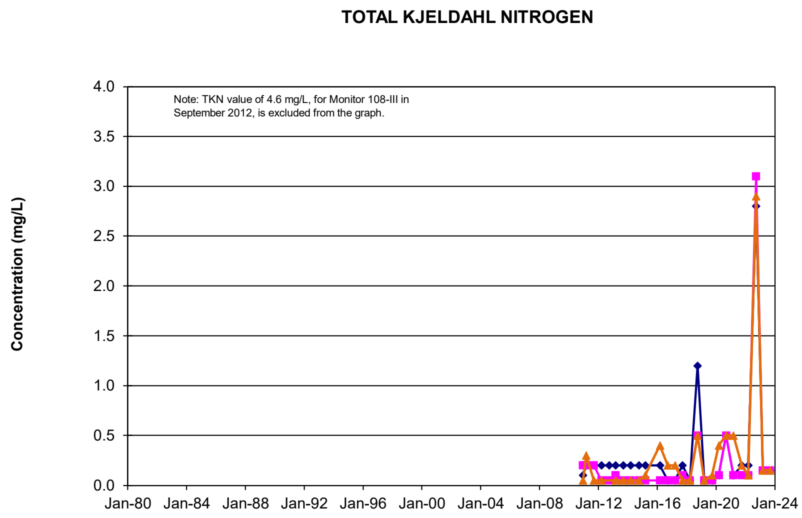
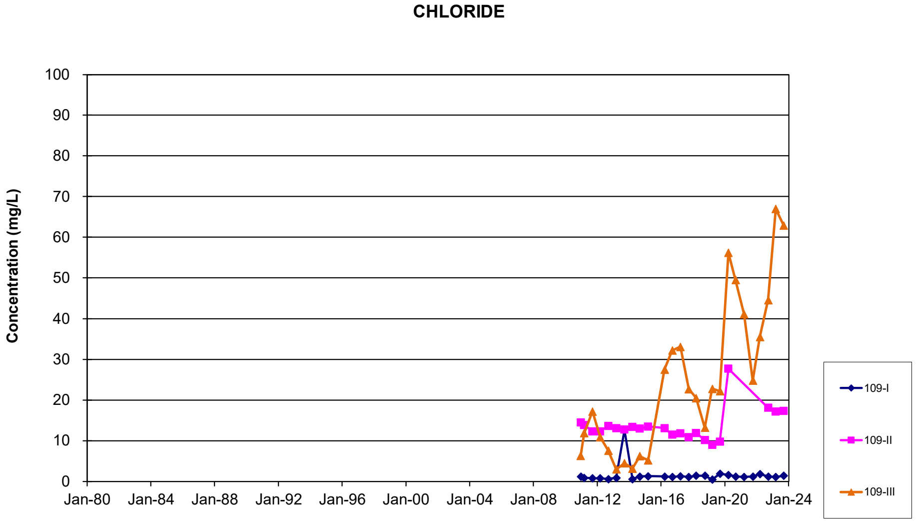
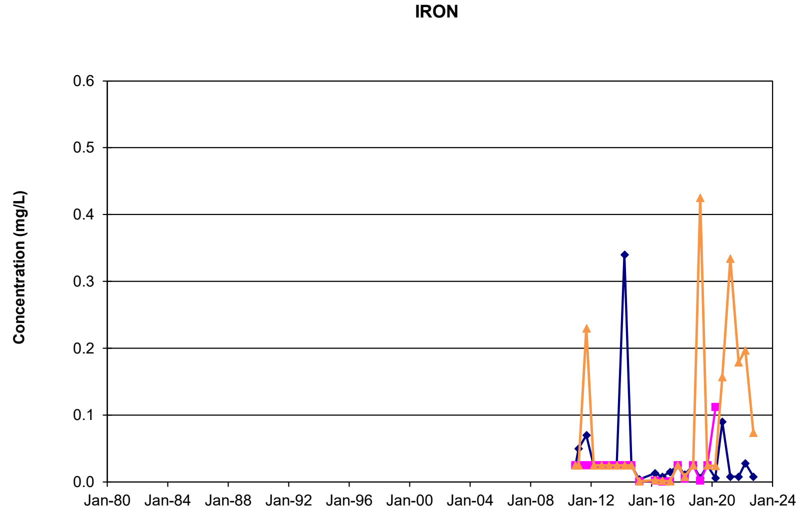
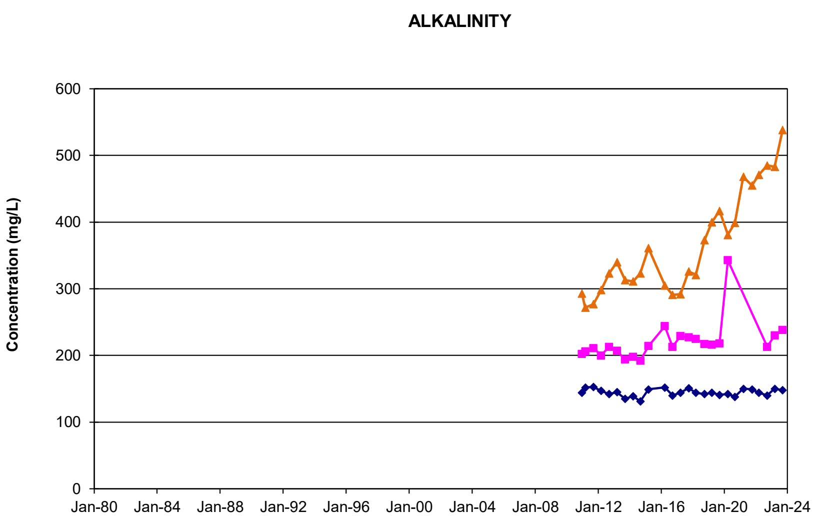


Figure F.36

Time Concentration Graphs - Groundwater: Overburden







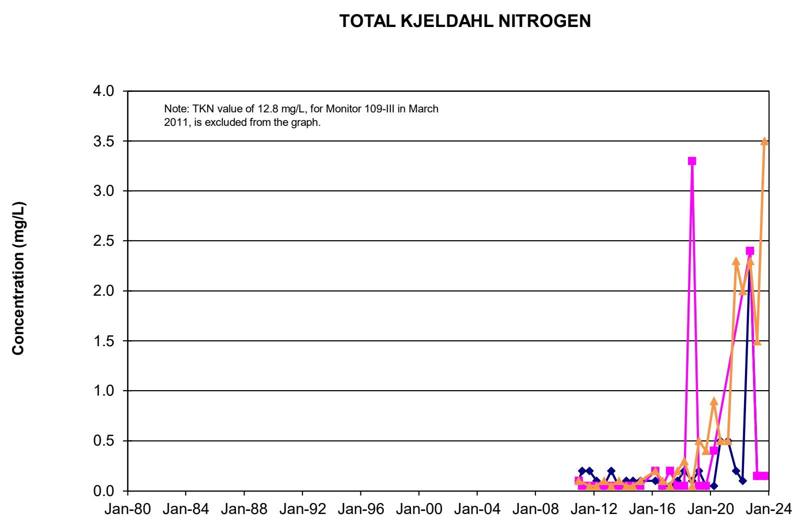
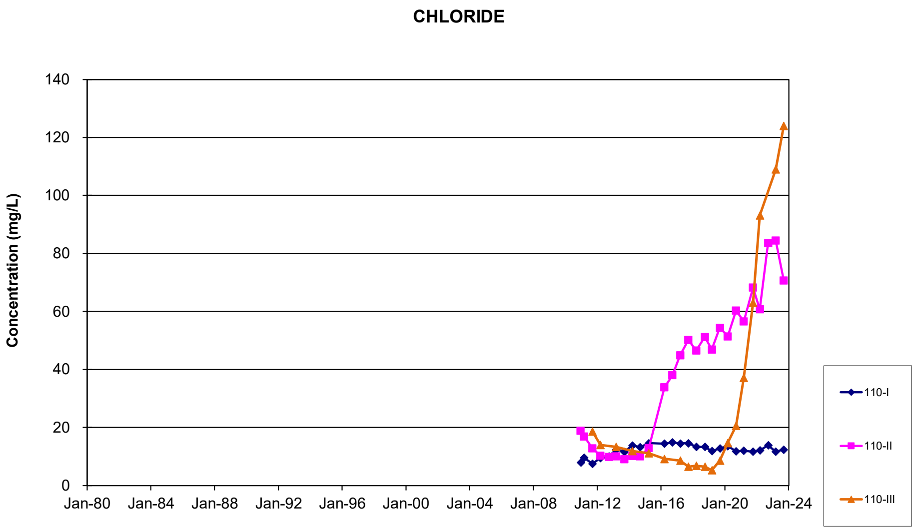
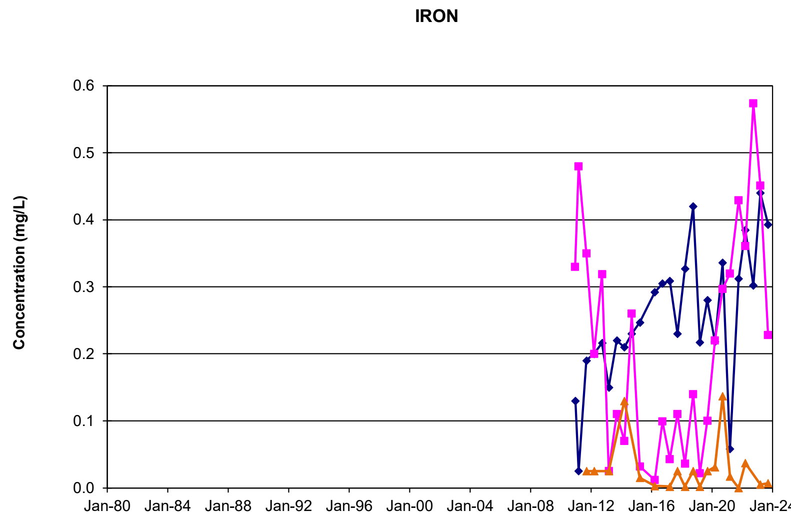
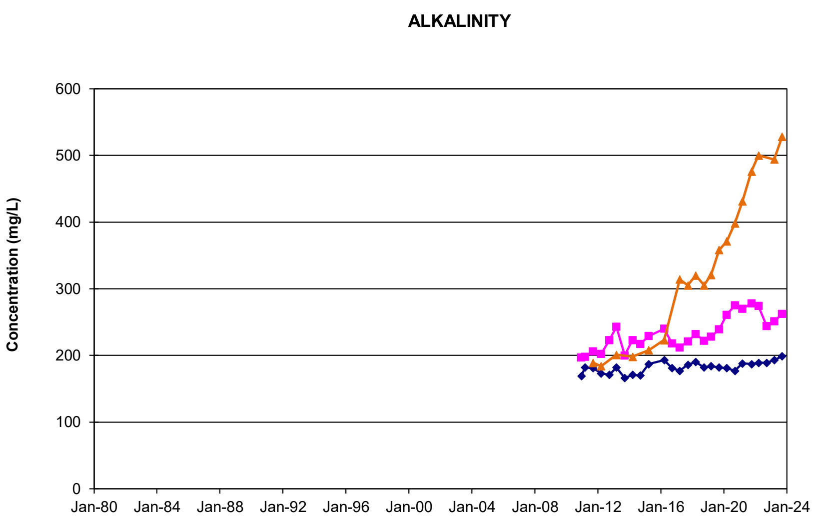


Figure F.37

Time Concentration Graphs - Groundwater: Overburden







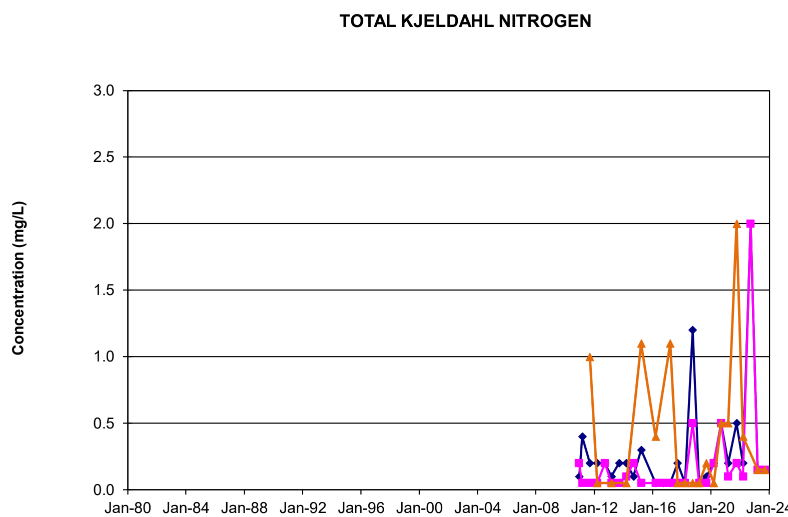
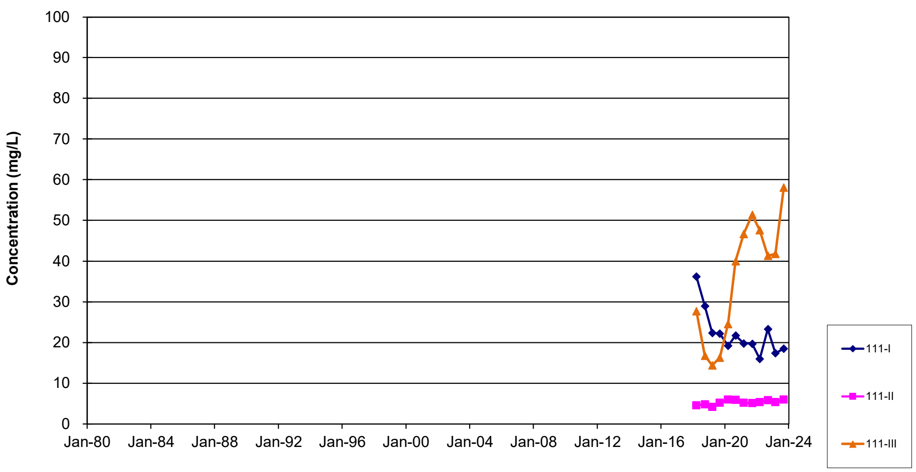


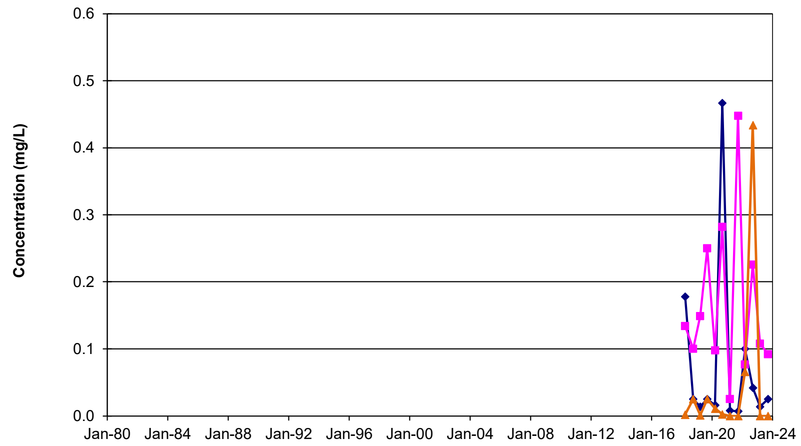
Figure F.38

Time Concentration Graphs - Groundwater: Overburden

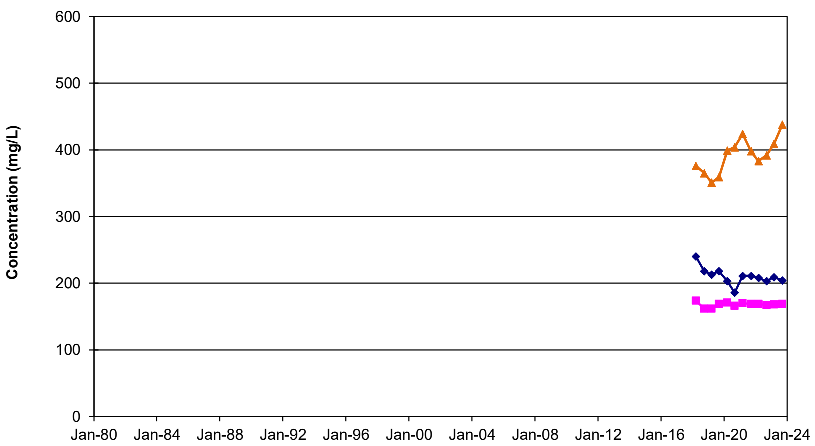
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

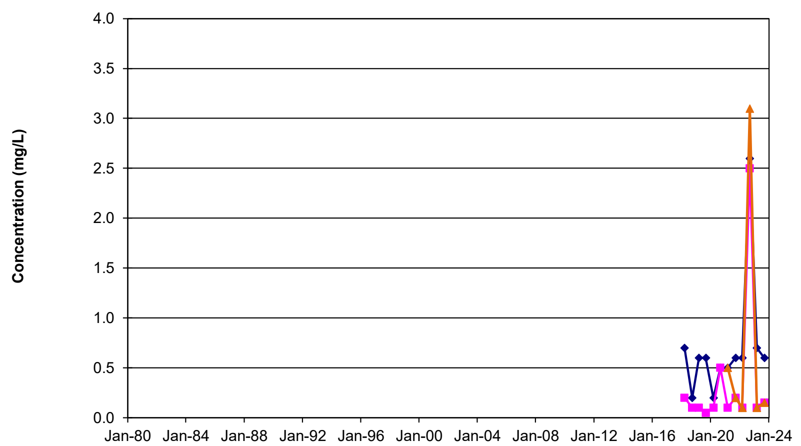
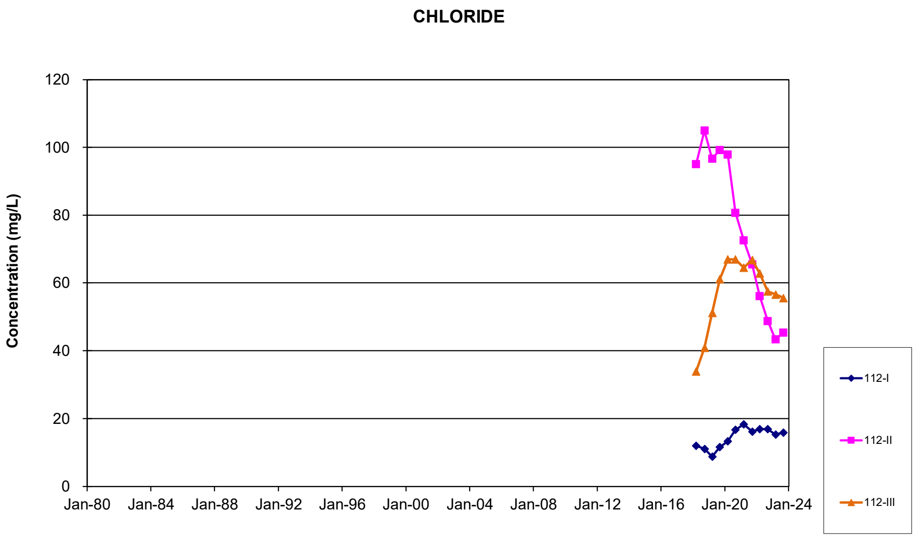
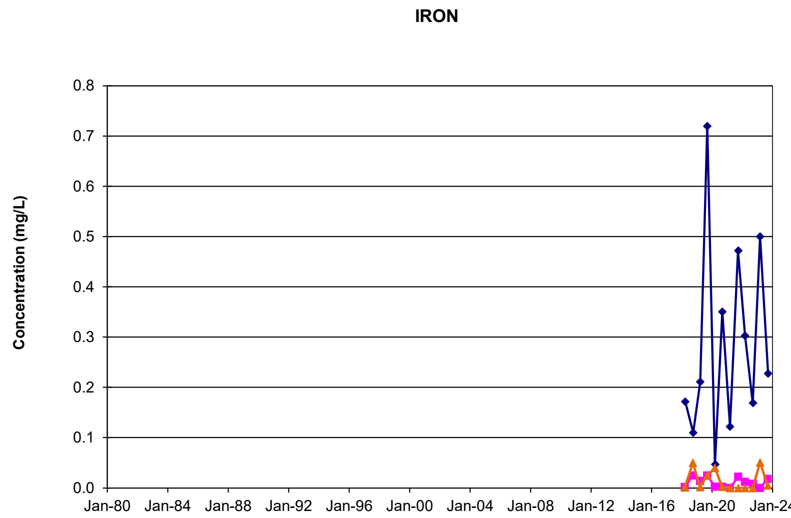
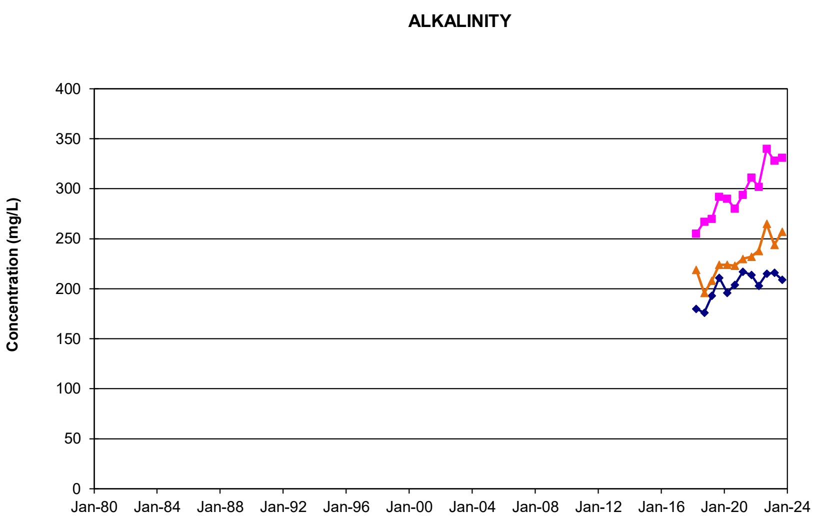


Figure F.39

Time Concentration Graphs - Groundwater: Overburden







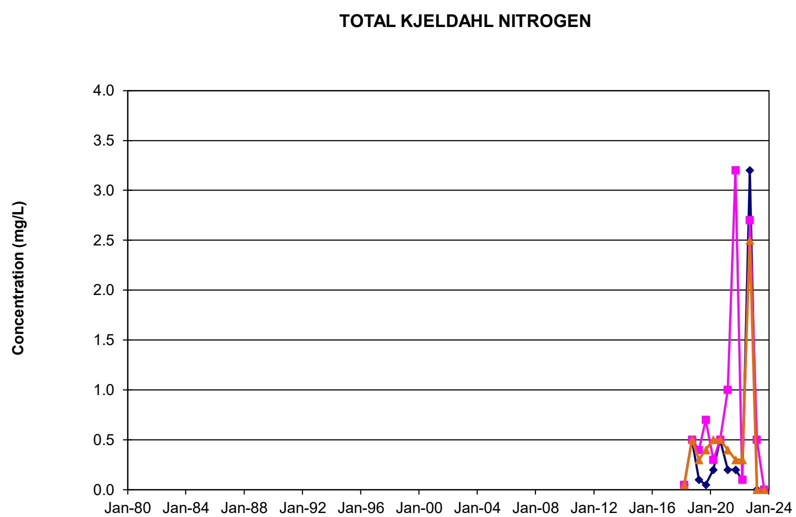
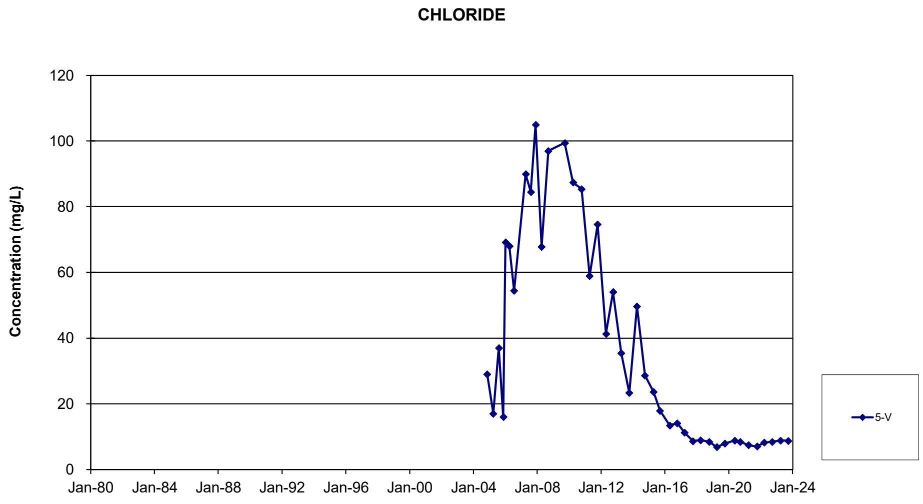
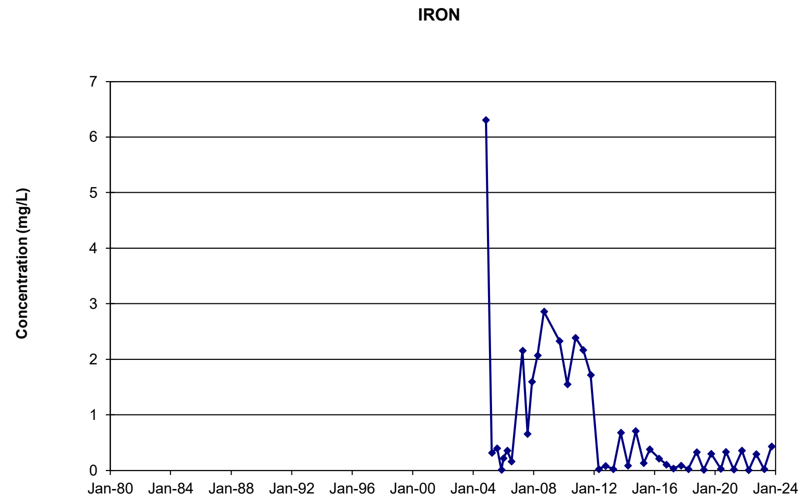
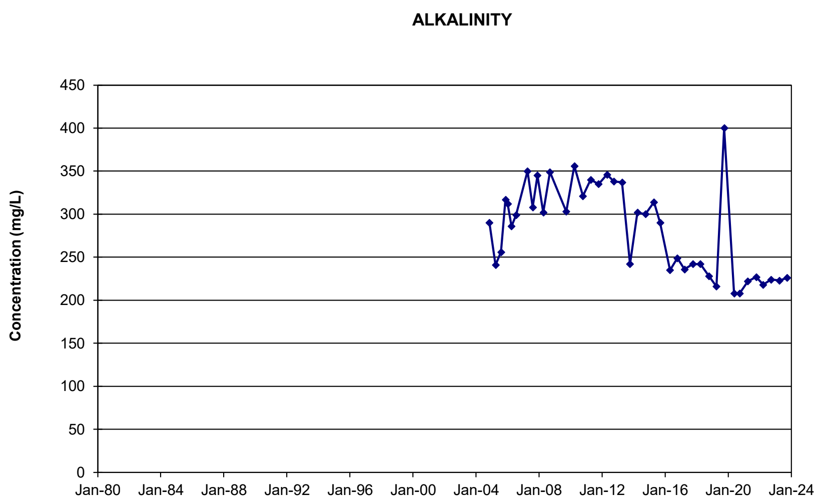


Figure F.40

Time Concentration Graphs - Groundwater: Shallow Bedrock







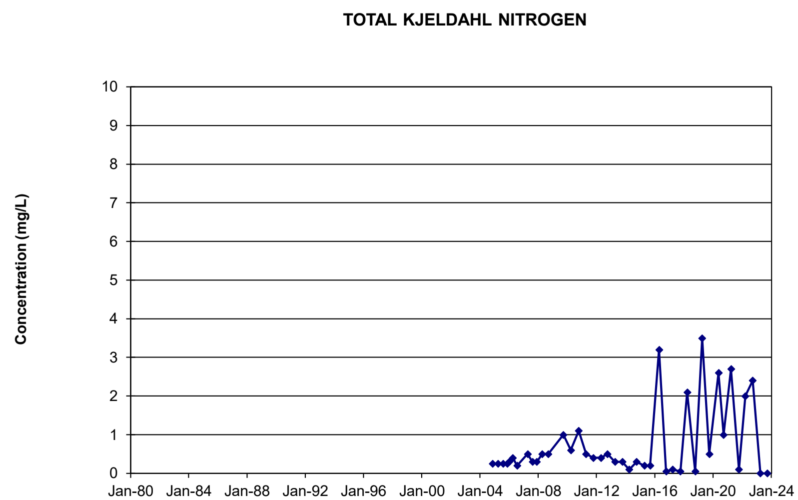
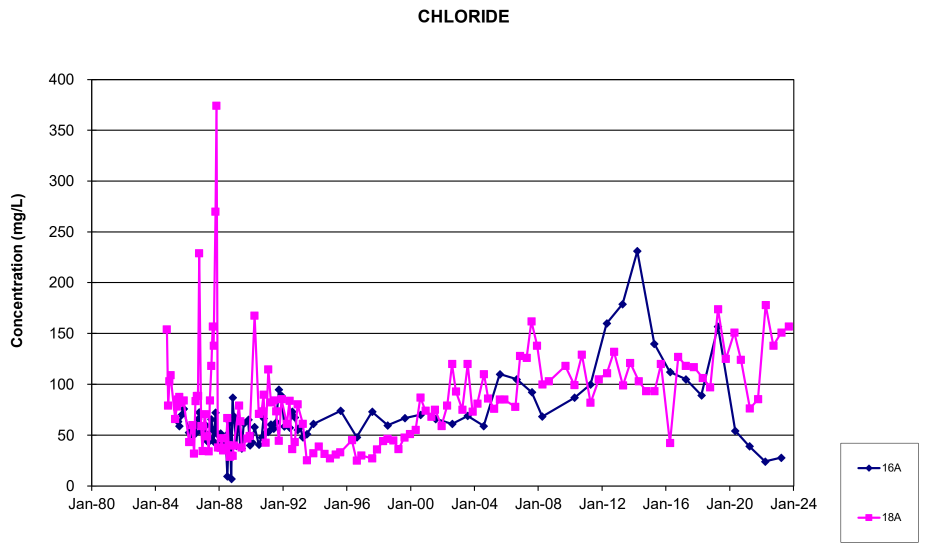
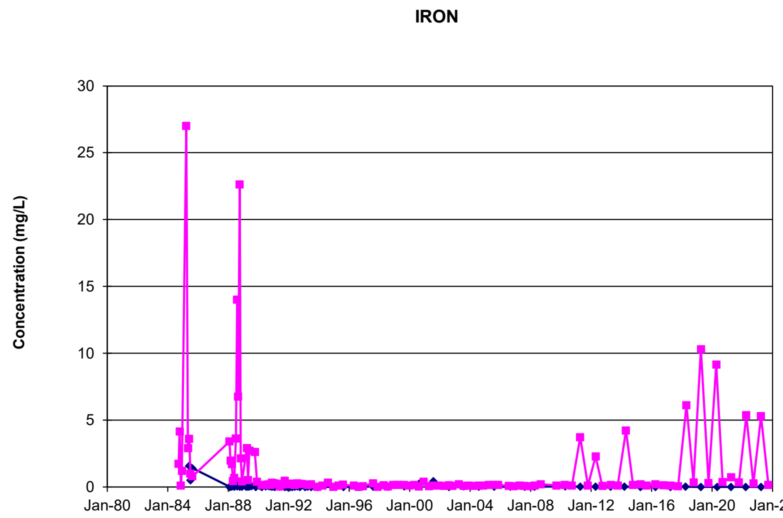
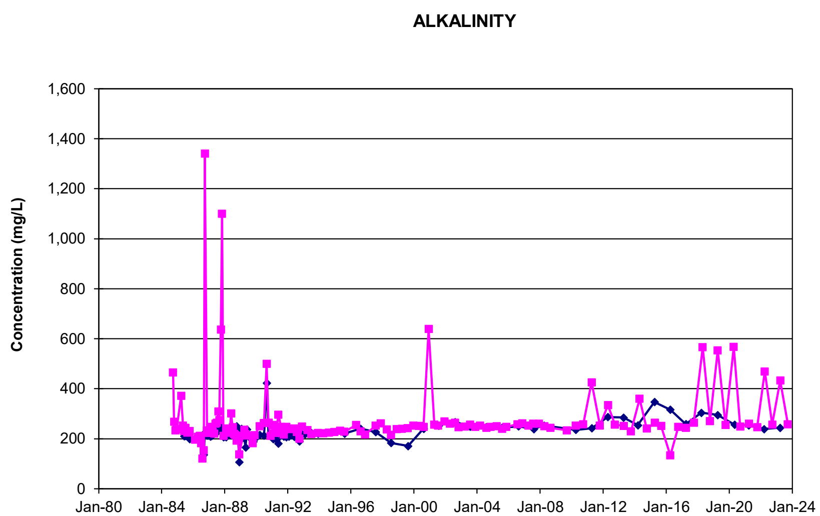


Figure F.41

Time Concentration Graphs - Groundwater: Shallow Bedrock







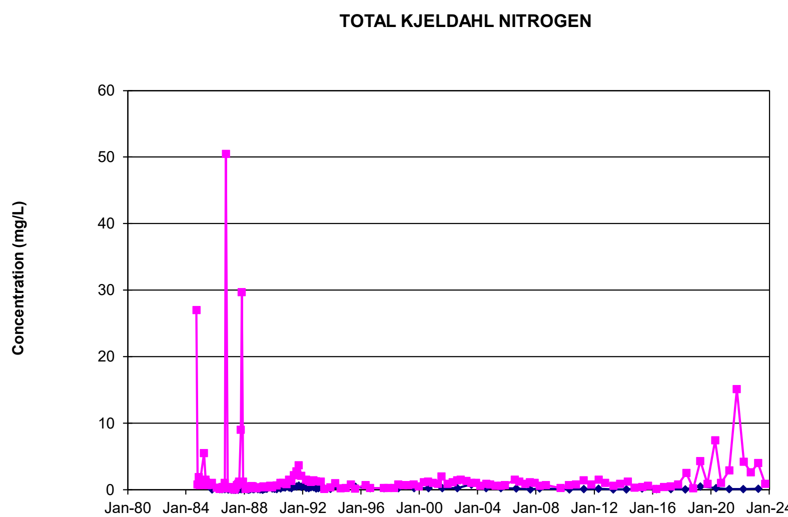
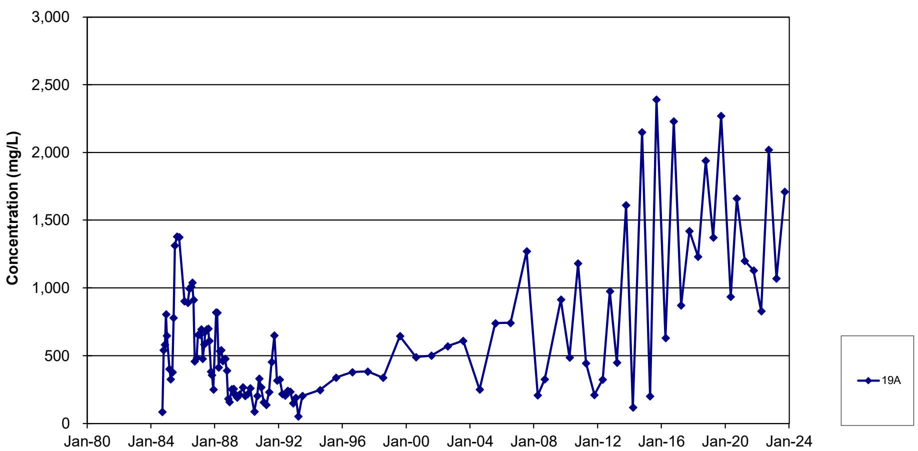


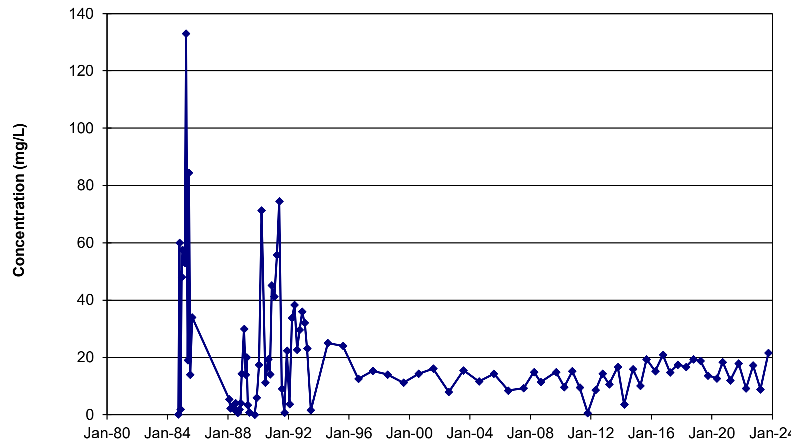
Figure F.42

Time Concentration Graphs - Groundwater: Shallow Bedrock

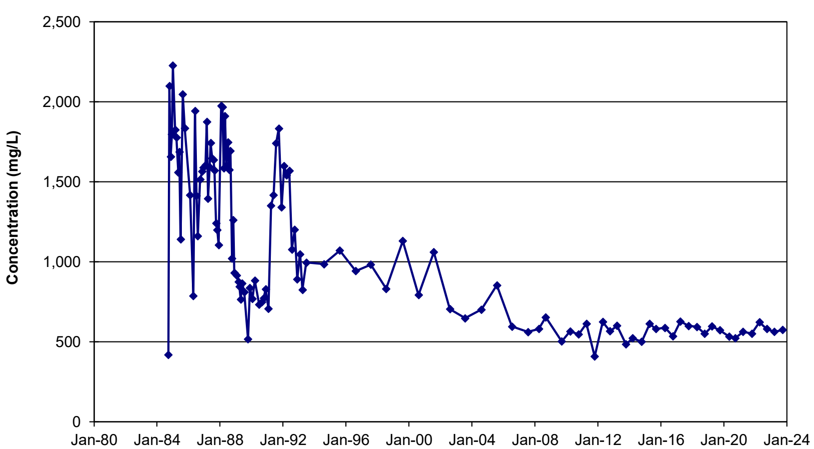
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

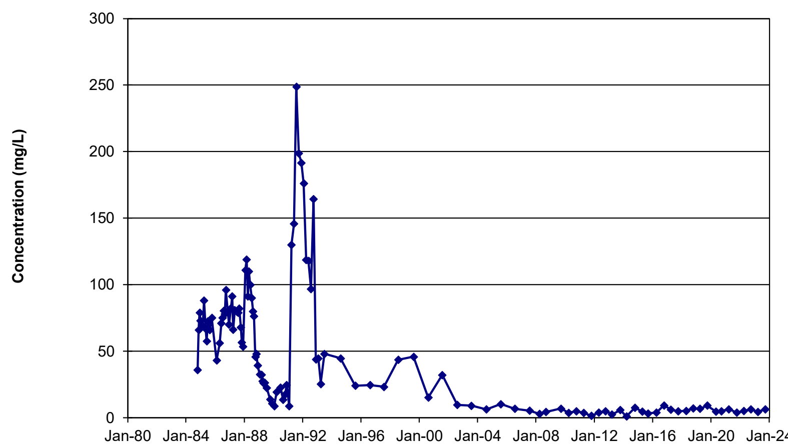
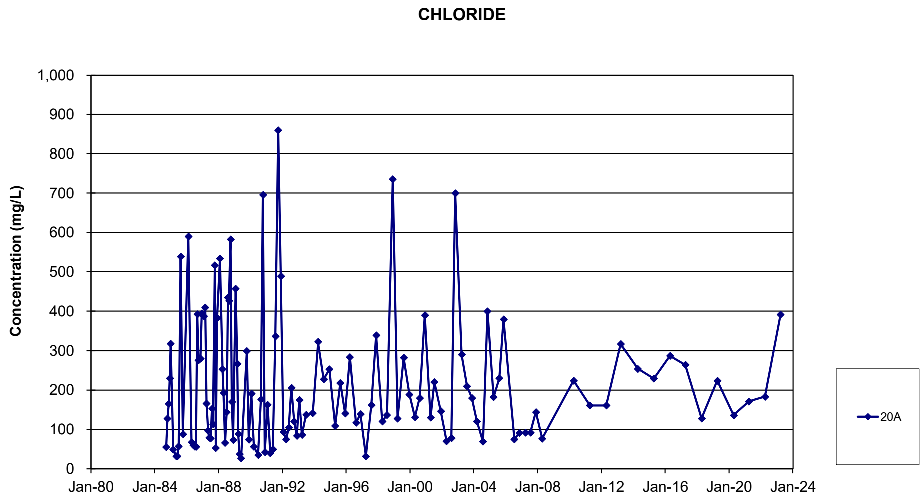
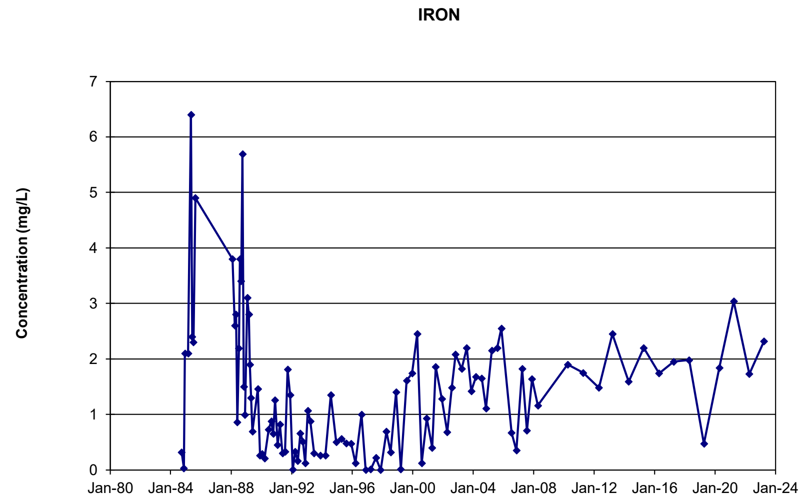
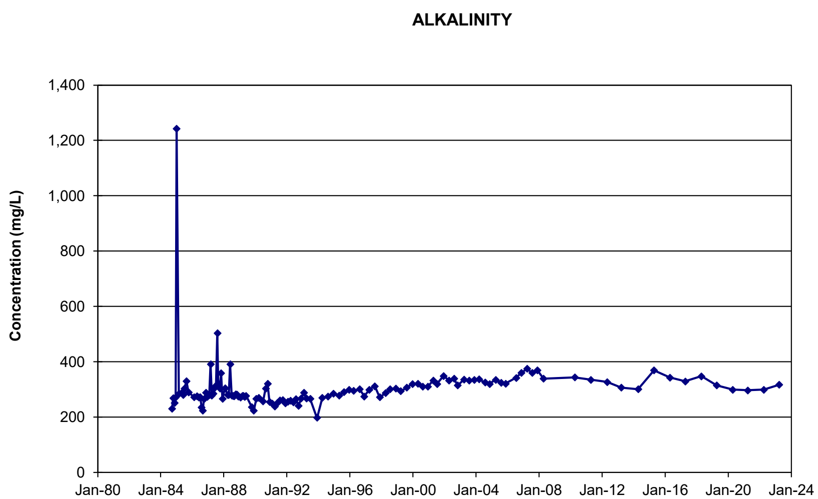


Figure F.43

Time Concentration Graphs - Groundwater: Shallow Bedrock







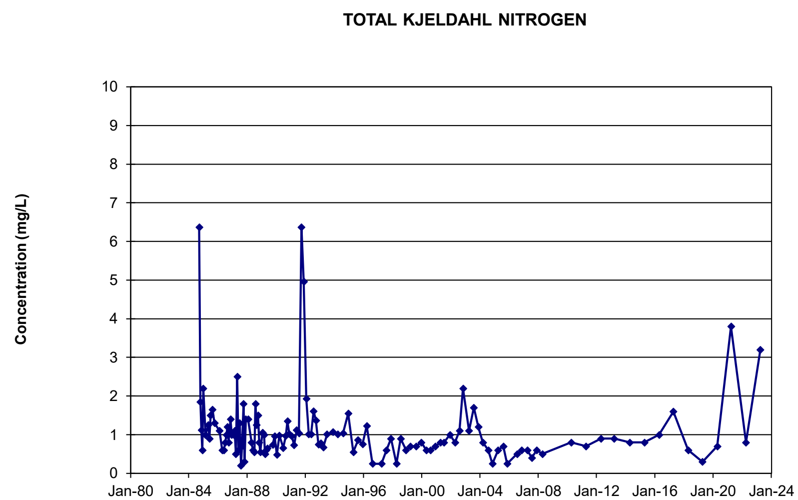
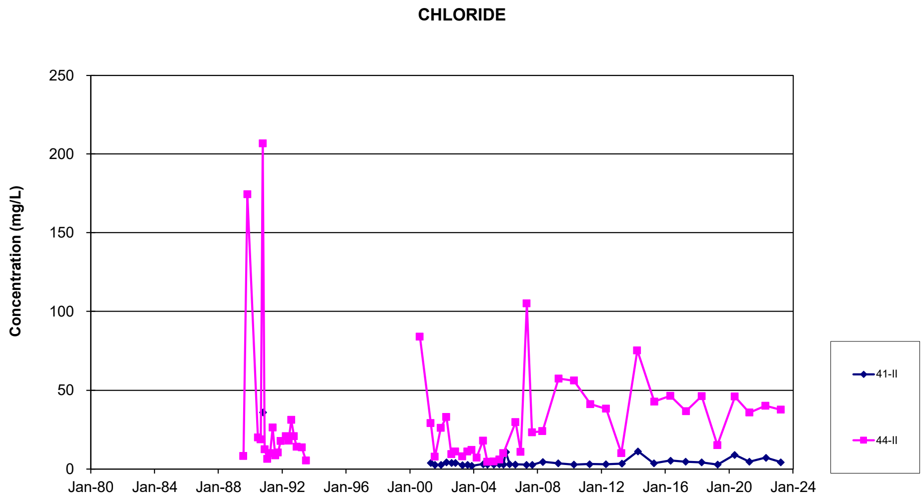
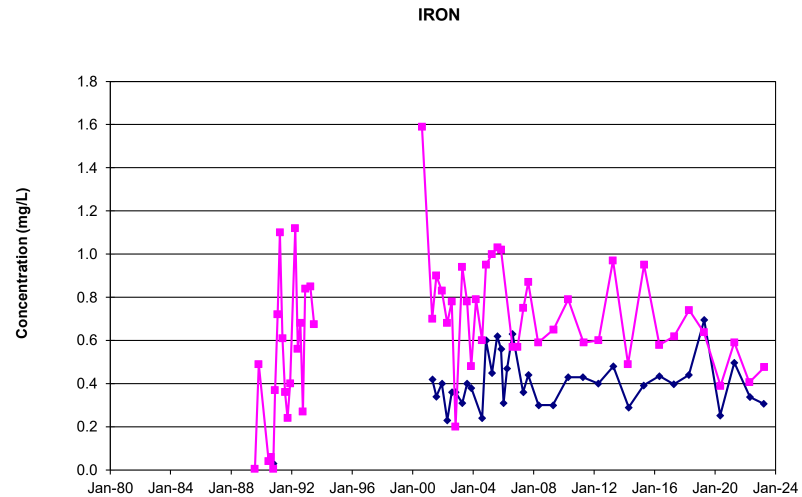
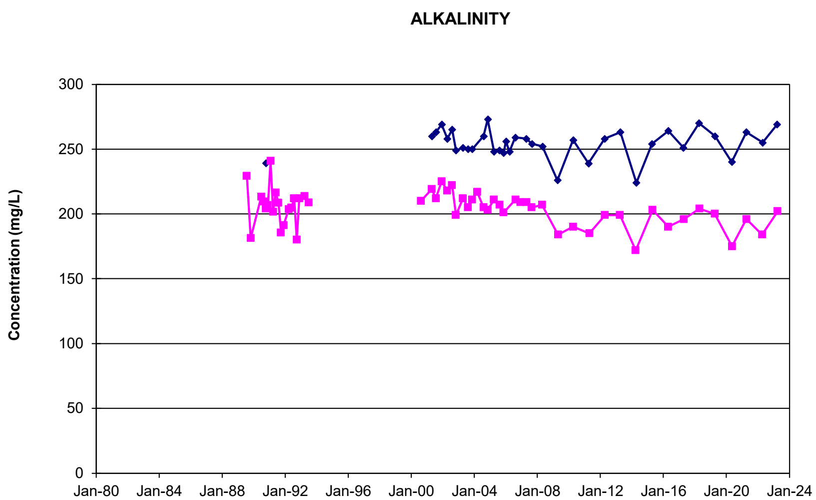


Figure F.44

Time Concentration Graphs - Groundwater: Shallow Bedrock







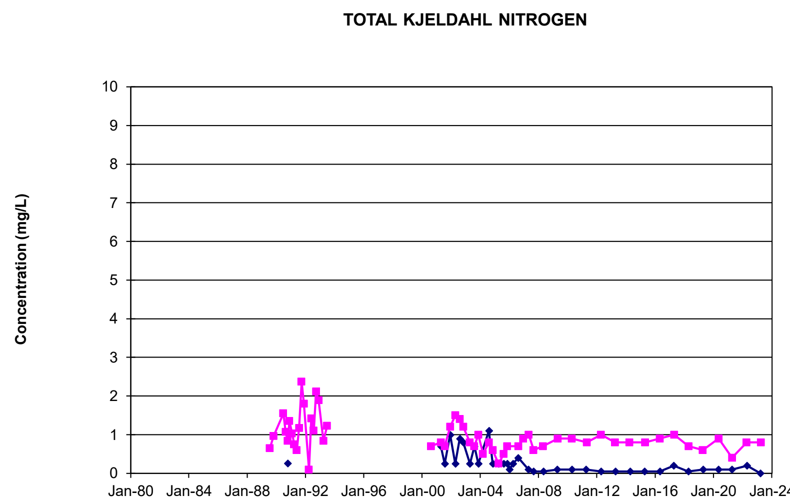
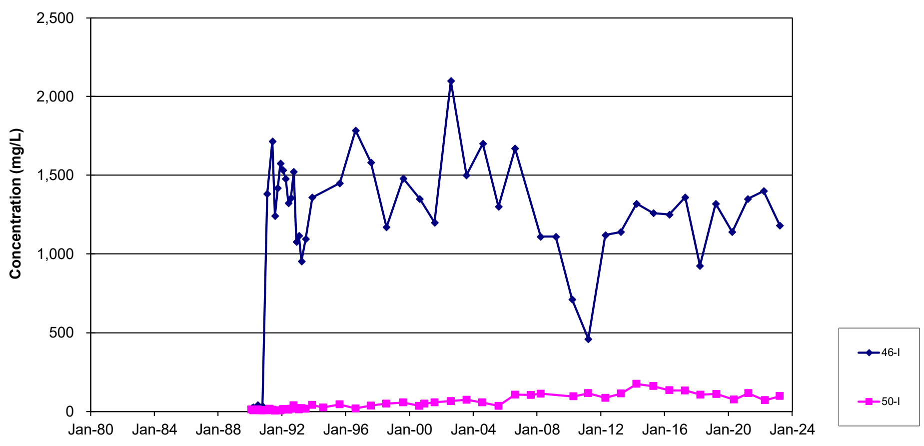


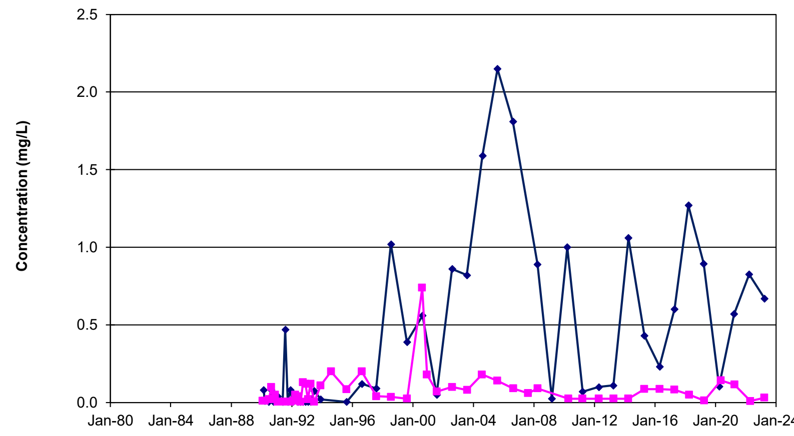
Figure F.45

Time Concentration Graphs - Groundwater: Shallow Bedrock

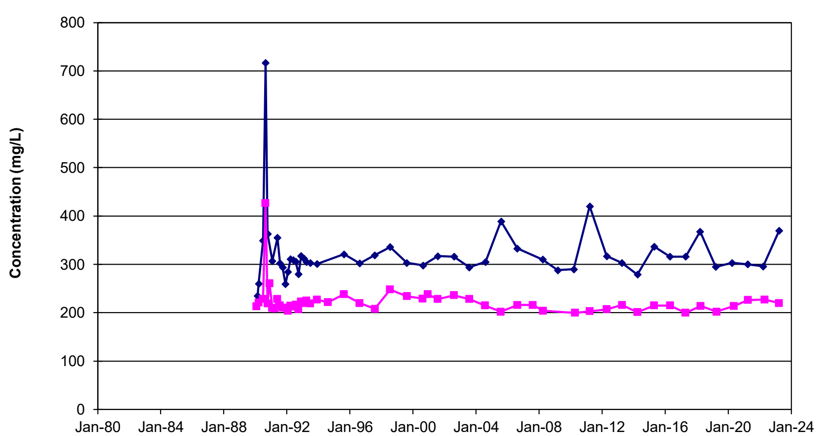
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

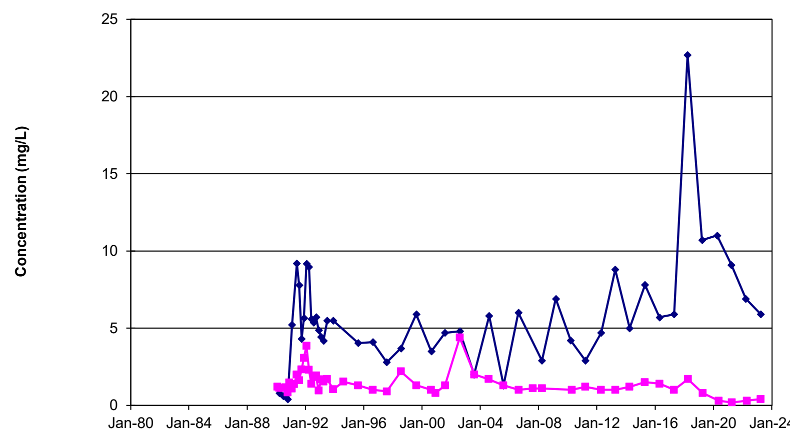
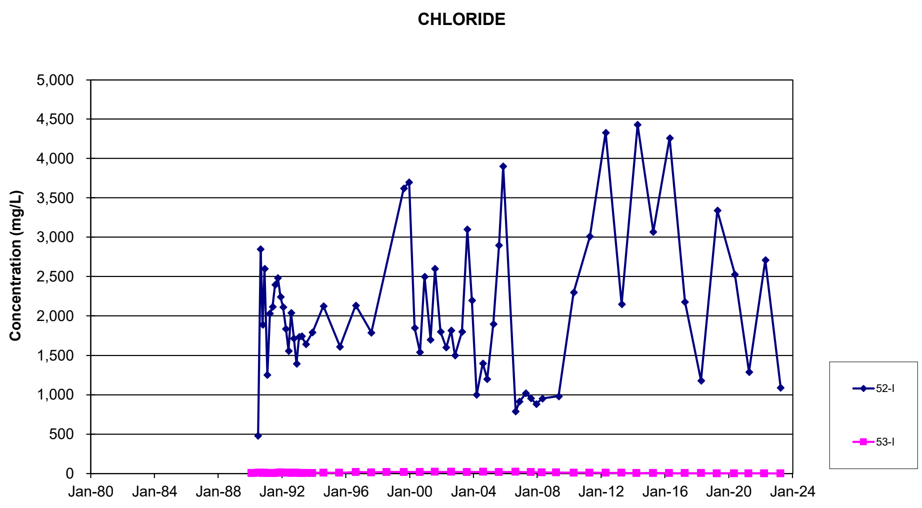
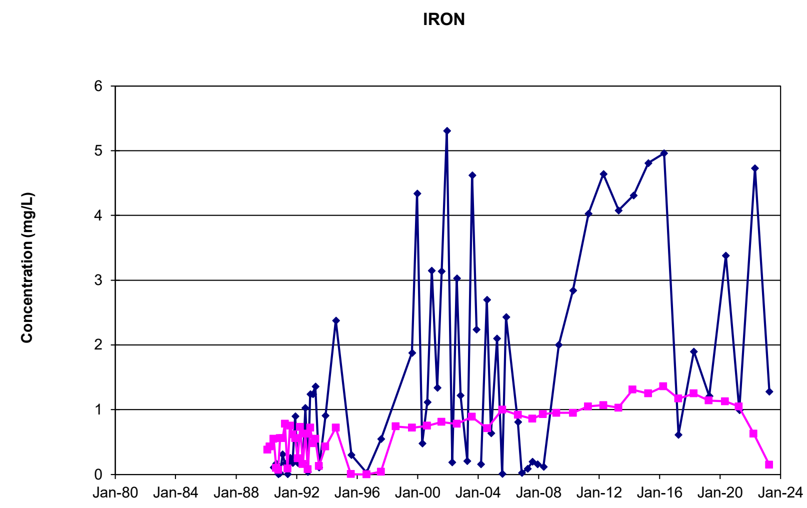
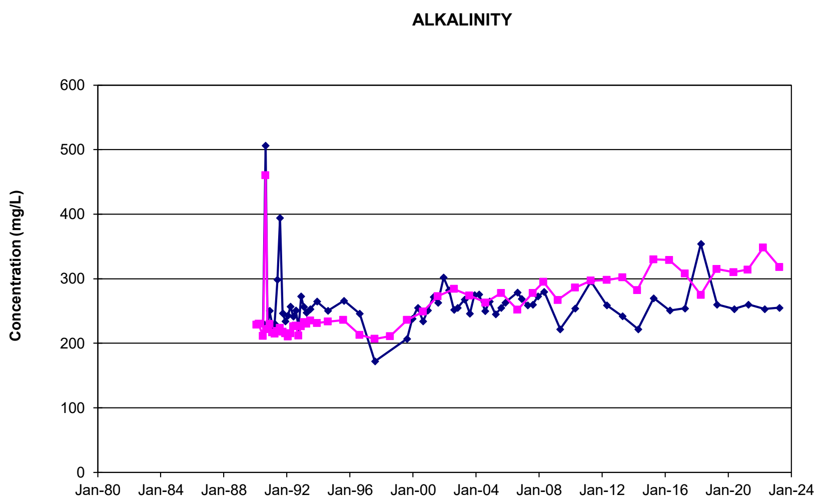


Figure F.46

Time Concentration Graphs - Groundwater: Shallow Bedrock







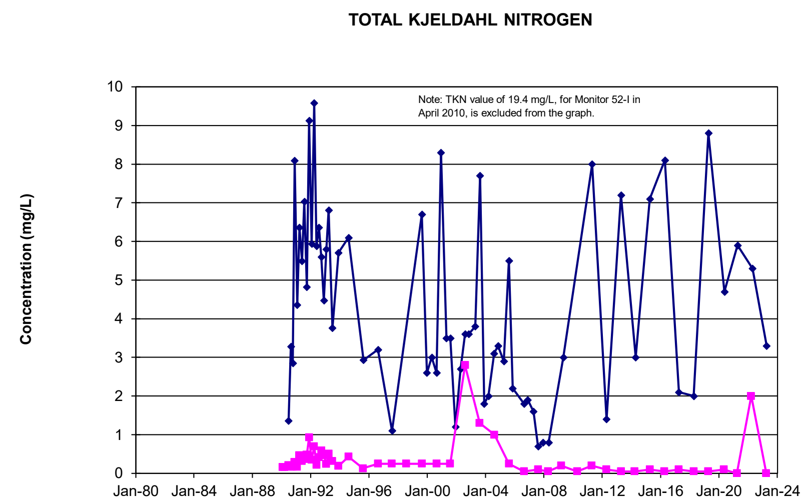
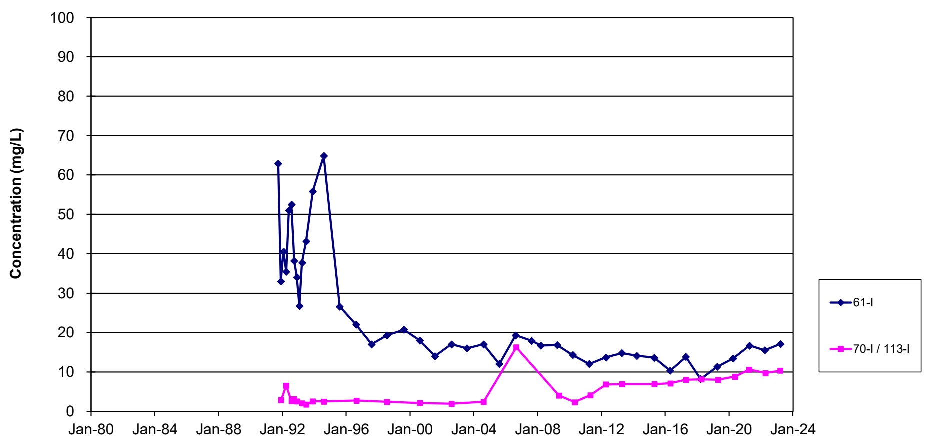


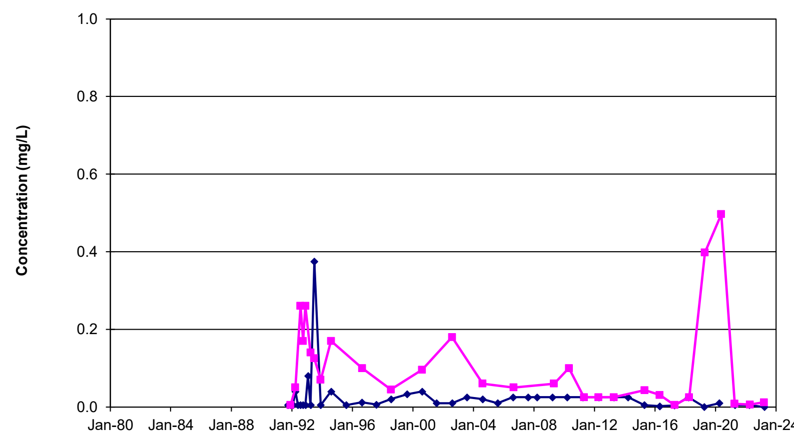
Figure F.47

Time Concentration Graphs - Groundwater: Shallow Bedrock

CHLORIDE



IRON



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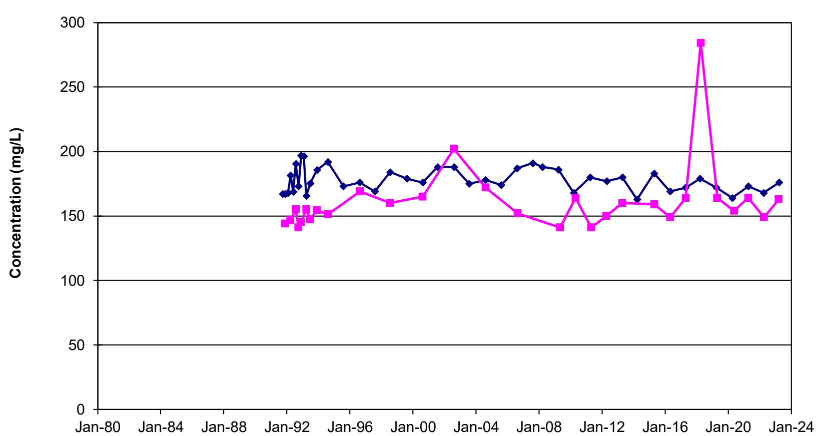


TOTAL KJELDAHL NITROGEN

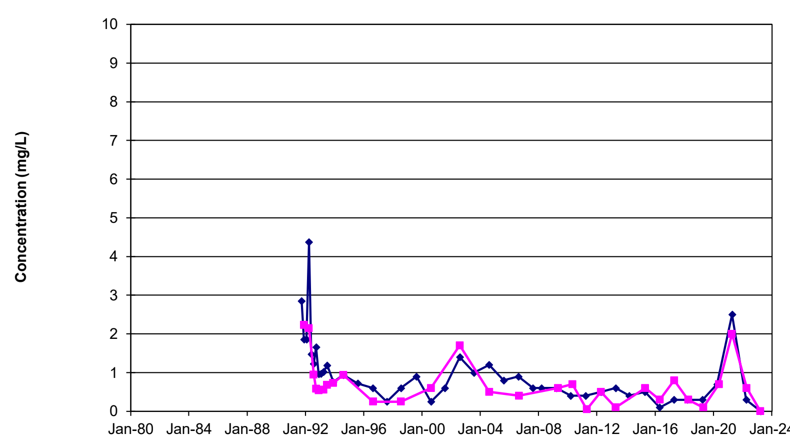
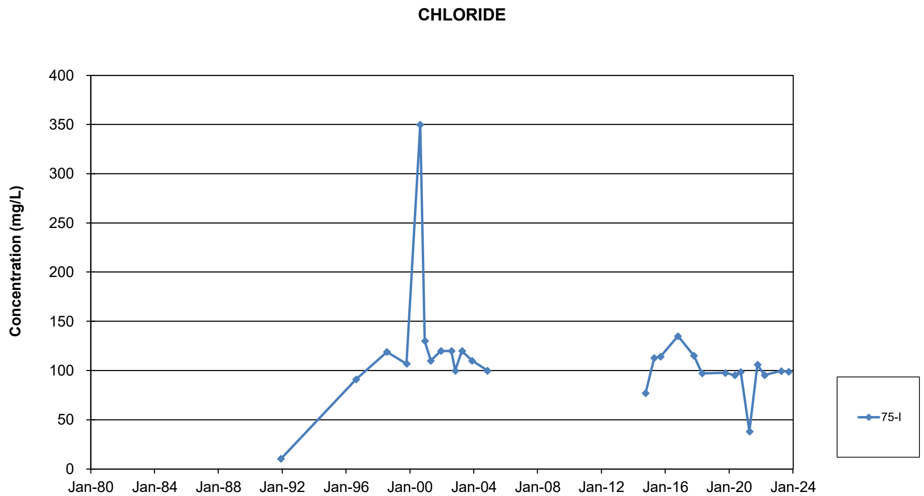
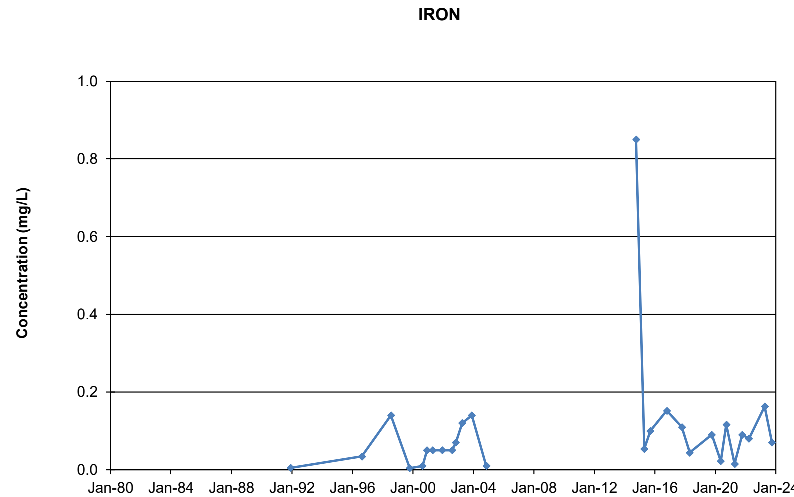
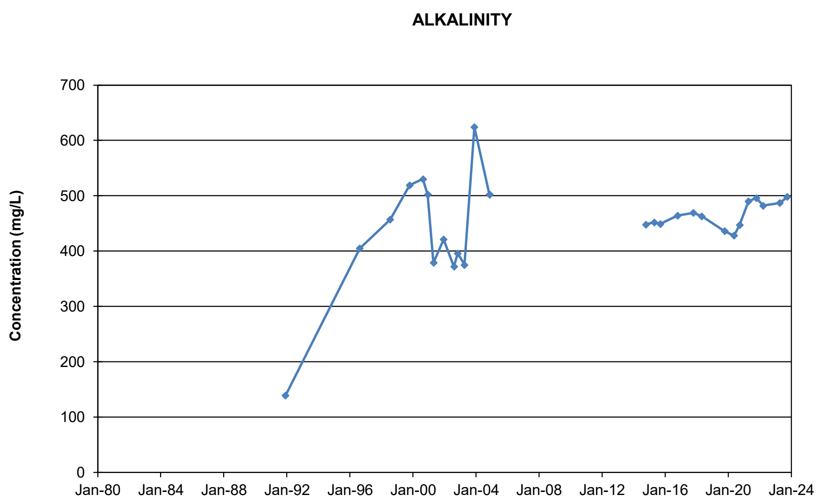


Figure F.48

Time Concentration Graphs - Groundwater: Shallow Bedrock







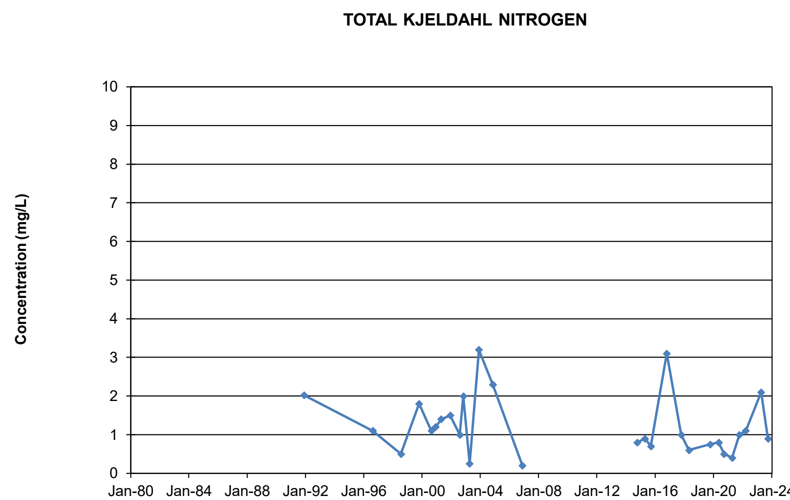
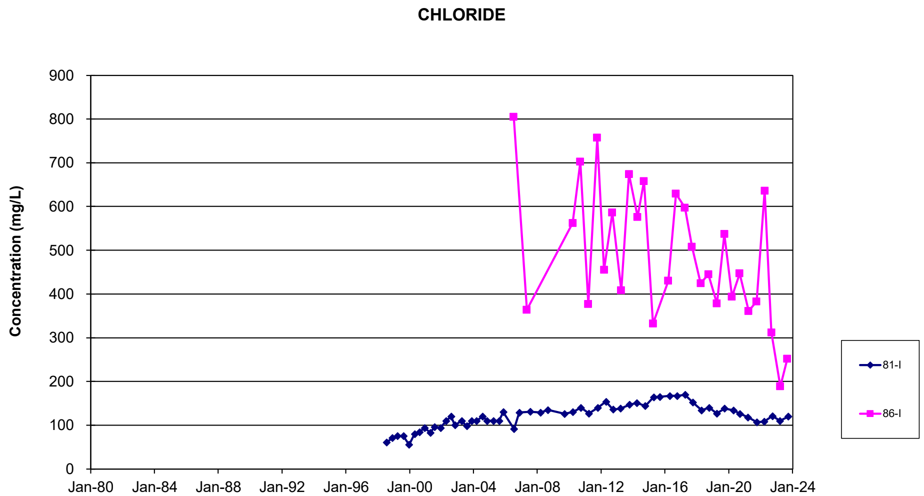
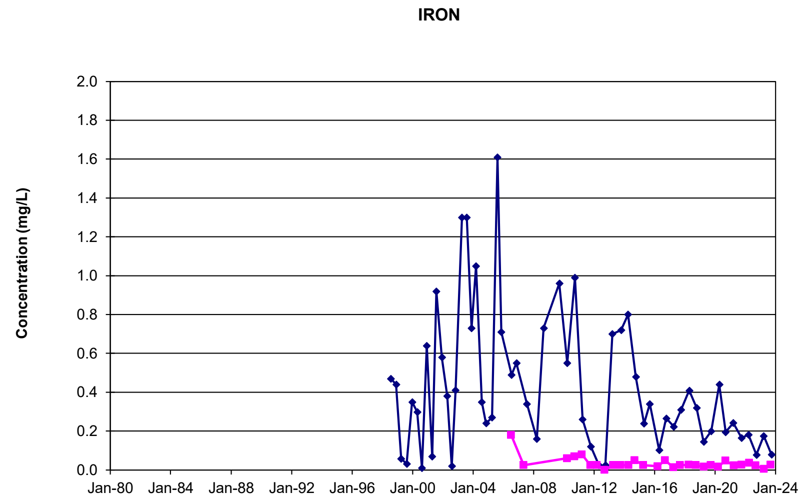
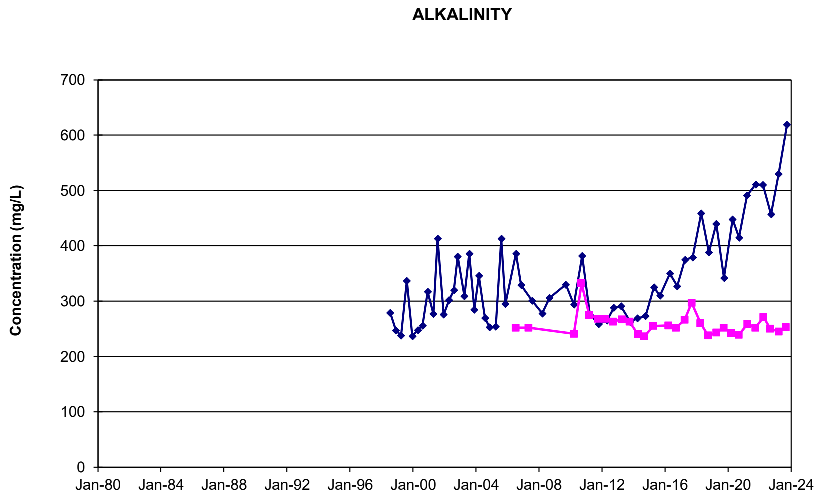


Figure F.49

Time Concentration Graphs - Groundwater: Shallow Bedrock







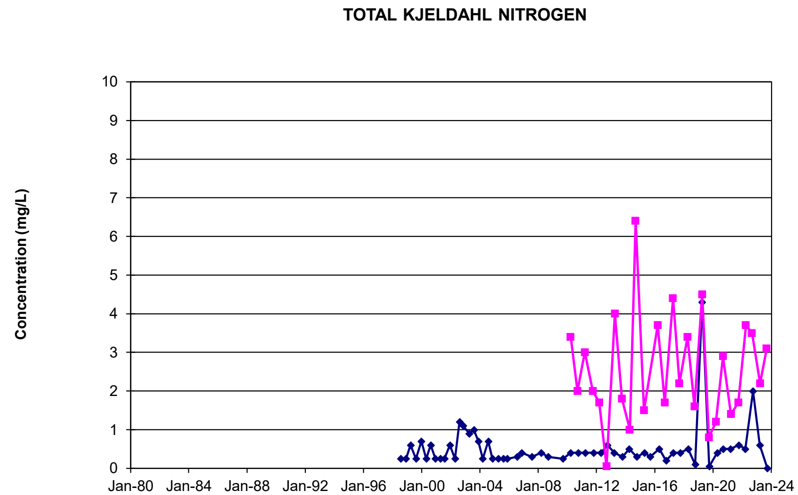
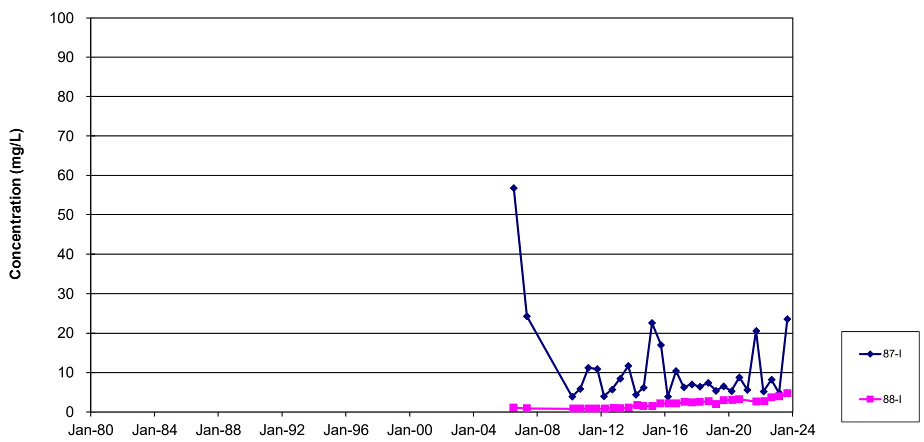


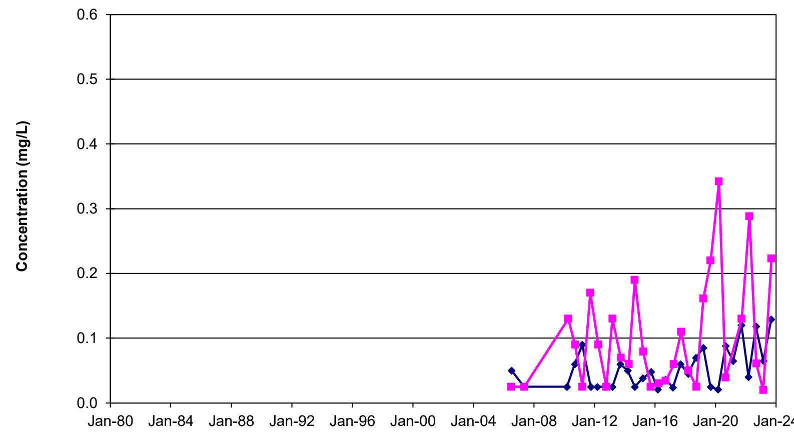
Figure F.50

Time Concentration Graphs - Groundwater: Shallow Bedrock

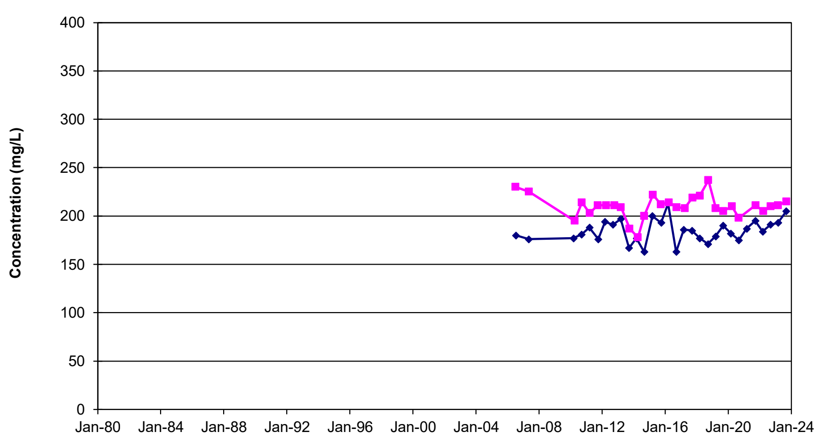
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

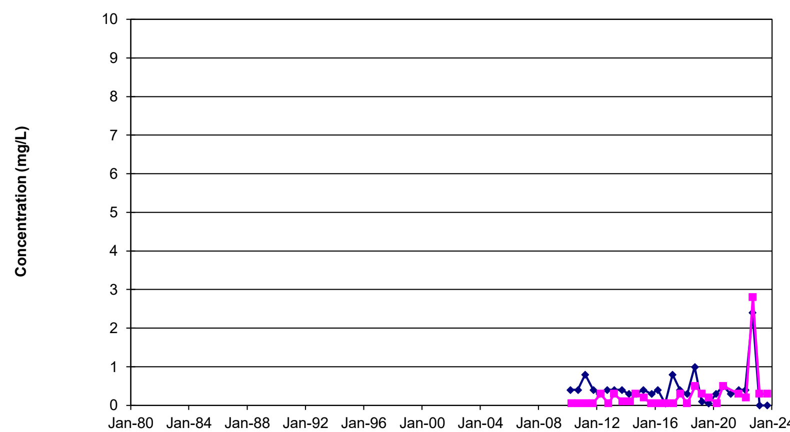
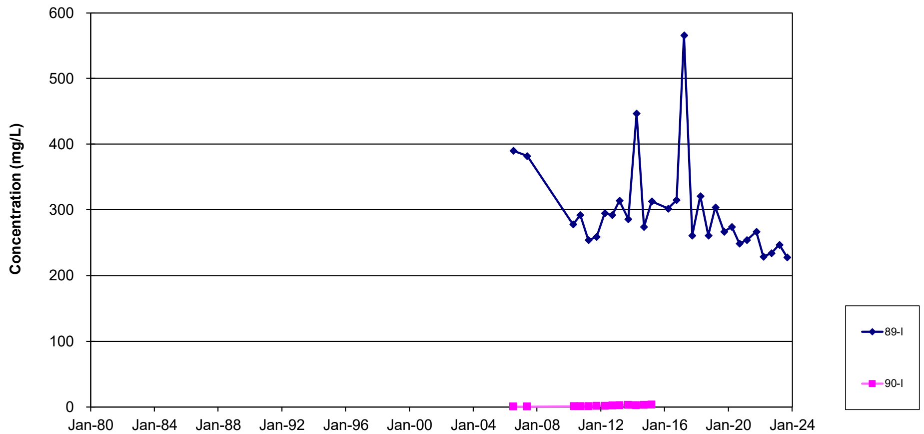


Figure F.51

Time Concentration Graphs - Groundwater: Shallow Bedrock

CHLORIDE



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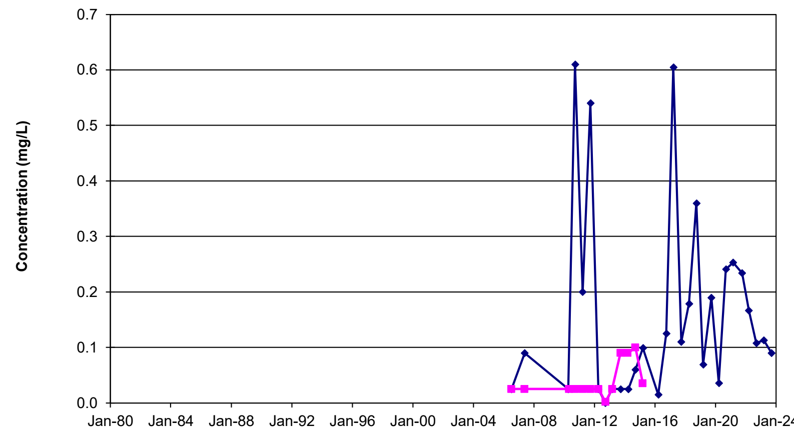

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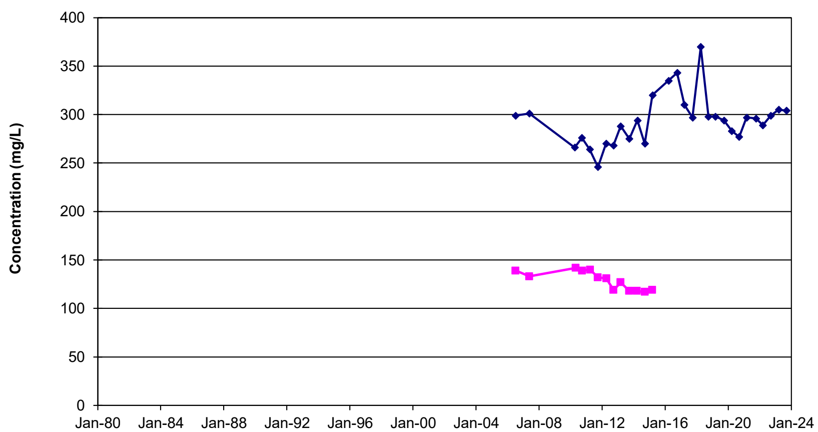


TOTAL KJELDAHL NITROGEN

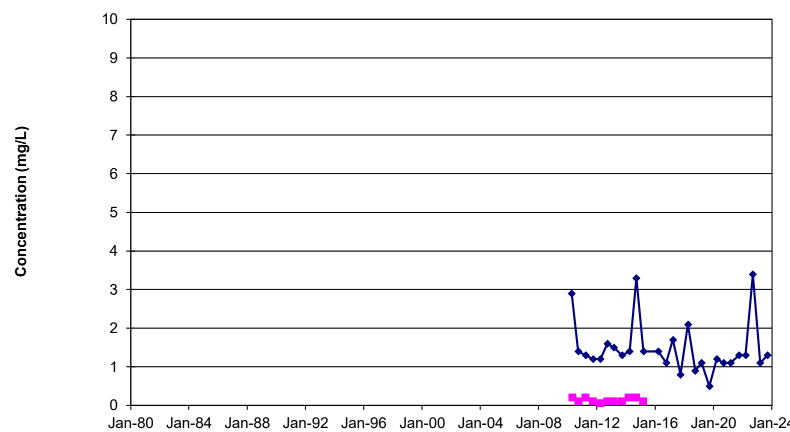
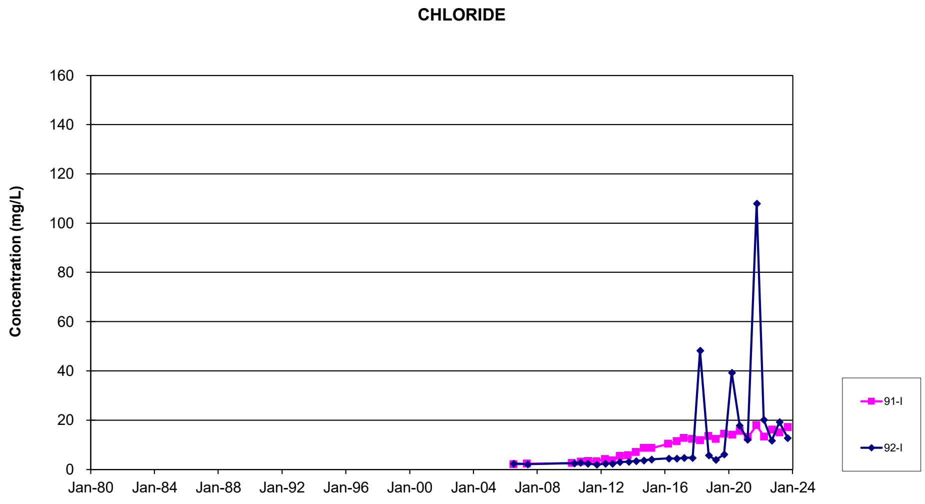
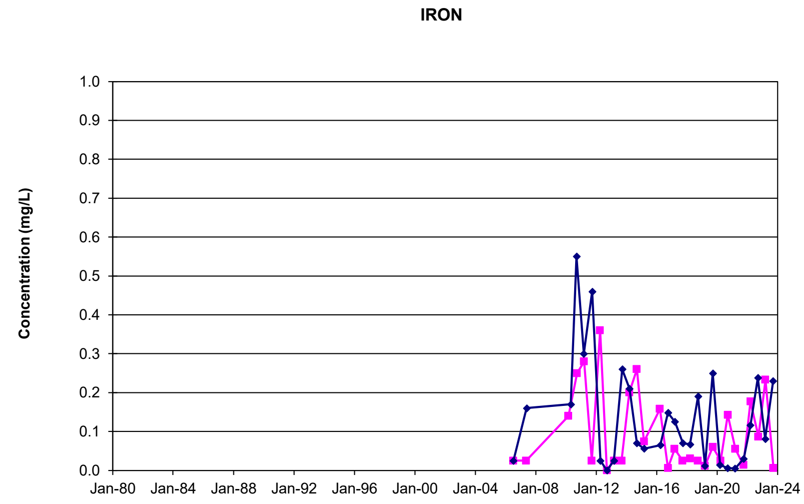
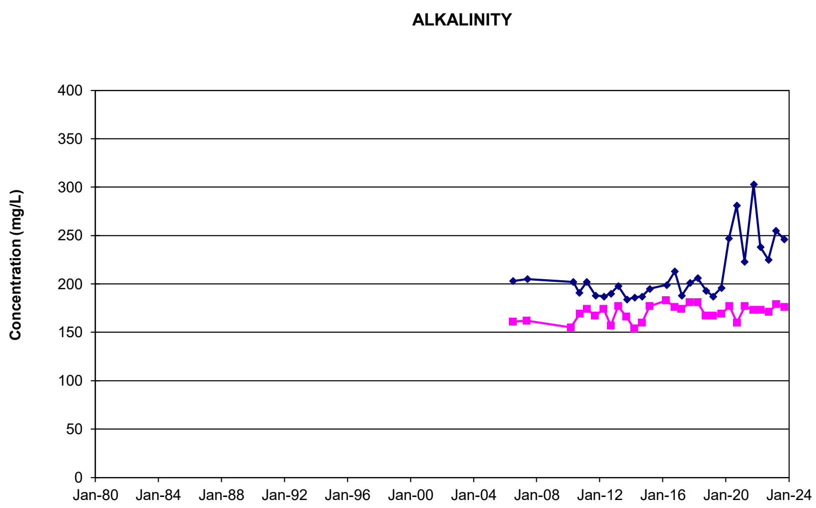


Figure F.52

Time Concentration Graphs - Groundwater: Shallow Bedrock







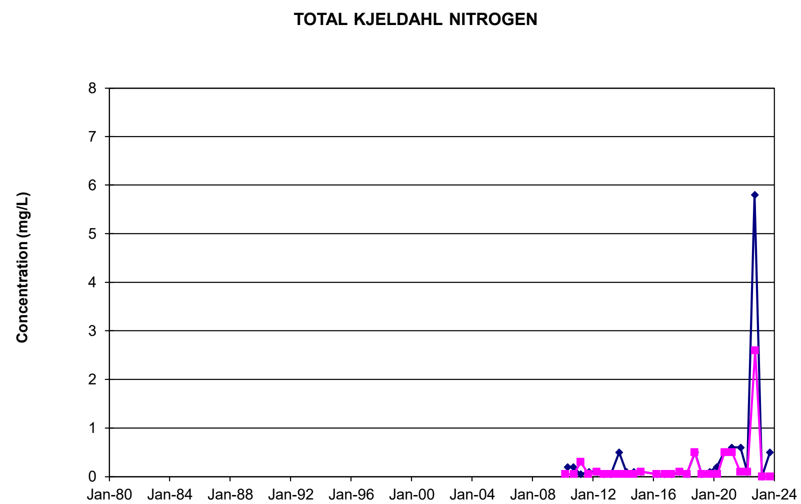
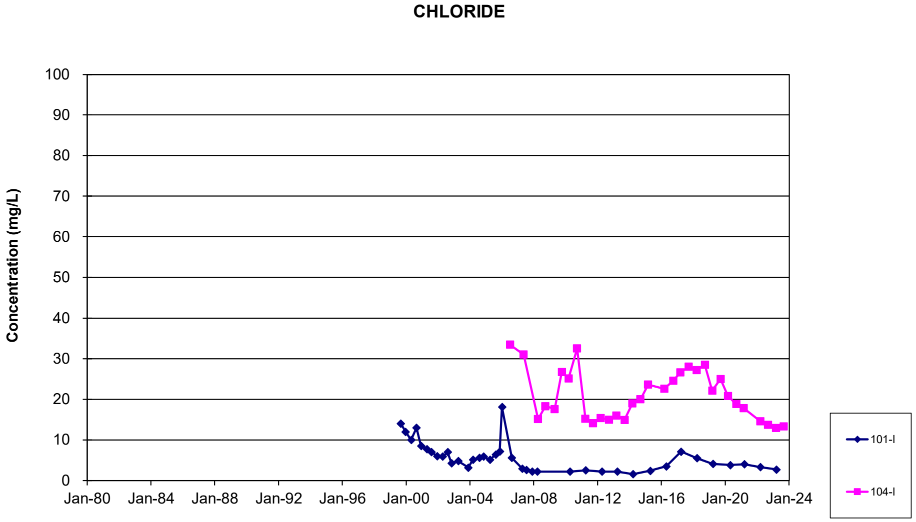
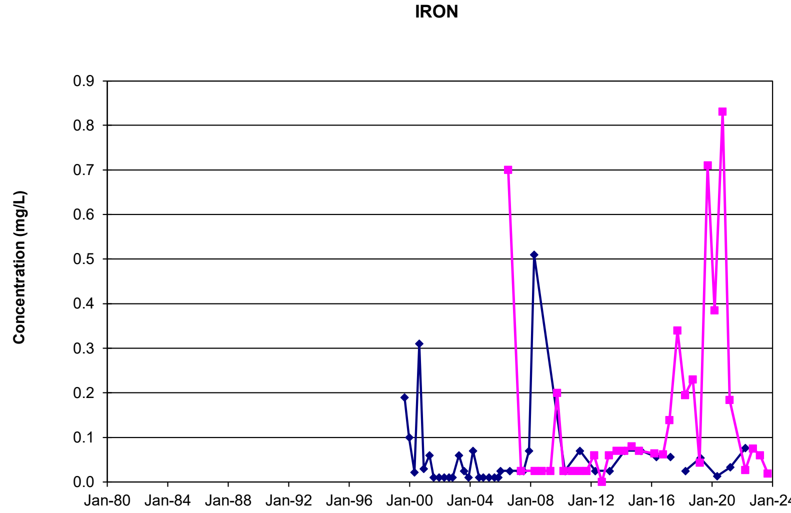
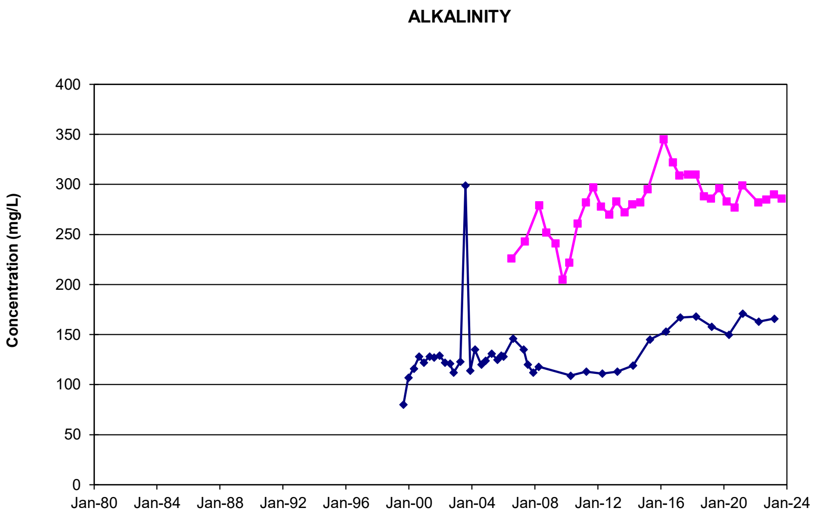


Figure F.53

Time Concentration Graphs - Groundwater: Shallow Bedrock







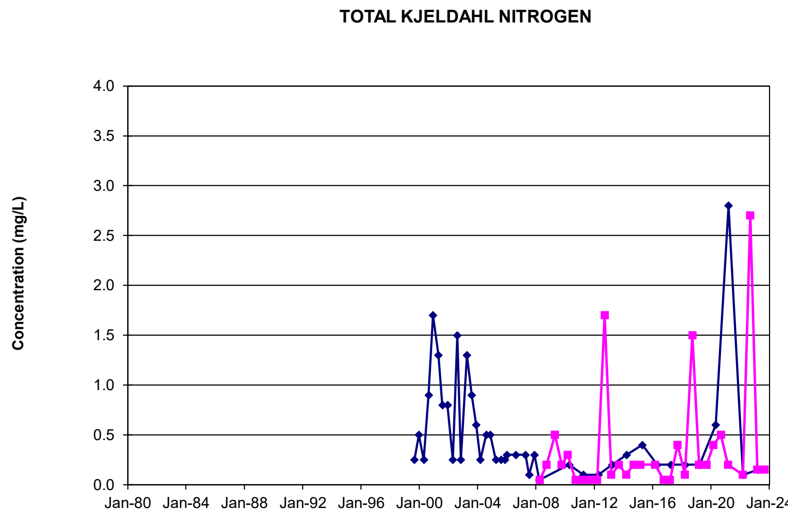
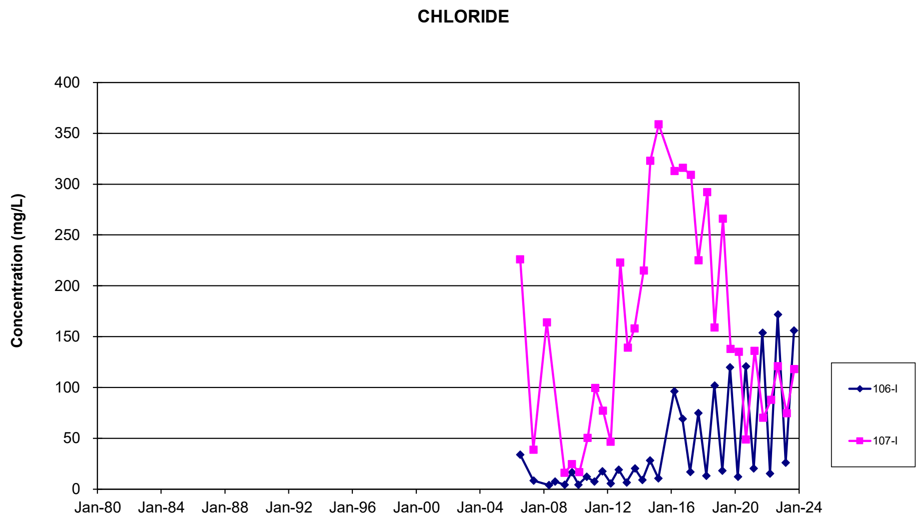
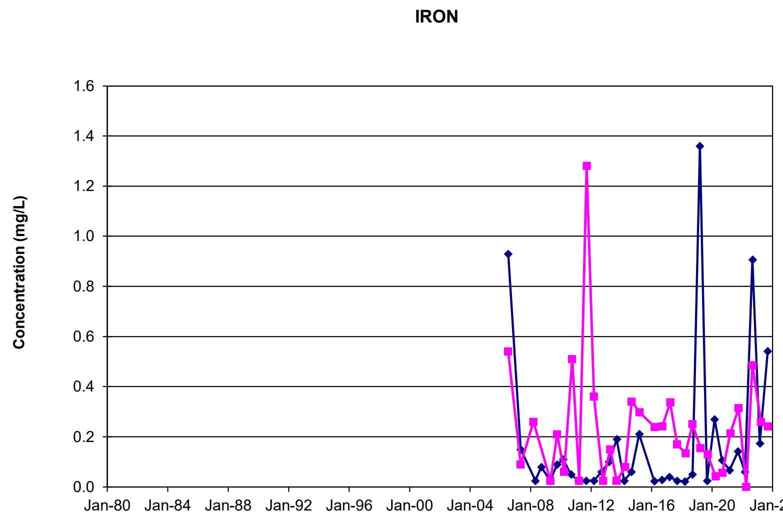
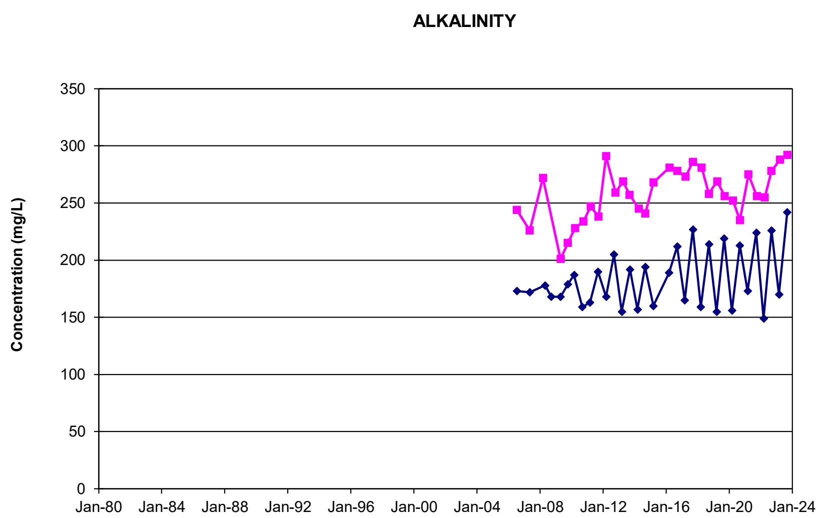


Figure F.54

Time Concentration Graphs - Groundwater: Shallow Bedrock







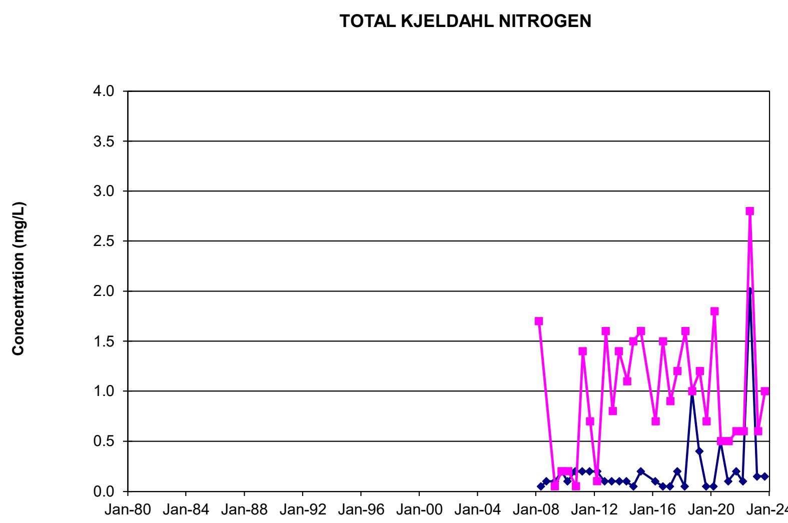
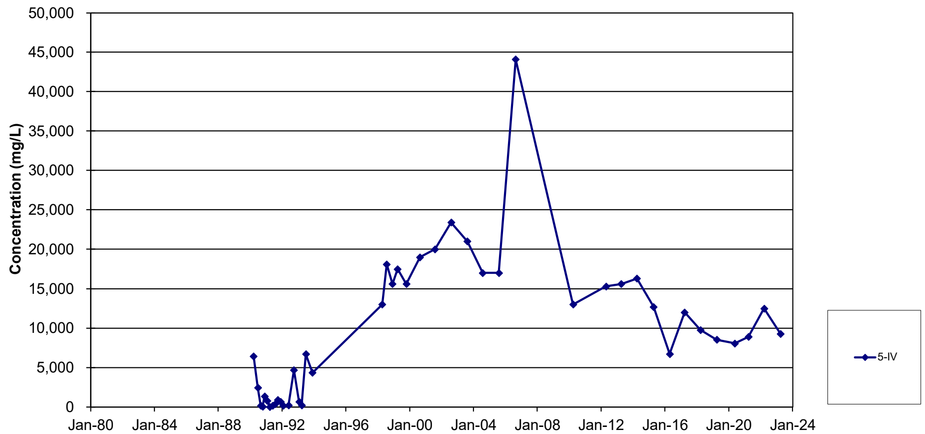


Figure F.55

Time Concentration Graphs - Groundwater: Deep Bedrock

CHLORIDE



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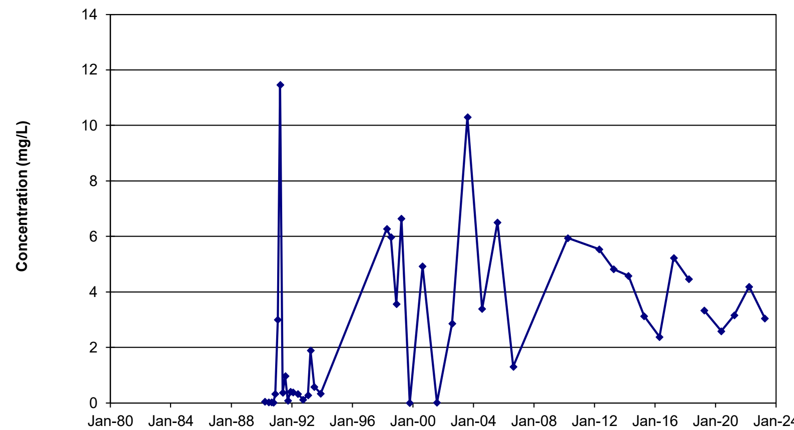

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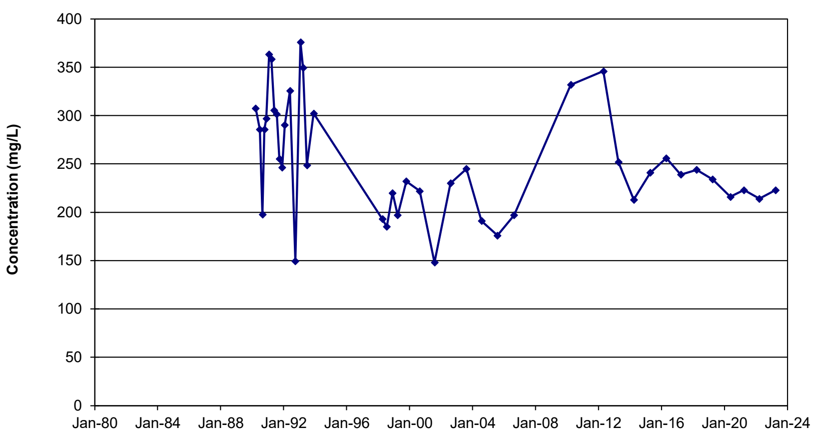


TOTAL KJELDAHL NITROGEN

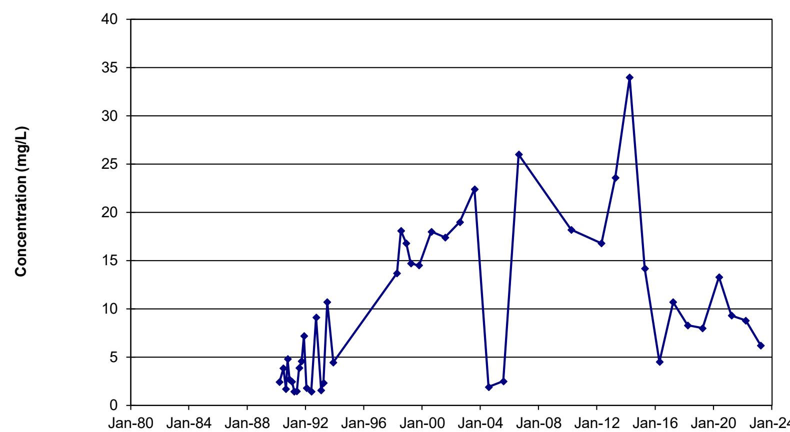
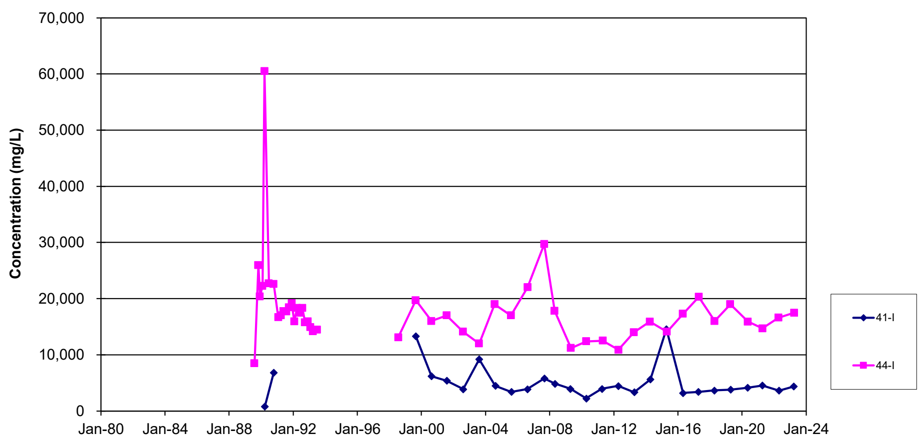


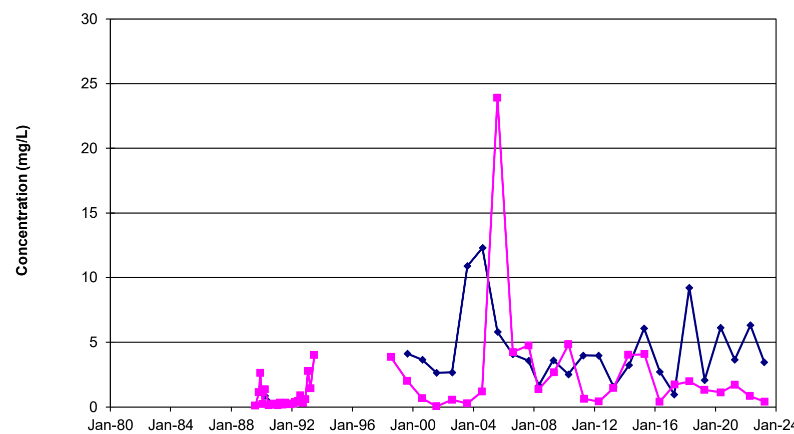
Figure F.56

Time Concentration Graphs - Groundwater: Deep Bedrock

CHLORIDE



IRON



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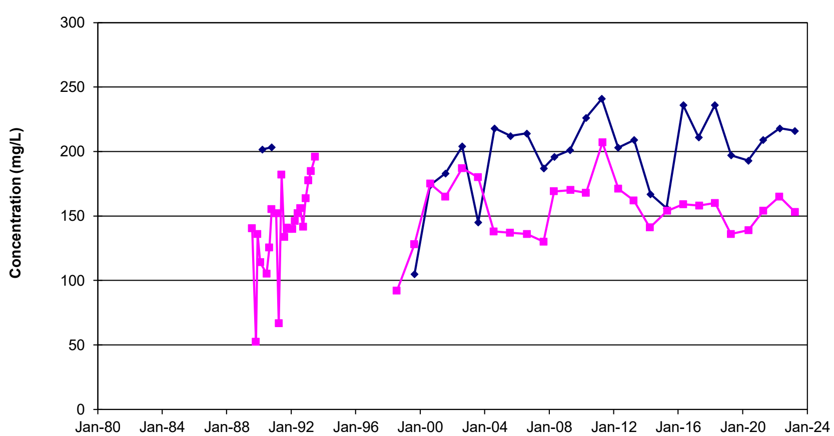


TOTAL KJELDAHL NITROGEN

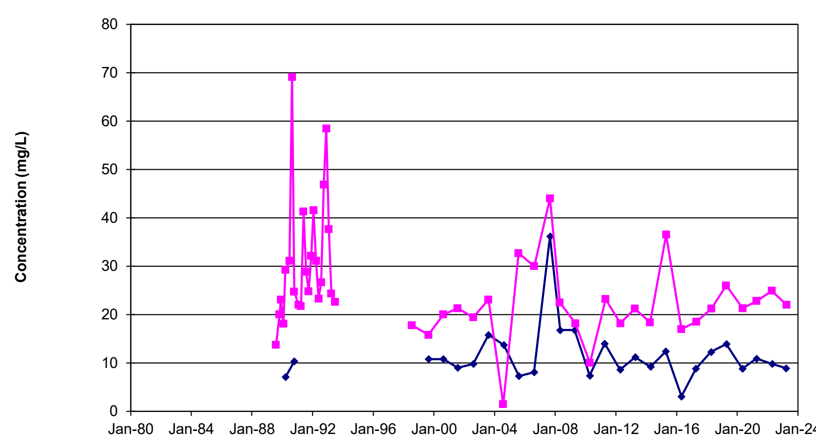
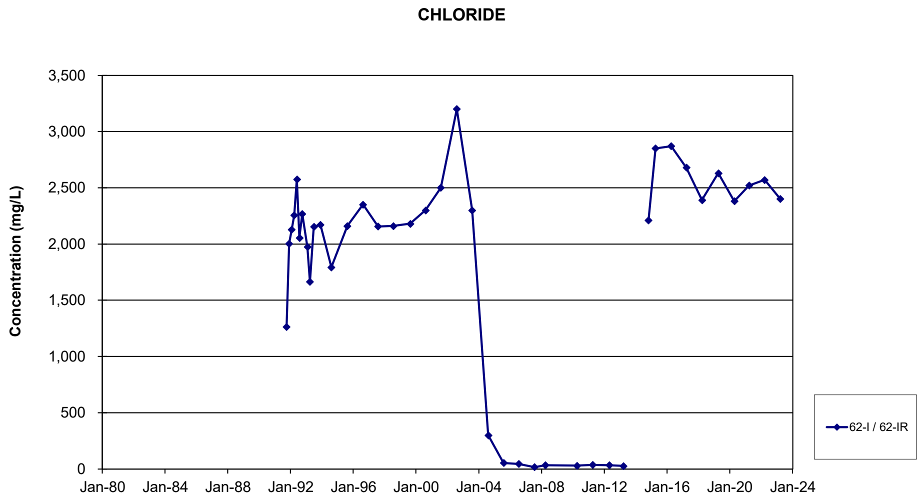
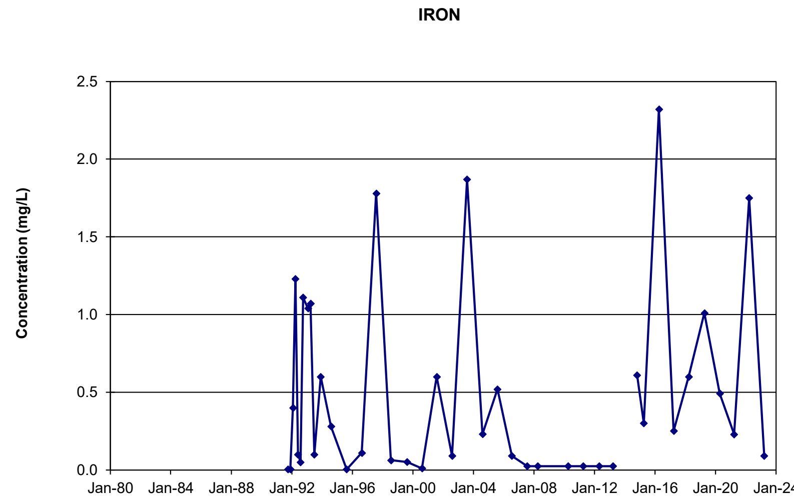
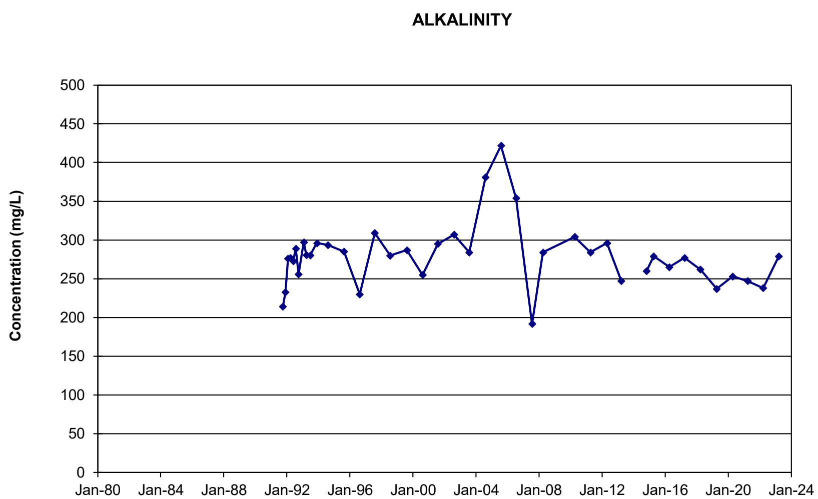


Figure F.57

Time Concentration Graphs - Groundwater: Deep Bedrock







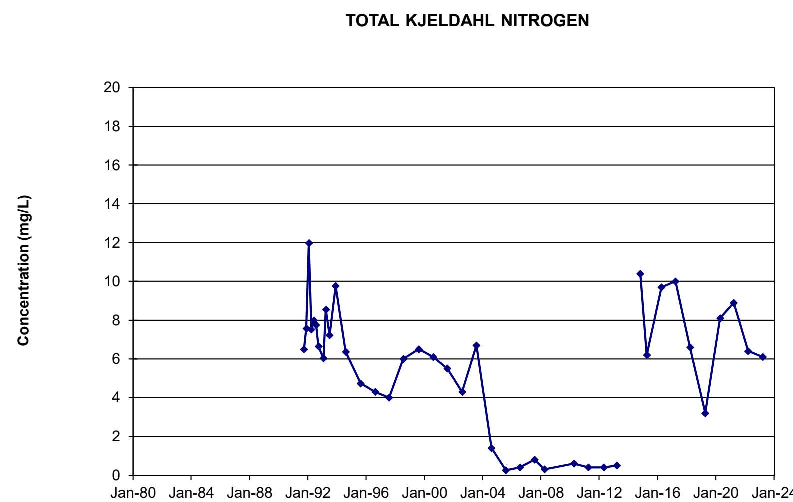
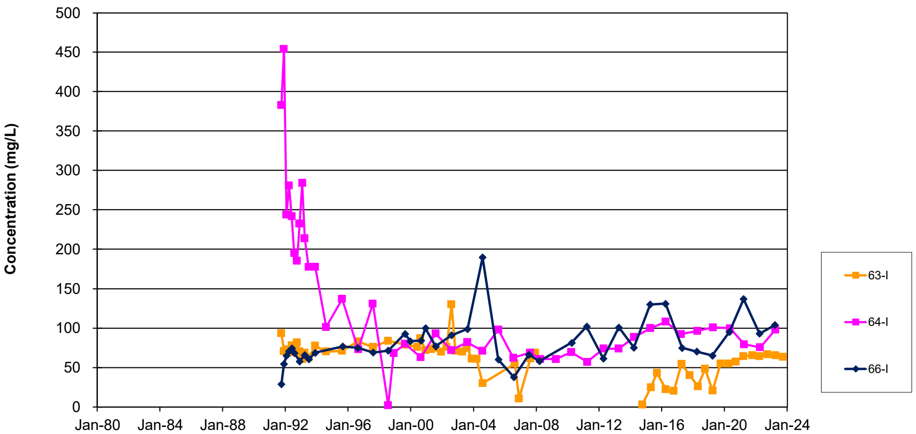


Figure F.58

Time Concentration Graphs - Groundwater: Deep Bedrock

CHLORIDE



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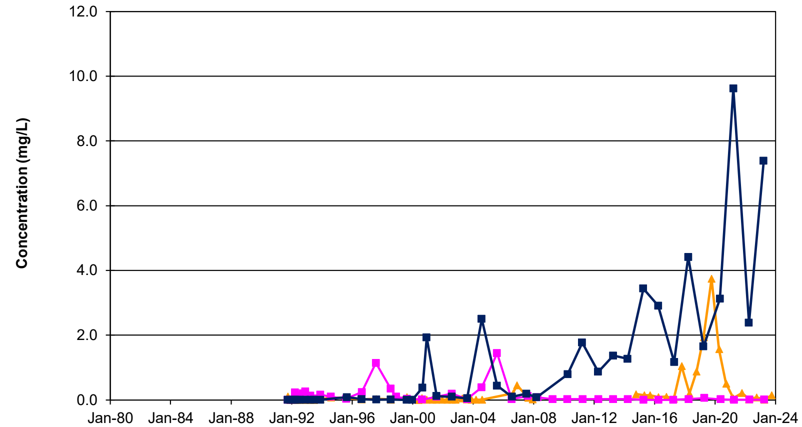
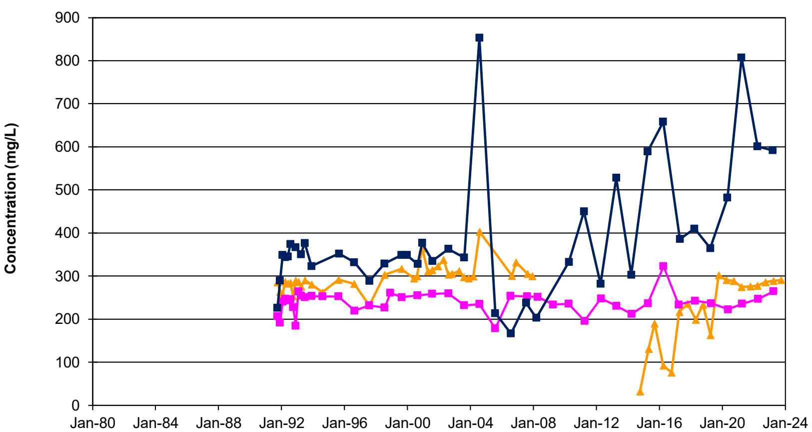


ALKALINITY



TOTAL KJELDAHL NITROGEN

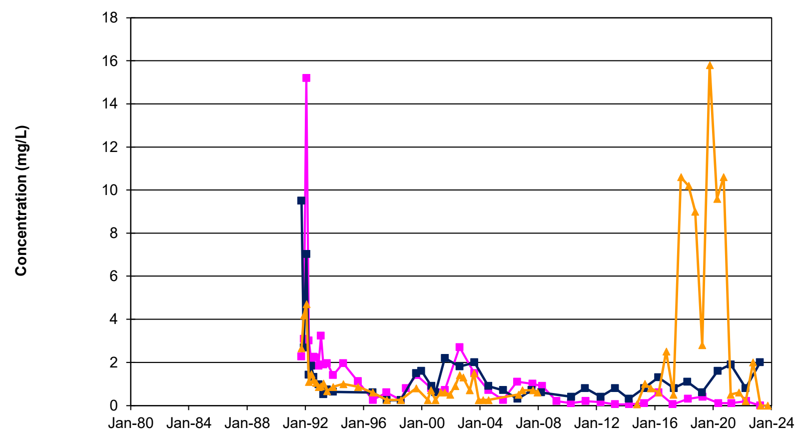
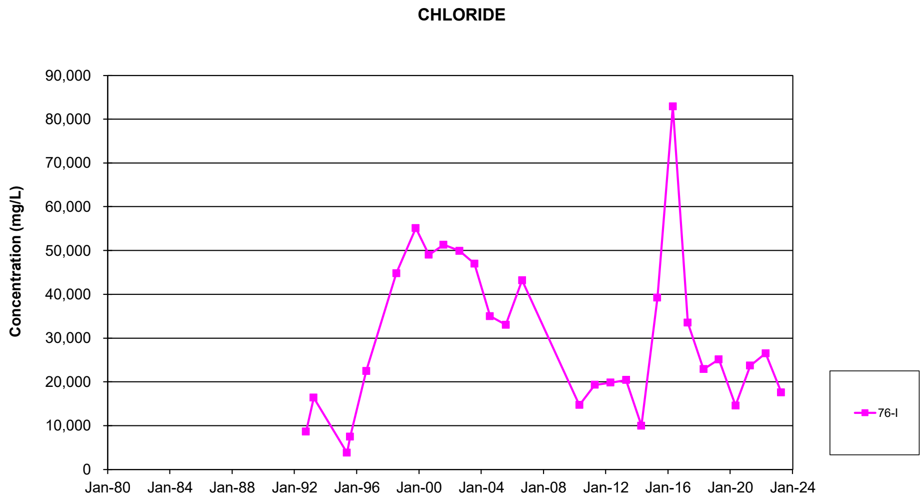
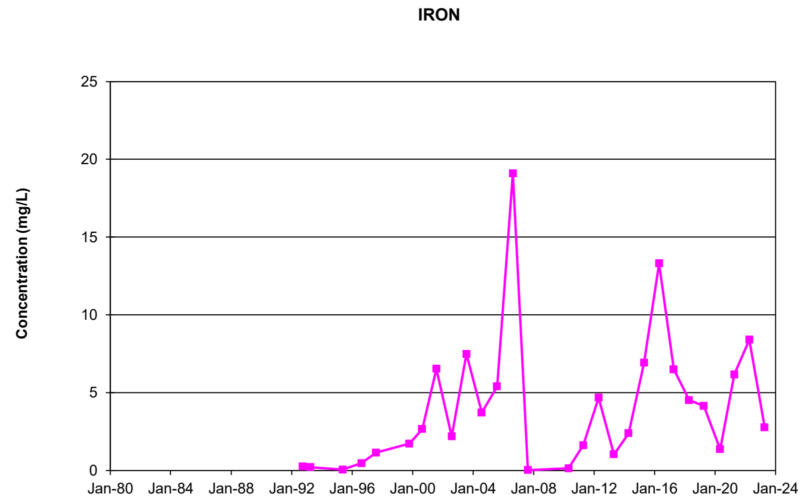
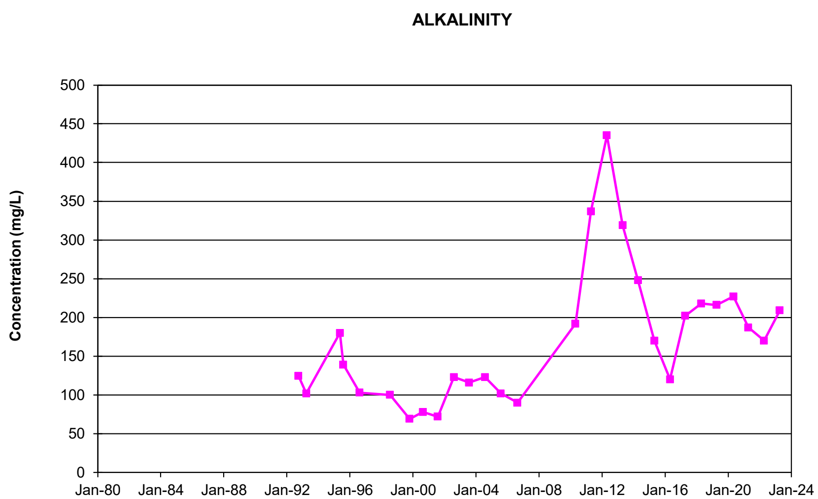


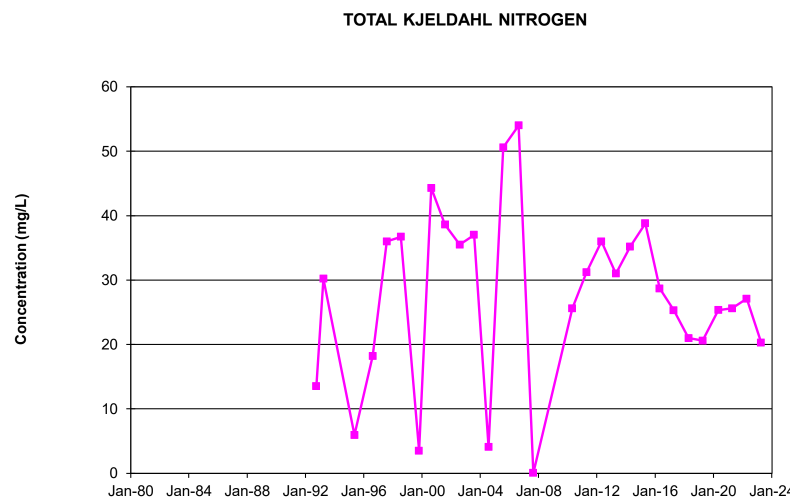
Figure F.59

Time Concentration Graphs - Groundwater: Deep Bedrock









APPENDIX

G

QA/QC RESULTS

Table G.1
Field Duplicate Samples - Relative Percent Differences - Groundwater (Inorganics)
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	March 2023															
		33-II				50-II				62-II				85-I			
		MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)
Alkalinity	mg/L	5	381	377	**1**	5	308	310	**1**	5	285	286	**<1**	5	230	234	**2**
Aluminum	mg/L													0.025	<0.025	<0.025	**<2MDL**
Ammonia	mg/L	0.1	0.1	0.1	**<2MDL**	0.1	0.2	0.2	**<2MDL**	0.1	0.2	0.1	**<2MDL**	0.1	0.1	0.1	**<2MDL**
Arsenic	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	0.0009	0.0009	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Barium	mg/L													0.001	0.291	0.294	**1**
Beryllium	mg/L													0.0005	<0.0005	<0.0005	**<2MDL**
Bicarbonate	mg/L	5	380	376	**1**	5	307	309	**1**	5	284	285	**<1**	5	230	233	**1**
Boron	mg/L													0.0005	0.012	0.013	**8**
Cadmium	mg/L													0.0001	<0.0001	<0.0001	**<2MDL**
Calcium	mg/L	0.2	134	138	**3**	0.2	117	120	**3**	0.2	118	115	**3**	0.2	228	228	**<1**
Carbonate	mg/L	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**
Chemical Oxygen Demand	mg/L	10	20	20	**<2MDL**	10	<10	20	**<2MDL**	10	20	20	**<2MDL**	10	<10	<10	**<2MDL**
Chloride	mg/L	0.1	43.8	44.9	**2**	0.1	255	248	**3**	0.1	27.9	28.0	**<1**	0.1	385	394	**2**
Chromium	mg/L													0.0005	<0.0005	<0.0005	**<2MDL**
Cobalt	mg/L													0.0005	<0.0005	<0.0005	**<2MDL**
Conductivity	µS/cm	0.5	821	875	**6**	0.5	1440	1400	**3**	0.5	667	674	**1**	0.5	1770	1780	**1**
Copper	mg/L													0.0005	0.0007	0.0005	**<2MDL**
Dissolved Organic Carbon	mg/L	1	4.5	4.6	**<2MDL**	1	2	2	**<2MDL**	1	5.3	5.3	**<1**	1	1.2	<1.0	**<2MDL**
Hardness	mg/L	0.71	412	423	**3**	0.71	431	444	**3**	0.71	318	310	**3**	0.71	709	709	**<1**
Iron	mg/L	0.005	0.032	0.031	**3**	0.005	1.15	1.18	**3**	0.005	0.056	0.050	**11**	0.005	<0.005	<0.005	**<2MDL**
Lead	mg/L													0.0005	<0.0005	<0.0005	**<2MDL**
Magnesium	mg/L	0.05	18.7	19.10	**2**	0.05	33.8	35.1	**4**	0.05	5.67	5.57	**2**	0.05	34	34	**<1**
Manganese	mg/L	0.0005	0.0107	0.0102	**5**	0.0005	0.0277	0.0282	**2**	0.0005	0.0372	0.0353	**5**	0.0005	0.0123	0.0126	**2**
Molybdenum	mg/L													0.0005	<0.0005	<0.0005	**<2MDL**
Nickel	mg/L													0.002	<0.002	<0.002	**<2MDL**
Nitrate	mg/L	0.05	0.43	0.42	**2**	0.05	<0.05	<0.05	**<2MDL**	0.05	0.10	0.10	**<2MDL**	0.05	3.45	3.44	**<1**
Nitrite	mg/L	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**
Phenols	µg/L	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**
Phosphate	mg/L	0.02	<0.02	<0.02	**<2MDL**					0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**
Phosphorus	mg/L	0.02	<0.02	<0.02	**<2MDL**	0.01	<0.01	<0.01	**<2MDL**	0.02	0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**
Potassium	mg/L	0.5	1.4	1.4	**<2MDL**	0.5	3.1	3.4	**9**	0.5	<0.5	<0.5	**<2MDL**	0.5	9.8	10	**2**
Sodium	mg/L	0.1	54.2	55.7	**3**	0.1	82.5	85.9	**4**	0.1	18.4	18	**2**	0.1	115	117	**2**
Sulphate	mg/L	0.2	80.8	81.6	**1**	0.2	52.9	52.3	**1**	0.2	48.2	49.5	**3**	0.2	77.3	77.6	**<1**
Total Dissolved Solids	mg/L	50	590	580	**2**	50	790	800	**1**	50	460	470	**2**	50	1250	1270	**2**
Total Kjeldhal Nitrogen	mg/L	0.3	0.4	<0.3	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**
Zinc	mg/L													0.005	<0.005	<0.005	**<2MDL**

NOTES:
1) Blank indicates parameter not analysed
2) RPD = Relative Percent Difference $\quad RPD = \frac{X1-X2}{Xavg} \times 100$
3) mg/L - milligrams per litre, µg/L - micrograms per litre
4) µS/cm - microSiemens per centimetre
5) MDL - Method Detection Limit
6) for values >5xMDL, RPDs of >20% are shaded, for values<5xMDL, RPDs of >2xMDL are shaded

Table G.1
Field Duplicate Samples - Relative Percent Differences - Groundwater (Inorganics)
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	March 2023												April 2023			
		89-III				106-I				111-III				63-II			
		MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)
Alkalinity	mg/L	5	320	301	**6**	5	170	172	**1**	5	409	408	**<1**	5	220	220	**<1**
Aluminum	mg/L	0.025	<0.025	<0.025	**<2MDL**	0.025	<0.025	<0.025	**<2MDL**	0.025	<0.025	<0.025	**<2MDL**	0.025	<0.025	<0.025	**<2MDL**
Ammonia	mg/L	0.1	0.2	0.2	**<1**	0.1	0.2	0.2	**<2MDL**	0.1	0.1	0.1	**<2MDL**	0.1	0.2	0.1	**<2MDL**
Arsenic	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	0.0038	0.0039	**3**
Barium	mg/L	0.001	0.037	0.039	**5**	0.001	0.053	0.052	**2**	0.001	0.127	0.143	**12**	0.001	0.104	0.106	**2**
Beryllium	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Bicarbonate	mg/L	5	319	300	**6**	5	169	171	**1**	5	408	407	**<1**	5	219	219	**<1**
Boron	mg/L	0.0005	0.006	0.005	**18**	0.0005	0.0397	0.0404	**2**	0.0005	0.0325	0.0384	**17**	0.0005	0.020	0.018	**11**
Cadmium	mg/L	0.0001	<0.0001	<0.0001	**<2MDL**	0.0001	<0.0001	<0.0001	**<2MDL**	0.0001	<0.0001	<0.0001	**<2MDL**	0.0001	<0.0001	<0.0001	**<2MDL**
Calcium	mg/L	0.2	124	124	**<1**	0.2	61.3	60.6	**1**	0.2	167	166	**1**	0.2	61.7	61.3	**1**
Carbonate	mg/L	1	<1	<1	**<2MDL**	1	1	1	**<2MDL**	1	1	1	**<2MDL**	1	1	1	**<2MDL**
Chemical Oxygen Demand	mg/L	10	<10	10	**<2MDL**	10	50	<10	**>2MDL**	10	20	10	**<2MDL**	10	60	<10	**>2MDL**
Chloride	mg/L	0.1	9.2	9.1	**1**	0.1	26.2	25.7	**2**	0.1	41.8	41.4	**1**	0.1	9.5	9.4	**1**
Chromium	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Cobalt	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	0.0015	0.0015	**<2MDL**
Conductivity	µS/cm	0.5	581	556	**4**	0.5	420	435	**4**	0.5	922	919	**<1**	0.5	495	503	**2**
Copper	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	0.0006	0.0012	**<2MDL**	0.0005	<0.0005	0.0005	**<2MDL**
Dissolved Organic Carbon	mg/L	1	2.4	2.8	**<2MDL**	1	1.3	1.3	**<2MDL**	1	1.7	1.6	**<2MDL**	1	<1	<1	**<2MDL**
Hardness	mg/L	0.71	330	330	**<1**	0.71	209	207	**1**	0.71	475	473	**<1**	0.71	287	286	**<1**
Iron	mg/L	0.005	<0.005	<0.005	**<2MDL**	0.005	0.174	0.182	**4**	0.005	<0.005	<0.005	**<2MDL**	0.005	0.306	0.322	**5**
Lead	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Magnesium	mg/L	0.05	4.85	4.91	**1**	0.05	13.6	13.5	**1**	0.05	14.2	14.1	**1**	0.05	32.3	32.4	**<1**
Manganese	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	0.0112	0.0122	**9**	0.0005	0.0033	0.0034	**3**	0.0005	0.0123	0.0126	**2**
Molybdenum	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	0.0007	0.0008	**<2MDL**
Nickel	mg/L	0.002	<0.002	<0.002	**<2MDL**	0.002	<0.002	<0.002	**<2MDL**	0.002	<0.002	<0.002	**<2MDL**	0.002	<0.002	<0.002	**<2MDL**
Nitrate	mg/L	0.05	2.42	2.28	**6**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**
Nitrite	mg/L	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**
Phenols	µg/L	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**
Phosphate	mg/L	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**				
Phosphorus	mg/L	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**	0.01	<0.01	<0.01	**<2MDL**
Potassium	mg/L	0.5	0.5	<0.5	**<2MDL**	0.5	1.7	1.7	**<2MDL**	0.5	1.2	1.2	**<2MDL**	0.5	1.5	1.5	**<2MDL**
Sodium	mg/L	0.1	3.7	3.7	**0**	0.1	21.5	21.6	**<1**	0.1	28.6	28.6	**<1**	0.1	8.8	8.8	**<1**
Sulphate	mg/L	0.2	16.7	16.3	**2**	0.2	21.9	22.7	**4**	0.2	73.6	73.4	**<1**	0.2	36.8	36.8	**<1**
Total Dissolved Solids	mg/L	50	400	380	**5**	50	250	330	**28**	50	590	610	**3**	50	240	270	**12**
Total Kjeldhal Nitrogen	mg/L	0.3	<0.3	<0.3	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**	0.1	0.1	0.2	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**
Zinc	mg/L	0.005	<0.005	<0.005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	0.0014	**<2MDL**	0.005	<0.005	<0.005	**<2MDL**

NOTES:
1) Blank indicates parameter not analysed
2) RPD = Relative Percent Difference $\quad RPD = \frac{X1-X2}{Xavg} \times 100$
3) mg/L - milligrams per litre, µg/L - micrograms per litre
4) µS/cm - microSiemens per centimetre
5) MDL - Method Detection Limit
6) for values >5xMDL, RPDs of >20% are shaded, for values<5xMDL, RPDs of >2xMDL are shaded

Table G.1
Field Duplicate Samples - Relative Percent Differences - Groundwater (Inorganics)
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	September 2023															
		63-II				86-III				94-I				109-II			
		MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)
Alkalinity	mg/L	5	216	219	**1**	5	291	290	**<1**	5	196	195	**1**	5	238	237	**<1**
Aluminum	mg/L																
Ammonia	mg/L	0.1	0.2	0.2	**<2MDL**	0.1	0.1	0.1	**<2MDL**	0.1	0.2	0.1	**<2MDL**	0.1	<0.1	0.1	**<2MDL**
Arsenic	mg/L	0.0005	0.0040	0.0039	**3**	0.0005	<0.0005	0.0005	**<2MDL**	0.0005	0.0022	0.0022	**<2MDL**	0.0005	0.0007	0.0007	**<2MDL**
Barium	mg/L																
Beryllium	mg/L																
Bicarbonate	mg/L	5	215	218	**1**	5	290	289	**<1**	5	195	194	**1**	5	237	236	**<1**
Boron	mg/L																
Cadmium	mg/L																
Calcium	mg/L	0.2	59.2	59.4	**<1**	0.2	105	94.0	**11**	0.2	64.0	56.6	**12**	0.2	92.7	93.5	**1**
Carbonate	mg/L	1	1	1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	1	1	**<2MDL**
Chemical Oxygen Demand	mg/L	10	20	10	**<2MDL**	10	20	10	**<2MDL**	10	<10	20	**<2MDL**	10	<10	<10	**<2MDL**
Chloride	mg/L	0.1	9.6	9.7	**1**	0.1	195	188	**4**	0.1	12.2	12.1	**1**	0.1	17.3	17.3	**<1**
Chromium	mg/L																
Cobalt	mg/L																
Conductivity	µS/cm	0.5	494	494	**<1**	0.5	1220	1200	**2**	0.5	498	502	**1**	0.5	635	636	**<1**
Copper	mg/L																
Dissolved Organic Carbon	mg/L	1	3.2	2.7	**<2MDL**	1	<1	<1	**<2MDL**	1	2.5	2.5	**<2MDL**	1	1.0	1.1	**<2MDL**
Hardness	mg/L	0.71	247	248	**<1**	0.71	454	429	**6**	0.71	259	241	**7**	0.71	335	338	**1**
Iron	mg/L	0.005	0.31	0.30	**3**	0.005	0.015	0.019	**<2MDL**	0.005	0.517	0.533	**3**	0.005	0.173	0.161	**7**
Lead	mg/L																
Magnesium	mg/L	0.05	24.0	24.1	**<1**	0.05	46.7	47.2	**1**	0.05	24.0	24.3	**1**	0.05	25.2	25.4	**1**
Manganese	mg/L	0.0005	0.011	0.010	**10**	0.0005	0.0086	0.0090	**5**	0.0005	0.0105	0.0108	**3**	0.0005	0.0179	0.0181	**1**
Molybdenum	mg/L																
Nickel	mg/L																
Nitrate	mg/L	0.05	<0.05	<0.05	**<2MDL**	0.05	0.12	0.12	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**
Nitrite	mg/L	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**
Phenols	µg/L	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**
Phosphate	mg/L	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**
Phosphorus	mg/L	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**	0.02	<0.02	<0.02	**<2MDL**
Potassium	mg/L	0.5	2.2	2.2	**<2MDL**	0.5	2.8	2.9	**4**	0.5	1.3	1.4	**<2MDL**	0.5	2.4	2.4	**<2MDL**
Sodium	mg/L	0.1	7.3	7.2	**1**	0.1	103	105	**2**	0.1	8.1	8.1	**<1**	0.1	9.1	9.4	**3**
Sulphate	mg/L	0.2	35.6	35.2	**1**	0.2	17.5	17.1	**2**	0.2	57.2	57.1	**<1**	0.2	72.0	72.5	**1**
Total Dissolved Solids	mg/L	50	320	310	**3**	50	680	680	**<1**	50	260	230	**<2MDL**	50	410	390	**5**
Total Kjeldhal Nitrogen	mg/L	0.3	<0.3	<0.3	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**	0.3	<0.3	<0.3	**<2MDL**
Zinc	mg/L																

NOTES:
1) Blank indicates parameter not analysed
2) RPD = Relative Percent Difference $RPD = \frac{X1-X2}{Xavg} \times 100$
3) mg/L - milligrams per litre, µg/L - micrograms per litre
4) µS/cm - microSiemens per centimetre
5) MDL - Method Detection Limit
6) for values >5xMDL, RPDs of >20% are shaded, for values<5xMDL, RPDs of >2xMDL are shaded

Table G.2

Field Duplicate Samples - Relative Percent Differences - Groundwater (Organics)

Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	March 2023															
		85-I				89-III				106-I				111-III			
		MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)
1,1,2,2-Tetrachlorethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,1,2-Trichlorethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,1-Dichloroethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,1-Dichloroethylene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,2-Dichlorobenzene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,2-Dichloroethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,2-Dichlorpropane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,3-Dichlorobenzene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,3-dichloropropene(E)	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,3-Dichloropropene(Z)	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
1,4-Dichlorobenzene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Benzene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Bromodichloromethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Bromoform	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Bromomethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Carbon Tetrachloride	µg/L	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL
Chlorobenzene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Chloroethane	µg/L	5	<5	<5	<2MDL	5	<5	<5	<2MDL	5	<5	<5	<2MDL	5	<5	<5	<2MDL
Chloroform	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Chloromethane	µg/L	5	<5	<5	<2MDL	5	<5	<5	<2MDL	5	<5	<5	<2MDL	5	<5	<5	<2MDL
cis-1,2-Dichloroethylene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Dibromochloromethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Dichloromethane	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Ethyl Benzene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Ethylene Dibromide	µg/L	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL
m/p-Xylenes	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
o-Xylene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Styrene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Tetrachloroethylene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Toluene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
trans-1,2-Dichloroethylene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Trichloroethylene	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL
Trichlorofluoromethane	µg/L	5	<5	<5	<2MDL	5	<5	<5	<2MDL	5	<5	<5	<2MDL	5	<5	<5	<2MDL
Vinyl Chloride	µg/L	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL	0.2	<0.2	<0.2	<2MDL
Xylenes - total	µg/L	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL	0.5	<0.5	<0.5	<2MDL

NOTES:
1) Blank indicates parameter not analysed
2) RPD = Relative Percent Difference $\quad RPD = \frac{X1-X2}{Xavg} \times 100$
3) µg/L - micrograms per litre
4) MDL - Method Detection Limit
5) for values >5xMDL, RPDs of >20% are shaded, for values <5xMDL, RPDs of >2xMDL are shaded

Table G.2
Field Duplicate Samples - Relative Percent Differences - Groundwater (Organics)
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	April 2023				September 2023			
		63-II				5-IV			
		MDL	Original	Duplicate	**RPD (%)**	MDL	Original	Duplicate	**RPD (%)**
1,1,2,2-Tetrachlorethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,1,2-Trichlorethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,1-Dichloroethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,1-Dichloroethylene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,2-Dichlorobenzene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,2-Dichloroethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,2-Dichlorpropane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,3-Dichlorobenzene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,3-dichloropropene(E)	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,3-Dichloropropene(Z)	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
1,4-Dichlorobenzene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Benzene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Bromodichloromethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Bromoform	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Bromomethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Carbon Tetrachloride	µg/L	0.2	<0.2	<0.2	**<2MDL**	0.2	<0.2	<0.2	**<2MDL**
Chlorobenzene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Chloroethane	µg/L	5	<5	<5	**<2MDL**	5	<5	<5	**<2MDL**
Chloroform	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Chloromethane	µg/L	5	<5	<5	**<2MDL**	5	<5	<5	**<2MDL**
cis-1,2-Dichloroethylene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Dibromochloromethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Dichloromethane	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Ethyl Benzene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Ethylene Dibromide	µg/L	0.2	<0.2	<0.2	**<2MDL**	0.2	<0.2	<0.2	**<2MDL**
m/p-Xylenes	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	0.6	<0.5	**<2MDL**
o-Xylene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Styrene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Tetrachloroethylene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Toluene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
trans-1,2-Dichloroethylene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Trichloroethylene	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	<0.5	<0.5	**<2MDL**
Trichlorofluoromethane	µg/L	5	<5	<5	**<2MDL**	5	<5	<5	**<2MDL**
Vinyl Chloride	µg/L	0.2	<0.2	<0.2	**<2MDL**	0.2	<0.2	<0.2	**<2MDL**
Xylenes - total	µg/L	0.5	<0.5	<0.5	**<2MDL**	0.5	0.8	0.7	**13**

NOTES:
1) Blank indicates parameter not analysed
2) RPD = Relative Percent Difference $\quad RPD = \frac{X1\text{-}X2}{Xavg} \times 100$
3) µg/L - micrograms per litre
4) MDL - Method Detection Limit
5) for values >5xMDL, RPDs of >20% are shaded, for values <5xMDL, RPDs of >2xMDL are shaded

Table G.3
Field Duplicate Samples - Relative Percent Differences - Surface Water
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	June 2023				December 2023			
		SW2				SW3			
		MDL	Original	Duplicate	RPD (%)	MDL	Original	Duplicate	RPD (%)
Alkalinity	mg/L	5	230	235	**2**	5	291	294	**1**
Ammonia: total	mg/L	0.1	0.1	0.1	**<2MDL**	0.1	<0.1	<0.1	**<2MDL**
Arsenic	mg/L	0.0005	0.0006	0.0006	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Barium	mg/L	0.001	0.049	0.050	**2**	0.001	0.055	0.052	**6**
Biochemical Oxygen Demand	mg/L	2	<2.0	2.2	**<2MDL**	2	<2.0	<2.0	**<2MDL**
Boron	mg/L	0.005	0.040	0.042	**5**	0.005	0.016	0.014	**<2MDL**
Cadmium	mg/L	0.0001	<0.0001	<0.0001	**<2MDL**	0.0001	<0.0001	<0.0001	**<2MDL**
Chemical Oxygen Demand	mg/L	10	50	50	**<2MDL**	10	20	20	**<2MDL**
Chloride	mg/L	0.1	93.4	92.5	**1**	0.1	88.1	86.7	**2**
Chromium	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Conductivity	µS/cm	0.5	749	740	**1**	0.5	887	888	**<1**
Copper	mg/L	0.0005	0.0027	0.0013	**>2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Iron	mg/L	0.005	0.620	0.712	**14**	0.005	0.116	0.120	**3**
Lead	mg/L	0.0005	<0.0005	<0.0005	**<2MDL**	0.0005	<0.0005	<0.0005	**<2MDL**
Mercury	µg/L	0.0001	<0.0001	<0.0001	**<2MDL**	0.0001	<0.0001	<0.0001	**<2MDL**
Nitrate	mg/L	0.05	<0.05	<0.05	**<2MDL**	0.05	0.22	0.22	**<2MDL**
Nitrite	mg/L	0.05	<0.05	<0.05	**<2MDL**	0.05	<0.05	<0.05	**<2MDL**
pH	units	0.1	7.6	7.56	**1**	0.1	7.83	7.89	**1**
Phenols	µg/L	1	<1	<1	**<2MDL**	1	<1	<1	**<2MDL**
Phosphorus	mg/L	0.02	0.11	0.11	**<1**	0.02	0.05	0.04	**<2MDL**
Sulphate	mg/L	0.2	23.6	24.6	**4**	0.2	46.6	45.6	**2**
Total Dissolved Solids	mg/L	50	480	500	**4**	50	580	560	**4**
Total Kjeldahl Nitrogen	mg/L	0.1	0.8	0.8	**<1**	0.1	0.4	0.5	**<2MDL**
Total Suspended Solids	mg/L	2.0	11.3	11.3	**<1**	2.0	3.0	6.0	**<2MDL**
Zinc	mg/L	0.005	<0.005	<0.005	**<2MDL**	0.005	<0.005	<0.005	**<2MDL**

NOTES:
1) Blank indicates parameter not analysed.
2) RPD = Relative Percent Difference $RPD = \frac{X1-X2}{Xavg} \times 100$
3) mg/L - milligrams per litre, µg/L - micrograms per litre
4) µS/cm - microSiemens per centimetre
5) MDL - Method Detection Limit
6) for values >5xMDL, RPDs of >20% are shaded, for values<5xMDL, RPDs of >2xMDL are shaded

TABLE G.4
Field Blanks Chemical Results
Peterborough County/CityWaste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	Field Blanks								Hydrasleeve Field Blanks	
		Feb-23	Mar-23	Mar-23	Mar-23	Apr-23	Jun-23	Jun-23	Nov-23	Mar-23	Apr-23
Alkalinity	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Aluminum	mg/L		<0.025							<0.025	
Ammonia	mg/L	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1
Arsenic	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005		<0.0005		<0.0005	<0.0005
Barium	mg/L	<0.001	<0.001			<0.001		<0.001		<0.001	
Beryllium	mg/L		<0.0005							<0.0005	
Biochemical Oxygen Demand	mg/L	<2.0				<2.0		<2.0			
Boron	mg/L	<0.0005	<0.005			<0.005		<0.005		<0.0005	
Cadmium	mg/L	<0.0001	<0.0001			<0.0001		<0.0001		<0.0001	
Calcium	mg/L		<0.2	<0.2	<0.2		<0.2		<0.2	<0.2	<0.2
Chemical Oxygen Demand	mg/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloride	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	mg/L	<0.0005	<0.0005			<0.0005		<0.0005		<0.0005	
Cobalt	mg/L		<0.0005							<0.0005	
Conductivity	µS/cm	0.7	1.1	0.9	1.3	1.6	0.8	1	0.9	0.8	1
Copper	mg/L	<0.0005	<0.0005			<0.0005		<0.0005		<0.0005	
Dissolved Organic Carbon	mg/L		<1.0	<1.0	<1.0		<1.0		<1.0	<1.0	<1.0
Iron	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.05	0.4		<0.005	<0.005
Lead	mg/L	<0.0005	<0.0005			<0.0005		<0.0005		<0.0005	
Magnesium	mg/L		<0.05	<0.05	<0.05		<0.05		<0.05	<0.05	<0.05
Manganese	mg/L		<0.0005	<0.0005	<0.0005					<0.0005	<0.0005
Mercury	µg/L	<0.1				<0.1		<0.1			
Molybdenum	mg/L		<0.0005							<0.0005	
Nickel	mg/L		<0.002							<0.002	
Nitrate	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	5.88	5.75	5.81	5.56	5.49	5.76	5.77	5.73	5.95	5.8
Phenols	µg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Phosphate	mg/L		<0.02	<0.02	<0.02					<0.02	
Phosphorus	mg/L	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.02	<0.01	<0.02	<0.01
Potassium	mg/L		<0.5	<0.5	<0.5		<0.5		<0.5	<0.5	<0.5
Sodium	mg/L		<0.1	<0.1	<0.1		<0.1		<0.1	<0.1	<0.1
Sulphate	mg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Total Dissolved Solids	mg/L	<50	<50	<50	<50	<50		<50		<50	<50
Total Kjeldahl Nitrogen	mg/L	<0.1	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Total Suspended Solids	mg/L	<2.0				<2.0		<2.0			
Vanadium	mg/L										
Zinc	mg/L	<0.0005	<0.005			<0.005		<0.005		<0.0005	

NOTES: 1) Blank indicates parameter not analysed.
2) mg/L - milligrams per litre, µg/L - micrograms per litre
3) µS/cm - microSiemens per centimetre

TABLE G.4
Field Blanks Chemical Results
Peterborough County/CityWaste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	Field Blank	Hydrasleeve Field Blank
		Mar-23	Mar-23
1,1,2,2-Tetrachlorethane	µg/L	<0.5	<0.5
1,1,2-Trichlorethane	µg/L	<0.5	<0.5
1,1-Dichloroethane	µg/L	<0.5	<0.5
1,1-Dichloroethylene	µg/L	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	<0.5	<0.5
1,2-Dichloroethane	µg/L	<0.5	<0.5
1,2-Dichlorpropane	µg/L	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	<0.5	<0.5
1,3-dichloropropene(E)	µg/L	<0.5	<0.5
1,3-Dichloropropene(Z)	µg/L	<0.5	<0.5
1,4-Dichlorobenzene	µg/L	<0.5	<0.5
Benzene	µg/L	<0.5	<0.5
Bromodichloromethane	µg/L	<0.5	<0.5
Bromoform	µg/L	<0.5	<0.5
Bromomethane	µg/L	<0.5	<0.5
Carbon Tetrachloride	µg/L	<0.2	<0.2
Chlorobenzene	µg/L	<0.5	<0.5
Chloroethane	µg/L	<5	<5
Chloroform	µg/L	<0.5	<0.5
Chloromethane	µg/L	<5	<5
cis-1,2-Dichloroethylene	µg/L	<0.5	<0.5
Dibromochloromethane	µg/L	<0.5	<0.5
Dichloromethane	µg/L	<0.5	<0.5
Ethyl Benzene	µg/L	<0.5	<0.5
Ethylene Dibromide	µg/L	<0.2	<0.2
m/p-Xylenes	µg/L	<0.5	<0.5
o-Xylene	µg/L	<0.5	<0.5
Styrene	µg/L	<0.5	<0.5
Tetrachloroethylene	µg/L	<0.5	<0.5
Toluene	µg/L	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L	<0.5	<0.5
Trichloroethylene	µg/L	<0.5	<0.5
Trichlorofluoromethane	µg/L	<5	<5
Vinyl Chloride	µg/L	<0.2	<0.2
Xylenes: total	µg/L	<0.5	<0.5

NOTES: 1) Blank indicates parameter not analysed.
2) mg/L - milligrams per litre, µg/L - micrograms per litre
3) µS/cm - microSiemens per centimetre

APPENDIX

H

SURFACE WATER QUALITY DATA

Table H.1
Surface Water Flow Measurements
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

AREA	STATION	EVENT	FLOW RATE (L/s)
CENTRAL WATER COURSE	SW1	Feb-23	287
		Apr-23	43
		Jun-23	9
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	12
	SW2	Feb-23	Frozen
		Apr-23	36
		Jun-23	13
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	11.9
	SW3	Feb-23	195
		Apr-23	27
		Jun-23	15
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	15.4
	SW18	Feb-23	Frozen
		Apr-23	33
		Jun-23	10
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	13.7
	SW19	Feb-23	Frozen
		Apr-23	NMF
		Jun-23	NMF
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	NMF
	SW20	Feb-23	Frozen
		Apr-23	33
		Jun-23	NMF
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	NMF

NOTES: 1) NMF - No measurable flow.
2) Frozen - Unable to measure flow due to frozen conditions.
3) Dry - Dry conditions, no sample obtained.

Table H.1
Surface Water Flow Measurements
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

AREA	STATION	EVENT	FLOW RATE (L/s)
BENSFORT ROAD	SW17	Feb-23	69
		Apr-23	11
		Jun-23	9
		Aug-23	Dry
		Oct-23	Dry
		Dec-23	4.4
	SW21	Feb-23	62
		Apr-23	13
		Jun-23	12
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	8
	SW23	Feb-23	55
		Apr-23	NMF
		Jun-23	NMF
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	NMF
WETLAND (WESTERN WATER COURSE)	SW24	Feb-23	Frozen
		Apr-23	NMF
		Jun-23	NMF
		Aug-23	NMF
		Oct-23	Dry
		Dec-23	NMF

NOTES:
1) NMF - No measurable flow.
2) Frozen - Unable to measure flow due to frozen conditions.
3) Dry - Dry conditions, no sample obtained.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW1								
			Apr-18	Jun-18	Dec-18	Apr-19	Jun-19	Dec-19	Feb-20	Apr-20	Jun-20
Alkalinity	mg/L		188	356	225	192	276	171	241	219	313
Ammonia: total	mg/L		0.1	0.4	0.2	0.2	<0.1	0.2	0.1	0.2	0.2
Ammonia: un-ionized	mg/L	0.02	0.0005	0.0036	0.0008	0.0026	<0.0003	0.0013	<0.0001	0.0015	0.0028
Arsenic	mg/L	0.005	<0.0005	0.0009	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	0.0012
Barium	mg/L		0.036	0.106	0.060	0.039	0.043	0.045	0.057	0.047	0.086
Biochemical Oxygen Demand	mg/L		<2.3	2.7	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.6
Boron	mg/L	0.200	0.01	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.03
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		20	20	30	20	40	40	30	30	60
Chloride	mg/L		40.4	628	95.4	39.5	41.6	63.2	102	46.8	82.7
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0019
Conductivity	µS/cm		536	2740	863	550	687	625	865	639	878
Conductivity - field	µS/cm		517	2740	808	571	729	652	926	641	890
Copper	mg/L	0.005 **	0.0009	0.0009	0.0019	0.0015	0.0007	0.0018	<0.0005	0.0012	0.002
Dissolved Oxygen - field	mg/L		9.04	6.16	6.99	10	4.32	10.7	6.03	8.73	4.2
Iron	mg/L	0.3	0.05	0.82	0.16	0.07	0.36	0.09	0.06	0.11	2.39
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2
Nitrate (as N)	mg/L		1.66	0.18	1.75	0.5	<0.05	1.91	0.2	0.6	<0.5
Nitrite (as N)	mg/L		<0.5	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5
pH	units	6.5-8.5	7.86	7.63	7.66	7.92	7.9	7.87	7.49	7.89	7.83
pH - field	units	6.5-8.5	7.5	7.3	7.6	7.9	7.8	7.9	7.5	7.8	7.7
Phenols: total	µg/L	1	<1	<1	<1	1	2	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.01	0.14	0.03	0.02	0.08	0.05	0.03	0.02	0.25
Sulphate	mg/L		20.8	34.8	55.3	20.2	6.8	34.5	30.5	20.1	7.4
Temperature - field	°C		8.2	22.1	0.8	7.6	17.5	0.2	1.2	5.1	16.0
Total Dissolved Solids	mg/L		340	1800	540	330	420	360	500	360	570
Total Kjeldahl Nitrogen	mg/L		0.4	1.2	0.4	0.6	0.8	0.4	0.3	<0.2	1.1
Total Suspended Solids	mg/L		<2.0	8	3.2	<2.0	4	<2.0	<2.0	<2.0	52.4
Zinc	mg/L	0.020	<0.0005	<0.0005	0.0019	0.0041	0.0038	0.004	<0.0005	0.0043	0.01

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW1									
			Dec-20	Apr-21	Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		244	246	356	346	259	260	157	238	247	284
Ammonia: total	mg/L		<0.1	0.1	0.2	0.2	0.2	0.2	<0.1	0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	<0.0002	0.0009	0.0011	0.0006	0.0016	0.0024	<0.0003	0.0006	0.0007	<0.0002
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	0.0006	<0.0005
Barium	mg/L		0.056	0.051	0.051	0.055	0.048	0.045	0.037	0.047	0.060	0.056
Biochemical Oxygen Demand	mg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.02	0.02	0.02	0.01	0.02	0.03	0.01	0.02	0.04	0.01
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		30	20	30	<10	20	40	20	30	40	<10
Chloride	mg/L		86.9	53.2	65.2	52.6	63.9	47	52.1	48.0	104	95.6
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.0005
Conductivity	µS/cm		832	715	900	822	736	673	509	547	808	903
Conductivity - field	µS/cm		838	701	886	862	678	638	532	630	845	918
Copper	mg/L	0.005 **	0.003	0.0014	0.0044	0.0008	0.0019	<0.005	0.0017	0.0013	0.0012	<0.0005
Dissolved Oxygen - field	mg/L		8.6	8.65	4.8	9.09	8.52	5.46	8.57	7.50	6.36	13.2
Iron	mg/L	0.3	0.05	0.08	0.10	0.17	0.07	0.35	0.082	0.057	1.12	0.056
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		4.41	0.64	0.2	1.08	<0.05	<0.05	2.69	<0.05	<0.05	0.21
Nitrite (as N)	mg/L		<0.5	<0.05	1.03	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.88	7.93	7.89	7.86	7.78	7.96	7.72	7.72	7.71	7.59
pH - field	units	6.5-8.5	7.8	7.9	7.5	7.6	7.6	7.6	7.5	7.7	7.4	7.5
Phenols: total	µg/L	1	2	<1	1	<1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.03	0.02	0.05	0.01	<0.02	0.09	0.02	0.02	0.14	0.03
Sulphate	mg/L		51	24.8	18	21.3	15	14.9	30.1	18.7	24.4	47.0
Temperature - field	°C		0.5	3.9	9.8	0.7	10.7	17.6	0.8	5.3	15	0.6
Total Dissolved Solids	mg/L		500	420	570	490	430	420	270	460	540	640
Total Kjeldahl Nitrogen	mg/L		0.7	<2.0	<2.0	0.5	0.5	0.7	0.6	0.5	0.8	0.4
Total Suspended Solids	mg/L		<2.0	<2.0	<2.0	2	<2.0	3.6	<2.0	<2.0	30	8
Zinc	mg/L	0.020	0.0018	0.0044	0.0022	0.0019	0.0021	<0.01	0.0035	<0.005	0.017	<0.005

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW2									
			Apr-18	Dec-18	Apr-19	Jun-19	Dec-19	Apr-20	Jun-20	Dec-20	Apr-21	Jun-21
Alkalinity	mg/L		188	220	208	278	169	219	311	244	243	328
Ammonia: total	mg/L		0.1	0.1	0.2	<0.1	0.2	0.2	0.2	<0.1	0.1	0.2
Ammonia: un-ionized	mg/L	0.02	0.0010	0.0007	0.0040	<0.0004	0.0014	0.0016	0.0017	<0.0002	0.0010	0.0009
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.001
Barium	mg/L		0.036	0.061	0.039	0.043	0.043	0.044	0.070	0.054	0.047	0.046
Biochemical Oxygen Demand	mg/L		<2.3	<2.0	<2.0	<2.0	<2.0	<2.0	2.1	<2.0	<2.0	9.3
Boron	mg/L	0.200	0.01	0.01	0.02	0.02	0.01	0.01	0.03	0.01	0.02	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		30	30	<10	30	30	20	40	50	30	50
Chloride	mg/L		39.5	89.8	38.8	43.1	57.4	46.7	79.5	79.1	55.9	85.4
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		534	846	561	695	611	639	877	812	712	900
Conductivity - field	µS/cm		523	803	567	733	637	636	871	828	694	874
Copper	mg/L	0.005 **	0.0009	0.0022	0.001	0.0006	0.0018	0.0013	0.0008	0.0009	0.001	0.0006
Dissolved Oxygen - field	mg/L		9.53	8.51	12	5.22	11.4	9.03	0.67	6.68	11.3	0.62
Iron	mg/L	0.3	0.04	0.05	0.06	0.24	0.08	0.09	0.81	0.04	0.05	0.60
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2
Nitrate (as N)	mg/L		1.62	1.76	0.5	<0.05	1.77	0.6	<0.5	4.89	0.58	<0.05
Nitrite (as N)	mg/L		<0.5	<0.05	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.05	<0.05
pH	units	6.5-8.5	7.91	7.75	8.04	7.96	7.9	7.96	7.7	7.86	8.06	7.52
pH - field	units	6.5-8.5	7.8	7.9	8.1	8.0	7.9	7.7	7.5	7.9	7.9	7.2
Phenols: total	µg/L	1	<1	<1	1	2	<1	<1	<1	2	2	1
Phosphorus	mg/L	0.03	0.01	0.02	0.02	0.07	0.05	0.02	0.16	0.03	0.03	0.23
Sulphate	mg/L		20.3	54.7	19.2	7.1	35.3	20.3	6.5	48.6	23.9	5.2
Temperature - field	°C		8.7	0.4	7.8	17.9	0.2	6.9	15.4	0.4	5.2	14.4
Total Dissolved Solids	mg/L		330	540	340	420	350	340	580	470	420	620
Total Kjeldahl Nitrogen	mg/L		0.4	0.5	0.6	0.8	0.4	<0.2	1.1	0.7	<2.0	2.5
Total Suspended Solids	mg/L		<2.0	<2.0	<2.0	2	<2.0	<2.0	2.8	<2.0	<2.0	10
Zinc	mg/L	0.020	<0.0005	0.0025	0.0051	0.003	0.0036	0.0029	0.0008	<0.0005	0.0016	0.0013

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW2									
			Aug-21	Oct-21	Nov-21	Apr-22	Jun-22	Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		407	360	348	259	344	283	156	248	230	288
Ammonia: total	mg/L		0.2	0.2	0.2	0.1	0.2	0.2	<0.1	<0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0010	0.0013	0.0007	0.0011	0.0006	0.0012	<0.0004	<0.0005	0.0006	<0.0003
Arsenic	mg/L	0.005	0.001	<0.0005	<0.0005	<0.0005	<0.005	<0.005	<0.0005	<0.0005	0.0006	<0.0005
Barium	mg/L		0.071	0.050	0.054	0.043	0.047	0.083	0.036	0.049	0.049	0.056
Biochemical Oxygen Demand	mg/L		15.7	<2.0	<2.0	<2.0	4.3	5.2	<2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.03	0.02	0.01	0.02	0.03	0.02	0.01	0.02	0.04	0.01
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		80	20	<10	20	60	50	20	40	50	<10
Chloride	mg/L		74.8	65.2	54.9	54.9	46.8	66.2	45.2	49.7	93.4	97.8
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		999	901	859	704	825	812	484	580	749	903
Conductivity - field	µS/cm		948	896	875	664	837	771	522	626	796	913
Copper	mg/L	0.005 **	0.0005	0.0007	0.0007	0.0009	<0.005	<0.005	0.0012	0.0015	0.0027	<0.0005
Dissolved Oxygen - field	mg/L		<0.05	4.37	10.7	9.09	0.24	1.45	10.8	6.89	4.00	12.1
Iron	mg/L	0.3	1.01	0.07	0.06	0.05	0.77	1.20	0.059	0.13	0.62	0.055
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		<0.05	0.09	1.02	<0.05	<0.05	<0.05	2.9	<0.05	<0.05	0.18
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.55	7.82	7.9	7.83	7.64	7.61	7.82	7.78	7.60	7.66
pH - field	units	6.5-8.5	7.3	7.5	7.6	7.7	7.0	7.2	7.7	7.6	7.3	7.6
Phenols: total	µg/L	1	2	1	1	<1	<1	1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.49	0.06	0.01	<0.02	0.10	0.22	0.02	0.04	0.11	0.03
Sulphate	mg/L		2	19.2	20.4	14.1	8	10	28.4	18.5	23.6	47.5
Temperature - field	°C		15.1	10.0	0.3	11.4	16.8	20.2	0.6	5.9	15.8	1.1
Total Dissolved Solids	mg/L		680	510	450	400	480	530	280	400	480	620
Total Kjeldahl Nitrogen	mg/L		1.7	0.7	0.4	0.2	1	1	0.5	0.6	0.8	0.4
Total Suspended Solids	mg/L		22	<2.0	<2.0	<2.0	16	9.2	<2.0	7.2	11.3	<2
Zinc	mg/L	0.020	0.0028	0.0034	0.0009	0.0012	<0.01	<0.01	0.0023	<0.005	<0.005	<0.005

NOTES: 1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW3									
			Apr-18	Dec-18	Apr-19	Jun-19	Dec-19	Feb-20	Apr-20	Jun-20	Dec-20	Apr-21
Alkalinity	mg/L		197	220	197	283	190	259	226	335	258	253
Ammonia: total	mg/L		0.1	0.1	0.2	<0.1	0.2	0.2	0.2	0.3	<0.1	0.1
Ammonia: un-ionized	mg/L	0.02	0.0010	0.0005	0.0038	<0.0004	0.0014	0.0006	0.0029	0.0124	<0.0002	0.0023
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005
Barium	mg/L		0.039	0.057	0.041	0.045	0.049	0.064	0.049	0.061	0.058	0.050
Biochemical Oxygen Demand	mg/L		<2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0
Boron	mg/L	0.200	0.01	0.01	0.02	0.03	0.02	0.02	0.01	0.03	0.02	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		10	40	20	60	50	40	20	40	40	30
Chloride	mg/L		39.9	82.5	39.5	38.3	72.2	93	45.7	68.2	81.1	57
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005	<0.0005
Conductivity	µS/cm		544	826	557	688	703	876	645	874	837	719
Conductivity - field	µS/cm		529	771	578	728	734	931	644	876	842	700
Copper	mg/L	0.005 **	0.001	0.0016	0.001	0.0008	0.0019	<0.0005	0.0021	0.0014	0.001	0.0011
Dissolved Oxygen - field	mg/L		11.5	9.53	12.1	5.58	11	6.96	9.67	5.7	8.51	10.7
Iron	mg/L	0.3	0.03	0.03	0.10	0.28	0.11	0.08	0.17	0.77	0.04	0.04
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2
Nitrate (as N)	mg/L		1.52	2.02	0.6	0.16	1.59	0.61	0.7	<0.5	5.04	0.42
Nitrite (as N)	mg/L		<0.5	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	2.53	<0.05
pH	units	6.5-8.5	8.1	7.83	8.17	8.07	7.99	7.51	8.13	8.17	7.88	8.21
pH - field	units	6.5-8.5	7.8	7.8	8.1	8.0	7.9	7.5	8.0	8.1	7.9	8.3
Phenols: total	µg/L	1	<1	1	1	1	<1	<1	<1	<1	2	2
Phosphorus	mg/L	0.03	0.01	0.02	0.02	0.08	0.04	0.03	0.03	0.12	0.03	0.02
Sulphate	mg/L		19.8	54.4	18.2	5.9	42.4	31.4	19.2	5.8	48.1	23.2
Temperature - field	°C		8.7	0.3	7.7	16.8	0.1	1.1	7.4	17.4	0.0	5.6
Total Dissolved Solids	mg/L		320	520	330	390	410	520	360	570	520	430
Total Kjeldahl Nitrogen	mg/L		0.4	0.5	0.5	0.7	0.4	0.4	0.6	1	1	<2.0
Total Suspended Solids	mg/L		<2.0	<2.0	4	5	2.4	2.4	4	11.2	<2.0	4.7
Zinc	mg/L	0.020	<0.0005	0.0015	0.0052	0.0033	0.0022	<0.0005	0.003	0.0028	<0.0005	0.0012

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW3							
			Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		369	359	262	272	158	247	296	291
Ammonia: total	mg/L		0.2	0.2	0.1	0.2	0.1	0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0022	0.0008	0.0019	0.0040	0.0003	0.0008	0.0008	<0.0004
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	0.0006	<0.0005
Barium	mg/L		0.051	0.054	0.044	0.037	0.037	0.046	0.061	0.055
Biochemical Oxygen Demand	mg/L		<2.0	<2.0	<2.0	<2.0	2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.02	0.02	0.02	0.03	0.01	0.02	0.04	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		20	<10	20	30	20	30	40	20
Chloride	mg/L		63.9	52.5	53.4	46.6	45.1	46.8	112	88.1
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		906	860	714	701	496	596	857	887
Conductivity - field	µS/cm		892	882	673	663	523	634	910	903
Copper	mg/L	0.005 **	0.0009	0.0007	0.0009	<0.005	0.0013	0.0012	0.001	<0.0005
Dissolved Oxygen - field	mg/L		7.93	10.6	12.8	5.68	8.42	12.7	5.74	15.6
Iron	mg/L	0.3	0.04	0.09	0.05	0.16	0.046	0.043	0.380	0.116
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		0.13	1.04	0.06	0.14	2.79	0.24	0.54	0.22
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	8.09	8.02	8.13	8.11	7.79	8.01	7.78	7.83
pH - field	units	6.5-8.5	7.8	7.7	8.0	7.8	7.5	7.8	7.5	7.8
Phenols: total	µg/L	1	2	1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.04	0.03	<0.02	0.09	<0.02	0.02	0.10	0.05
Sulphate	mg/L		16.3	19.5	14.5	14.6	27.9	19.1	13.0	46.6
Temperature - field	°C		9.8	0.3	11.7	17.1	0.0	5.4	14.2	0.1
Total Dissolved Solids	mg/L		520	380	400	420	330	390	550	580
Total Kjeldahl Nitrogen	mg/L		0.7	0.5	0.4	0.7	0.4	0.5	0.8	0.4
Total Suspended Solids	mg/L		<2.0	2	<2.0	<2.0	<2.0	6	4.7	3
Zinc	mg/L	0.020	<0.0005	0.0017	0.0022	<0.01	0.0017	<0.005	<0.005	<0.005

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW17								
			Apr-18	Dec-18	Apr-19	Jun-19	Dec-19	Feb-20	Apr-20	Jun-20	Dec-20
Alkalinity	mg/L		160	232	182	262	212	218	220	297	226
Ammonia: total	mg/L		0.1	0.2	0.2	<0.1	0.2	0.1	0.2	0.2	<0.1
Ammonia: un-ionized	mg/L	0.02	<0.0001	0.0008	0.0024	<0.0003	0.0009	0.0006	0.0017	0.0030	<0.0002
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	0.001	<0.0005
Barium	mg/L		0.035	0.068	0.037	0.046	0.065	0.063	0.047	0.073	0.058
Biochemical Oxygen Demand	mg/L		<2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	<2.0
Boron	mg/L	0.200	0.02	0.03	0.03	0.03	0.04	0.02	0.02	0.05	0.03
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		30	50	20	30	40	40	30	70	30
Chloride	mg/L		47.3	149	46.6	50.2	137	172	73.6	125	111
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		521	1080	554	703	962	1040	731	991	876
Conductivity - field	µS/cm		506	1010	571	743	1000	1150	722	1000	875
Copper	mg/L	0.005 **	0.0012	0.0014	0.0029	<0.0005	0.0018	<0.0005	0.0012	0.0005	0.0007
Dissolved Oxygen - field	mg/L		10.3	9.42	10.4	1.89	9.92	10.3	7.34	3.66	8.85
Iron	mg/L	0.3	0.05	0.07	0.08	0.23	0.12	0.09	0.16	1.50	0.10
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2
Nitrate (as N)	mg/L		1.55	1.01	<0.5	<0.05	2.48	0.34	<0.5	<0.5	2.06
Nitrite (as N)	mg/L		<0.5	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5	<0.5	<0.5
pH	units	6.5-8.5	7.93	7.76	7.96	7.8	7.84	7.51	7.86	7.8	7.85
pH - field	units	6.5-8.5	7.5	7.6	7.9	7.7	7.7	7.8	7.8	7.7	7.9
Phenols: total	µg/L	1	<1	<1	1	2	<1	<1	<1	<1	2
Phosphorus	mg/L	0.03	0.01	0.03	0.02	0.08	0.05	0.05	0.03	0.22	0.05
Sulphate	mg/L		24.6	64.2	21.9	8.9	49.2	29.2	25.2	10.2	58.5
Temperature - field	°C		8.4	1.0	7.9	18.2	0.4	1.3	6.3	16.5	0.4
Total Dissolved Solids	mg/L		320	650	340	430	550	610	420	660	510
Total Kjeldahl Nitrogen	mg/L		0.5	0.5	0.6	0.8	<0.5	0.3	0.7	1.3	0.4
Total Suspended Solids	mg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2	18.8	<2.0
Zinc	mg/L	0.020	0.0013	0.0037	0.005	0.003	0.0094	0.0054	0.0041	0.0025	0.0027

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW17								
			Apr-21	Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		254	321	334	246	228	145	243	251	280
Ammonia: total	mg/L		0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0009	0.0012	0.0005	0.0007	0.0018	0.0003	0.0012	0.0005	<0.0002
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	0.0006	0.0006	<0.0005
Barium	mg/L		0.052	0.057	0.063	0.050	0.047	0.038	0.057	0.060	0.083
Biochemical Oxygen Demand	mg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.03	0.02	0.02	0.03	0.03	0.02	0.03	0.04	0.03
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		40	30	<10	20	40	20	40	40	<10
Chloride	mg/L		89.5	109	100	108	49.3	63.8	87.7	120	247
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		850	973	993	878	634	529	667	839	1450
Conductivity - field	µS/cm		831	956	1010	824	606	555	752	892	1460
Copper	mg/L	0.005 **	0.0008	<0.0005	0.0005	0.0007	<0.005	0.0011	0.0007	0.0006	<0.0005
Dissolved Oxygen - field	mg/L		9.06	5.65	9.42	8.37	2.84	7.84	9.10	4.02	14.0
Iron	mg/L	0.3	0.11	0.17	0.18	0.08	0.34	0.153	0.138	0.65	0.095
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		<0.05	<0.05	0.16	<0.05	<0.05	2.04	<0.05	<0.05	0.43
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.94	7.8	7.82	7.75	7.85	7.71	7.78	7.64	7.62
pH - field	units	6.5-8.5	7.9	7.5	7.5	7.5	7.4	7.6	7.7	7.3	7.5
Phenols: total	µg/L	1	2	2	2	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.03	0.06	0.03	<0.02	0.09	0.03	0.03	0.10	0.04
Sulphate	mg/L		33.4	25.9	21.6	19	15.5	31.8	20.8	22.7	63
Temperature - field	°C		4.6	10.4	0.7	11.4	18.4	0.6	5.7	15.6	1.0
Total Dissolved Solids	mg/L		500	590	580	500	380	370	480	580	950
Total Kjeldahl Nitrogen	mg/L		<2.0	0.8	0.6	0.5	0.8	0.6	0.7	0.9	0.4
Total Suspended Solids	mg/L		<2.0	<2.0	2	<2.0	<2.0	<2.0	3.2	6	6
Zinc	mg/L	0.020	0.0029	<0.0005	0.0051	0.0014	<0.01	0.0042	<0.005	<0.005	0.008

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW18							
			Apr-18	Dec-18	Apr-19	Jun-19	Dec-19	Apr-20	Jun-20	Dec-20
Alkalinity	mg/L		191	222	188	293	191	223	333	247
Ammonia: total	mg/L		0.1	0.1	0.2	<0.1	0.2	0.1	0.3	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0012	0.0006	0.0043	<0.0003	0.0012	0.0016	0.0058	<0.0002
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	0.0008	<0.0005
Barium	mg/L		0.038	0.057	0.040	0.050	0.047	0.048	0.063	0.056
Biochemical Oxygen Demand	mg/L		<2.3	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	<2.0
Boron	mg/L	0.200	0.01	0.01	0.02	0.03	0.02	0.02	0.04	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		30	50	20	20	40	20	40	20
Chloride	mg/L		41	89.3	39.2	44.6	60.4	48.3	81.4	80.5
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0006	<0.0005
Conductivity	µS/cm		541	846	550	725	660	646	916	821
Conductivity - field	µS/cm		528	800	568	765	694	642	924	834
Copper	mg/L	0.005 **	0.0009	0.0023	0.0009	0.0007	0.0021	0.0015	0.0011	0.0009
Dissolved Oxygen - field	mg/L		9.55	8.78	11.9	3.77	10.5	9.31	5.47	7.44
Iron	mg/L	0.3	0.02	0.03	0.04	0.45	0.20	0.16	1.10	0.06
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2
Nitrate (as N)	mg/L		1.48	1.71	0.5	0.1	1.6	0.6	<0.5	4.65
Nitrite (as N)	mg/L		<0.5	<0.05	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5
pH	units	6.5-8.5	8.09	7.84	8.12	7.96	7.92	8.07	7.94	7.87
pH - field	units	6.5-8.5	7.8	7.9	8.1	7.9	7.9	8.0	7.8	8.0
Phenols: total	µg/L	1	<1	<1	<1	3	<1	<1	<1	2
Phosphorus	mg/L	0.03	0.01	0.02	0.02	0.07	0.06	0.03	0.15	0.04
Sulphate	mg/L		20.2	55.5	19.2	6.2	37.5	20	5.5	48.3
Temperature - field	°C		10.1	0.4	7.9	17.3	0.1	9.4	17.4	0.1
Total Dissolved Solids	mg/L		320	540	320	430	390	350	580	470
Total Kjeldahl Nitrogen	mg/L		0.5	0.5	0.5	0.8	0.5	0.6	1.1	0.4
Total Suspended Solids	mg/L		<2.0	<2.0	<2.0	3	7.2	2.8	11.6	<2.0
Zinc	mg/L	0.020	<0.0005	0.0019	0.0027	0.0036	0.0037	0.0025	0.0033	0.0014

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW18						
			Apr-21	Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23
Alkalinity	mg/L		252	363	348	260	265	158	247
Ammonia: total	mg/L		0.1	0.2	0.2	0.1	0.2	0.2	0.2
Ammonia: un-ionized	mg/L	0.02	0.0015	0.0018	0.0006	0.0012	0.0024	0.0008	0.0014
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005
Barium	mg/L		0.048	0.051	0.052	0.044	0.038	0.037	0.049
Biochemical Oxygen Demand	mg/L		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.02	0.02	0.01	0.02	0.02	0.01	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		30	30	<10	30	40	20	30
Chloride	mg/L		56.7	66.8	57	55.5	47.4	46.8	50.7
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005
Conductivity	µS/cm		718	911	870	712	692	496	569
Conductivity - field	µS/cm		700	894	923	669	669	535	642
Copper	mg/L	0.005 **	0.0011	0.0007	0.0007	0.0012	<0.005	0.0014	0.0012
Dissolved Oxygen - field	mg/L		11.2	6.52	10.4	10.8	4.99	11.8	11.2
Iron	mg/L	0.3	0.08	0.05	0.15	0.054	0.22	0.059	0.065
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1
Nitrate (as N)	mg/L		0.5	0.12	1.03	<0.05	0.07	2.82	0.1
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	8.07	7.93	8	7.93	8.00	7.78	7.91
pH - field	units	6.5-8.5	8.0	7.7	7.6	7.8	7.6	7.7	7.7
Phenols: total	µg/L	1	1	1	2	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.02	0.05	0.03	<0.02	0.08	<0.02	0.02
Sulphate	mg/L		24.2	17.8	19.5	14.1	14.2	28.8	19.7
Temperature - field	°C		6.2	10.7	0.1	11.8	17.5	0.5	6.3
Total Dissolved Solids	mg/L		420	540	510	410	420	300	400
Total Kjeldahl Nitrogen	mg/L		<2.0	0.7	0.6	0.5	0.9	0.6	0.7
Total Suspended Solids	mg/L		<2.0	<2.0	2.4	<2.0	<2.0	<2.0	2.8
Zinc	mg/L	0.020	0.0013	<0.0005	0.0009	0.0016	<0.01	0.003	<0.005

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW19										
			Apr-18	Apr-19	Dec-19	Apr-20	Apr-21	Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23
Alkalinity	mg/L		231	205	141	215	238	384	333	257	353	169	239
Ammonia: total	mg/L		0.1	0.2	0.2	<0.1	<0.1	0.2	0.2	0.1	0.2	<0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0007	0.0030	0.0016	<0.0002	<0.0002	0.0018	0.0007	0.0010	0.0019	<0.0002	<0.0002
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005
Barium	mg/L		0.039	0.041	0.029	0.040	0.042	0.048	0.054	0.042	0.035	0.034	0.043
Biochemical Oxygen Demand	mg/L		<2.3	2.0	<2.0	<2.0	<2.0	<2.0	2.2	<2.0	<2.0	2.7	3.7
Boron	mg/L	0.200	0.01	0.01	0.00	0.01	0.01	0.01	0.01	0.01	<0.02	0.003	0.009
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		30	40	50	30	20	20	<10	10	20	10	40
Chloride	mg/L		25.5	27.4	16.9	25.6	30.4	37.3	34.1	29.7	25.6	26.6	22.0
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0005	<0.0005	<0.001	<0.0005	<0.0005
Conductivity	µS/cm		559	555	394	562	622	841	778	620	770	459	491
Conductivity - field	µS/cm		544	573	387	564	606	829	798	585	729	496	538
Copper	mg/L	0.005 **	0.0007	0.001	0.002	0.0012	0.0009	0.001	0.0013	0.003	<0.005	0.001	0.0017
Dissolved Oxygen - field	mg/L		8.65	7.2	11.3	8.21	11.5	6.68	9.57	7.64	2.17	12.7	7.06
Iron	mg/L	0.3	0.00	0.05	0.07	0.02	0.01	0.06	0.43	0.026	0.170	0.018	0.237
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1
Nitrate (as N)	mg/L		2.54	2.5	0.88	1.1	1.56	0.27	1.52	0.4	<0.05	3.79	<0.05
Nitrite (as N)	mg/L		<0.5	<0.5	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.83	7.8	7.86	7.95	8.11	7.94	8	7.77	7.98	7.90	7.68
pH - field	units	6.5-8.5	7.7	8.0	8.0	7.8	8.0	7.7	7.6	7.8	7.5	7.5	7.3
Phenols: total	µg/L	1	<1	1	<1	<1	1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	<0.01	0.02	0.04	0.02	0.02	0.04	0.03	<0.02	0.05	<0.02	0.04
Sulphate	mg/L		15.7	18.2	21.9	17.6	21.7	15.2	20.7	15.9	10.9	24.5	19
Temperature - field	°C		8.0	7.2	0.0	5.6	6.3	9.4	0.3	10.0	15.1	0.9	4.3
Total Dissolved Solids	mg/L		330	350	220	300	320	500	450	340	440	340	370
Total Kjeldahl Nitrogen	mg/L		0.5	0.2	0.7	0.5	<2.0	0.6	0.5	0.3	0.6	0.8	0.4
Total Suspended Solids	mg/L		2	14	<2.0	<2.0	3.3	<2.0	14.8	<2.0	2.8	8.4	17.6
Zinc	mg/L	0.020	<0.0005	0.0032	0.0032	0.0007	0.0007	<0.0005	0.0024	0.0005	<0.01	0.0012	<0.005

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW20								
			Apr-18	Dec-18	Apr-19	Jun-19	Dec-19	Apr-20	Jun-20	Dec-20	Apr-21
Alkalinity	mg/L		237	216	206	310	138	216	358	252	240
Ammonia: total	mg/L		0.1	0.2	0.2	<0.1	0.2	0.1	0.2	<0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0007	0.0015	0.0022	<0.0003	0.0012	0.0007	0.0014	<0.0002	<0.0002
Arsenic	mg/L	0.005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.0005	0.001	<0.0005	<0.0005
Barium	mg/L		0.038	0.053	0.040	0.047	0.032	0.041	0.050	0.049	0.041
Biochemical Oxygen Demand	mg/L		<2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		10	50	30	40	20	<10	40	30	20
Chloride	mg/L		25.1	41.4	26.2	23	23.3	24.5	17.2	50.3	28.4
Chromium	mg/L	0.010	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		558	677	541	678	424	556	753	750	613
Conductivity - field	µS/cm		543	639	558	719	442	557	756	758	592
Copper	mg/L	0.005 **	0.0008	0.0025	0.001	0.0006	0.0014	0.0022	0.0014	0.0008	0.0011
Dissolved Oxygen - field	mg/L		9.11	5.13	6.97	2.38	11	7.85	1.4	7.39	9.84
Iron	mg/L	0.3	0.03	0.24	0.01	0.70	0.08	0.03	1.46	0.02	0.04
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2
Nitrate (as N)	mg/L		1.97	2.71	1.9	<0.05	2.12	0.9	<0.5	8.14	1.31
Nitrite (as N)	mg/L		<0.5	<0.05	<0.5	<0.05	<0.05	<0.5	<0.5	<0.5	<0.05
pH	units	6.5-8.5	7.86	7.71	7.83	7.84	7.95	7.93	7.68	7.96	8.05
pH - field	units	6.5-8.5	7.6	8.0	7.9	7.7	7.9	7.7	7.4	8.0	8.0
Phenols: total	µg/L	1	<1	<1	<1	2	<1	<1	1	6	2
Phosphorus	mg/L	0.03	0.01	0.04	0.01	0.05	0.06	0.01	0.11	0.03	0.02
Sulphate	mg/L		15	45.8	16.8	2.8	23.4	16.9	1.6	43.1	21.6
Temperature - field	°C		9.0	0.1	7.4	17.6	0.1	5.5	13.9	0.2	5.2
Total Dissolved Solids	mg/L		340	390	310	380	240	310	470	470	370
Total Kjeldahl Nitrogen	mg/L		0.6	0.4	0.5	0.8	0.4	0.5	1.1	0.5	<2.0
Total Suspended Solids	mg/L		<2.0	2.8	<2.0	3	<2.0	<2.0	3.6	<2.0	<2.0
Zinc	mg/L	0.020	<0.0005	0.0024	0.0017	0.0018	0.0019	0.0028	<0.0005	<0.0005	0.0006

NOTES: 1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW20									
			Jun-21	Aug-21	Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		381	438	375	336	264	334	170	236	268	301
Ammonia: total	mg/L		0.7	0.3	0.1	0.2	0.1	0.2	<0.1	0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0115	0.0021	0.0005	0.0007	0.0006	0.0016	<0.0003	0.0002	0.0004	<0.0003
Arsenic	mg/L	0.005	0.0018	0.0012	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	<0.0005	0.0009	<0.0005
Barium	mg/L		0.072	0.066	0.050	0.052	0.041	0.037	0.034	0.042	0.040	0.048
Biochemical Oxygen Demand	mg/L		7.0	2.4	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Boron	mg/L	0.200	0.01	0.02	0.01	0.01	0.01	<0.02	0.00	0.01	0.02	0.01
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		90	60	20	470	10	20	10	30	50	<10
Chloride	mg/L		25.8	31.9	40	34.8	26.8	27.3	27.7	21.0	10.6	40.7
Chromium	mg/L	0.010	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	0.0006	<0.0005
Conductivity	µS/cm		720	914	850	784	621	724	464	479	599	743
Conductivity - field	µS/cm		767	866	836	779	584	704	493	532	610	731
Copper	mg/L	0.005 **	0.0017	0.0011	0.0009	0.0008	0.0014	<0.005	0.0024	0.0016	0.0034	<0.0005
Dissolved Oxygen - field	mg/L		2.48	0.81	4.39	8.46	5.68	1.22	9.88	3.62	2.51	12.5
Iron	mg/L	0.3	2.42	1.79	0.07	0.03	0.04	0.22	0.047	0.033	0.42	0.028
Lead	mg/L	0.005 ***	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		0.05	<0.05	0.37	1.49	0.24	<0.05	3.92	<0.05	0.17	0.14
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.9	7.71	7.82	7.97	7.71	7.9	7.81	7.66	7.47	7.65
pH - field	units	6.5-8.5	7.8	7.4	7.5	7.6	7.5	7.4	7.6	7.2	7.2	7.6
Phenols: total	µg/L	1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.15	0.15	0.03	0.01	<0.02	0.06	<0.02	<0.01	0.10	0.02
Sulphate	mg/L		0.7	1	18.4	22.2	12.8	10.3	25.1	18.0	47.0	39.6
Temperature - field	°C		15.5	14.9	8.3	0.4	10.3	16.0	0.8	4.1	14.1	0.5
Total Dissolved Solids	mg/L		540	610	500	460	270	450	330	370	440	470
Total Kjeldahl Nitrogen	mg/L		4.4	2	0.6	0.4	0.4	0.4	0.7	0.5	1.3	0.4
Total Suspended Solids	mg/L		32.7	10	<2.0	<2.0	<2.0	<2.0	<2.0	3.2	11.3	4
Zinc	mg/L	0.020	0.0065	0.0019	<0.0005	0.001	0.0008	0.01	0.0023	<0.005	<0.005	<0.005

NOTES: 1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW21										
			Apr-18	Jun-18	Dec-18	Apr-19	Jun-19	Oct-19	Dec-19	Apr-20	Jun-20	Dec-20	Apr-21
Alkalinity	mg/L		161	289	229	185	252	218	210	217	298	226	252
Ammonia: total	mg/L		0.1	0.6	0.2	0.2	<0.1	0.1	0.2	0.1	0.3	<0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	<0.0001	0.0060	<0.0001	0.0016	<0.0003	0.0009	0.0009	<0.0001	0.0046	<0.0003	<0.0002
Arsenic	mg/L	0.005	<0.0005	0.0011	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.0005
Barium	mg/L		0.034	0.076	0.067	0.040	0.046	0.100	0.062	0.049	0.085	0.056	0.051
Biochemical Oxygen Demand	mg/L		<2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	4.4	<2.0	<2.0
Boron	mg/L	0.200	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.02	0.04	0.03	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		30	40	60	40	50	30	30	50	70	30	50
Chloride	mg/L		45.9	153	136	42.9	56.1	373	133	69.2	109	101	89.6
Chromium	mg/L	0.010	<0.0005	0.0005	0.0006	<0.0005	<0.0005	0.0007	<0.0005	<0.0005	0.0008	<0.0005	<0.0005
Conductivity	µS/cm		520	1000	1020	552	691	1770	938	717	944	856	827
Conductivity - field	µS/cm		505	998	967	568	731	1820	994	721	948	865	814
Copper	mg/L	0.005 **	0.001	0.0008	0.0013	0.0008	0.0005	0.0023	0.0015	0.0012	0.0009	0.0006	0.0006
Dissolved Oxygen - field	mg/L		11.7	4.43	9.48	10.5	2.72	6.94	10.9	6.23	4.28	10.5	8.48
Iron	mg/L	0.3	0.05	1.72	0.26	0.05	0.30	0.46	0.12	0.10	1.76	0.10	0.09
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2
Nitrate (as N)	mg/L		1.59	0.1	1.11	<0.5	<0.05	<0.5	2.74	<0.5	<0.5	2.17	<0.05
Nitrite (as N)	mg/L		<0.5	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.5	<0.05
pH	units	6.5-8.5	7.96	7.76	7.75	7.95	7.82	7.78	7.73	7.78	7.93	7.79	7.88
pH - field	units	6.5-8.5	6.8	7.5	7.2	7.7	7.8	7.7	7.7	7.4	7.7	8.3	8.1
Phenols: total	µg/L	1	<1	<1	<1	2	2	<1	<1	<1	1	1	1
Phosphorus	mg/L	0.03	0.02	0.14	0.06	0.02	0.12	0.08	0.06	0.03	0.35	0.05	0.03
Sulphate	mg/L		24.9	7.1	65.1	21.9	10.6	64	50.6	26.2	11.4	61.6	31.6
Temperature - field	°C		8.4	16.5	2.7	8.7	17.6	9.3	1.6	6.1	16.2	1.6	5.2
Total Dissolved Solids	mg/L		320	690	600	330	420	1030	530	380	630	530	500
Total Kjeldahl Nitrogen	mg/L		0.4	2	0.5	0.6	0.8	0.4	<0.5	0.5	1.4	0.5	<2.0
Total Suspended Solids	mg/L		2.4	15	3.2	<2.0	<2.0	10	<2.0	<2.0	26.4	<2.0	<2.0
Zinc	mg/L	0.020	0.0026	0.0086	0.0083	0.0045	0.0038	0.0114	0.0109	0.0051	0.0083	0.0059	0.0028

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW21									
			Jun-21	Aug-21	Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		394	366	319	328	243	224	145	243	232	262
Ammonia: total	mg/L		1.6	0.9	0.2	0.2	0.1	0.2	0.1	0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0223	0.0108	0.0009	0.0001	0.0006	0.0015	0.0001	0.0001	0.0005	<0.0002
Arsenic	mg/L	0.005	0.0008	0.0012	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	0.0006	0.0006	<0.0005
Barium	mg/L		0.164	0.155	0.067	0.066	0.049	0.045	0.037	0.058	0.056	0.085
Biochemical Oxygen Demand	mg/L		<2.0	<2.0	<2.0	<2.0	<2.0	2.2	3.2	<2.0	2.0	<2.0
Boron	mg/L	0.200	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.03	0.04	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		50	70	40	20	20	40	30	50	40	<10
Chloride	mg/L		572	366	108	88.9	90.9	46.6	61.4	74.6	98.1	202
Chromium	mg/L	0.010	0.0013	0.0021	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		2540	1890	969	936	816	625	524	681	734	1300
Conductivity - field	µS/cm		2500	1810	959	961	769	597	553	808	775	1320
Copper	mg/L	0.005 **	0.0016	0.0019	0.0008	0.0101	0.0009	<0.005	0.0011	0.0007	0.0005	<0.0005
Dissolved Oxygen - field	mg/L		2.49	2.38	6.74	11.1	6.89	2.45	5.96	8.32	5.24	16.3
Iron	mg/L	0.3	1.37	2.22	0.37	0.20	0.07	0.24	0.13	0.16	0.34	0.09
Lead	mg/L	0.005 ***	0.0009	0.0013	<0.0005	0.0008	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		0.05	0.07	<0.05	0.09	0.06	<0.05	2.08	<0.05	<0.05	0.91
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.79	7.98	7.74	7.84	7.7	7.84	7.60	7.71	7.64	7.65
pH - field	units	6.5-8.5	7.6	7.6	7.4	6.8	7.5	7.3	7.1	6.6	7.2	7.4
Phenols: total	µg/L	1	<1	1	2	<1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.15	0.19	0.10	0.05	<0.02	0.07	0.02	0.04	0.08	0.04
Sulphate	mg/L		21.3	14.4	24.2	22.5	20.9	16.2	32.8	21.8	22.6	58.6
Temperature - field	°C		17.3	16.2	9.8	2.0	10.6	18.9	1.7	5.4	15.6	1
Total Dissolved Solids	mg/L		1500	1080	570	510	480	380	350	580	500	790
Total Kjeldahl Nitrogen	mg/L		3.2	1.4	0.9	0.6	0.4	0.8	0.8	0.7	0.8	0.4
Total Suspended Solids	mg/L		42.7	30	5.6	<2.0	<2.0	3.2	<2.0	2.8	4.8	5
Zinc	mg/L	0.020	0.0191	0.0298	0.0016	0.0189	0.0014	<0.01	0.0063	<0.005	<0.005	<0.005

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW23										
			Apr-18	Jun-18	Dec-18	Apr-19	Jun-19	Oct-19	Dec-19	Apr-20	Jun-20	Oct-20	Dec-20
Alkalinity	mg/L		155	237	233	181	262	109	213	218	296	213	225
Ammonia: total	mg/L		0.1	0.2	0.2	0.2	<0.1	0.1	0.2	<0.1	0.2	0.2	<0.1
Ammonia: un-ionized	mg/L	0.02	<0.0001	0.0007	0.0006	0.0021	<0.0008	0.0010	0.0009	<0.0002	0.0021	0.0007	<0.0002
Arsenic	mg/L	0.005	<0.0005	0.0009	<0.0005	<0.0005	0.0008	0.0007	<0.0005	0.0005	0.001	0.0005	<0.0005
Barium	mg/L		0.033	0.076	0.075	0.038	0.053	0.036	0.063	0.049	0.066	0.077	0.055
Biochemical Oxygen Demand	mg/L		<2.3	15.6	<2.0	<2.0	2.3	2.6	<2.0	<2.0	2.6	4.5	<2.0
Boron	mg/L	0.200	0.02	0.01	0.03	0.03	0.03	0.02	0.03	0.02	0.05	0.04	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		<10	70	60	40	40	20	50	40	50	70	30
Chloride	mg/L		48.1	129	146	45.2	50.7	129	136	71.1	121	253	108
Chromium	mg/L	0.010	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.001	<0.0005	<0.0005	<0.0005	0.0008	<0.0005
Conductivity	µS/cm		521	915	1060	554	700	833	958	722	980	1310	865
Conductivity - field	µS/cm		505	921	988	571	742	866	1000	722	983	1260	858
Copper	mg/L	0.005 **	0.001	0.0007	0.0021	0.0012	<0.0005	0.0035	0.002	0.0017	<0.0005	0.0016	<0.0005
Dissolved Oxygen - field	mg/L		10	2.91	7.64	11.3	2.18	5.62	10	7.19	2.71	5.18	9.07
Iron	mg/L	0.3	0.04	1.67	0.18	0.05	0.34	0.61	0.13	0.14	1.14	1.02	0.08
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0008	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2
Nitrate (as N)	mg/L		1.52	<0.05	1.11	<0.5	<0.05	0.53	2.56	<0.5	<0.5	<0.05	2.13
Nitrite (as N)	mg/L		<0.5	<0.05	<0.05	<0.5	<0.05	<0.5	<0.05	<0.5	<0.5	<0.05	<0.5
pH	units	6.5-8.5	8	7.22	7.71	7.92	7.6	7.61	7.81	7.85	7.73	7.18	7.84
pH - field	units	6.5-8.5	7.2	7.0	7.5	7.8	7.7	7.8	7.7	7.6	7.5	7.2	8.1
Phenols: total	µg/L	1	<1	12	<1	<1	2	<1	<1	<1	<1	1	1
Phosphorus	mg/L	0.03	0.02	0.14	0.05	0.02	0.12	0.28	0.06	0.03	0.24	0.16	0.06
Sulphate	mg/L		24.7	2.7	64.3	21	9.2	82.6	51	25.8	11.3	18.8	59.4
Temperature - field	°C		8.5	18.9	1.0	8.1	18.1	10.2	0.3	5.6	16.8	11.7	0.5
Total Dissolved Solids	mg/L		320	670	630	330	420	490	550	430	640	770	530
Total Kjeldahl Nitrogen	mg/L		0.4	1.6	0.4	0.6	0.8	0.9	0.6	0.6	1.4	<1.0	0.5
Total Suspended Solids	mg/L		2	15	4.8	<2.0	2	11	<2.0	<2.0	2.8	14.5	<2.0
Zinc	mg/L	0.020	0.0009	<0.0005	0.0068	0.0056	0.0029	0.0091	0.0106	0.0061	0.0025	0.0059	0.0023

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW23										
			Apr-21	Jun-21	Aug-21	Oct-21	Nov-21	Apr-22	Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		253	335	332	320	327	247	227	146	240	250	273
Ammonia: total	mg/L		<0.1	0.2	0.2	0.1	0.2	0.1	0.2	0.1	0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	<0.0002	0.0010	0.0005	0.0005	0.0005	0.0006	0.0018	0.0004	0.0015	0.0004	<0.0002
Arsenic	mg/L	0.005	<0.0005	0.0009	0.0007	<0.0005	<0.0005	<0.0005	<0.005	<0.0005	0.0006	0.0006	<0.0005
Barium	mg/L		0.054	0.043	0.138	0.055	0.065	0.050	0.042	0.038	0.062	0.060	0.085
Biochemical Oxygen Demand	mg/L		<2.0	3.7	3.4	<2.0	2.3	<2.0	2.9	<2.0	<2.0	2.2	<2.0
Boron	mg/L	0.200	0.03	0.03	0.04	0.02	0.02	0.02	0.03	0.02	0.03	0.04	0.02
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		50	60	40	40	30	30	40	20	40	40	10
Chloride	mg/L		94.9	155	352	105	94	98.8	51.2	64.0	77.3	106	240
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	µS/cm		845	1160	1720	972	972	852	643	525	691	791	1400
Conductivity - field	µS/cm		824	1140	1740	946	980	809	610	557	755	832	1410
Copper	mg/L	0.005 **	0.0006	<0.0005	<0.0005	<0.0005	0.001	0.0006	<0.005	0.0024	0.0007	0.0005	<0.0005
Dissolved Oxygen - field	mg/L		9.09	1.97	<0.05	4.7	8.41	5.61	2.74	6.98	4.62	3.22	12.2
Iron	mg/L	0.3	0.10	0.48	0.92	0.12	0.24	0.07	0.24	0.134	0.161	0.490	0.147
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	0.15	<0.05	<0.05	2.03	<0.05	<0.05	0.61
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.96	7.43	7.44	7.78	7.79	7.67	7.84	7.62	7.62	7.59	7.51
pH - field	units	6.5-8.5	8.0	7.2	6.9	7.4	7.5	7.4	7.4	7.7	8.1	7.2	7.4
Phenols: total	µg/L	1	1	<1	2	<1	<1	<1	<1	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.03	0.34	0.12	0.08	0.05	<0.02	0.08	0.03	0.04	0.09	0.04
Sulphate	mg/L		30.3	6.7	5.2	26.9	22.6	20	15.6	32.5	20.7	20.6	60.6
Temperature - field	°C		5.0	17.2	15.9	10.3	0.5	11.4	18.6	0.7	5.2	15.1	1.4
Total Dissolved Solids	mg/L		450	780	1090	570	530	470	380	330	500	530	870
Total Kjeldahl Nitrogen	mg/L		<2.0	2.1	1.1	0.8	0.6	0.5	0.6	0.6	0.7	0.9	0.4
Total Suspended Solids	mg/L		<2.0	4.7	6	2.4	4.4	2.4	3.6	3.6	3.6	7.6	<2
Zinc	mg/L	0.020	0.003	0.0009	0.0103	<0.0005	0.0103	0.0011	<0.01	0.0044	<0.005	0.005	<0.005

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PWQO[1]	SW24								
			Apr-18	Apr-19	Jun-19	Dec-19	Apr-20	Apr-21	Oct-21	Nov-21	Apr-22
Alkalinity	mg/L		235	234	299	191	237	250	406	364	262
Ammonia: total	mg/L		0.1	0.2	<0.1	0.2	<0.1	0.1	0.2	0.2	0.1
Ammonia: un-ionized	mg/L	0.02	0.0007	0.0022	<0.0002	0.0010	<0.0002	0.0007	0.0014	0.0004	0.0009
Arsenic	mg/L	0.005	<0.0005	<0.0005	0.0011	0.0006	<0.0005	0.0005	0.0009	<0.0005	<0.0005
Barium	mg/L		0.028	0.035	0.043	0.050	0.034	0.044	0.064	0.066	0.046
Biochemical Oxygen Demand	mg/L		<2.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.4	<2.0
Boron	mg/L	0.200	0.01	0.01	0.02	0.03	0.01	0.01	0.02	0.01	0.01
Cadmium	mg/L	0.0005 *	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		20	30	30	50	<10	40	60	40	30
Chloride	mg/L		63.5	6.4	6.8	9.2	6.4	8.2	8.1	8.2	5
Chromium	mg/L	0.010	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	<0.0005
Conductivity	µS/cm		515	527	612	568	556	562	762	687	551
Conductivity - field	µS/cm		500	546	655	551	562	555	759	709	550
Copper	mg/L	0.005 **	0.0005	0.0005	<0.0005	0.0021	0.0008	0.0006	0.0006	0.0005	0.0006
Dissolved Oxygen - field	mg/L		9.11	6.85	2.5	7.35	4.77	6.63	6.58	7.31	6.91
Iron	mg/L	0.3	0.01	0.07	0.61	0.11	0.03	0.11	0.37	0.46	0.11
Lead	mg/L	0.005 ***	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<0.2	<0.2
Nitrate (as N)	mg/L		<0.5	<0.5	<0.05	0.15	<0.5	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L		<0.5	<0.5	<0.05	<0.05	<0.5	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.88	7.76	7.52	7.76	7.8	7.9	7.92	7.75	7.75
pH - field	units	6.5-8.5	7.6	7.9	7.5	7.7	7.6	7.7	7.6	7.4	7.7
Phenols: total	µg/L	1	<1	<1	1	<1	<1	<1	<1	1	<1
Phosphorus	mg/L	0.03	<0.01	0.03	0.07	0.06	<0.01	0.02	0.05	0.05	<0.02
Sulphate	mg/L		24.4	27.7	8.3	79.9	35	27.4	9.4	8.2	18.4
Temperature - field	°C		8.8	7.1	14.8	1.2	7.4	6.2	10.9	0.5	9.9
Total Dissolved Solids	mg/L		310	330	360	350	310	370	460	350	310
Total Kjeldahl Nitrogen	mg/L		0.2	0.2	0.6	0.6	0.3	<2.0	0.9	0.6	0.4
Total Suspended Solids	mg/L		2	7.2	9	3.6	<2.0	<2.0	4.8	27.2	2
Zinc	mg/L	0.020	<0.0005	0.0029	0.0035	0.0054	0.0011	0.0012	<0.0005	0.0087	0.0007

NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, µg/L - micrograms per litre, µS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

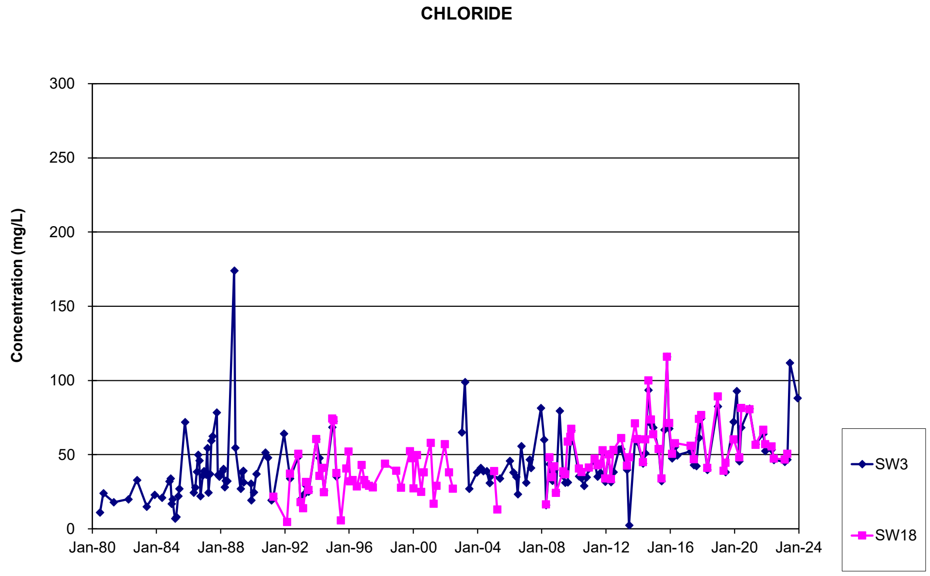
Table H.2
Surface Water Chemical Results
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

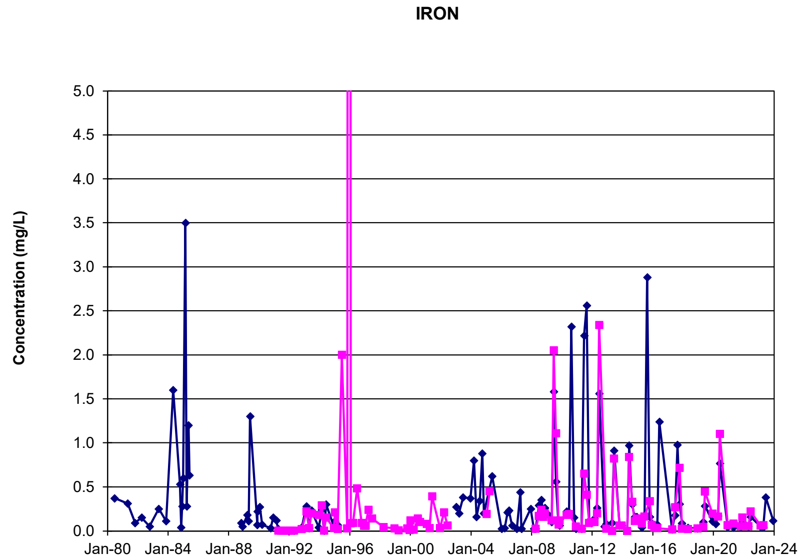
PARAMETER	UNITS	PWQO[1]	SW24				
			Jun-22	Feb-23	Apr-23	Jun-23	Dec-23
Alkalinity	mg/L		356	201	259	270	322
Ammonia: total	mg/L		0.1	<0.1	0.1	0.1	<0.1
Ammonia: un-ionized	mg/L	0.02	0.0007	<0.0002	0.0008	0.0007	<0.0001
Arsenic	mg/L	0.005	<0.005	<0.0005	<0.0005	0.0009	0.0008
Barium	mg/L		0.051	0.050	0.038	0.055	0.076
Biochemical Oxygen Demand	mg/L		<2.0	2.6	<2.0	4.4	<2.0
Boron	mg/L	0.200	0.03	0.02	0.01	0.03	0.02
Cadmium	mg/L	0.0005 *	<0.001	<0.0001	<0.0001	<0.0001	<0.0001
Chemical Oxygen Demand	mg/L		50	40	90	60	40
Chloride	mg/L		4.9	7.7	5.4	4.3	8.0
Chromium	mg/L	0.010	<0.001	<0.0005	<0.0005	<0.0005	<0.0005
Conductivity	μS/cm		682	491	498	507	736
Conductivity - field	μS/cm		604	515	516	542	759
Copper	mg/L	0.005 **	<0.005	0.0013	0.0006	0.001	<0.0005
Dissolved Oxygen - field	mg/L		0.68	6.88	5.21	5.49	11.3
Iron	mg/L	0.3	0.64	0.08	0.03	0.52	0.25
Lead	mg/L	0.005 ***	<0.01	<0.0005	<0.0005	<0.0005	<0.0005
Mercury	mg/L		<0.2	<0.1	<0.1	<0.1	<0.1
Nitrate (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
Nitrite (as N)	mg/L		<0.05	<0.05	<0.05	<0.05	<0.05
pH	units	6.5-8.5	7.98	7.65	7.73	7.76	7.34
pH - field	units	6.5-8.5	7.4	7.5	7.8	7.4	7.3
Phenols: total	μg/L	1	4	<1	<1	<1	<1
Phosphorus	mg/L	0.03	0.09	0.04	0.02	0.21	0.07
Sulphate	mg/L		4.1	62.2	27.8	18.8	73.5
Temperature - field	°C		16.7	0.7	6.3	14.5	1.2
Total Dissolved Solids	mg/L		410	240	360	350	520
Total Kjeldahl Nitrogen	mg/L		0.8	0.5	0.3	0.9	0.7
Total Suspended Solids	mg/L		10.4	5.2	6.4	22.7	3
Zinc	mg/L	0.020	<0.01	0.0041	<0.005	0.007	<0.005

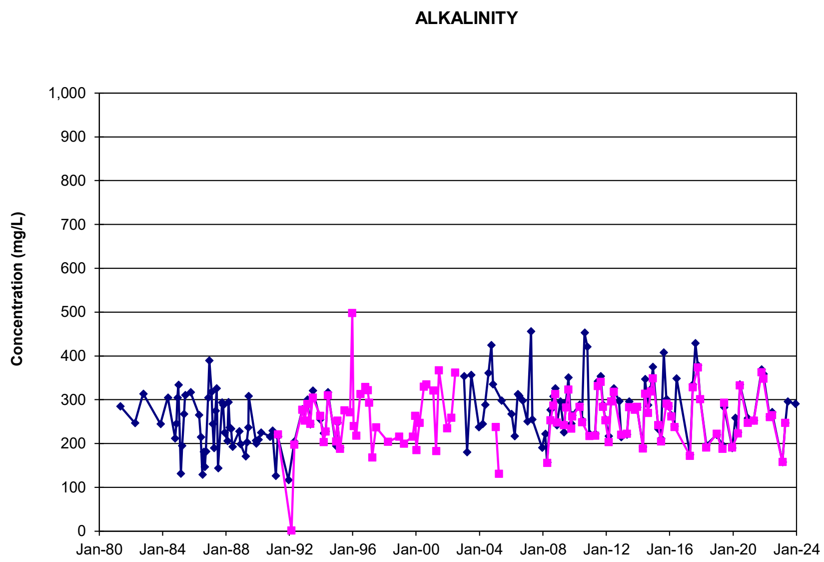
NOTES:
1) PWQO - Provincial Water Quality Objectives (1999)
2) mg/L - milligrams per litre, μg/L - micrograms per litre, μS/cm - microSiemens per centimetre, ºC - degrees Celsius
3) * - Cadmium PWQO value based on hardness >100 mg/L.
4) ** - Copper PWQO value based on hardness >20 mg/L.
5) *** - Lead PWQO value based on hardness >80 mg/L.

Figure H.1

Time Concentration Graphs - Surface Water Stations: Central Water Course







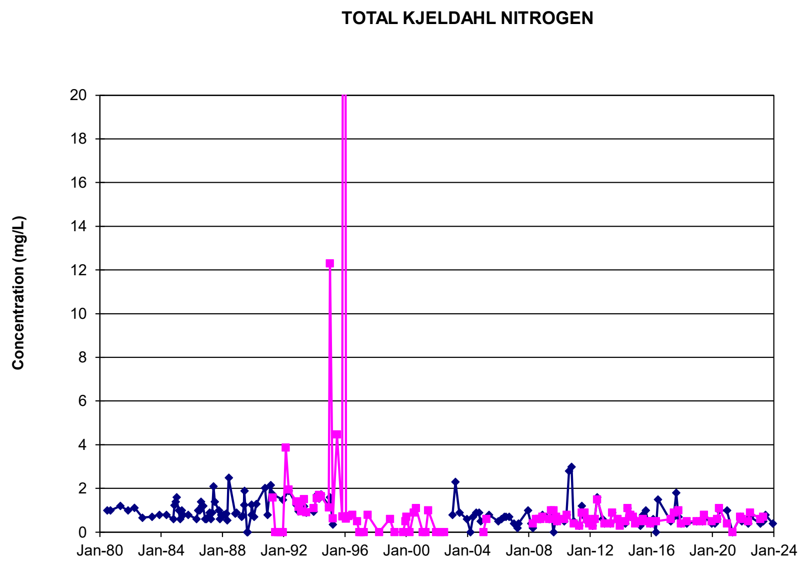
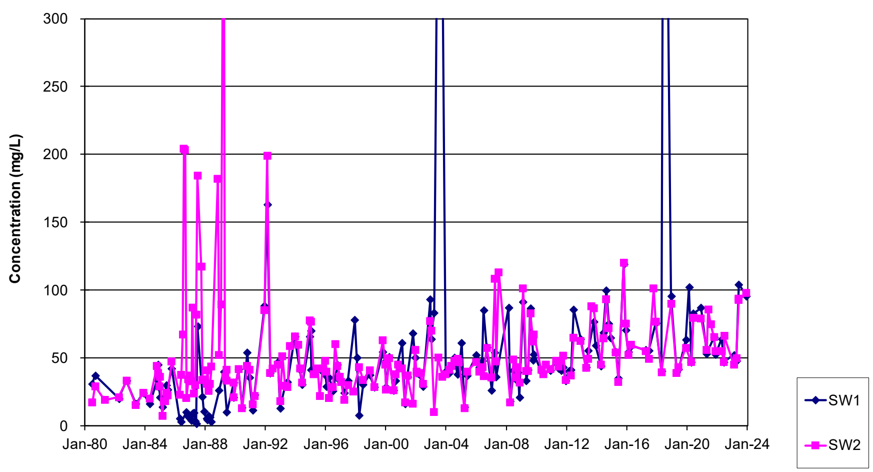


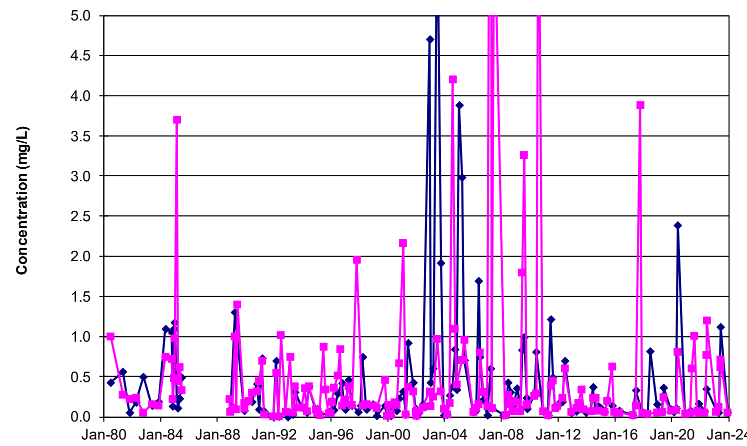
Figure H.2

Time Concentration Graphs - Surface Water Stations: Central Water Course

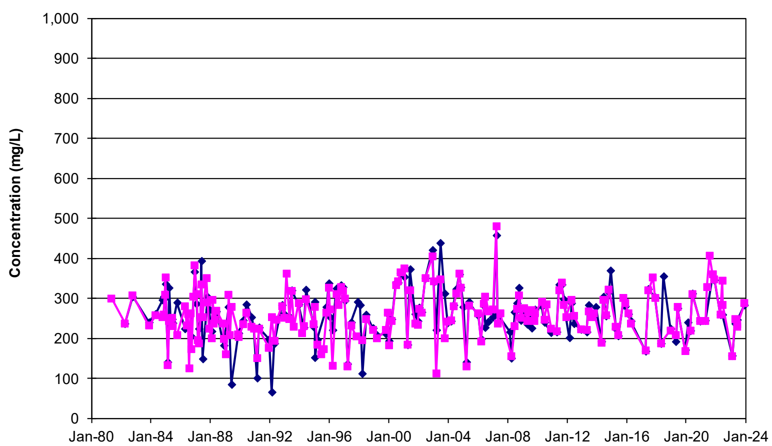
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

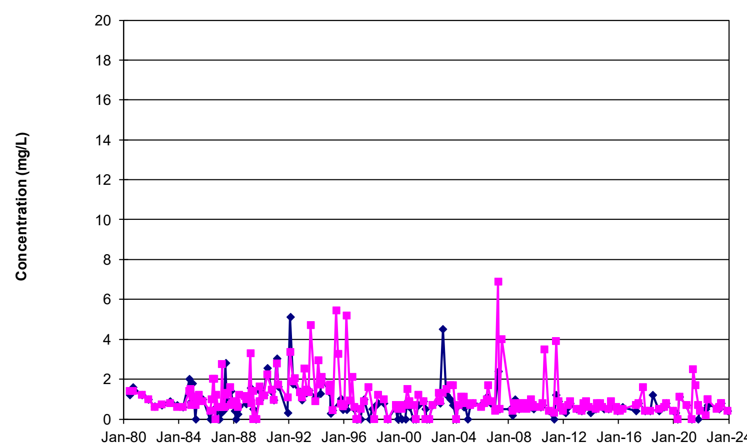
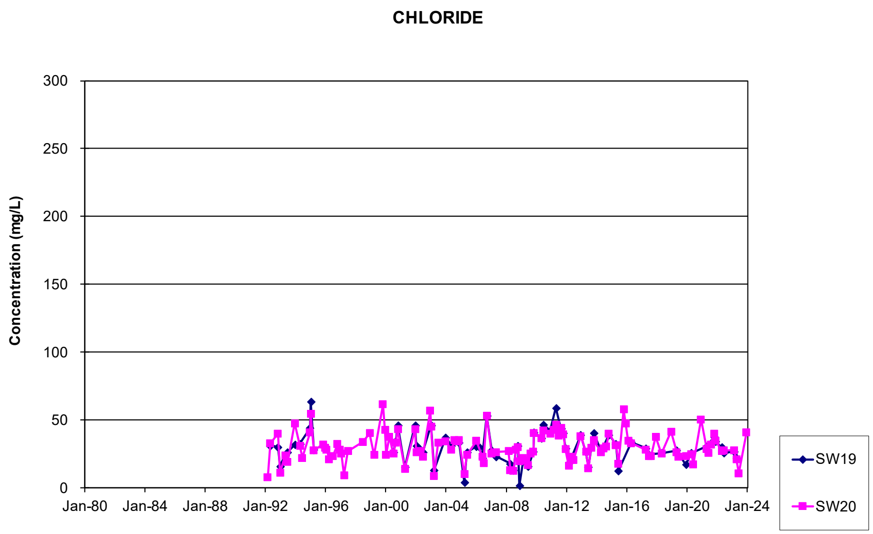
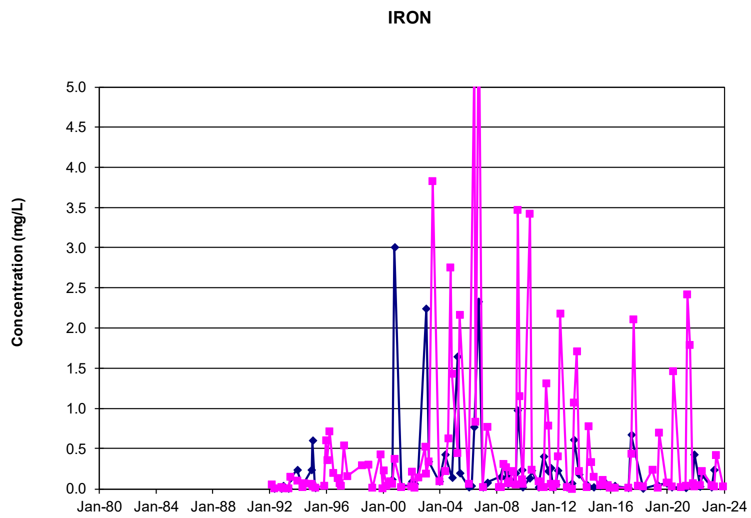
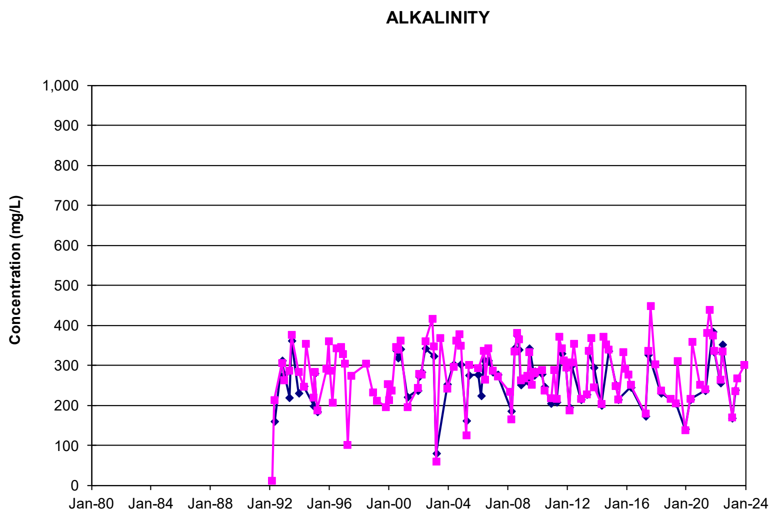


Figure H.3

Time Concentration Graphs - Surface Water Stations: Central Water Course







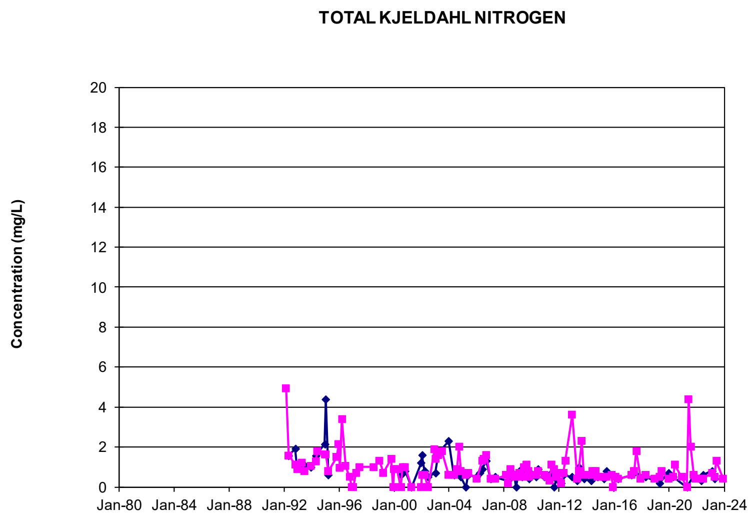
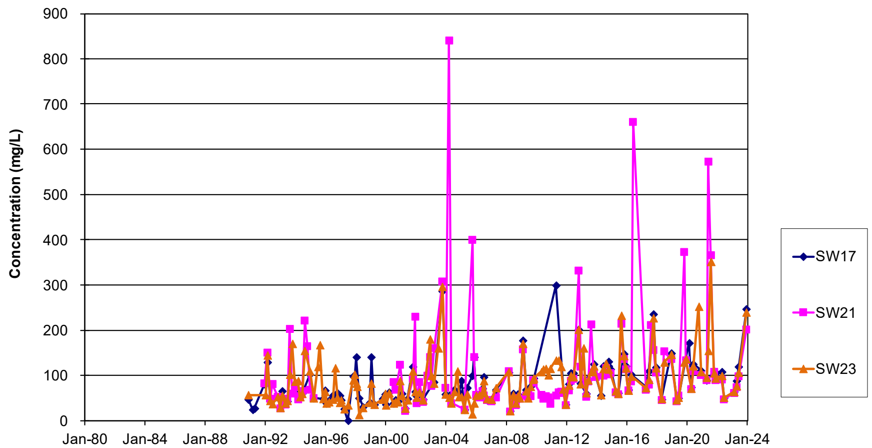


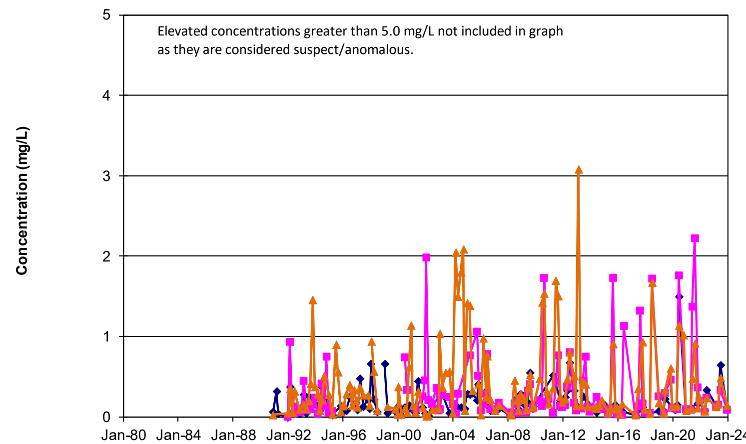
Figure H.4

Time Concentration Graphs - Surface Water Stations: Bensfort Road Ditch

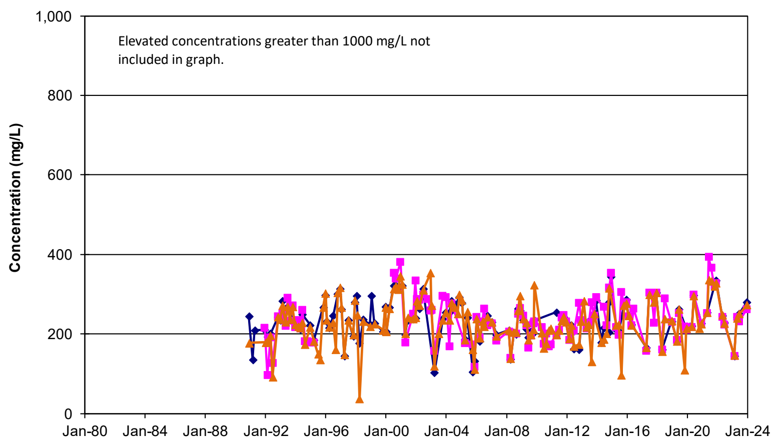
CHLORIDE



IRON



ALKALINITY



TOTAL KJELDAHL NITROGEN

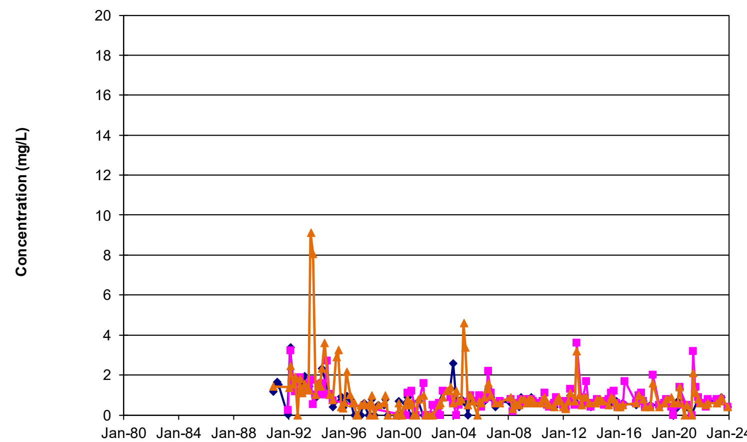
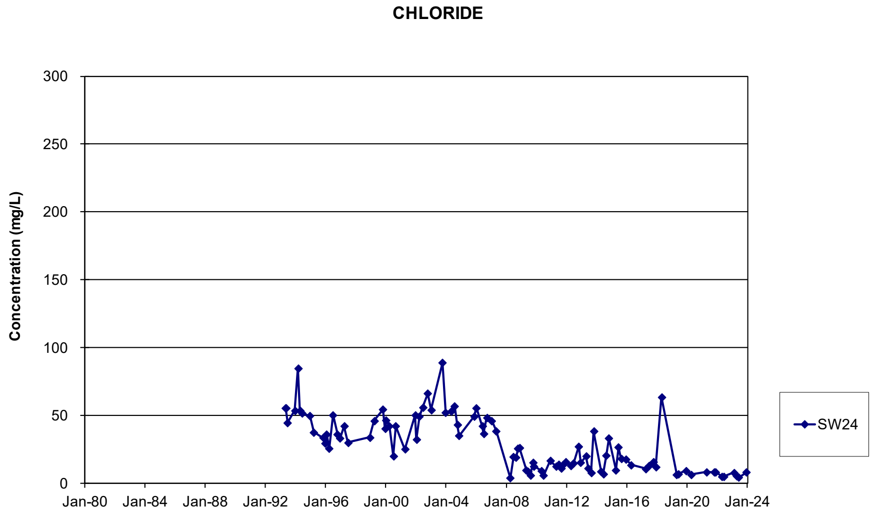
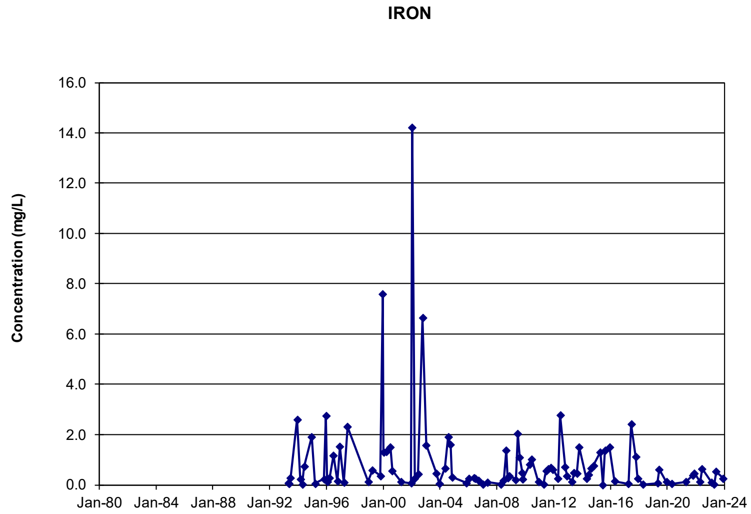
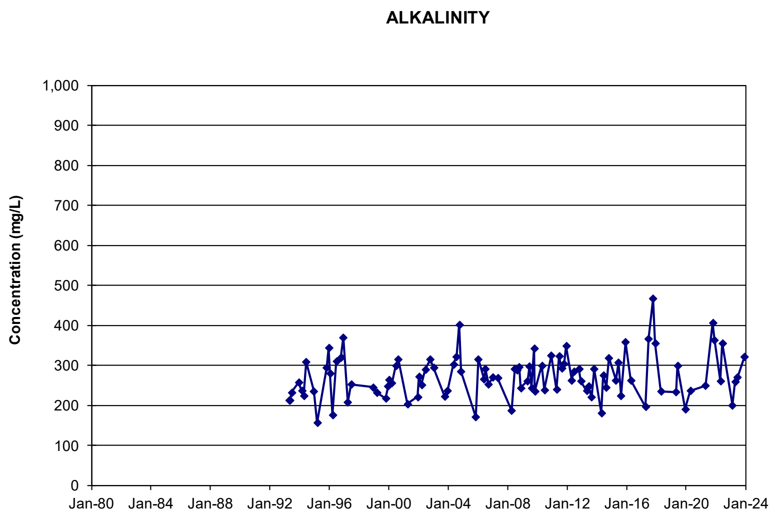


Figure H.5

Time Concentration Graphs - Surface Water Stations: Wetland Area (Western Water Course)







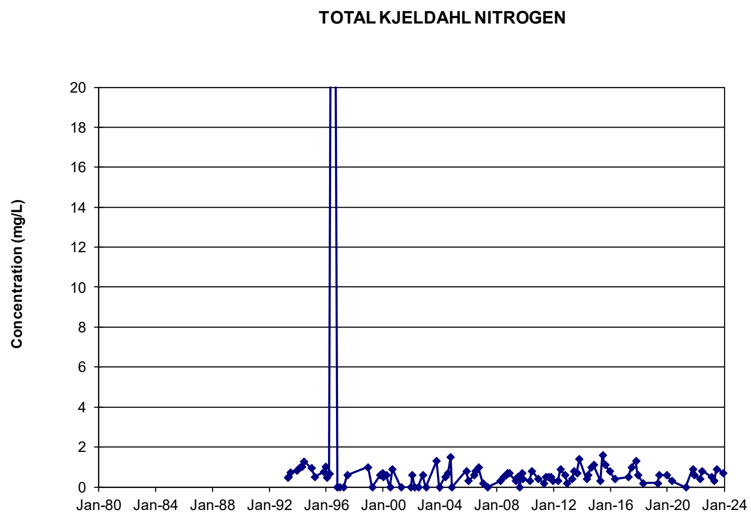


Table H.3
NFA Stormwater Management Pond Sampling
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

AREA	SAMPLING LOCATIONS	EVENT DATE	SAMPLED	COMMENTS
NFA STORMWATER MANAGEMENT POND	INLET	5-Apr-2023	Sampled	SW inlet - low consistent flow, water was very turbid and light brown. Litter observed in culvert, especially where the structure meets the ponds edge / cattails. NW inlet: low consistent flow, water was very turbid with a light brown cloudiness. Lots of garbage debris in culvert, some pieces directly outside culvert. Composite sample observations: very turbid, light brown, slight refuse type odour, no sheen.
	OUTLET	5-Jan-2023	Sampled	Significant rainfall for around a week prior to sampling - from Dec 30 (~6.2mm) to Jan 4 (~23.7mm). Stormwater may be bypassing over frozen ice to the outlet structure. Sample was slightly to moderately turbid, silty light brown to light grey colour (both light grey and brown sand components), slight sediment or refuse like odour, no sheen detected.
		5-Apr-2023	Sampled	Sampling was initiated by a rain fall event with varying intensity - total rainfall prior to sampling ~28.2mm. Outflow pipe had moderate and consistent flow. Sample was slight to moderate amount of black to grey suspended solids, slight light grey turbidity/cloudiness, slight musty or refuse odour and no sheen.
		12-Jun-2023	Sampled	Sampling was initiated by a rain fall event - total rainfall prior to sampling ~35.7mm. At the time of sampling there was low but consistent flow from the discharge pipe. Sample was mainly clear with very slight light brown to yellow tinge, musty sulphur or refuse like odour, no sheen detected.
		12-Jul-2023	Dry	Sampling event initiated by rainfall overnight. Pond water level was observed ~10cm below outlet level.
		13-Jul-2023	Sampled	Sampling event initiated by rainfall event - rainfall was variable across the City. Outlet pipe had moderate and consistent flow. Foam was observed on rip rap rocks where pipe discharges. Sample was observed to be mainly clear with a slight yellow tinge, very few if any visible suspended solids, slight musty odour, no sheen.
		4-Aug-2023	Sampled	Sampling event initiated by storm event. Outlet pipe had moderate and consistent flow. Significant foaming was observed in the rip rock discharge area especially nearest to the outlet pipe. Sample was mainly clear to very slightly turbid, light brown to yellow tinge, very few suspended solids, very slight musty odour, no sheen.
		10-Aug-2023	Sampled	Sampling event initiated by rainfall event. There was some light foaming at the rip rock discharge at the outlet pipe, but much less than the sample last week - likely due to lower water velocities. Low but consistent flow from the discharge pipe, some standing water in rip rock area. No litter observed at time of sampling. Sample was mainly clear with very slight turbidity, slight yellow tinge, very few suspended solids, slight musty odour, no sheen.
		6-Oct-2023	Dry	Sampling event initiated by overnight rainfall. Total of 16mm of rain was received overnight. No Sample Collected - pond level was ~60cm below outlet level.
		20-Oct-2023	Dry	Sampling event initiated by rainfall throughout the day. Pond water level was observed ~75-80cm below outlet level.
		21-Nov-2023	Dry	Sampling event initiated by rainfall throughout the day. Pond water level was observed ~50-60cm below outlet level.
		27-Nov-2023	Dry	Sampling event initiated by rainfall throughout the day. Pond water level was observed ~40cm below outlet level.
		3-Dec-2023	Dry	Sampling event initiated by rainfall throughout the day. Pond water level was observed ~20-25cm below outlet level.
		13-Dec-2023	Dry	Sample event initiated by snow fall and snow melt. Pond water level was observed ~10 below outlet level.
		18-Dec-2023	Dry	Sampling event initiated by rainfall throughout the day. Pond water level was observed ~10cm below outlet level.
		27-Dec-2023	Sampled	Storm pond outlet sampled only - beyond the normal fall semi annual inlet and outlet sampling period - pond was below outflow during this period. Winter event initiated by heavy rainfall and elevated temperatures. Sample was mainly clear with a very slight light brown cloudiness, slight refuse and sediment like odour, no observable sheen.

NOTES: 1) NMS - No measurable sample
2) Dry - Dry conditions, no sample obtained.
3) Precipitation data obtained from Environment Canada, Peterborough Airport Station Data.

Table H.4

Stormwater Pond Chemical Results - Inorganic Parameters

Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PEO	OUTLET									
			Jan-18	May-18	Nov-18	Dec-18	Apr-19	Jun-19	Oct-19	Dec-19	Mar-20	Oct-20
Alkalinity	mg/L			41	84.6		132		96.4			115
Aluminum	mg/L			0.05	1.99		0.516		0.252			0.122
Ammonia: total	mg/L		0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.6	1.5	0.3
Ammonia: un-ionized	mg/L	0.020	0.003	0.076	0.003	0.001	0.004	0.001	0.008	0.002	0.001	0.011
Antimony	mg/L											
Arsenic	mg/L											
Barium	mg/L											
Beryllium	mg/L											
Biochemical Oxygen Demand	mg/L			3.8	2.9		2.6		<2.0			5.6
Bismuth	mg/L											
Boron	mg/L	0.2		0.0896	0.0805		0.0762		0.0542			0.0478
Bromide	mg/L											
Cadmium	mg/L			<0.0001	<0.0001		<0.0001		<0.0001			<0.0001
Calcium	mg/L			30.1	42.6		65.4		51			47.7
Chemical Oxygen Demand	mg/L			50	40		30		30			30
Chloride	mg/L			142	52.8		78.8		58.9			58.6
Chromium	mg/L			<0.0005	0.0023		0.0012		0.0006			<0.0005
Cobalt	mg/L											
Colour	TCU			32	16		12		15			11
Conductivity - field	µS/cm		929	697	414	591	628	433	563	806	974	499
Copper	mg/L			<0.0005	0.004		0.0024		0.0036			0.0012
Dissolved Organic Carbon	mg/L			10	8.8		6.3		6.8			9.3
Dissolved Oxygen - field	mg/L		9.4	7.88	10	17.1	7.95	5.69	6.27	11	3.37	6.43
Fluoride	mg/L											
Hardness	mg/L			118	137		196					147
Iron	mg/L	0.3		0.2	1.48		0.489		0.31			0.175
Lead	mg/L			<0.0005	0.002		0.0008		<0.0005			<0.0005
Lithium	mg/L											
Magnesium	mg/L			10.5	7.37		7.96		7.38			6.87
Manganese	mg/L			0.0332	0.0538		0.0242		0.0983			0.0256
Mercury	µg/L			<0.1	<0.1		<0.1		<0.1			<0.2
Molybdenum	mg/L											
Nickel	mg/L			<0.002	0.004		<0.002		<0.002			<0.002
Nitrate	mg/L			<0.5	0.17		<0.5		1.88			0.28
Nitrite	mg/L			<0.5	<0.05		<0.5		<0.05			<0.05
Oil and Grease - total	mg/L	15	<10.0	10.5	16.4	14.8	<10.0	<10.0	10.7	<10.0	13.2	10.5
Oxydation Reduction Potential	mV											
pH	units	6.5 - 8.5	7.65	9.32	8.55	8.14	7.96	8.15	8	7.86	7.49	8
pH - field	units		7.2	9.1	8.1	7.8	7.98	7.27	8.17	7.53	6.93	8.29
Phenols	µg/L			1	<1		1		<1			<1
Phosphate	mg/L											
Phosphorus	mg/L			0.04	0.08		0.05		0.15			0.11
Potassium	mg/L			7.1	8.6		5.9		6.5			6.8
Selenium	mg/L			<0.0005	<0.0005		<0.0005		<0.0005			<0.0005
Silver	mg/L			<0.0005	<0.0005		<0.0005		<0.0005			<0.0005
Sodium	mg/L			89.8	40.4		50.5		40.4			40.7
Strontium	mg/L											
Sulfur	mg/L											
Sulphate	mg/L			63.7	48.2		45.9		55.7			25.6
Tellurium	mg/L											
Temperature - field	°C		0.7	24.3	6.4	3.1	12.9	18.6	10.1	1.3	0.5	10.7
Thallium	mg/L											
Tin	mg/L											
Titanium	mg/L											
Total Kjeldahl Nitrogen	mg/L			2	0.7		0.7		3.9			0.9
Total Suspended Solids	mg/L		10.8	<2.0	34	121	<2.0	4	2	4.8	6	11.2
Tungsten	mg/L											
Turbidity	NTU	25	27.6	2.4	75	199	25.4	5.2	11.7	7.1	7.8	4.8
Uranium	mg/L											
Vanadium	mg/L			0.0008	0.0028		0.0009		0.0008			<0.0005
Zinc	mg/L			<0.0005	0.0114		0.0081		0.0332			0.0125
Zirconium	mg/L											

NOTES: 1) PEO - Pond Effluent Objectives for outlet, as outlined in Condition 7 of Amended ECA 2231-8YCPHG, dated September 28, 2012.

2) Blank indicates parameter not analysed.

Table H.4

Stormwater Pond Chemical Results - Inorganic Parameters

Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PEO	OUTLET										
			Mar-21	Apr-21	Jul-21	Sep-21	Oct-21	Dec-21	Feb-22	Jun-22	Jun-22	Jan-23	Apr-23
Alkalinity	mg/L			77.3		109				82.5			365
Aluminum	mg/L			0.041		1.21				0.049			0.322
Ammonia: total	mg/L		0.6	0.1	0.2	0.2	0.1	0.2	0.7	0.3	0.2	10.4	8.3
Ammonia: un-ionized	mg/L	0.020	0.002	0.004	0.006	0.006	<0.003	0.009	0.018	0.010	0.007	<0.003	0.005
Antimony	mg/L												
Arsenic	mg/L												
Barium	mg/L												
Beryllium	mg/L												
Biochemical Oxygen Demand	mg/L			<2.0		2.6				<2.0			144
Bismuth	mg/L												
Boron	mg/L	0.2		0.0532		0.05				0.06			0.12
Bromide	mg/L												
Cadmium	mg/L			<0.0001		<0.0001				<0.001			<0.001
Calcium	mg/L			49.1		53.9				45.9			98.4
Chemical Oxygen Demand	mg/L			20		20				20			260
Chloride	mg/L			131		40.3				219			121
Chromium	mg/L			<0.0005		0.0018				<0.001			0.002
Cobalt	mg/L												
Colour	TCU			14		23				20			20
Conductivity - field	µS/cm		435	648	654	390	472	755	450	917	635	827	1100
Copper	mg/L			0.0013		0.0012				<0.005			<0.005
Dissolved Organic Carbon	mg/L			7.4		7.6				7.7			78
Dissolved Oxygen - field	mg/L		12.5	11	3.17	3.61	8.5	11.9	16.2	6.30	6.73	13.6	7.25
Fluoride	mg/L												
Hardness	mg/L			160		156				156			309
Iron	mg/L	0.3		0.1		1.1				0.28			0.77
Lead	mg/L			<0.0005		0.0011				<0.01			<0.01
Lithium	mg/L												
Magnesium	mg/L			9.2		5.25				10.1			15.4
Manganese	mg/L			0.017		0.0854				0.2920			0.363
Mercury	µg/L			<0.2		<0.2				<0.2			<0.1
Molybdenum	mg/L												
Nickel	mg/L			<0.002		<0.002				<0.005			0.005
Nitrate	mg/L			<0.05		0.24				0.42			<0.05
Nitrite	mg/L			<0.05		<0.05				<0.05			<0.05
Oil and Grease - total	mg/L	15	<10.0	20	<10.0	<10.0	<10.0	<10.0	16.4	15.3	14.3	11.4	<10.0
Oxydation Reduction Potential	mV												-146.4
pH	units	6.5 - 8.5	8.13	8.05	7.92	7.89	7.87	8.08	7.82	7.96	7.97	7.30	7.55
pH - field	units		7.43	8.05	7.36	7.57	7.48	7.96	7.65	7.60	7.37	6.57	7.54
Phenols	µg/L			2		1				2			52
Phosphate	mg/L												
Phosphorus	mg/L			0.02		0.07				0.06			0.08
Potassium	mg/L			4.8		5.4				4.1			10.9
Selenium	mg/L			<0.0005		<0.0005				<0.02			<0.02
Silver	mg/L			<0.0005		<0.0005				<0.01			<0.01
Sodium	mg/L			75.3		18.8				119			70.5
Strontium	mg/L												
Sulfur	mg/L												
Sulphate	mg/L			49.8		22.6				28.5			40.3
Tellurium	mg/L												
Temperature - field	°C		1.8	11.7	18.6	17	15.9	3.3	0.3	16.6	22.0	1.5	5.7
Thallium	mg/L												
Tin	mg/L												
Titanium	mg/L												
Total Kjeldahl Nitrogen	mg/L			3		3.7				2.8			10.9
Total Suspended Solids	mg/L		17	<2.0	18.4	127	2.8	<2.0	100	4	3.2	54.2	30
Tungsten	mg/L												
Turbidity	NTU	25	38.6	2.2	28.1	45.1	5.2	7	365	2.4	5.4	108	111
Uranium	mg/L												
Vanadium	mg/L			<0.0005		0.0022				<0.002			<0.002
Zinc	mg/L			0.0018		0.0047				<0.01			0.02
Zirconium	mg/L												

NOTES: 1) PEO - Pond Effluent Objectives for outlet, as outlined in Condition 7 of Amended ECA 2231-8YCPHG, dated September 28, 2012.

2) Blank indicates parameter not analysed.

Table H.4
Stormwater Pond Chemical Results - Inorganic Parameters
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	PEO	OUTLET				
			Jun-23	Jul-23	Aug-23	Aug-23	Dec-23
Alkalinity	mg/L						
Aluminum	mg/L						
Ammonia: total	mg/L		1.0	0.3	0.2	0.3	0.2
Ammonia: un-ionized	mg/L	0.020	0.008	0.006	0.005	0.009	0.003
Antimony	mg/L						
Arsenic	mg/L						
Barium	mg/L						
Beryllium	mg/L						
Biochemical Oxygen Demand	mg/L						
Bismuth	mg/L						
Boron	mg/L	0.2					
Bromide	mg/L						
Cadmium	mg/L						
Calcium	mg/L						
Chemical Oxygen Demand	mg/L						
Chloride	mg/L						
Chromium	mg/L						
Cobalt	mg/L						
Colour	TCU						
Conductivity - field	µS/cm		696	488	458	490	696
Copper	mg/L						
Dissolved Organic Carbon	mg/L						
Dissolved Oxygen - field	mg/L		4.82	3.6	4.09	4.98	18.3
Fluoride	mg/L						
Hardness	mg/L						
Iron	mg/L	0.3					
Lead	mg/L						
Lithium	mg/L						
Magnesium	mg/L						
Manganese	mg/L						
Mercury	µg/L						
Molybdenum	mg/L						
Nickel	mg/L						
Nitrate	mg/L						
Nitrite	mg/L						
Oil and Grease - total	mg/L	15	<10.0	12.2	10.3	13.2	<10
Oxydation Reduction Potential	mV						
pH	units	6.5 - 8.5	7.52	7.64	7.55	7.75	7.80
pH - field	units		7.40	7.19	7.13	7.34	7.45
Phenols	µg/L						
Phosphate	mg/L						
Phosphorus	mg/L						
Potassium	mg/L						
Selenium	mg/L						
Silver	mg/L						
Sodium	mg/L						
Strontium	mg/L						
Sulfur	mg/L						
Sulphate	mg/L						
Tellurium	mg/L						
Temperature - field	°C		17.6	20.3	20.4	20.7	1.9
Thallium	mg/L						
Tin	mg/L						
Titanium	mg/L						
Total Kjeldahl Nitrogen	mg/L						
Total Suspended Solids	mg/L		4.4	12	6	<2.0	2
Tungsten	mg/L						
Turbidity	NTU	25	4.5	1.8	10.1	6.4	7
Uranium	mg/L						
Vanadium	mg/L						
Zinc	mg/L						
Zirconium	mg/L						

NOTES: 1) PEO - Pond Effluent Objectives for outlet, as outlined in Condition 7 of Amended ECA 2231-8YCPHG, dated September 28, 2012.
2) Blank indicates parameter not analysed.

Table H.5
Stormwater Pond Chemical Results - Organic Parameters
Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	INLET								
		May-18	Nov-18	Apr-19	Oct-19	Oct-20	Apr-21	Sep-21	Jun-22	Apr-23
1,1,2,2-Tetrachlorethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorpropane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene(E)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
1,3-Dichloropropene(Z)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Bromoform	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5		<5
Chloroform	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5			<0.5	<0.5	<0.5		
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Ethyl Benzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Ethylene dibromide	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5

NOTE: Blank indicates parameter not analysed.

Table H.5

Stormwater Pond Chemical Results - Organic Parameters

Peterborough County/City Waste Management Facility - 2023 Monitoring Program

PARAMETER	UNITS	OUTLET								
		May-18	Nov-18	Apr-19	Oct-19	Oct-20	Apr-21	Sep-21	Jun-22	Apr-23
1,1,2,2-Tetrachlorethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichlorethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorpropane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropene(E)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
1,3-Dichloropropene(Z)	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
1,4-Dichlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Bromoform	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chlorobenzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	µg/L	<5	<5	<5	<5	<5	<5	<5		<5
Chloroform	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	µg/L		<0.5			<0.5	<0.5	<0.5		
Dibromochloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichloromethane	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Ethyl Benzene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5
Ethylene dibromide	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
m/p-Xylenes	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1.2
trans-1,2-Dichloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichlorofluoromethane	µg/L	<5	<5	<5	<5	<5	<5	<5	<5	<5
Vinyl Chloride	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Xylenes - total	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		<0.5

NOTE: Blank indicates parameter not analysed.

APPENDIX

I

LANDFILL GAS ODOUR
CONTROL SYSTEM

LANDFILL GAS ODOUR CONTROL SYSTEM DESCRIPTION

TABLE OF CONTENTS

1.0 General

In March 2000, a Landfill Gas Odour Control System (LFG System) was established on site in the South Fill Area (SFA). In 2015, the LFG system was expanded to include the North Fill Area (NFA). The LFG system was established with the following objectives:

- to actively collect landfill gas (LFG) from the waste to provide odour control; and
- to operate in accordance with Conditions identified in ECA No. A341508.

The major components of the LFG System are the collection field, the gas control facility, and the Landfill Gas Utilization Plant (LGUP). Figure 7.1 shows the current LFG System components and layout.

1.1 Landfill Gas Collection Field

Five LFG wells were initially installed with the SFA LFG System in 2000 along with ten connections to the leachate collection system (LCS). The gas collection field was expanded to 17 LFG extraction wells in 2004 and 22 wells in 2007 to further improve odour control and to replace the collection capacity of eight gas system interconnections[1] to the LCS that were lost as a result of the vertical and horizontal expansion into Cell 1 – West A in 2005. The 2002 and 2007 expansion of the LFG System was also intended to achieve additional emission reductions as part of the City and the County's participation in Environment Canada's Pilot Emission Removals, Reductions and Learning (PERRL) Initiative report for the Site submitted in draft to Environment Canada in February 2008. The PERRL program terminated December 31, 2007.

A new LFG System connection to the LCS was made at the high end clean out HCO5 – 95 in Fall 2005 to increase gas draw from that portion of the LCS. The LFG System connection to the high end of the toe drain, formerly at TD-VC, was re-installed in Fall 2006 with a connection to TD-00-05. A connection from the main header to manhole MH J3 was made in 2007 to provide odour control at this location. Two new LFG valve chambers were installed in the north area of

[1] Connections removed at: VC1-94, VC2-94, VC3-94, VC4-94, VC5-95, VC6-95, VC7-95 and TD-VC.

the SFA in 2008 connecting to MH I1. These connections were made as part of the City's on-going efforts to control odour on the east and north sides of the SFA.

In 2011 24 new gas wells and the associated collection pipe were installed in the SFA.

The SFA LFG collection field is currently comprised of:

- 46 vertical extraction wells in Cell1 South and North; and
- 5 tie-ins to the leachate toe drain MHI1, MHD2, HC05-95, TD-00-05, and MH J3.

The extraction wells and LCS are connected to the LFG System utilizing a network of lateral and header piping. Each of the wells and four of LCS tie-ins are controlled by individual control valves. Monitoring ports are used to ensure that the LFG System is effectively balanced based on the methane and oxygen content of the collected landfill gas. The collection piping is graded so that any condensate forming in the piping is drained into the extraction wells or the existing LCS. Condensate collected at the gas control plant is pumped to the LCS.

Construction of Phase 1 of the LFG System in the NFA was completed in 2015. Phase 1 included installation of horizontal LFG collection pipes within Cell 2. The collection pipes were connected to the existing LCS manholes in Cell 2 to alleviate odour issues originating from the LCS. Horizontal pipes directe collected LFG to the existing LGUP and flare on site. A valve chamber and isolation valves were installed west of Cell 2 to isolate gas collected from the NFA and SFA. A test port was installed at the valve chamber to monitor quality of LFG collected from Cell 2.

Phase 2 of the LFG System in the NFA was completed in February 2018. Phase 2 included the perimeter header pipes around Cells 2 and 3, and 4 vertical LFG extraction wells in Cell 2.

Phase 3 of the LFG system in the NFA was completed in February 2020. Phase 3 included installation of horizontal LFG collection pipes in Cell 3 and three vertical LFG extraction wells. The horizontal collection pipes and extraction wells were connected to the perimeter header pipes previsouly installed in 2018. During Cell 4 construction, the LFG main header was expanded around the exterior of Cell 4 connecting the south north and south main header completing the installation of the main header within the entire NFA. Approximately 520m of header pipe was installed with eight (8) capped branch saddles for future connections.

1.2 Landfill Gas Control Facility

The control facility of the LFG System was relocated to the NFA on November 25, 2005 to facilitate the optimization of the SFA capacity. The LFG Control Facility is located in a fenced compound near the NFA. Approximately 600 meters of header pipe connect the Control Facility to the SFA collection field. The Control Facility has the following primary structures:

- blower and associated piping and valving;
- LFG flare stack;
- condensate trap;
- control panel;
- continuous gas analyzer; and
- continuous flow meter.

The controls and monitor for the plant are fully automated and include the following features:

- thermocouple connected to a datalogger and automated temperature controls;
- warning and alarm notification, or shutdown upon occurrence of fault conditions; and
- monitoring of flare operating temperatures and gas flows.

The operation of the flare is governed by thermocouples and the supply of LFG to the flare. A gas analyzer and flow meter were supplementary features installed for the quantification of emission reductions for the PERLL program. Both instruments are not required for the operation of the LFG System under the ECA.

A blower with a capacity in the range of approximately 14.2 cubic metres per minute (500 cubic feet per minute) applies a vacuum on the LFG collection field. The extracted LFG is transferred through the condensate trap to remove moisture and particulate matter. Condensate is collected in a rigid wall tank in the condensate trap and is pumped out as required by the Owner. The LFG is then directed to the flare stack, which combusts the LFG at a temperature of 875°C with a minimum retention time of 0.75 seconds to ensure a high level of hydrocarbon destruction efficiency and to minimize greenhouse gas emissions. Poured-in-place concrete pads have been constructed to house the blower, valves, and associated piping. Electrical controls, monitoring instrumentation, and electrical distribution equipment are housed in a weatherproof electrical cabinet, all of which have been now located in the vicinity of the new operations control area in the NFA.

Construction of the LGUP adjacent to the NFA commenced in October 2012 and was completed in July 2013. The LGUP is owned and operated by Peterborough Utilities Group (PUG). In July 2013 the LGUP started to receive landfill gas collected from the SFA and convert it to electricity. The electricity is then fed to the nearby electrical grid.

The perimeter LFG piping in Cell 2 was connected to the existing LGUP and flare on August 17, 2015.

As a result of an unscheduled inspection by the Technical Safety and Standards Association (TSSA) on May 29, 2013 upgrades to the Landfill Gas Control Facility were required. Major upgrades to the facility included replacement of the flare refractory, valves, and burner management system. The upgrades were completed in 2015 to satisfy TSSA requirements. The flare remains operational as a contingency to burn collection gas when the LGUP is not running.

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 24-Jan-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_2O

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- PUG not onsite.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	67.0	32.4	0.2	0.4	1.6	-0.5	No indicator on valve to determine positioning.
GW05-10	68.9	30.8	0.0	0.3	2.5	1.4	No indicator on valve to determine positioning
GW06-03	65.4	34.6	0.0	0.0	-1.7	-1.7	40% Closed
GW07-03	63.6	35.5	0.8	0.1	-1.3	-1.8	95% Closed
GW05-00	63.2	35.6	0.4	0.8	-1.7	-1.7	95% Closed
GW04-00	15.7	12.4	14.8	57.1	-1.3	-1.3	95% Closed
LCMV1	17.8	12.9	14.6	54.7	-1.4	-1.4	90% Closed
GW03-00	64.1	35.9	0.0	0.0	-1.3	-1.4	30% Closed
LCMV2	45.9	28.6	5.7	19.8	-1.0	-1.4	80% Closed
GW02-00	62.8	32.6	1.7	2.9	-1.5	-1.5	100% Open
GW01-00	67.5	32.5	0.0	0.0	101.9	101.9	20% Closed - High positive pressure, City staff advised of field observations.
LCMV3	67.1	32.8	0.0	0.1	0.0	0.0	70% Closed - Sag in flex hose condensation frozen restricting flow.
GW17-03	65.3	34.6	0.0	0.1	0.4	0.4	70% Closed
GW16-03	65.7	34.3	0.0	0.0	-1.4	-1.4	80% Closed
GW15-03	74.1	25.6	0.0	0.3	11.4	11.4	100% Open
LCMV5	44.4	25.8	6.6	23.2	-1.2	-1.2	95% Closed. LCMV5 is the smaller wellhead with white house in GW14-03.
GW14-03	67.1	32.7	0.0	0.2	-0.1	-1.2	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	66.8	33.0	0.2	0.0	-0.8	-1.2	80% Closed
GW12-03	67.8	32.0	0.0	0.2	-0.6	-0.6	45% Closed
GW11-03	70.3	29.1	0.3	0.3	-1.1	-1.4	90% Closed
GW23-10	67.2	32.8	0.0	0.0	0.6	0.6	No indicator on valve to determine positioning.
GW24-10	66.7	32.8	0.5	0.0	7.4	7.9	No indicator on valve to determine positioning
GW22-10	67.1	32.9	0.0	0.0	1.0	0.0	95% Closed
GW17-10	67.1	32.7	0.0	0.2	48.7	49.7	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. See notes at GW13-10 for rational of high pressure.
GW20-10	64.4	32.0	0.4	3.2	0.1	0.1	No indicator on valve to determine positioning
GW18-10	69.7	29.2	1.0	0.1	-1.1	-1.1	No indicator on valve to determine positioning
GW21-10	69.1	30.9	0.0	0.0	1.4	-1.0	No indicator on valve to determine positioning
GW19-10	68.2	31.7	0.0	0.1	1.0	-1.0	No indicator on valve to determine positioning.
GW10-03	70.5	29.4	0.0	0.1	-1.4	-1.4	30% Closed
GW09-03	72.4	24.6	2.0	1.0	-1.9	-1.9	45% Closed
GW08-03	71.2	28.1	0.7	0.0	-1.5	-1.6	75% Closed
GW18-07	66.0	33.8	0.0	0.2	0.9	0.1	100% Open
LCMV4	67.8	30.7	0.0	1.5	0.1	0.1	85% Closed
GW20-07	67.9	29.9	2.2	0.0	112.9	112.9	80% Closed - High positive pressure, City staff advised of field observations.
GW02-10	65.6	32.5	1.0	0.9	-1.7	-1.7	No indicator on valve to determine positioning
GW21-07	69.4	25.8	3.5	1.3	-1.5	-1.5	90% Closed
GW22-07	63.9	35.6	0.3	0.2	-1.4	-1.4	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	63.0	36.2	0.3	0.5	-1.4	-1.4	No indicator on valve to determine positioning
GW03-10	63.7	36.3	0.0	0.0	-1.1	-1.4	No indicator on valve to determine positioning
GW06-10	68.7	30.8	0.2	0.3	-1.2	-1.2	No indicator on valve to determine positioning

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	68.5	29.1	2.0	0.4	-1.2	-1.2	No indicator on valve to determine positioning
GW08-10	68.7	30.3	0.9	0.1	-2.6	-1.2	No indicator on valve to determine positioning
GW19-07	70.3	29.5	0.1	0.1	0.7	0.1	85% Closed
GW16-10	65.9	34.1	0.0	0.0	-0.1	-1.4	No indicator on valve to determine positioning
GW15-10	68.2	30.5	0.3	1.0	-0.7	-0.7	No indicator on valve to determine positioning
GW12-10	67.3	31.4	0.7	0.6	-1.6	-1.6	No indicator on valve to determine positioning
GW11-10	67.3	31.8	0.4	0.5	37.0	-2.0	No indicator on valve to determine positioning.
GW14-10	67.3	32.5	0.0	0.2	-1.5	-1.5	No indicator on valve to determine positioning
GW13-10	64.5	35.5	0.0	0.0	41.9	40.9	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Above ground lateral connection suspected to be frozen restricting gas flow. Lateral between GW13-10 and GW17-10 also suspected to be compromised.
GW10-10	63.5	36.0	0.0	0.5	-0.2	-0.5	80% Closed
GW09-10	58.9	35.5	3.0	2.6	-1.9	-1.9	No indicator on valve to determine positioning
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	66.0	29.9	0.7	3.4	-27.7	-27.8	50% Closed
NGW-2	65.9	33.0	0.5	0.6	-28.1	-28.1	80% Closed
NGW-3	66.9	32.0	0.5	0.6	-29.5	-29.5	30% Closed
NGW-4	66.7	32.6	0.0	0.7	39.5	38.7	40% closed
NGW-5	55.1	28.8	3.9	12.2	-23.8	-24.5	75% Closed
NGW-9	65.8	33.5	0.4	0.3	-0.6	-0.6	60% Closed
NGW-14	66.2	33.6	0.1	0.1	-0.8	-0.8	70% Closed
HC-3	14.1	30.2	1.2	54.5	-12.7	-25.1	100% Closed
HC-1	65.5	28.5	4.1	1.9	-18.0	-27.1	20% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 27-Feb-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_20

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- PUG not onsite.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	64.9	24.3	0.0	10.8	0.0	-1.7	No indicator on valve to determine positioning.
GW05-10	66.2	23.9	0.0	9.9	0.2	0.1	No indicator on valve to determine positioning
GW06-03	59.4	25.2	0.3	15.1	-1.7	-1.7	40% Closed
GW07-03	60.2	25.5	0.0	14.3	-1.7	-1.7	95% Closed
GW05-00	52.8	24.4	2.0	20.8	-1.7	-1.8	95% Closed
GW04-00	0.6	2.2	22.5	74.7	-1.8	-1.8	95% Closed
LCMV1	14.1	11.0	18.3	56.6	-1.8	-1.8	90% Closed
GW03-00	62.4	25.0	0.5	12.1	-0.4	-0.4	30% Closed
LCMV2	40.5	21.0	6.4	32.1	-1.4	-1.6	80% Closed
GW02-00	63.9	24.6	0.0	11.5	-1.8	-1.8	100% Open
GW01-00	66.8	23.8	0.0	9.4	37.7	37.7	20% Closed - High positive pressure for second monitoring visit.
LCMV3	63.5	24.7	0.0	11.8	0.0	0.0	70% Closed - Sag in flex hose, condensation frozen and restricting flow.
GW17-03	65.9	24.1	0.0	10.0	9.2	9.2	70% Closed
GW16-03	65.7	24.8	0.0	9.5	-1.6	-1.6	80% Closed
GW15-03	78.5	17.0	0.0	4.5	6.4	6.4	100% Open - Sag in flex hose, condensation frozen and restricting flow.
LCMV5	0.7	0.9	21.7	76.7	-1.3	-1.3	95% Closed. LCMV5 is the smaller wellhead with white house in GW14-03.
GW14-03	33.6	20.9	0.0	45.5	1.1	-1.3	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	58.1	23.0	1.1	17.8	-1.4	-1.5	80% Closed
GW12-03	69.1	22.7	0.0	8.2	-1.4	-1.4	45% Closed
GW11-03	72.5	21.8	0 . 4	5.7	-1.3	-1.4	90% Closed
GW23-10	45.5	22.3	0.0	32.2	0.1	0.0	No indicator on valve to determine positioning.
GW24-10	66.5	23.8	0.0	9.7	2.4	1.7	No indicator on valve to determine positioning
GW22-10	48.4	20.9	4.8	25.9	0.0	0.0	95% Closed
GW17-10	67.2	23.7	0.7	8.4	8.7	8.7	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. See notes at GW13-10 for rational of high pressure.
GW20-10	27.6	23.1	0.0	49.3	-0.6	-1.6	No indicator on valve to determine positioning
GW18-10	69.1	22.9	0.0	8.0	-1.5	-1.6	No indicator on valve to determine positioning
GW21-10	68.5	22.4	0.0	9.1	0.9	0.9	No indicator on valve to determine positioning
GW19-10	-	-	-	-	-	-	No indicator on valve to determine positioning. - Valves frozen.
GW10-03	71.5	21.7	0.6	6.2	-1.5	-1.5	30% Closed
GW09-03	70.5	20.1	1.1	8.3	-1.5	-1.5	45% Closed
GW08-03	68.7	21.6	1.6	8.1	-1.4	-1.5	75% Closed
GW18-07	67.4	23.5	2.3	6.8	3.5	0.0	100% Open
LCMV4	67.2	23.6	0.0	9.2	0.0	0.0	85% Closed
GW20-07	-	-	-	-	-	-	80% Closed - Top of wellhead missing and open to atmosphere. High pressure reading observed in January 2023 monitoring. Don Briand informed of missing cap.
GW02-10	68.1	23.4	0.0	8.5	-1.8	-1.8	No indicator on valve to determine positioning
GW21-07	73.2	21.4	0.0	5.4	-1.7	-1.7	90% Closed
GW22-07	68.3	23.1	1.8	6.8	-1.7	-1.7	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	66.3	24.0	0.0	9.7	-1.7	-1.7	No indicator on valve to determine positioning
GW03-10	68.1	23.4	0.0	8.5	-1.8	-1.8	No indicator on valve to determine positioning
GW06-10	-	-	-	-	-	-	No indicator on valve to determine positioning - Valves frozen.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	69.3	22.9	0.0	7.8	-1.6	-1.2	No indicator on valve to determine positioning
GW08-10	69.6	22.7	0.0	7.7	-1.6	-1.2	No indicator on valve to determine positioning
GW19-07	69.0	23.0	0.0	8.0	4.1	0.1	85% Closed
GW16-10	57.5	23.6	0.0	18.9	0.1	-1.4	No indicator on valve to determine positioning
GW15-10	71.5	22.5	0.0	6.0	-1.3	-0.7	No indicator on valve to determine positioning
GW12-10	-	-	-	-	-	-	No indicator on valve to determine positioning. - Valves frozen.
GW11-10	-	-	-	-	-	-	No indicator on valve to determine positioning. - Valves frozen.
GW14-10	68.7	23.2	0.7	7.4	-1.5	-1.5	No indicator on valve to determine positioning
GW13-10	66.2	23.9	0.7	9.2	43.0	43.0	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Above ground lateral connection suspected to be frozen restricting gas flow. Lateral between GW13-10 and GW17-10 also suspected to be compromised.
GW10-10	66.0	24.2	0.0	9.8	-0.8	-0.5	80% Closed
GW09-10	-	-	-	-	-	-	No indicator on valve to determine positioning. - Valves frozen.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	67.1	24.4	0.7	7.8	-3.9	-4.0	50% Closed
NGW-2	62.3	24.9	1.4	11.4	-4.0	-4.0	75% Closed
NGW-3	67.8	30.5	1.0	0.7	-3.9	-3.9	30% Closed
NGW-4	66.1	24.1	0.0	9.8	22.3	22.3	30% closed
NGW-5	67.3	24.1	0.1	8.5	-3.7	-3.9	75% Closed
NGW-9	65.7	24.1	0.0	10.2	16.0	16.0	55% Closed
NGW-14	66.1	24.0	2.8	7.1	16.5	16.5	60% Closed
HC-3	5.5	17.5	10.3	66.7	0.8	-1.6	100% Closed
HC-1	65.4	24.2	0.0	10.4	-1.0	-4.0	20% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 29-Mar-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_20

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress.
- LFG well cap missing from GW20-07 in the SFA and flex hose disconnected from NGW-09 in the NFA. Landfill manager notified and PUG was onsite in the afternoon to complete repairs.
- Landfill seep observed in the NFA by NGW-14 on the south slope of Cell 2 and East slope of Cell 2 by NGW-2. Landfill manager notified.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	63.3	31.2	0.1	5.4	0.2	-7.1	No indicator on valve to determine positioning.
GW05-10	66.0	30.8	0.0	3.2	-2.1	-2.1	No indicator on valve to determine positioning
GW06-03	58.0	33.2	0.3	8.5	-7.8	-7.8	40% Closed
GW07-03	58.9	34.0	0.0	7.1	-7.5	-7.5	95% Closed
GW05-00	52.8	31.4	1.3	14.5	-7.6	-7.6	95% Closed
GW04-00	22.1	13.0	13.9	51.0	-7.8	-7.8	95% Closed
LCMV1	7.0	5.3	18.7	69.0	-7.8	-7.8	90% Closed
GW03-00	61.3	32.9	0.0	5.8	-8.0	-8.0	30% Closed
LCMV2	13.8	9.6	16.0	60.6	-1.5	-7.8	80% Closed
GW02-00	62.4	32.3	0.2	5.1	-8.0	-8.0	100% Open
GW01-00	65.2	31.0	0.0	3.8	15.7	15.8	20% Closed - High positive pressure for second monitoring visit.
LCMV3	59.6	30.6	0.2	9.6	0.0	0.0	70% Closed - Sag in flex hose, condensation frozen and restricting flow.
GW17-03	63.0	32.0	0.0	5.0	-6.4	-6.7	70% Closed
GW16-03	64.9	30.2	0.0	4.9	-6.2	-6.2	80% Closed
GW15-03	-	-	-	-	-	-	100% Open - Flooded well.
LCMV5	36.0	18.6	7.5	37.9	-5.8	-5.8	95% Closed. LCMV5 is the smaller wellhead with white house in GW14-03.
GW14-03	29.0	24.0	1.1	45.9	-4.9	-5.2	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	54.1	28.9	0.8	16.2	-5.7	-5.7	80% Closed
GW12-03	68.1	28.0	0.0	3.9	-5.6	-5.7	45% Closed
GW11-03	40.4	16.5	6.0	37.1	-5.7	-5.7	90% Closed
GW23-10	37.6	26.1	1.1	35.2	-1.2	-1.2	No indicator on valve to determine positioning. Quick coupler needs to be replaced.
GW24-10	64.3	31.4	0.0	4.3	3.1	3.1	No indicator on valve to determine positioning
GW22-10	32.5	18.3	9.0	40.2	-1.6	-6.2	95% Closed
GW17-10	64.2	30.6	0.7	4.5	13.3	13.3	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. See notes at GW13-10 for rational of high pressure. Grading is required around well, settlement has occurred and will require to be
GW20-10	58.7	30.8	0.0	10.5	-4.3	-4.5	No indicator on valve to determine positioning
GW18-10	67.5	28.6	0.0	3.9	-6.3	-6.3	No indicator on valve to determine positioning
GW21-10	69.8	28.6	0.0	1.6	2.2	2.1	No indicator on valve to determine positioning
GW19-10	68.4	29.9	0.0	1.7	-1.7	-6.2	No indicator on valve to determine positioning.
GW10-03	68.7	26.8	0.0	4.5	-5.5	-5.9	30% Closed
GW09-03	69.7	23.7	0.5	6.1	-5.3	-5.6	45% Closed
GW08-03	67.2	25.8	1.6	5.4	-5.5	-5.6	75% Closed
GW18-07	65.3	30.9	0.0	3.8	1.2	0.0	100% Open
LCMV4	67.4	29.8	0.0	2.8	-0.1	-0.3	85% Closed
GW20-07	-	-	-	-	-	-	80% Closed - Top of wellhead still missing and open to atmosphere. Don Briand was notified and PUG was onsite in the afternoon to complete repairs. High pressure reading observed in January 2023 monitoring.
GW02-10	65.4	30.3	0.0	4.3	-6.8	-6.9	No indicator on valve to determine positioning
GW21-07	70.9	26.0	0.0	3.1	-6.7	-6.8	90% Closed
GW22-07	65.9	30.2	0.0	3.9	-6.7	-6.7	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	66.0	30.1	0.7	3.2	-6.7	-6.7	No indicator on valve to determine positioning
GW03-10	66.5	29.7	0.0	3.8	-6.5	-6.6	No indicator on valve to determine positioning
GW06-10	65.6	30.3	0.0	4.1	-6.5	-6.5	No indicator on valve to determine positioning

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	69.3	30.4	0.0	0.3	-6.5	-6.5	No indicator on valve to determine positioning
GW08-10	67.3	28.7	0.0	4.0	-7.6	-7.6	No indicator on valve to determine positioning
GW19-07	68.9	27.7	0.0	3.4	1.0	0.0	85% Closed
GW16-10	60.3	31.1	0.0	8.6	0.4	-5.0	No indicator on valve to determine positioning
GW15-10	66.6	27.9	0.0	5.5	-3.7	-4.0	No indicator on valve to determine positioning
GW12-10	67.2	28.8	0.0	4.0	-6.5	-6.5	No indicator on valve to determine positioning.
GW11-10	67.2	29.3	0.0	3.5	36.5	-6.1	No indicator on valve to determine positioning.
GW14-10	66.1	30.1	0.0	3.8	-0.5	-5.7	No indicator on valve to determine positioning
GW13-10	63.6	31.6	0.0	4.8	-0.2	-0.2	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Above ground lateral connection suspected to be frozen/thawing restricting gas flow. Condensation in the above ground line is likely and should be drained when able. Lateral between GW13-10 and GW17-10 also suspected to be compromised.
GW10-10	62.3	33.4	0.0	4.3	-4.4	-4.9	80% Closed
GW09-10	58.9	35.5	3.0	2.6	-6.3	-6.3	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	64.6	32.7	0.0	2.7	-7.3	-7.3	50% Closed
NGW-2	64.5	32.8	0.0	2.7	-7.3	-4.0	75% Closed - Observed leachate staining/bubbling through final cover between NGW-3 and NGW-3.
NGW-3	65.0	31.3	0.9	2.8	-7.1	7.5	30% Closed
NGW-4	64.5	32.8	0.0	2.7	-7.5	-7.5	30% closed
NGW-5	63.2	32.9	0.0	3.9	-7.0	-7.1	75% Closed
NGW-9	64.7	32.6	0.0	2.7	0.0	0.0	60% Closed - Flex hose disconnected from HDPE pipe. Don Briand made aware. PUG was onsite in the afternoon to reconnect hose to the system.
NGW-14	63.8	32.5	0.0	3.7	0.1	0.1	60% Closed. - Leachate seep observed to the west of well.
HC-3	5.3	20.7	9.8	64.2	3.9	4.0	100% Closed
HC-1	63.0	33.8	0.0	3.2	-1.6	-7.4	20% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 20-Apr-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: -2.6 "$H_2$0

Flow at Gas Utilization Plant: 194 cfm

Temp. at Gas Utilization Plant: 8.7 degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress and Todd Brothers onsite to complete access road construction and miscellanious items to be completed under Cell 4 Construction contract.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	51.0	26.3	0.2	22.5	-	-4.1	- GUP operating.
GW04-10	53.3	22.4	2.3	22.0	0.0	-1.9	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired.
GW05-10	65.9	23.6	0.0	10.5	0.0	0.0	No indicator on valve to determine positioning
GW06-03	59.5	25.1	0.0	15.4	-2.3	-2.3	40% Closed
GW07-03	59.5	25.2	0.0	15.3	-2.2	-2.3	95% Closed
GW05-00	52.5	23.9	1.8	21.8	-2.2	-2.2	95% Closed
GW04-00	23.9	15.2	11.2	49.7	-2.3	-2.3	95% Closed
LCMV1	11.0	9.5	16.1	63.4	-2.5	-2.5	90% Closed
GW03-00	61.4	24.8	0.0	13.8	-2.4	-2.4	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	30.0	18.0	0.0	52.0	-0.5	-2.3	80% Closed
GW02-00	62.0	24.4	0.3	13.3	-2.4	-2.4	100% Open
GW01-00	64.5	23.9	0.0	11.6	-2.3	-2.3	20% Closed
LCMV3	54.8	24.0	0.3	20.9	-1.0	-2.4	70% Closed - Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	62.2	24.4	0.2	13.2	-2.4	-2.4	70% Closed
GW16-03	62.5	24.1	0.0	13.4	-2.4	-2.4	80% Closed
GW15-03	63.3	24.0	1.0	0.1	3.4	3.4	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction.
LCMV5	2.9	3.5	18.2	75.4	-2.2	-2.2	95% Closed. LCMV5 is the smaller wellhead with white house in GW14-03.
GW14-03	14.3	18.2	2.3	65.2	-2.0	-2.2	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	48.8	22.9	0.7	27.6	-2.4	-2.4	80% Closed
GW12-03	66.4	23.0	0.0	10.6	-2.4	-2.4	45% Closed
GW11-03	51.7	20.0	0.8	27.5	-2.4	-2.4	90% Closed
GW23-10	29.2	21.3	0.0	49.5	-0.7	-1.2	No indicator on valve to determine positioning. Quick coupler on wellhead needs to be replaced and leaking.
GW24-10	62.6	24.4	0.0	13.0	1.4	1.4	No indicator on valve to determine positioning
GW22-10	29.5	16.9	9.7	43.9	-0.6	-2.5	95% Closed
GW17-10	64.0	24.2	0.0	11.8	4.6	4.7	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	57.2	24.1	0.0	18.7	-1.6	-1.6	No indicator on valve to determine positioning
GW18-10	66.7	23.2	0.0	10.1	-2.5	-2.5	No indicator on valve to determine positioning. Quick coupler on wellhead needs to be replaced and leaking.
GW21-10	63.5	23.0	0.5	13.0	0.5	0.5	No indicator on valve to determine positioning
GW19-10	55.9	23.1	0.0	21.0	-0.4	-2.6	No indicator on valve to determine positioning.
GW10-03	73.5	22.4	0.0	4.1	-2.5	-2.5	30% Closed
GW09-03	62.5	19.9	1.9	15.7	-2.6	-2.6	45% Closed
GW08-03	68.8	22.4	0.0	8.8	-2.5	-2.5	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	63.7	24.0	0.0	12.3	-2.6	-2.6	100% Open
LCMV4	14.7	14.2	9.1	62.0	-0.7	-2.6	85% Closed
GW20-07	70.5	21.5	0.0	8.0	-0.9	-1.0	80% Closed
GW02-10	64.4	24.0	0.0	11.6	-2.7	-2.7	No indicator on valve to determine positioning
GW21-07	69.6	21.7	0.0	8.7	-2.6	-2.6	80% Closed
GW22-07	63.8	23.9	0.0	12.3	-2.6	-2.6	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	62.0	24.0	0.0	14.0	-2.7	-2.7	No indicator on valve to determine positioning
GW03-10	64.1	24.0	0.0	11.9	-2.6	-2.6	No indicator on valve to determine positioning
GW06-10	63.6	24.1	0.0	12.3	-2.6	-2.6	No indicator on valve to determine positioning

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	66.5	23.4	0.0	10.1	-2.5	-2.5	No indicator on valve to determine positioning
GW08-10	66.4	23.3	0.0	10.3	-2.6	-2.7	No indicator on valve to determine positioning
GW19-07	67.5	22.8	0.0	9.7	-2.5	-2.5	80% Closed
GW16-10	39.6	23.3	0.0	37.1	0.0	-2.3	No indicator on valve to determine positioning
GW15-10	67.5	22.8	0.0	9.7	-1.8	-1.8	No indicator on valve to determine positioning
GW12-10	66.5	23.4	0.0	10.1	-1.7	-2.0	No indicator on valve to determine positioning.
GW11-10	64.4	23.7	0.0	11.9	16.0	-2.6	No indicator on valve to determine positioning.
GW14-10	64.3	23.9	0.0	11.8	-2.3	-2.3	No indicator on valve to determine positioning
GW13-10	63.0	24.9	0.0	12.1	-2.3	-2.4	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample port should be replaced.
GW10-10	60.4	25.2	0.0	14.4	-1.6	-1.6	80% Closed
GW09-10	61.1	25.0	0.0	13.9	-2.5	-2.6	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	60.4	24.9	0.0	14.7	-3.4	-3.4	50% Closed
NGW-2	56.2	24.6	0.6	18.6	-3.4	-3.4	75% Closed
NGW-3	61.4	25.0	0.0	13.6	-3.4	-3.4	30% Closed
NGW-4	61.9	25.8	0.0	12.3	-3.4	-3.4	30% closed
NGW-5	59.6	25.3	0	15.1	-3.4	-3.4	75% Closed
NGW-9	65.2	25.0	0.0	9.8	-3.4	-3.4	60% Closed
NGW-14	60.0	25.2	0.0	14.8	-3.3	-3.4	60% Closed
HC-3	2.5	18.4	11.0	68.1	-0.6	-3.3	100% Closed
HC-1	58.9	25.4	0.0	15.7	-1.0	-3.3	20% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 25-May-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_20

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress.
'- Final cover repairs required around NGW-14 and east slope of Cell 2.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	43.3	23.7	5.2	27.8	0.1	-4.6	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired.
GW05-10	70.5	28.1	0.4	1.0	0.3	0.3	No indicator on valve to determine positioning
GW06-03	58.9	33.5	0.6	7.0	-5.1	-5.1	40% Closed
GW07-03	60.6	32.1	0.1	7.2	-5.0	-5.0	95% Closed
GW05-00	40.8	24.4	6.5	28.3	-5.2	-5.2	95% Closed
GW04-00	33.2	18.3	8.8	39.7	-5.2	-5.2	95% Closed
LCMV1	5.4	4.7	17.9	72.0	-5.2	-5.2	90% Closed
GW03-00	65.1	31.7	0.0	3.2	-5.1	-5.1	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	25.4	18.8	8.0	47.8	-4.5	-5.1	70% Closed
GW02-00	65.2	30.5	0.4	3.9	-5.5	-5.5	100% Open
GW01-00	67.4	29.4	0.0	3.2	-5.5	-5.5	20% Closed
LCMV3	43.5	24.8	5.5	26.2	-3.6	-5.6	70% Closed - Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	63.0	30.2	0.1	6.7	-4.7	-4.8	70% Closed
GW16-03	64.9	30.3	0.0	4.8	-4.9	-4.9	80% Closed
GW15-03	75.6	19.3	0.2	0.1	19.5	19.5	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction.
LCMV5	5.2	3.8	16.5	74.5	-5.2	-5.2	95% Closed. LCMV5 is the smaller wellhead with white house in GW14-03.
GW14-03	25.7	22.6	0.1	51.6	-4.5	-5.2	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	51.0	27.4	0.5	21.1	-5.0	-5.1	80% Closed
GW12-03	69.8	26.3	0.1	3.8	-5.4	-5.2	45% Closed
GW11-03	51.0	24.4	0.0	24.6	-4.9	-5.1	90% Closed
GW23-10	36.5	24.9	0.1	38.5	-1.3	-2.3	No indicator on valve to determine positioning. Quick coupler on wellhead needs to be replaced and leaking.
GW24-10	71.5	28.5	0.0	0.0	4.8	4.6	No indicator on valve to determine positioning
GW22-10	28.4	15.7	10.7	45.2	-1.3	-5.3	95% Closed
GW17-10	68.2	29.0	0.3	2.5	12.5	12.5	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	49.9	27.5	0.1	22.5	-3.3	-5.2	No indicator on valve to determine positioning
GW18-10	71.2	27.5	0.0	1.3	-5.5	-5.5	No indicator on valve to determine positioning. Quick coupler on wellhead needs to be replaced and leaking.
GW21-10	62.3	26.3	0.0	11.4	0.6	0.6	No indicator on valve to determine positioning
GW19-10	60.2	27.0	0.0	12.8	-0.5	-5.2	No indicator on valve to determine positioning.
GW10-03	71.5	22.7	1.0	4.8	-5.1	-5.1	30% Closed
GW09-03	69.2	23.3	0.7	6.8	-5.1	-5.1	45% Closed
GW08-03	68.4	24.3	0.8	6.5	-5.2	-5.2	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	63.7	28.4	0.0	7.9	-6.0	-6.0	100% Open
LCMV4	13.3	13.6	8.5	64.6	-0.6	-5.0	85% Closed
GW20-07	75.0	23.3	0.5	1.2	-0.8	-1.3	80% Closed
GW02-10	66.9	28.8	0.1	4.2	-6.2	-6.2	No indicator on valve to determine positioning
GW21-07	71.0	23.6	0.0	5.4	-5.8	-5.9	80% Closed
GW22-07	65.4	28.1	0.0	6.5	-5.9	-5.9	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	63.5	28.8	0.4	7.3	-6.1	-6.1	No indicator on valve to determine positioning
GW03-10	68.0	27.9	0.0	4.1	-5.9	-5.9	No indicator on valve to determine positioning
GW06-10	66.9	29.7	0.0	3.4	-5.9	-5.9	No indicator on valve to determine positioning

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	64.9	28.8	0.9	5.4	-6.0	-6.0	No indicator on valve to determine positioning
GW08-10	70.2	26.1	0.0	3.7	-5.9	-5.9	No indicator on valve to determine positioning
GW19-07	69.6	26.0	0.1	4.3	-5.9	-5.9	80% Closed
GW16-10	50.5	26.6	0.0	22.9	0.0	-5.0	No indicator on valve to determine positioning
GW15-10	71.0	26.4	0.0	2.6	-3.1	-3.1	No indicator on valve to determine positioning
GW12-10	68.7	26.6	0.1	4.6	-6.0	-6.0	No indicator on valve to determine positioning.
GW11-10	68.0	26.0	0.0	6.0	38.6	-6.0	No indicator on valve to determine positioning.
GW14-10	70.9	27.9	0.0	1.2	-5.4	-5.5	No indicator on valve to determine positioning
GW13-10	63.4	29.1	0.1	7.4	-5.4	-5.6	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample port should be replaced.
GW10-10	63.4	30.0	0.0	6.6	-3.8	-4.5	80% Closed
GW09-10	63.1	30.4	0.0	6.5	-5.8	-5.8	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	61.9	29.7	0.2	8.2	-11.5	-11.5	50% Closed
NGW-2	64.3	29.3	0.1	6.3	-11.5	-11.5	75% Closed
NGW-3	69.2	30.2	0.0	0.6	-11.5	-11.5	95% Closed
NGW-4	62.7	30.6	0.0	6.7	-11.3	-11.5	80% closed
NGW-5	65.2	27	0.1	7.7	-11.3	-11.3	75% Closed
NGW-9	64.5	30.6	0.0	4.9	-11.7	-11.7	75% Closed
NGW-14	62.7	31.0	0.5	5.8	-11.5	-11.5	80% Closed
HC-3	1.5	16.7	11.2	70.6	3.7	-11.7	100% Closed
HC-1	56.1	30.6	0.9	12.4	-3.8	-12.0	40% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 30-Jun-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_20

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress.
- Final cover repairs required on the East and South slopes of Cell 2.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	37.5	25.0	5.5	32.0	-0.2	-2.9	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired.
GW05-10	63.2	33.6	1.1	2.1	-1.0	-1.1	No indicator on valve to determine positioning
GW06-03	57.3	38.0	0.9	3.8	-3.1	-3.2	40% Closed
GW07-03	58.5	38.9	0.2	2.4	-3.1	-3.2	95% Closed
GW05-00	63.5	31.6	3.8	1.1	-3.2	-3.3	95% Closed
GW04-00	24.3	16.7	11.9	47.1	-3.1	-3.2	95% Closed
LCMV1	7.2	5.6	17.8	69.4	-3.3	-3.3	90% Closed
GW03-00	62.1	37.6	0.3	0.0	-3.1	-3.1	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	28.7	19.9	9.5	41.9	-2.8	-3.1	70% Closed
GW02-00	62.3	35.9	0.8	1.0	-3.1	-3.1	100% Open
GW01-00	65.7	34.3	0.0	0.0	-3.0	-3.1	20% Closed
LCMV3	38.7	25.3	6.8	29.2	-1.4	-3.1	70% Closed - Sag in flex hose. Hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	62.4	35.7	0.3	1.6	-2.6	-2.7	65% Closed
GW16-03	61.5	38.0	0.1	0.4	-2.6	-2.6	80% Closed
GW15-03	68.9	28.0	0.0	0.1	6.6	6.4	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction.
LCMV5	2.3	2.4	18.5	76.8	-2.3	-2.3	95% Closed. LCMV5 is the smaller wellhead with white house in GW14-03.
GW14-03	6.3	11.0	9.9	72.8	-2.0	-2.6	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	48.8	30.9	0.7	19.6	-2.5	-2.5	80% Closed
GW12-03	68.8	30.2	0.6	0.4	-2.4	-2.5	45% Closed
GW11-03	47.6	28.1	0.2	24.1	-2.5	-2.5	85% Closed
GW23-10	31.3	25.0	0.1	43.6	-1.2	N/A	No indicator on valve to determine positioning. Quick coupler on wellhead should be replaced and leaking.
GW24-10	64.5	35.2	0.0	0.3	0.8	0.8	No indicator on valve to determine positioning
GW22-10	30.0	18.6	9.9	41.5	-0.5	-2.5	95% Closed
GW17-10	63.9	34.7	0.5	0.9	5.4	5.4	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	52.9	33.9	0.1	13.1	-1.3	-2.3	No indicator on valve to determine positioning
GW18-10	63.9	30.5	1.0	4.6	-2.7	N/A	No indicator on valve to determine positioning. Quick coupler on wellhead should be replaced..
GW21-10	68.9	31.0	0.1	0.0	-2.0	-2.0	No indicator on valve to determine positioning
GW19-10	56.6	32.3	0.1	11.0	-0.2	-2.6	No indicator on valve to determine positioning.
GW10-03	69.0	30.1	0.1	0.8	-2.6	-2.6	30% Closed
GW09-03	71.0	28.5	0.1	0.4	-2.5	-2.5	45% Closed
GW08-03	70.4	28.8	0.1	0.7	-2.3	-2.3	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	69.7	29.9	0.3	0.1	-2.3	-2.3	100% Open
LCMV4	14.5	14.8	8.7	62.0	-0.2	-0.5	85% Closed
GW20-07	69.3	29.9	0.2	0.6	1.2	2.2	80% Closed
GW02-10	67.8	31.5	0.5	0.2	-2.3	-2.3	No indicator on valve to determine positioning
GW21-07	71.4	27.9	0.3	0.4	-3.0	-3.4	90% Closed
GW22-07	68.7	29.7	0.1	1.5	-2.2	-2.2	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	64.3	33.6	0.1	2.0	-2.3	-2.3	No indicator on valve to determine positioning
GW03-10	68.7	29.5	0.0	1.8	-2.3	-2.3	No indicator on valve to determine positioning
GW06-10	66.2	30.2	0.3	3.3	-2.3	-2.3	No indicator on valve to determine positioning

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	66.3	31.2	0.1	2.4	-3.0	-3.0	No indicator on valve to determine positioning
GW08-10	67.4	31.8	0.1	0.7	-3.6	-3.6	No indicator on valve to determine positioning
GW19-07	70.3	29.7	0.0	0.0	0.1	0.0	80% Closed
GW16-10	49.9	32.8	0.1	17.2	0.1	-2.5	No indicator on valve to determine positioning
GW15-10	68.7	31.1	0.1	0.1	-2.5	-2.5	No indicator on valve to determine positioning
GW12-10	68.2	31.4	0.1	0.3	-3.0	-3.2	No indicator on valve to determine positioning.
GW11-10	66.5	33.1	0.1	0.3	16.9	-2.2	No indicator on valve to determine positioning.
GW14-10	65.1	33.5	0.2	1.2	-2.8	-3.5	No indicator on valve to determine positioning
GW13-10	63.2	28.3	0.2	8.3	-2.4	-2.4	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample port should be replaced.
GW10-10	64.6	32.1	0.1	3.2	-1.5	-1.9	80% Closed
GW09-10	60.1	31.8	0.5	7.6	-2.3	-2.3	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	62.6	37.3	0.0	0.1	-3.6	-3.6	50% Closed
NGW-2	63.2	36.7	0.0	0.1	-3.6	-3.6	75% Closed
NGW-3	63.2	35.8	0.0	1.0	-3.5	-3.5	95% Closed
NGW-4	62.1	37.7	0.0	0.2	-3.6	-3.7	80% closed
NGW-5	63.5	36.1	0	0.4	-3.7	-3.7	75% Closed
NGW-9	62.6	36.6	0.0	0.8	-3.7	-3.7	75% Closed
NGW-14	62.2	37.5	0.0	0.3	-3.7	-3.7	80% Closed
HC-3	4.8	32.3	5.1	57.8	-2.4	-3.7	100% Closed
HC-1	60.1	39.2	0.6	0.1	-0.9	-3.7	40% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 27-Jul-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_20

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress.
- Progressive final cover observed placed on slopes of Cell 2 and 3.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	38.6	26.4	5.0	30.0	0.0	-1.9	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired.
GW05-10	63.8	35.8	0.4	0.0	-0.1	-0.3	No indicator on valve to determine positioning
GW06-03	57.1	40.5	0.1	2.3	-2.2	-2.5	40% Closed
GW07-03	58.2	40.5	0.2	1.1	-2.2	-2.3	95% Closed
GW05-00	44.0	30.2	5.6	20.2	-2.3	-2.3	95% Closed
GW04-00	28.5	17.9	10.5	43.1	-2.3	-2.3	95% Closed
LCMV1	9.5	7.3	16.7	66.5	-2.3	-2.3	90% Closed
GW03-00	58.6	37.8	1.7	1.9	-2.3	-2.3	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	48.8	29.0	5.7	16.5	-2.2	-2.2	70% Closed
GW02-00	62.3	36.8	0.4	0.5	-2.2	-2.2	100% Open
GW01-00	64.3	33.4	0.4	1.9	-2.3	-2.3	20% Closed
LCMV3	60.6	38.6	0.2	0.6	-1.5	-2.3	70% Closed - Sag in flex hose. Hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	62.5	36.8	0.0	0.7	-1.8	-1.8	65% Closed
GW16-03	60.0	38.9	0.3	0.8	-1.8	-1.8	80% Closed
GW15-03	60.1	38.7	0.2	1.0	8.1	8.1	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction.
LCMV5	5.2	7.7	14.3	72.8	-2.2	-2.2	95% Closed. LCMV5 is the smaller wellhead with white hose in GW14-03.
GW14-03	14.7	18.8	4.5	62.0	-1.8	-2.2	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	55.6	32.2	0.5	11.7	-1.7	-1.8	80% Closed
GW12-03	67.3	31.5	0.9	0.3	-1.8	-1.8	45% Closed
GW11-03	70.3	28.1	0.2	1.4	-1.8	-1.8	85% Closed
GW23-10	34.6	26.7	0.0	38.7	-0.8	-	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced. Unable to sample static pressure from the systems side due to quick coupler repairs required.
GW24-10	62.8	36.1	0.1	1.0	1.8	1.0	No indicator on valve to determine positioning
GW22-10	46.6	26.7	4.4	22.3	-0.3	-1.0	95% Closed
GW17-10	65.1	34.2	0.3	0.4	6.3	5.9	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	61.2	34.4	0.1	4.3	-0.7	-1.0	No indicator on valve to determine positioning
GW18-10	64.2	33.4	0.9	1.5	-1.9	-2.0	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW21-10	69.3	30.3	0.1	0.3	0.4	0.0	No indicator on valve to determine positioning
GW19-10	63.1	35.7	0.3	0.9	0.0	-1.9	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW10-03	58.3	26.7	2.8	12.2	-1.6	-1.8	30% Closed
GW09-03	63.5	33.2	0.2	3.1	-1.8	-1.8	45% Closed
GW08-03	70.2	29.2	0.3	0.3	-2.0	-2.1	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	65.3	34.1	0.0	0.6	0.0	0.0	100% Open
LCMV4	66.6	33.1	0.0	0.3	0.0	0.0	85% Closed
GW20-07	68.3	31.7	0.0	0.0	1.5	1.5	80% Closed
GW02-10	65.1	33.5	0.3	1.1	-2.2	-2.2	No indicator on valve to determine positioning
GW21-07	40.5	16.3	8.5	34.7	-2.3	-2.3	90% Closed
GW22-07	65.0	34.5	0.5	0.0	-2.2	-2.2	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	62.0	37.8	0.1	0.1	-2.3	-2.3	No indicator on valve to determine positioning
GW03-10	61.7	36.7	1.0	0.6	-2.3	-2.3	No indicator on valve to determine positioning
GW06-10	65.5	34.0	0.2	0.3	-4.7	-2.1	No indicator on valve to determine positioning

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	66.8	33.0	0.2	0.0	-2.3	-2.3	No indicator on valve to determine positioning
GW08-10	67.2	32.5	0.1	0.2	-2.3	-2.3	No indicator on valve to determine positioning
GW19-07	64.5	26.6	0.2	8.7	-0.1	-0.3	80% Closed
GW16-10	59.4	36.5	0.1	4.0	0.0	-1.8	No indicator on valve to determine positioning
GW15-10	66.6	32.5	0.2	0.7	-1.8	-1.9	No indicator on valve to determine positioning
GW12-10	67.8	32.0	0.1	0.1	-1.8	-1.8	No indicator on valve to determine positioning.
GW11-10	66.7	33.3	0.0	0.0	17.7	-2.3	No indicator on valve to determine positioning.
GW14-10	65.3	33.1	0.3	1.3	-2.0	-2.3	No indicator on valve to determine positioning
GW13-10	62.7	36.4	0.3	0.6	-2.3	-2.3	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample port should be replaced.
GW10-10	61.5	38.4	0.1	0.0	-1.7	-2.0	80% Closed
GW09-10	62.5	36.8	0.2	0.5	-2.3	-2.3	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	62.7	37.1	0.0	0.2	-2.6	-2.6	50% Closed
NGW-2	62.3	35.6	0.9	1.2	-2.6	-2.6	75% Closed
NGW-3	63.2	36.6	0.2	0.0	-2.6	-2.6	95% Closed
NGW-4	61.2	36.9	0.5	1.4	-2.7	-2.7	80% closed
NGW-5	62.4	37.4	0.2	0.0	-2.6	-2.6	75% Closed
NGW-9	61.8	37.9	0.1	0.2	-2.7	-2.8	75% Closed
NGW-14	62.5	37.0	0.2	0.3	-2.7	-2.8	80% Closed
HC-3	5.2	29.0	6.1	59.7	0.7	-2.7	100% Closed
HC-1	60.1	38.6	0.2	1.1	-0.3	-2.9	40% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 29-Aug-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_20

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 2/3 landfilling in progress.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	35.4	26.6	3.7	34.3	-0.1	-1.6	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired. Sample tube on the LFG well is broken and requires repairs.
GW05-10	63.0	34.3	2.5	0.2	0.0	-0.3	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements
GW06-03	60.2	39.1	0.7	0.0	-1.6	-1.6	40% Closed
GW07-03	60.6	38.2	0.4	0.8	-2.0	-2.2	95% Closed
GW05-00	43.3	30.5	4.4	21.8	-2.2	-2.2	95% Closed
GW04-00	30.1	21.2	8.6	40.1	-1.5	-2.0	95% Closed
LCMV1	15.4	7.6	15.8	61.2	-1.8	-1.8	90% Closed
GW03-00	60.0	37.6	1.3	1.1	-0.8	-0.8	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	32.2	18.2	10.2	39.4	-1.7	-1.8	70% Closed
GW02-00	61.6	36.9	0.5	1.0	-1.8	-1.8	100% Open
GW01-00	63.1	35.1	0.3	1.5	-1.9	-1.9	20% Closed
LCMV3	59.6	37.3	0.3	2.8	-1.1	-2.3	70% Closed - Sag in flex hose. Hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	57.6	34.6	1.4	6.4	-1.6	-1.8	65% Closed
GW16-03	61.5	36.3	1.7	0.5	-1.6	-1.6	80% Closed
GW15-03	63.5	35.9	0.4	0.2	8.6	8.6	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction. All three (3) rubber sample port caps should be replaced.
LCMV5	10.7	1.7	18.2	69.4	-1.4	-1.7	95% Closed. LCMV5 is the smaller wellhead with white hose in GW14-03.
GW14-03	28.9	13.3	7.5	50.3	-1.7	-1.7	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	67.6	30.9	0.5	1.0	-1.5	-1.6	80% Closed
GW12-03	68.3	31.2	0.4	0.1	-1.7	-1.7	45% Closed
GW11-03	53.1	16.5	8.3	22.1	-1.3	-1.3	85% Closed
GW23-10	37.8	27.1	0.4	34.7	-0.5	N/A	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced. Unable to sample static pressure from the systems side due to quick coupler repairs required.
GW24-10	63.7	36.0	0.3	0.0	1.9	1.9	No indicator on valve to determine positioning
GW22-10	45.3	24.9	6.2	23.6	0.0	-1.3	95% Closed
GW17-10	63.7	33.9	0.4	2.0	6.2	6.2	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	56.0	35.5	0.4	8.1	-0.7	-1.5	No indicator on valve to determine positioning
GW18-10	63.1	32.3	0.5	4.1	-1.5	-1.5	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW21-10	69.5	30.0	0.4	0.1	0.6	0.6	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW19-10	62.3	34.5	0.5	2.7	0.0	-1.3	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW10-03	66.8	29.0	0.6	3.6	-1.3	-1.3	35% Closed
GW09-03	61.5	26.7	0.5	11.3	-1.2	-1.3	45% Closed
GW08-03	66.0	28.3	0.7	5.0	-1.7	-1.7	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	64.0	33.3	0.4	2.3	0.0	0.0	100% Open
LCMV4	65.8	33.3	0.4	0.5	0.0	0.0	85% Closed
GW20-07	69.4	27.8	0.5	2.3	1.5	1.7	80% Closed. All three (3) rubber sample port caps should be replaced.
GW02-10	61.9	34.3	0.5	3.3	-1.5	-1.5	No indicator on valve to determine positioning.
GW21-07	45.7	18.2	6.5	29.6	-1.7	-1.7	90% Closed
GW22-07	60.2	36.5	0.4	2.9	-1.4	-1.4	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	59.0	35.9	0.5	4.6	-1.6	-1.6	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW03-10	63.1	34.0	0.7	2.2	-1.8	-1.8	No indicator on valve to determine positioning
GW06-10	59.6	34.3	0.4	5.7	-1.5	-1.5	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Engineered fill required around well, settlement has occurred and the well is hard to sample.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	65.0	32.2	0.5	2.3	-1.8	-1.8	No indicator on valve to determine positioning
GW08-10	62.3	32.5	0.5	4.7	-1.8	-1.8	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements.
GW19-07	66.0	28.1	0.4	5.5	0.0	0.1	80% Closed. Two (2) rubber sample port caps should be replaced.
GW16-10	60.6	35.2	0.4	3.8	0.0	-1.6	No indicator on valve to determine positioning
GW15-10	63.0	31.9	0.5	4.6	-0.8	-1.0	No indicator on valve to determine positioning
GW12-10	62.0	30.4	0.6	7.0	-1.5	-1.5	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements.
GW11-10	62.7	33.0	0.4	3.9	18.2	-2.1	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW14-10	62.9	32.6	0.4	4.1	-2.1	-2.1	No indicator on valve to determine positioning
GW13-10	60.2	34.9	0.5	4.4	-1.8	-1.8	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample tube on the LFG well is broken and requires repairs. Missing rubber casing that covers all three sample ports from weather elements.
GW10-10	57.7	38.3	0.4	3.6	-1.4	-1.5	80% Closed. Broken sample port on well . Well adjuster missing wheel
GW09-10	57.9	36.8	0.5	4.8	-2.1	-2.1	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	63.0	36.2	0.4	0.4	-4.6	-4.6	50% Closed
NGW-2	62.3	36.6	0.4	0.7	-3.7	-4.2	75% Closed
NGW-3	62.5	36.0	1.2	0.3	-4.5	-4.5	95% Closed
NGW-4	62.3	37.5	0.1	0.1	-4.7	-4.7	85% closed
NGW-5	62.3	37	0.5	0.2	-4.4	-4.5	75% Closed
NGW-9	62.5	36.8	0.6	0.1	-4.0	-4.3	75% Closed
NGW-14	63.7	33.4	2.7	0.2	-4.2	-4.3	80% Closed
HC-3	38.0	33.2	0.4	28.4	3.9	-4.3	100% Closed
HC-1	61.2	38.3	0.5	0.0	-4.3	-4.3	40% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.

2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 29-Sep-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_2O

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 2 landfilling in progress.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	40.0	24.4	1.4	34.2	-0.4	-3.6	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired. Sample tube on the LFG well is broken and requires repairs.
GW05-10	64.9	28.4	0.0	6.7	1.0	1.0	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements
GW06-03	58.2	32.2	0.0	9.6	-4.0	-4.0	40% Closed
GW07-03	59.2	32.2	0.1	8.5	-3.8	-4.0	95% Closed
GW05-00	53.2	29.2	1.9	15.7	-3.9	-3.9	95% Closed
GW04-00	56.7	32.5	0.0	10.8	-1.6	-2.0	95% Closed
LCMV1	6.9	5.2	17.9	70.0	-3.9	-3.9	90% Closed
GW03-00	59.5	31.3	0.0	9.2	-3.8	-3.8	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	18.2	12.6	13.8	55.4	-2.8	-3.8	70% Closed
GW02-00	61.3	30.5	0.5	7.7	-3.8	-3.8	100% Open
GW01-00	63.2	30.2	0.0	6.6	-4.0	-4.0	20% Closed
LCMV3	57.9	30.1	0.4	11.6	-1.6	-4.0	70% Closed - Sag in flex hose. Hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	56.6	28.6	0.9	13.9	-3.2	-3.3	65% Closed
GW16-03	41.1	24.4	5.2	29.3	-3.1	-3.2	80% Closed
GW15-03	62.7	29.1	0.0	8.2	16.5	16.5	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction. All three (3) rubber sample port caps should be replaced.
LCMV5	3.1	4.5	16.6	75.8	-2.8	-3.2	95% Closed. LCMV5 is the smaller wellhead with white hose in GW14-03.
GW14-03	38.4	23.5	0.0	38.1	-2.8	-2.8	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	56.4	27.1	0.0	16.5	-2.7	-2.8	80% Closed
GW12-03	66.6	25.7	0.0	7.7	-2.8	-2.8	45% Closed
GW11-03	68.5	23.1	0.0	8.4	-2.5	-2.6	85% Closed
GW23-10	47.7	25.6	0.0	26.7	0.0	N/A	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced. Unable to sample static pressure from the systems side due to quick coupler repairs required.
GW24-10	61.8	26.7	0.0	11.5	6.7	6.4	No indicator on valve to determine positioning
GW22-10	53.6	26.2	1.9	18.3	0.2	0.0	95% Closed
GW17-10	64.2	27.9	0.0	7.9	18.3	18.3	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	60.4	28.1	0.0	11.5	-1.3	-2.0	No indicator on valve to determine positioning
GW18-10	65.0	26.9	0.0	8.1	-3.0	-3.0	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW21-10	69.0	26.3	0.0	4.7	1.4	1.0	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW19-10	62.7	27.3	0.0	10.0	0.2	-2.9	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW10-03	67.2	30.5	0.1	2.2	-2.7	-2.7	35% Closed
GW09-03	62.5	31.1	0.2	6.2	-2.7	-2.8	45% Closed
GW08-03	68.2	30.0	0.8	1.0	-2.4	-2.6	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	65.8	32.9	0.5	0.8	0.0	0.0	100% Open
LCMV4	61.5	33.6	0.5	4.4	0.0	0.0	85% Closed
GW20-07	68.2	28.9	0.4	2.5	1.0	0.8	80% Closed. All three (3) rubber sample port caps should be replaced.
GW02-10	63.4	33.7	0.3	2.6	-2.7	-2.7	No indicator on valve to determine positioning.
GW21-07	47.8	20.1	4.4	27.7	-2.7	-2.8	90% Closed
GW22-07	64.5	33.1	0.3	2.1	-2.7	-2.8	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	62.5	36.1	0.2	1.2	-2.8	-2.8	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW03-10	65.5	27.7	0.0	6.8	1.0	1.0	No indicator on valve to determine positioning
GW06-10	62.7	27.6	0.0	9.7	-3.7	-3.8	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Engineered fill required around well, settlement has occurred and the well is hard to sample.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	65.4	26.7	0.0	7.9	-3.6	-3.6	No indicator on valve to determine positioning
GW08-10	64.1	27.0	0.0	8.9	-3.6	-3.6	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements.
GW19-07	70.1	24.1	0.0	5.8	0.5	0.5	80% Closed. Two (2) rubber sample port caps should be replaced.
GW16-10	54.8	28.5	0.0	16.7	0.2	-3.0	No indicator on valve to determine positioning
GW15-10	64.6	26.5	0.0	8.9	-2.7	-2.8	No indicator on valve to determine positioning
GW12-10	65.5	26.1	0.1	8.3	-3.7	-3.7	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements.
GW11-10	66.5	26.7	0.0	6.8	45.0	-3.2	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW14-10	65.6	28.0	0.0	6.4	-3.5	-3.5	No indicator on valve to determine positioning
GW13-10	62.0	29.6	0.0	8.4	-3.1	-3.3	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample tube on the LFG well is broken and requires repairs. Missing rubber casing that covers all three sample ports from weather elements.
GW10-10	58.7	30.1	0.0	11.2	-2.5	-2.5	80% Closed. Broken sample port on well . Well adjuster missing wheel
GW09-10	60.6	29.6	0.0	9.8	-3.7	-3.7	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	65.0	32.1	0.0	2.9	-8.5	-8.5	50% Closed
NGW-2	62.0	31.4	0.3	6.3	-8.5	-8.5	75% Closed
NGW-3	62.5	32.0	0.1	5.4	-8.5	-8.5	95% Closed
NGW-4	65.7	32.4	0.0	1.9	-8.6	-8.6	85% closed
NGW-5	62.1	31.1	0	6.8	-8.5	-8.5	75% Closed
NGW-9	64.0	31.4	0.0	4.6	-8.5	-8.5	75% Closed
NGW-14	61.9	32.2	0.1	5.8	-8.4	-8.5	80% Closed
HC-3	14.9	29.3	0.0	55.8	7.9	-8.7	100% Closed
HC-1	64.0	35.1	0.0	0.9	-2.5	-8.8	40% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 26-Oct-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_2O

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 2 landfilling in progress.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	43.6	30.8	1.9	23.7	0.3	-1.1	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired. Sample tube on the LFG well is broken and requires repairs.
GW05-10	65.2	34.8	0.0	0.0	0.6	0.6	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements
GW06-03	59.9	39.8	0.3	0.0	-1.2	-1.2	40% Closed
GW07-03	54.5	40.0	0.0	5.5	-1.2	-1.2	95% Closed
GW05-00	60.4	38.8	0.3	0.5	-1.2	-1.2	95% Closed
GW04-00	31.4	26.7	5.5	36.4	-0.9	-0.9	95% Closed
LCMV1	9.0	5.9	17.8	67.3	-1.2	-1.2	90% Closed
GW03-00	60.9	38.9	0.0	0.2	-1.7	-1.7	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	20.3	14.8	11.8	53.1	-1.3	-1.5	70% Closed
GW02-00	62.6	37.4	0.0	0.0	-1.6	-1.6	100% Open
GW01-00	65.5	34.5	0.0	0.0	-1.6	-1.6	20% Closed
LCMV3	49.3	33.9	2.9	13.9	-0.7	-1.7	70% Closed - Sag in flex hose. Hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	60.4	34.9	0.7	4.0	-1.4	-1.6	65% Closed
GW16-03	51.0	31.8	3.1	14.1	-1.3	-1.3	80% Closed
GW15-03	62.6	37.3	0.0	0.1	5.2	5.2	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction. All three (3) rubber sample port caps should be replaced.
LCMV5	0.2	0.4	20.7	78.7	-1.2	-1.2	95% Closed. LCMV5 is the smaller wellhead with white hose in GW14-03.
GW14-03	34.5	26.0	0.0	39.5	-1.2	-1.2	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	55.2	30.5	4.2	10.1	-1.3	-1.3	80% Closed
GW12-03	68.8	31.0	0.0	0.2	-1.3	-1.3	45% Closed
GW11-03	41.5	16.8	7.7	34.0	-1.2	-1.3	90% Closed
GW23-10	52.8	31.3	0.0	15.9	0.0	N/A	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced. Unable to sample static pressure from the systems side due to quick coupler repairs required.
GW24-10	65.3	34.2	0.0	0.5	2.4	1.7	No indicator on valve to determine positioning
GW22-10	67.7	29.7	2.2	0.4	0.0	-1.5	95% Closed
GW17-10	64.1	34.5	0.0	1.4	7.4	7.2	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	60.5	35.0	0.0	4.5	-0.6	-1.6	No indicator on valve to determine positioning
GW18-10	65.7	33.6	0.0	0.7	-1.4	-1.5	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW21-10	69.0	29.9	0.0	1.1	0.3	0.3	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW19-10	65.0	34.9	0.0	0.1	0.0	-1.5	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW10-03	61.3	29.6	0.5	8.6	-1.3	-1.3	35% Closed
GW09-03	68.5	31.3	0.0	0.2	-1.3	-1.4	45% Closed
GW08-03	70.6	28.6	0.5	0.3	-1.4	-1.4	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	66.1	33.5	0.0	0.4	0.1	0.0	100% Open
LCMV4	66.4	33.6	0.0	0.0	0.0	0.0	85% Closed
GW20-07	68.9	30.0	0.2	0.9	0.2	-0.2	80% Closed. All three (3) rubber sample port caps should be replaced.
GW02-10	65.2	34.5	0.0	0.3	-1.8	-1.8	No indicator on valve to determine positioning.
GW21-07	49.8	20.9	4.9	24.4	-1.6	-1.6	90% Closed
GW22-07	64.5	34.0	0.1	1.4	-1.7	-1.7	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	63.9	34.2	0.5	1.4	-1.6	-1.6	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW03-10	65.9	33.8	0.0	0.3	-1.0	-1.6	No indicator on valve to determine positioning
GW06-10	62.5	35.7	0.2	1.6	-1.6	-1.6	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Engineered fill required around well, settlement has occurred and the well is hard to sample.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	67.2	32.6	0.0	0.2	-1.7	-1.7	No indicator on valve to determine positioning
GW08-10	66.9	33.1	0.0	0.0	-1.8	-1.8	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements.
GW19-07	70.1	29.8	0.0	0.1	0.1	-0.5	80% Closed. Two (2) rubber sample port caps should be replaced.
GW16-10	63.5	34.5	0.0	2.0	0.0	-1.7	No indicator on valve to determine positioning
GW15-10	66.3	33.7	0.0	0.0	-1.3	-1.5	No indicator on valve to determine positioning
GW12-10	68.2	31.7	0.0	0.1	-1.6	-1.6	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements.
GW11-10	67.8	32.2	0.0	0.0	16.7	-1.5	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW14-10	66.5	33.5	0.0	0.0	-1.6	-1.6	No indicator on valve to determine positioning
GW13-10	63.9	35.1	0.2	0.8	-1.4	-1.5	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample tube on the LFG well is broken and requires repairs. Missing rubber casing that covers all three sample ports from weather elements.
GW10-10	61.8	38.0	0.0	0.2	-1.5	-1.5	80% Closed. Broken sample port on well . Well adjuster missing wheel
GW09-10	62.1	37.6	0.0	0.3	-1.5	-1.5	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	62.6	37.3	0.0	0.1	-3.0	-3.0	50% Closed
NGW-2	60.9	36.6	0.5	2.0	-3.1	-3.1	75% Closed
NGW-3	65.4	33.2	0.0	1.4	-3.1	-3.1	95% Closed
NGW-4	63.0	37.0	0.0	0.0	-3.1	-3.1	85% closed
NGW-5	62.9	36.9	0	0.2	-3.1	-3.1	75% Closed
NGW-9	61.7	37.4	0.0	0.9	-3.1	-3.1	75% Closed
NGW-14	62.5	37.4	0.0	0.1	-3.1	-3.1	80% Closed
HC-3	17.8	30.8	4.0	47.4	-0.3	-3.5	100% Closed
HC-1	58.7	36.7	0.0	4.6	-0.7	-3.2	40% Closed

Notes:
1. To convert from inches of water to kPa divide by 4.01.

2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 28-Nov-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_2O

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 2/3 landfilling in progress.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	59.8	31.2	0.3	8.7	0.3	-6.6	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired. Sample tube on the LFG well is broken and requires repairs.
GW05-10	Frozen	Frozen	Frozen	Frozen	Frozen	-6.0	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Frozen sample ports on well, unable to obtain readings.
GW06-03	62.5	35.6	0.2	1.7	-7.0	-7.0	40% Closed
GW07-03	63.7	36.0	0.2	0.1	-5.7	-6.0	95% Closed
GW05-00	48.6	30.2	4.6	16.6	-5.7	-5.8	95% Closed
GW04-00	31.0	24.2	7.0	37.8	-4.7	-5.0	95% Closed
LCMV1	11.3	8.5	15.6	64.6	-4.9	-5.6	90% Closed
GW03-00	57.1	32.5	3.8	6.6	-5.0	-5.0	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	21.1	17.3	12.2	49.4	-4.2	-4.2	70% Closed
GW02-00	58.6	35.2	3.1	3.1	-5.0	-5.0	100% Open
GW01-00	60.2	29.6	2.4	7.8	-5.3	-5.3	20% Closed
LCMV3	44.5	26.4	5.9	23.2	-2.7	-2.7	70% Closed - Sag in flex hose. Hose should be cut back to eliminate condensate and gas flow restriction.
GW17-03	54.6	29.7	4.3	11.4	-4.4	-4.5	65% Closed
GW16-03	54.2	32.0	2.7	11.1	-4.2	-4.2	80% Closed
GW15-03	64.4	31.1	1.6	2.9	11.5	11.5	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction. All three (3) rubber sample port caps should be replaced.
LCMV5	2.6	3.7	18.9	74.8	-4.2	-4.2	95% Closed. LCMV5 is the smaller wellhead with white hose in GW14-03.
GW14-03	31.6	25.7	1.4	41.3	-3.7	-4.2	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	52.6	29.1	2.1	16.2	-4.2	-4.2	80% Closed
GW12-03	68.2	29.8	2.0	0.0	-4.5	-4.5	45% Closed
GW11-03	43.2	17.4	7.5	31.9	-4.3	-4.3	90% Closed
GW23-10	44.8	28.8	0.5	25.9	0.0	0.0	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced. Unable to sample static pressure from the systems side due to quick coupler repairs required.
GW24-10	62.2	32.7	0.2	4.9	4.2	4.0	No indicator on valve to determine positioning
GW22-10	42.8	24.6	6.2	26.4	-1.1	-5.0	95% Closed
GW17-10	67.6	32.2	0.0	0.2	63.0	63.0	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	59.7	31.9	0.4	8.0	-3.0	-3.0	No indicator on valve to determine positioning
GW18-10	67.5	30.7	0.9	0.9	-3.7	-3.7	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW21-10	68.5	28.4	1.0	2.1	0.7	0.7	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW19-10	66.5	32.8	0.0	0.7	-2.7	-5.0	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW10-03	70.2	29.7	0.0	0.1	-4.8	-4.8	35% Closed
GW09-03	68.7	31.3	0.0	0.0	-5.0	-5.0	45% Closed
GW08-03	71.2	28.8	0.0	0.0	-5.0	-5.0	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	66.6	33.4	0.0	0.0	0.3	0.2	100% Open
LCMV4	65.0	34.5	0.0	0.5	0.2	0.2	85% Closed
GW20-07	69.8	30.0	0.0	0.2	-2.5	-4.5	80% Closed. All three (3) rubber sample port caps should be replaced.
GW02-10	66.5	33.4	0.0	0.1	-5.6	-5.6	No indicator on valve to determine positioning.
GW21-07	71.3	26.8	0.0	1.9	-5.9	-5.9	90% Closed
GW22-07	63.9	35.4	0.2	0.5	-5.6	-5.6	Approximately 80% Closed - Valve indicator sticker missing
GW01-10	62.9	37.1	0.0	0.0	-6.0	-6.0	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW03-10	64.6	34.3	0.5	0.6	-5.3	-5.3	No indicator on valve to determine positioning
GW06-10	66.5	33.5	0.0	0.0	-5.9	-5.9	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Engineered fill required around well, settlement has occurred and the well is hard to sample.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	66.5	31.5	0.9	1.1	7.2	7.2	No indicator on valve to determine positioning
GW08-10	68.0	31.2	0.0	0.8	0.0	0.0	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements.
GW19-07	70.0	29.9	0.0	0.1	-4.5	-5.0	80% Closed. Two (2) rubber sample port caps should be replaced.
GW16-10	67.9	32.1	0.0	0.0	-5.0	-5.0	No indicator on valve to determine positioning
GW15-10	65.3	33.9	0.1	0.7	-5.2	-5.2	No indicator on valve to determine positioning
GW12-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Frozen sample ports on well, unable to obtain readings.
GW11-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs. Frozen sample ports on well, unable to obtain readings.
GW14-10	64.7	31.4	2.2	1.7	-4.8	-4.8	No indicator on valve to determine positioning
GW13-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample tube on the LFG well is broken and requires repairs. Missing rubber casing that covers all three sample ports from weather elements.Frozen sample ports on well, unable to obtain readings.
GW10-10	57.0	33.7	1.7	7.6	-4.5	-5.0	80% Closed. Broken sample port on well . Well adjuster missing wheel.
GW09-10	60.0	33.2	4.4	2.4	-5.0	-5.0	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	62.6	37.2	0.0	0.2	-7.6	-7.6	50% Closed
NGW-2	61.6	37.8	0.6	0.0	-7.7	-7.7	75% Closed
NGW-3	62.3	37.7	0.0	0.0	-7.7	-7.7	95% Closed
NGW-4	59.8	40.2	0.0	0.0	-7.6	-7.6	85% closed
NGW-5	62.2	37.7	0	0.1	-8.0	-8.0	75% Closed
NGW-9	60.2	38.2	0.6	1.0	-7.7	-7.7	75% Closed
NGW-14	66.3	33.0	0.7	0.0	-7.6	-7.6	80% Closed
HC-3	16.3	32.5	1.6	49.6	-0.5	-7.1	100% Closed
HC-1	-	-	-	-	-2.1	-2.1	40% Closed. Well flooded gem and couldn't obtain readings.

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

Peterborough County/City Waste Management Facility
Landfill Gas Monitoring

Date: 21-Dec-23 22-Dec-23

Measurements from Gas Utilization Plant Equipment:

Pressure at Gas Utilization Plant: N/A "H_2O

Flow at Gas Utilization Plant: N/A cfm

Temp. at Gas Utilization Plant: N/A degrees C at point of entry

Notes:
- Gas Utilization Plant (GUP) operating.
- Minimal odours observed onsite in the NFA and SFA during survey.
- Cell 4 landfilling in progress.
- WSP returned to site December 22, 2023 to complete LFG monitoring due to battery deficiencies on December 21, 2023.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
Gas Utilization Plant	-	-	-	-	-	-	- GUP operating, PUG was not onsite during monitoring event.
GW04-10	58.5	38.5	2.2	0.8	1.5	-1.7	No indicator on valve to determine positioning. One (1) of the four (4) quick connects on wellhead is broken and needs to be repaired. Sample tube on the LFG well is broken and requires repairs.
GW05-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Frozen sample ports on well, unable to obtain readings.
GW06-03	55.6	41.7	2.0	0.7	-1.7	-1.7	40% Closed
GW07-03	55.7	41.3	2.9	0.1	-2.0	-2.0	95% Closed
GW05-00	48.2	34.3	4.5	13.0	-2.0	-2.1	95% Closed
GW04-00	35.2	25.7	9.1	30.0	-1.5	-1.8	95% Closed
LCMV1	7.2	4.3	19.2	69.3	-1.6	-1.8	90% Closed
GW03-00	57.9	38.2	3.7	0.2	-1.5	-1.6	30% Closed. All three (3) rubber sample port caps should be replaced.
LCMV2	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	70% Closed. Frozen sample ports on well, unable to obtain readings.
GW02-00	47.8	29.9	8.7	13.6	-1.9	-1.9	100% Open
GW01-00	59.4	33.2	3.1	4.3	-1.8	-1.8	20% Closed
LCMV3	52.5	39.8	5.8	1.9	0.1	-2.7	70% Closed - Sag in flex hose. Hose should be cut back to eliminate condensate and gas flow restriction. Gas flow restricted to the system due to frozen condensate in flex hose.
GW17-03	54.9	35.9	7.2	2.0	-1.4	-1.5	65% Closed
GW16-03	59.2	39.0	0.5	1.3	-1.6	-1.6	80% Closed
GW15-03	59.0	39.5	1.5	0.0	3.6	3.6	100% Open. Sag in flex hose, hose should be cut back to eliminate condensate and gas flow restriction. All three (3) rubber sample port caps should be replaced.
LCMV5	0.3	0.4	19.1	80.2	-1.3	-1.3	95% Closed. LCMV5 is the smaller wellhead with white hose in GW14-03.
GW14-03	30.0	25.4	3.0	41.6	-0.1	-1.3	85% Closed

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH_4	CO_2	O_2	Balance			
GW13-03	58.0	34.3	4.0	3.7	-0.4	-0.5	80% Closed
GW12-03	67.8	30.9	1.2	0.1	-1.3	-1.3	45% Closed
GW11-03	36.6	18.3	11.6	33.5	-1.0	-1.0	90% Closed
GW23-10	26.1	23.1	4.8	46.0	0.0	0.0	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced. Unable to sample static pressure from the systems side due to quick coupler repairs required.
GW24-10	59.5	38.8	1.3	0.4	2.4	0.0	No indicator on valve to determine positioning
GW22-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	95% Closed. Frozen sample ports on well, unable to obtain readings.
GW17-10	60.2	39.7	0.0	0.1	25.9	25.9	No indicator on valve to determine positioning. Suspected blockage in lateral between GW17-10 and GW13-10. Grading is required around well, settlement has occurred and ponding water is evident.
GW20-10	58.2	35.5	1.7	4.6	0.0	0.0	No indicator on valve to determine positioning
GW18-10	67.5	30.7	0.9	0.9	-1.3	-1.3	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW21-10	31.1	16.9	10.7	41.3	0.4	0.0	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW19-10	62.3	33.5	0.6	3.6	0.3	0.1	No indicator on valve to determine positioning. Quick coupler on wellhead is leaking and should be replaced.
GW10-03	63.6	31.9	3.6	0.9	-1.3	-1.3	35% Closed
GW09-03	63.3	31.9	2.3	2.5	-1.0	-1.0	45% Closed
GW08-03	66.8	30.7	2.0	0.5	-1.4	-1.4	75% Closed. All three (3) rubber sample port caps should be replaced.
GW18-07	61.3	38.7	0.0	0.0	4.4	0.4	100% Open
LCMV4	63.1	36.0	0.6	0.3	0.4	0.4	85% Closed
GW20-07	57.6	32.5	5.6	4.3	0.4	-1.4	80% Closed. All three (3) rubber sample port caps should be replaced.
GW02-10	50.0	26.7	7.2	16.1	-1.5	-1.5	No indicator on valve to determine positioning.
GW21-07	49.3	19.8	7.9	23.0	-1.5	-1.5	90% Closed
GW22-07	58.7	35.4	5.9	0.0	-1.3	-1.3	Approximately 80% Closed - Valve indicator sticker missing. Rubber sample port caps should be replaced.
GW01-10	54.9	40.0	3.7	1.4	-0.6	-0.6	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs.
GW03-10	59.5	36.5	3.1	0.9	-1.1	-1.2	No indicator on valve to determine positioning
GW06-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Engineered fill required around well, settlement has occurred and the well is hard to sample. Frozen sample ports on well, unable to obtain readings.

Well	Gas Concentrations (%)				Static Pressure on the well (inches H_2O)	Static Pressure on the system (inches H_2O)	Comments
	CH4	CO_2	O_2	Balance			
GW07-10	61.4	34.9	3.0	0.7	-1.3	-1.2	No indicator on valve to determine positioning
GW08-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Frozen sample ports on well, unable to obtain readings.
GW19-07	65.4	32.7	1.4	0.5	0.0	0.0	80% Closed. Two (2) rubber sample port caps should be replaced.
GW16-10	42.6	31.9	3.7	21.8	0.0	-1.5	No indicator on valve to determine positioning
GW15-10	62.1	30.2	4.2	3.5	-0.7	-1.5	No indicator on valve to determine positioning
GW12-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. Missing rubber casing that covers all three sample ports from weather elements. Frozen sample ports on well, unable to obtain readings.
GW11-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. Sample tube on the LFG well is broken and requires repairs. Frozen sample ports on well, unable to obtain readings.
GW14-10	56.7	35.4	4.3	3.6	-1.3	-1.3	No indicator on valve to determine positioning
GW13-10	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	No indicator on valve to determine positioning. GW13-10 is connected to GW14-10 lateral above ground as buried lateral from GW13-10 heading North is considered compromised. Sample tube on the LFG well is broken and requires repairs. Missing rubber casing that covers all three sample ports from weather elements. Frozen sample ports on well, unable to obtain readings.
GW10-10	56.9	37.4	5.3	0.4	-0.8	-1.3	80% Closed. Broken sample port on well . Well adjuster missing wheel.
GW09-10	58.2	35.2	4.6	2.0	-1.3	-1.3	No indicator on valve to determine positioning.
NFA Perimeter LFG System	-	-	-	-	-	-	No Flow
NGW-1	59.6	39.6	0.6	0.2	-7.2	-7.3	50% Closed
NGW-2	56.4	39.5	3.2	0.9	-7.1	-7.1	75% Closed
NGW-3	60.2	36.0	2.8	1.0	-7.4	-7.4	95% Closed
NGW-4	60.6	38.5	0.9	0.0	-6.7	-6.7	85% closed
NGW-5	55.9	40.2	3.3	0.6	-6.8	-6.8	75% Closed
NGW-9	54.6	37.3	7.3	0.8	-6.7	-6.7	75% Closed
NGW-14	57.5	39.3	2.5	0.7	-6.7	-6.7	80% Closed
HC-3	15.6	27.8	2.3	54.3	0.0	-7.0	100% Closed
HC-1	55.4	37.5	4.3	2.8	-3.8	-7.0	40% Closed.

Notes:
1. To convert from inches of water to kPa divide by 4.01.
2. Static pressure is the pressure of the monitoring point relative to the atmospheric pressure. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)
3. Differential pressure is the pressure exerted by a gas when the body on which the pressure is exerted is not in motion. (http://www.geotechuk.com/technical-faqs/ga2000-and-gem2000-platform/pressure-definitions.aspx)

REPORT

2023 Landfill Surface Monitoring

Peterborough County/City Waste Management Facility

Submitted to:

City of Peterborough

500 George Street North
Peterborough, Ontario
K9H 3R9

Submitted by:

WSP Canada Inc.

6925 Century Avenue, Mississauga, Ontario L5N 7K2

January 2, 2024

January 2, 2024

Don Briand
Coordinator, Waste Operations
City of Peterborough
500 George Street North
Peterborough, Ontario
K9H 3R9

Subject: **2023 Landfill Surface Monitoring**

Peterborough County/City Waste Management Facility

Dear Mr. Briand

WSP Canada Inc (WSP), is pleased to submit to the City of Peterborough (the City), the 2023 report for the Landfill Surface Monitoring undertaken at the Peterborough County/City Waste management Facility site (hereinafter referred to as the landfill).

The key findings of the 2023 surface monitoring survey are as follows:

- Twelve (12) survey locations were identified with total hydrocarbon concentrations measured above exceedance criteria
- The survey locations with elevated total hydrocarbon concentrations were observed to be point-source emissions from maintenance holes for the leachate collection system

Should you have any questions or wish to discuss the surface monitoring program, please do not hesitate to contact the undersigned.

Yours truly,

Josh Guthrie, B.Sc.

Air Quality Specialist

Table of Contents

1.0 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the City of Peterborough (the City) to conduct the annual surface emission study for the Peterborough County/City Waste Management Facility (PCCWMF) site located at 1260 Bensfort Road, Peterborough. The field program was completed on September 28, 2023.

The sampling program consisted of a walk-over survey of the entire capped south fill area (SFA) landfill using a handheld flame ionization detector (FID) for total hydrocarbons (THC) analysis and a photo ionization detector (PID) for combustible gas analysis. The purpose of this monitoring was to determine areas of elevated THC and combustible gas concentrations, which are indicators of areas in which landfill gas may be escaping through the existing cover soils. Although methane gas is odourless, it is a surrogate measurement for a leak where the odourous compounds such as reduced sulphurs or volatile organic compounds (VOCs) may be emitted from the landfill.

2.0 SAMPLING METHODOLOGY

The monitoring was based on procedures outlines in the South Coast Air Quality Management District Rule 1150.2 "*CONTROL OF GASEOUS EMISSIONS FROM MUNICIPLE SOLID WASTE LANDFILLS"* (Rule 1150.2).

The landfill monitoring consisted of walking over the entire covered landfill using a THC and PID analyzer. A ThermoFisher TVA2020 was used to collect the measurements. The TVA2020 can use both FID and PID simultaneously. The FID measures organic compounds by utilizing a flame produced by the combustion of hydrogen and air. The FID was calibrated against U.S. EPA protocol methane gas. The FID was used as a THC analyzer in the study. The PID consists of an ultraviolet (UV) lamp of a specific energy and an ionization chamber and is used to detect aromatics, unsaturated hydrocarbons and chlorinated hydrocarbons as well as some inorganic gases. The PID was calibrated to isobutylene and used to sample combustible gases.

Since both detectors may be displayed and logged simultaneously, the relative signal response of the two detectors provides some reference to the identity of the compounds being measured. For instance, the PID does not respond to the presence of methane, but the FID responds readily to compounds contains carbon and hydrogen. A high FID reading with virtually no PID response might indicate the presence of methane gas. Consequently, PIDs respond very well to some inorganic gases that FIDs cannot detect. A high PID reading with no FID reading might suggest the presence of an inorganic compound. With readings from both detectors readily available, the TVA2020 can help a user make decisions about the type of compound present and which detector reading to use.

The monitoring was conducted in a grid formation, measuring the THC and combustible gas concentrations at approximately five (5) centimeters above the ground. Measurements were obtained along a pre-defined grid with spacing in the north-south and east-west direction of 20 meters, unless "hotspots" were identified. Hotspots are defined as any visible cracking larger than five (5) centimeters in width, areas of bubbling surface water, areas with no vegetation, and/or areas consisting of dead vegetation. These hotspots, if identified, were measured in addition to the points along the pre-defined grid pattern.

In accordance with Rule 1150.2 methodology, the maximum concentration of organic compounds as methane, measured at any point on the surface if the landfill, shall not exceed 500 ppm. Any areas or points exhibiting readings higher than 500 ppm THC, as methane, were noted as part of this monitoring event. These points were marked by recording the UTM co-ordinates from a GPS. The results of the monitoring are presented in **Table 1**, and the locations are shown in **Figure 1**.

3.0 RESULTS

During the monitoring survey, one WSP representative walked over the entire refuse area and monitoring THC and combustible gas levels. During the survey on July 18, the ambient temperature ranged between 18 °C and 25 °C, and wind was light, ranging from approximately 2 km/h – 4 km/h. During the survey on September 28, the ambient temperature ranged between 8 °C and 18 °C, and wind was light to moderate, ranging from approximately 10 km/h – 15 km/h. Barometric pressure remained steady during the monitoring period on both sampling days. There had been no measurable precipitation for the 72 hours preceding both sampling days. These conditions were considered ideal for the monitoring program.

A majority of the closed landfill site is covered in vegetation with some small barren areas and some unpaved roads. There were 12 locations identified out of 224 survey locations, that had THC concentrations above 500 ppm. All concentrations above 500 ppm were measured at leachate collection system maintenance holes. These survey locations are presented in **Figure 1** and **Table 1**.

4.0 DISCUSSION

Twelve (12) survey locations on the capped SFA landfill had THC concentrations above 500 ppm. Presented below is a summary of the findings:

- The twelve (12) elevated THC concentrations detected at the landfill, were emanating from maintenance holes connected to the leachate collection system and nearby gas monitoring wells. It is likely that landfill gas is entering the leachate collection system and being released through these maintenance holes. WSP understands that the City has attempted to remediate this issue in the past with limited success. WSP can support with additional reviews and remediation work at these maintenance holes, and can suggest possible maintenance hole cover upgrades.
- Slightly elevated THC concentrations (below 500 ppm) were detected at several locations on the capped SFA landfill and are highlighted in **Table 2**. These concentrations were observed to emanate from maintenance holes for the leachate collection system, as well as hotspots, where groundcover was barren and vegetation was observed to be stressed.

As part of the routine site inspections completed by City staff for the site, visual indicators of gas emissions should be identified, including bubbling surface water, dead vegetation, or visible cracking of cover materials larger than five (5) cm in width. If the findings from site inspections suggest a potential change in the cover material, then additional quantitative measurements may be required.

Signature Page

WSP Canada Inc.

Josh Guthrie, B.Sc.,
Air Quality Specialist

Roy Sabino, P.Eng.,
Senior Air Quality Engineer

FIGURE 1

2023 Landfill Surface Monitoring Exceedance Locations

KEY MAP

SCALE: 1:350,000

LEGEND

SAMPLE LOCATION WITH THC CONCENTRATION HIGHER THAN 500 ppm (THC CONCENTRATION)

0 25 50 100

1:3,000 METRES

NOTE(S)

1. ALL LOCATIONS ARE APPROXIMATE

REFERENCE(S)

1. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE - ONTARIO
2. BASE MAP: CITY OF PETERBOROUGH, PETERBOROUGH COUNTY, ONTARIO BASE MAP, PROVINCE OF ONTARIO, ONTARIO MNR, ESRI CANADA, ESRI, © OPENSTREETMAP CONTRIBUTORS, HERE, GARMIN, USGS, NGA, EPA, USDA, NPS, AAFC, NRCAN, CITY OF PETERBOROUGH, MAXAR, MICROSOFT
3. COORDINATE SYSTEM: NAD 1983 UTM ZONE 17N

CLIENT

CITY OF PETERBOROUGH

PROJECT

2023 LANDFILL MONITORING
1260 BENSFORT RD, PETERBOROUGH, ONTARIO

TITLE

2023 LANDFILL SURFACE MONITORING EXCEEDANCE LOCATIONS

CONSULTANT

YYYY-MM-DD	2023-11-16
DESIGNED	----
PREPARED	MG
REVIEWED	JG
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
111-53296-16	0001	A	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

APPENDIX A

Summary of Landfill Surface Monitoring Results

Table 1: Summary of Landfill Surface Monitoring Locations with Concnetrations Above 500 ppm
2023 Landfill Surface Monitoring
Peterborough Country/City Waste Management Facility
Project Number: CA-WSP-111-53296-16

SAMPLE ID	PID (ppm)	FID (ppm)	EASTING (UTM)	NORTHING (UTM)	FEATURE
2	0.0	578.0	717027	4900311	Maintenance Hole I3, Vegetation along Road
5	0.7	2022.0	717050	4900253	Maintenance Hole I5, Vegetation along Road
10	0.3	1962.0	717082	4900169	Maintenance Hole J3, Vegetation along Road
12	0.0	1477.0	717098	4900139	Maintenance Hole D2, Vegetation along Road
40	0.1	775.0	716838	4899690	Maintenance Hole A0
57	0.7	2212.0	717049	4899981	Maintenance Hole LC 06
63	0.0	977.0	717047	4900120	Maintenance Hole HC 05
164	0.3	2292.0	716797	4900256	Maintenance Hole on Road
191	10.5	551.0	716734	4900208	Maintenance Hole 6 by Road
211	0.5	2435.0	716696	4900111	Maintenance Hole south of Road
215	0.4	1557.0	716671	4900079	Maintenance Hole east of Road
219	41.8	2046.0	716686	4899994	Maintenance Hole 10 east of Road

Table 2: Landfill Surface Monitoring Locations
2023 Landfill Surface Monitoring
Peterborough Country/City Waste Management Facility
Project Number: CA-WSP-111-53296-16

SAMPLE ID	PID (ppm)	FID (ppm)	EASTING (UTM)	NORTHING (UTM)	FEATURE
1	2.3	1.2	717024	4900322	Vegetation along Road
2	0.0	578.0	717027	4900311	Maintenance Hole I3, Vegetation along Road
3	0.0	1.4	717038	4900282	Maintenance Hole I4, Vegetation along Road
4	0.0	0.0	717045	4900266	Vegetation along Road
5	0.7	2022.0	717050	4900253	Maintenance Hole I5, Vegetation along Road
6	0.0	0.0	717054	4900242	Vegetation along Road
7	0.0	11.6	717060	4900224	Maintenance Hole J1, Vegetation along Road
8	0.0	181.0	717070	4900199	Maintenance Hole J2, Vegetation along Road
9	0.0	0.0	717080	4900184	Vegetation along Road
10	0.3	1962.0	717082	4900169	Maintenance Hole J3, Vegetation along Road
11	0.0	0.0	717092	4900152	Vegetation along Road
12	0.0	1477.0	717098	4900139	Maintenance Hole D2, Vegetation along Road
13	0.0	0.0	717110	4900118	Maintenance Hole 6 on road
14	0.0	0.0	717113	4900099	Vegetation along Road
15	0.0	0.0	717116	4900077	Vegetation along Road
16	0.0	0.0	717115	4900058	Vegetation along Road
17	0.0	0.0	717110	4900040	Vegetation along Road
18	0.0	19.0	717109	4900021	Pump Station Holding Tank
19	0.0	0.0	717110	4900003	Vegetation along Road
20	0.0	0.0	717110	4899983	Vegetation along Road
21	0.0	0.0	717103	4899962	Vegetation along Road
22	0.0	0.0	717098	4899941	Vegetation along Road
23	0.0	0.0	717092	4899919	Vegetation along Road
24	0.0	0.0	717088	4899904	Vegetation along Road
25	0.0	0.0	717077	4899877	Vegetation along Road
26	0.0	0.0	717070	4899852	Vegetation along Road
27	0.0	0.0	717062	4899829	Vegetation along Road
28	0.0	290.0	717045	4899810	Maintenance Hole B1, Vegetation along Road
29	0.0	0.9	717039	4899791	Vegetation along Road
30	0.0	0.0	717036	4899767	Vegetation along Road
31	0.0	0.0	717023	4899746	Vegetation along Road
32	0.0	27.2	717009	4899722	Barren Patch near Road
33	0.0	0.2	716990	4899706	Vegetation along Road
34	0.0	0.5	716966	4899692	Vegetation along Road
35	0.0	1.3	716942	4899683	Vegetation along Road
36	0.0	0.1	716914	4899671	Vegetation along Road
37	0.0	45.7	716899	4899669	Maintenance Hole A1
38	0.0	8.1	716873	4899669	Barren/Vegetation along Road
39	0.0	54.0	716856	4899675	Barren/Vegetation along Road
40	0.1	775.0	716838	4899690	Maintenance Hole A0
41	0.0	0.0	716857	4899695	Vegetation along Road
42	0.0	0.1	716884	4899698	Vegetation along Road
43	0.0	0.0	716905	4899702	Vegetation along Road
44	0.0	0.0	716939	4899720	Maintenance Hole HC 02
45	0.0	0.2	716946	4899725	Maintenance Hole LC 01
46	0.0	0.0	716966	4899746	Vegetation along Road
47	0.0	0.0	716979	4899770	Maintenance Hole LC 02
48	0.0	0.0	716989	4899793	Vegetation along Road
49	0.0	0.0	716999	4899820	Maintenance Hole LC 03
50	0.0	0.0	717010	4899850	Vegetation along Road
51	0.0	0.0	717014	4899867	Maintenance Hole LC 04
52	0.0	55.4	717023	4899895	Maintenance Hole HC 03
53	0.1	85.9	717031	4899913	Maintenance Hole HC 04

Table 2: Landfill Surface Monitoring Locations
2023 Landfill Surface Monitoring
Peterborough Country/City Waste Management Facility
Project Number: CA-WSP-111-53296-16

SAMPLE ID	PID (ppm)	FID (ppm)	EASTING (UTM)	NORTHING (UTM)	FEATURE
54	0.0	137.0	717033	4899925	Maintenance Hole LC 05
55	0.0	0.0	717040	4899945	Vegetation along Road
56	0.0	0.0	717046	4899965	Vegetation along Road
57	0.7	2212.0	717049	4899981	Maintenance Hole LC 06
58	0.0	0.0	717054	4900003	Vegetation along Road
59	0.0	11.9	717061	4900023	Maintenance Hole LC 07
60	0.0	0.0	717064	4900041	Vegetation along Road
61	0.0	0.0	717068	4900070	Vegetation along Road
62	0.0	0.0	717063	4900093	Vegetation along Road
63	0.0	977.0	717047	4900120	Maintenance Hole HC 05
64	0.0	0.0	717040	4900140	Vegetation along Road
65	0.0	2.3	717027	4900167	GW01-00, Vegetated
66	0.0	0.0	717016	4900189	Vegetation along Road
67	0.0	0.0	717003	4900216	GW02-00, Vegetated
68	0.0	0.0	716993	4900237	Vegetation along Road
69	0.0	0.0	716985	4900258	GW03-00, Vegetated
70	0.0	0.0	716981	4900279	Vegetated Area
71	0.0	0.0	716973	4900297	Barren/Vegetated Area
72	0.0	0.0	716970	4900316	Vegetated Ditch
73	0.0	0.0	716942	4900307	Vegetated Ditch
74	0.0	10.4	716947	4900292	Barren/Vegetated Area
75	0.0	1.6	716952	4900274	Vegetated Area
76	0.0	0.4	716951	4900259	Vegetated Area
77	0.0	0.0	716951	4900242	Vegetated Area
78	0.0	0.1	716955	4900221	Vegetated Area
79	0.0	0.0	716964	4900203	Vegetated Area
80	0.0	100.0	716984	4900184	Barren Patch near Road
81	0.0	0.1	716985	4900159	Vegetated Area
82	0.0	0.4	716995	4900139	Vegetated Area
83	0.0	0.1	716997	4900124	Vegetated Area
84	0.0	161.0	716999	4900112	Barren Patch near Road
85	0.0	0.0	717003	4900089	Vegetated Area
86	0.0	0.0	717015	4900065	GW08-03, Vegetated
87	0.0	0.0	717012	4900039	Vegetated Area
88	0.0	0.0	717011	4900012	GW09-03, Vegetated
89	0.0	0.0	717005	4899988	Vegetated Area
90	0.0	0.0	716996	4899961	GW10-03, Vegetated
91	0.0	0.0	716995	4899933	Vegetated Area
92	0.0	0.0	716988	4899905	Vegetated Area
93	0.1	0.1	716980	4899885	Vegetated Area
94	0.0	0.0	716973	4899858	Vegetated Area
95	0.0	0.9	716965	4899832	Vegetated Area
96	0.0	0.0	716958	4899806	Vegetated Area
97	0.0	0.0	716947	4899780	Vegetated Area
98	0.1	0.0	716933	4899760	Vegetated Area
99	0.0	0.1	716912	4899742	Vegetated Area
100	0.0	0.1	716890	4899731	Vegetated Area
101	0.0	12.2	716863	4899732	Barren Patch near Road
102	0.0	0.2	716837	4899735	Vegetated Area
103	0.0	2.4	716812	4899733	Road
104	0.0	0.0	716838	4899773	Barren Area near Road
105	0.0	0.1	716838	4899773	Vegetated Area
106	0.0	0.1	716863	4899785	Vegetated Area

Table 2: Landfill Surface Monitoring Locations
2023 Landfill Surface Monitoring
Peterborough Country/City Waste Management Facility
Project Number: CA-WSP-111-53296-16

SAMPLE ID	PID (ppm)	FID (ppm)	EASTING (UTM)	NORTHING (UTM)	FEATURE
107	0.0	0.4	716886	4899806	Vegetated Area
108	0.0	10.0	716913	4899819	Vegetated Area
109	0.0	37.8	716940	4899843	Barren Patch near GW12-03
110	0.1	2.6	716942	4899874	Vegetated Area
111	0.2	251.0	716947	4899905	GW11-03, Barren/Vegetated
112	0.0	0.0	716953	4899937	GW21-10, Barren/Vegetated
113	0.0	0.0	716958	4899963	Vegetated Area
114	0.0	0.0	716963	4899987	GW19-10, Vegetated
115	0.0	0.0	716968	4900010	Vegetated Area
116	0.0	0.0	716967	4900033	GW-16-10, Vegetated
117	0.1	0.6	716966	4900063	Vegetated Area
118	0.0	0.0	716954	4900087	Vegetated Area
119	0.0	0.0	716945	4900111	Vegetated Area
120	0.2	1.3	716937	4900136	Vegetated Area
121	0.1	0.5	716929	4900161	GW21-07, Vegetated
122	0.1	0.7	716926	4900177	Vegetated Area
123	0.0	2.0	716925	4900202	GW02-10, Vegetated
124	0.1	0.9	716921	4900219	Vegetated Area
125	0.1	3.6	716919	4900237	GW04-00, Vegetated
126	0.1	66.8	716914	4900266	Barren Area
127	0.0	6.1	716912	4900285	Vegetated Ditch
128	0.0	0.0	716848	4900279	Maintenance Hole on Road
129	0.0	0.0	716859	4900258	Vegetated Area
130	0.0	0.0	716864	4900236	Vegetated Area
131	0.0	0.0	716866	4900217	Vegetated Area, SE of GW05-00
132	0.0	19.9	716867	4900193	Vegetated Area
133	0.0	0.7	716878	4900168	Vegetated Area, E of GW22-07
134	0.1	0.3	716889	4900135	Barren/Vegetated
135	0.1	0.3	716892	4900108	Vegetated Area near GW07-10
136	0.1	3.3	716906	4900078	Barren/Vegetated
137	0.0	16.7	716914	4900046	Vegetated Area
138	0.1	0.0	716912	4900017	Vegetated Area
139	0.1	0.0	716911	4899992	Vegetated Area
140	0.1	0.3	716905	4899955	Vegetated Area near GW18-10
141	0.1	0.0	716903	4899926	Vegetated Area near GW20-10
142	0.1	40.6	716891	4899900	Vegetated Area near GW22-10
143	0.1	0.8	716867	4899873	Barren/Vegetated
144	0.1	6.2	716864	4899852	Barren/Vegetated
145	0.1	0.2	716845	4899844	Barren/Vegetated
146	0.1	12.8	716819	4899838	Barren Area/Road
147	0.1	3.2	716810	4899870	Barren Area
148	0.1	0.0	716830	4899892	Vegetated Area
149	0.1	0.5	716853	4899914	Vegetated Area
150	0.1	0.0	716864	4899938	Vegetated Area
151	0.1	0.0	716865	4899959	Vegetated Area
152	0.1	0.0	716869	4899992	Vegetated Area
153	0.1	0.0	716878	4900020	Vegetated Area
154	0.1	0.2	716862	4900049	Vegetated Area near GW11-10
155	0.1	0.7	716858	4900084	Vegetated Area
156	0.1	0.0	716852	4900117	Vegetated Area
157	0.1	0.0	716844	4900146	Vegetated Area
158	0.1	66.1	716834	4900171	Vegetated Area
159	0.2	0.0	716819	4900188	Vegetated Area

Table 2: Landfill Surface Monitoring Locations
2023 Landfill Surface Monitoring
Peterborough Country/City Waste Management Facility
Project Number: CA-WSP-111-53296-16

SAMPLE ID	PID (ppm)	FID (ppm)	EASTING (UTM)	NORTHING (UTM)	FEATURE
160	0.2	6.6	716818	4900196	Barren/Vegetated
161	0.2	18.2	716815	4900215	Barren/Vegetated
162	0.2	0.0	716811	4900232	Vegetated Area
163	0.1	0.0	716809	4900252	Vegetated Area
164	0.3	2292.0	716797	4900256	Maintenance Hole on Road
165	0.2	0.0	716766	4900234	Vegetated Area near Road
166	0.2	0.0	716775	4900212	Vegetated Area
167	0.2	0.0	716779	4900197	Vegetated Area
168	0.2	0.0	716783	4900178	Vegetated Area near GW06-03
169	0.2	21.6	716792	4900173	Barren/Vegetated
170	0.2	0.0	716800	4900149	Vegetated Area
171	0.2	0.0	716809	4900121	Vegetated Area
172	0.2	0.0	716816	4900094	Vegetated Area
173	0.2	2.2	716828	4900068	Vegetated Area
174	0.2	0.0	716830	4900033	Vegetated Area neat GW10-10
175	0.2	0.2	716830	4900002	Barren Area
176	0.2	0.2	716826	4899973	Barren Area near Road
177	0.2	0.0	716813	4899946	Vegetated Area near Road
178	0.2	0.0	716799	4899919	Vegetated Area
179	0.2	0.0	716776	4899897	Vegetated Area
180	0.2	0.0	716742	4899907	Barren/Vegetated on old Road
181	0.2	0.1	716765	4899934	Vegetated Area by old Road
182	0.2	16.1	716774	4899960	Vegetated Area
183	0.2	7.6	716786	4899986	Vegetated Area
184	0.2	0.0	716787	4900023	Barren Area
185	0.2	0.0	716779	4900052	Barren Area
186	0.2	0.5	716770	4900082	Barren Area
187	0.2	2.4	716773	4900109	Barren/Vegetated
188	0.2	0.0	716766	4900134	Barren/Vegetated
189	0.2	0.0	716756	4900153	Barren/Vegetated
190	0.3	35.6	716742	4900179	Barren Slope
191	10.5	551.0	716734	4900208	Maintenance Hole 6 by Road
192	0.2	0.1	716706	4900151	Vegetated Area by Road
193	0.2	0.0	716718	4900145	Barren/Vegetated
194	0.2	0.0	716731	4900127	Barren/Vegetated
195	0.2	0.1	716743	4900107	Barren Slope
196	0.2	1.4	716744	4900077	Barren/Vegetated
197	0.2	0.0	716748	4900054	Barren Slope
198	0.3	0.2	716749	4900024	Barren/Vegetated on old Road
199	0.3	22.2	716754	4900003	Vegetated Area
200	0.3	0.0	716752	4899978	Vegetated Area
201	0.3	4.0	716735	4899960	Vegetated Area
202	0.3	0.0	716726	4899941	Vegetated Area
203	0.3	0.0	716709	4899916	Vegetated Area by Road
204	0.3	0.0	716688	4899938	Vegetated Area
205	0.3	0.0	716704	4899965	Vegetated Area
206	0.3	0.0	716716	4899984	Vegetated Area
207	0.3	42.2	716726	4900006	Stressed Vegetation
208	0.4	0.9	716721	4900035	Barren Area on old Road
209	0.4	2.5	716719	4900059	Barren/Vegetated Slope
210	0.4	0.0	716708	4900085	Vegetated Area
211	0.5	2435.0	716696	4900111	Maintenance Hole south of Road
212	0.4	0.0	716683	4900144	Vegetated Area by Road

Table 2: Landfill Surface Monitoring Locations
2023 Landfill Surface Monitoring
Peterborough Country/City Waste Management Facility
Project Number: CA-WSP-111-53296-16

SAMPLE ID	PID (ppm)	FID (ppm)	EASTING (UTM)	NORTHING (UTM)	FEATURE
213	0.4	0.0	716665	4900114	Vegetated Area by Road
214	0.4	11.2	716672	4900088	Vegetated Area
215	0.4	1557.0	716671	4900079	Maintenance Hole east of Road
216	0.4	7.5	716676	4900053	Vegetated Area
217	0.4	0.0	716695	4900034	Vegetated Area
218	0.4	0.5	716698	4900009	Vegetated Area
219	41.8	2046.0	716686	4899994	Maintenance Hole 10 east of Road
220	0.4	5.8	716675	4899990	Vegetated Ditch by Road
221	0.4	1.0	716660	4900013	Vegetated Ditch by Road
222	0.4	0.2	716653	4900047	Vegetated Area by Road
223	0.4	0.0	716646	4900073	Vegetated Area by Road
224	0.4	18.5	716651	4900099	Vegetated Area by Road

Notes:
XX indicates THC above 500 ppm
XX indicates THC above 100 ppm and below 500 ppm

APPENDIX B

Select Exceedance Photographs

2023 Landfill Surface Monitoring
Peterborough County/City Waste Management Facility

Photograph 1: Location of exceedance at Sample ID: 2. THC concentration of 578 ppm

Photograph 2: Location of exceedance at Sample ID: 5. THC concentration of 2022 ppm

Photograph 3: Location of exceedance at Sample ID: 10. THC concentration of 1962 ppm

Photograph 4: Location of exceedance at Sample ID: 12. THC concentration of 1477 ppm

Photograph 5: Location of exceedance at Sample ID: 40. THC concentration of 775 ppm

Photograph 6: Location of exceedance at Sample ID: 57. THC concentration of 2212 ppm

Photograph 7: Location of exceedance at Sample ID: 63. THC concentration of 977 ppm

Photograph 8: Location of exceedance at Sample ID: 164. THC concentration of 2292 ppm

Photograph 9: Location of exceedance at Sample ID: 191. THC concentration of 551 ppm

Photograph 10: Location of exceedance at Sample ID: 211. THC concentration of 2435 ppm

Photograph 11: Location of exceedance at Sample ID: 215. THC concentration of 1557 ppm

Photograph 12: Location of exceedance at Sample ID: 219. THC concentration of 2046 ppm

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APPENDIX

J

MONITORING & SCREENING CHECKLIST

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:
(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
(b) completed contact information for the Competent Environmental Practitioner (CEP)
(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:
(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..
Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information

Waste Disposal Site (WDS) Name	Peterborough County/City Waste Management Facility
Location (e.g. street address, lot, concession)	1260 Bensfort Road; Part Lots 13, 14, and 15, Concessions 13 and 14
GPS Location (taken within the property boundary at front gate/ front entry)	717033, 4900342, Zone 17, NAD 83
Municipality	Township of Otonabee-South Monaghan, County of Peterborough
Client and/or Site Owner	County/City of Peterborough
Monitoring Period (Year)	2023
This Monitoring Report is being submitted under the following:	
Environmental Compliance Approval (ECA) Number (formerly "Certificate of Approval" (C of A)) :	A341508
Director's Order No.:	
Provincial Officer's Order No.:	

Other:			
Report Submission Frequency	(●) **Annual** ( ) **Other**		
The site is: **(Operation Status)**	(●) **Open** ( ) **Inactive** ( ) **Closed**		
Is there an active waste transfer station at the site?	( ) **Yes** (●) **No**		
Does this WDS have a Closure Plan?	(●) **Not yet submitted** ( ) **Submitted and under review** ( ) **Submitted and approved**		
Total Approved Capacity	4,445,000	*Units*	Cubic Metres
Maximum Approved Fill Rate	85,000	*Units*	Tonnes per Year
Total Waste Received within Monitoring Period (Year)	43,259	*Units*	Tonnes
Total Waste Received within Monitoring Period (Year) *Describe the methodology used to determine this quantity*	Weighed		
Estimated Remaining Capacity	726,900	*Units*	Cubic Metres
Estimated Remaining Capacity *Describe the methodology used to determine this quantity*	Direct Survey (GPS/Total Station)		
Estimated Remaining Capacity *Date Last Determined*	December 22, 2023		
Non-Hazardous Approved Waste Types	[X] Domestic [X] Industrial, Commercial & Institutional (IC&I) [ ] Source Separated Organics (Green Bin) [ ] Tires	[X] Contaminated Soil [ ] Wood Waste [ ] Blue Box Material [ ] Processed Organics [ ] Leaf and Yard Waste	[ ] Food Processing/Preparation Operations Waste [ ] Hauled Sewage Other: Asbestos
Subject Waste Approved Waste Classes: Hazardous & Liquid Industrial *(separate waste classes by comma)*			

Year Site Opened *(enter the Calendar Year only)*	1981	**Current ECA Issue Date**	06/23/2023

Is your Site required to submit Financial Assurance?	◯ **Yes** ◉ **No**
Describe how your WDS is designed.	◯ Natural Attenuation only ◯ Fully engineered Facility ◉ Partially engineered Facility
Does your Site have an approved Contaminant Attenuation Zone?	◯ **Yes** ◉ **No**
If closed, specify ECA, control or authorizing document closure date:	Select Date
Has the nature of the operations at the site changed during this monitoring period?	◯ **Yes** ◉ **No**
If yes, provide details:	

Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i.e. exceeded the LEL for methane)	◯ Yes ◉ No

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	◉ **Yes** ◯ **No**	
2) All groundwater, leachate and landfill gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by ECA or other relevant authorizing/ control document(s):	◉ **Yes** ◯ **No** ◯ **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**

3) a) Some or all groundwater, leachate and landfill gas sampling and monitoring requirements have been established or defined outside of a ministry ECA, authorizing, or control document.	○ **Yes** ◉ **No** ○ **Not Applicable**	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	○ **Yes** ○ **No** ◉ **Not Applicable**	If no, list exceptions below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**

4) All field work for groundwater investigations was done in accordance with Standard Operating Procedures (SOP) as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	(●) **Yes** ( ) **No**	
Sampling and Monitoring Program Results/WDS Conditions and Assessment:		
5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	(●) **Yes** ( ) **No**	
6) The site meets compliance and assessment criteria.	(●) **Yes** ( ) **No**	Please see Section 5 of the 2023 Annual Monitoring Report.
7) The site continues to perform as anticipated. There have been no unusual trends/changes in measured leachate and groundwater levels or concentrations.	(●) **Yes** ( ) **No**	

1) Is one or more of the following risk reduction practices in place at the site: ***(a)* There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/ treatment; or** ***(b)* There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)* The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*The site has developed stable leachate mound(s) and stable leachate plume geometry/ concentrations; and** ***ii.*Seasonal and annual water levels and water quality fluctuations are well understood.**	(•) **Yes** ( ) **No**	**Note which practice(s):**	[X] **(a)** [ ] **(b)** [X] **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	( ) **Yes** (•) **No** ( ) **Not Applicable**	Please see Section 5 of the 2023 Annual Monitoring Report.	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Environmental Compliance Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

(●) **No changes to the monitoring program are recommended** (○) **The following change(s) to the monitoring program is/are recommended:**	
(●) **No Changes to site design and operation are recommended** (○) **The following change(s) to the site design and operation is/are recommended:**	
Name:	Albert Siertsema
Seal:	Add Image 

Signature:		**Date:**	14-May-2024
CEP Contact Information:	Albert Siertsema		
Company:	WSP Canada Inc.		
Address:	4 Hughson Street South, Suite 300, Hamilton, ON, Canada, L8N 3Z1		
Telephone No.:	905-529-4414	Fax No. :	
E-mail Address:	albert.siertsema@wsp.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	
Signature:		**Date:**	

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Un-named water courses and low lying areas.

Distance(s)	On and adjacent to the site.	
Based on all available information and site knowledge, it is my opinion that:		

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	(●) **Yes** ( ) **No**	If no, identify issues (Type Here):
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the ECA or relevant authorizing/control document(s) (if applicable):	( ) **Yes** (●) **No** ( ) **Not applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Outlined in Section 6.2 of the 2023 Annual Monitoring Report.		

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry ECA or authorizing/control document.	( ) **Yes** (●) **No** ( ) **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	( ) **Yes** ( ) **No** (●) **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date

4) All field work for surface water investigations was done in accordance with SOP, including internal/external QA/QC requirements, as established/outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	(●) Yes ( ) No	

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	( ) Yes (●) No

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table on the following page or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. ECA limit, PWQO, background	e.g. X% above PWQO
Please see Section 6 of the 2023 Annual Monitoring Report.		
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	(•) **Yes** ( ) **No**	Please see Section 6 of the 2023 Annual Monitoring Report.

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	(●) **Yes** ○ **No**	
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g. , PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	(●) Yes ○ No ○ Not Known ○ Not Applicable	Please see Section 5 and 6 of the 2023 Annual Monitoring Report.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ○ **No** (●) **Not Applicable**	

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Environmental Compliance Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

(●) **No Changes to the monitoring program are recommended** ( ) **The following change(s) to the monitoring program is/are recommended:**	
(●) **No changes to the site design and operation are recommended** ( ) **The following change(s) to the site design and operation is/ are recommended:**	

CEP Signature	
Relevant Discipline	Geological Engineer
Date:	14-May-2024
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